

# THE COMPOSITAE OF THE MALAY ARCHIPELAGO.

## I. VERNONIEAE AND EUPATORIEAE

by

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(Leiden).

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## GENERAL PART

### Introduction.

The region, from which the *Vernonieae* and the *Eupatorieae* have been worked out, includes the Greater Sunda Islands, the Lesser Sunda Islands and the Moluccas. It is a well-known fact, that the Malay Peninsula and the Philippines have a flora, which is related to that of the Malay Archipelago, *sensu stricto*, belonging to the same region indeed. The *Compositae* of these parts have, however, been recently dealt with by RIDLEY (Fl. Mal. Pen. II, 1923, 177) and by MERRILL (Enum. Phil. Flow. Pl. III, 1923, 591) respectively, whereas those from New Guinea, which is floristically less related to the Malay Archipelago, have been worked out by MATTFELD (Engl. Bot. Jahrb. LXII, 1929, 386).

The material, used for this paper, chiefly belongs to the National Herbarium (Rijksherbarium), Leiden (L), the Herbarium of the Botanical Gardens, Buitenzorg (B) and the University Herbarium, Utrecht (U); for the rest it is to be found in the Herbarium of the Royal Botanic Gardens, Kew (K) and the Herbarium of the British Museum, London (Br. M.); some specimens of the Herbarium of the Linnean Society of London and of the Herbarium of the „Conservatoire botanique de la ville de Genève” (G) have also been studied, whereas the type specimen of *Vernonia arborea* was discovered in the Herbarium of the Royal Botanic Garden, Edinburgh. I feel greatly indebted to the Directors of these herbaria for their kindness in putting these materials at my disposal.

In vernacular and geographical names I have used the common Dutch orthography, as a rule. The Malay word for mountain, „Goenoeng”, has been abbreviated to G., that for island, „Poeloe”, to P., that for river, „Kali”, to K., and „Soengai” (river) to S.

A! behind the name of an author means, that I examined the specimen of the species in question, which has been studied by that author. In many cases this specimen was the type specimen. A! behind a geographical name means, that specimens from the region cited have been studied by me.

The latest revision of the *Compositae* of the Malay Archipelago

is to be found in MIQUEL (Fl. Ind. Bat. II, 1856, 1), whereas an enumeration of the species has been given by BOERLAGE (Handl. Fl. Ned. Ind. II, 1899, 234).

MIQUEL mentioned 2 species of *Ethulia* (of which one probably does not occur in the region dealt with), 27 of *Vernonia* in 4 sections, 2 of *Decaneurum* (*Centratherum*), 1 of *Elephantopus*, 1 of *Ageratum*, 7 of *Adenostemma*, 2 of *Eupatorium*, 1 of *Mikania*. BOERLAGE enumerated the introduced monotypic genus *Sparganophorus* (*Struchium*) and one of the introduced species of *Eupatorium*; he considered 9 species of *Vernonia* as synonyms. The present author mentions 1 species of *Struchium*, 2 of *Ethulia*, 1 of *Centratherum*, 34 of *Vernonia* in 7 sections, 2 of *Elephantopus*, 1 of *Pseudelephantopus*, 1 of *Rolandra*, 2 of *Ageratum*, 5 of *Adenostemma*, 8 of *Eupatorium*, 1 of *Mikania*; in total 58 species have been described, of which 11 are introduced.

#### Taxonomical notes.

The species is considered to be the most fundamental, clearly delimited and only natural taxonomical unit, as a rule (DANSER, 1927; DU RIETZ, 1930). However, its delimitation has often been mistaken, for instance, when intermediate forms between two species, thus far considered to be good ones, are discovered. Nobody would hesitate then to combine the whole to one large polymorphic species (VELENOVSKY, 1905—1913; DU RIETZ, 1930; ROBINSON, 1934), called a syngameon by LOTSY. Thus some of the species based on very scanty material (often on one specimen only) afterwards may prove to be a part of such a syngameon. As such large polymorphic species must be considered *Centratherum frutescens*, consisting of 3, *Vernonia arborea* of 12, *Vernonia cinerea* of 7, *Vernonia cymosa* of 4, *Vernonia patula* of 3, *Elephantopus scaber* of 4 and *Adenostemma Lavenia* of 4 varieties in the Malay Archipelago. These varieties agree with those of VELENOVSKY (1905—1913) and with the subspecies of DANSER (1927) and DU RIETZ (1930). The only reason for naming these units „varieties” instead of „subspecies” is the fewer change of names. Their geographical distribution is most strikingly definite in the genus *Vernonia* and especially in *Vernonia arborea*. Moreover, in Sumatra and the Philippines there are some species, closely allied to *Vernonia arborea*; in future intermediate forms may be collected, which will make necessary to combine these species with *Vernonia arborea*. *Vernonia arborea*, *Vernonia javanica* and *Vernonia celebica*, now belonging to one large and polymorphic species, formerly have been considered to be three separate species,

evidently on account of the lack of sufficient material. The same fact can be stated in *Vernonia cymosa* and *Vernonia eupatorioides*, and also in *Vernonia cinerea* and *Vernonia parviflora*. GLEASON (1905—1907) noticed similar cases in the N. American species of *Vernonia*: in polymorphic species the extreme forms have often been considered as species for themselves. The varieties of the above-mentioned species are, like the subspecies of DU RIETZ (1930), not definitely delimited.

Former syngameons in *Vernonia* may have been the section *Congestae* and the Malay species of the section *Decaneurum*, both of them consisting of closely allied species with a definite area. No intermediate forms have been found here.

BENTHAM (1873) and SMALL (1917—1919) have given historical reviews of the literature concerning the *Compositae*. The classification of CASSINI, more or less followed by BENTHAM (1873) has still been maintained and is chiefly followed by HOFFMANN (1894).

*Vernonia* is a large and very difficult genus, of which EKMAN (1914) remarks: „all delimitation of taxonomical units in *Vernonia* is extremely difficult, from that of the species up to the genus”. Though the Malay species of *Vernonia* are fairly well distinguishable, as a rule, some of them show a great variability. Sections of *Vernonia* have been distinguished by DE CANDOLLE (1836), BENTHAM (1873) and HOFFMANN (1894). HOOKER (1882), however, states: „I have found it impossible to classify the Indian *Vernonias* under the commonly recognized sections of the genus in the *Genera Plantarum*”. Yet it seems desirable to maintain the sections, because of the unmistakable relations in certain groups of the species of *Vernonia*.

The sections of *Vernonia* in the Malay Archipelago show transitions into each other and are not always easy to delimit. Transitions are to be found between *Claotrachelus* and *Tephrodes*, *Claotrachelus* and *Cyanopsis*, *Claotrachelus* and *Lepidella*, between *Cyanopsis* and *Lepidella*, *Cyanopsis* and *Strobocalyx* and between *Strobocalyx* and *Decaneurum*.

According to BENTHAM (1873) the Old World sections *Cyanopsis*, *Lepidella* and *Tephrodes* deviate very much from the other sections. They might have been considered together as a separate genus, but they agree with the tropical American section *Lepidaploa*, except as to the typically shaped achenes.

The species of the section *Strobocalyx* have fairly uniform achenes with a pappus, consisting of broad and coarse hairs, as a rule. In this section we find species with a biseriate pappus, as well as species with a uniseriate pappus or with a pappus, which is undistinctly biseriate.

The section *Lepidella* is to be distinguished by the paleaceous outer pappus row. *Vernonia albifolia* of this section is closely allied to *Vernonia patula*, belonging to the section *Cyanopsis*; it is to be distinguished, however, by the biseriate pappus. *Vernonia Junghuhniana* is a species of the section *Lepidella*, that had become lost, since its specimens have been mixed up with those of *Vernonia cinerea* in various herbaria. *Tephrodes* is not a very distinct section with a biseriate setaceous pappus. *Vernonia patula* and *Vernonia moluccensis* seem to be intermediate forms between *Vernonia* and *Centratherum*. Accordingly, LESSING (in *Linnaea* 1829, 320) placed *Vernonia patula* in the genus *Centratherum*. These *Vernonia* species, however, have much smaller heads, achenes with fewer ribs and no outer involucreal scales, which are foliaceous. They agree with *Centratherum* in the prominently ribbed achenes and in the single caducous row of pappus-hairs, whereas *Vernonia*, as a rule, has a biseriate pappus, of which one row at least is permanent. GLEASON (1905—1907) and EKMAN (1914) have severed *Vernonia chinensis* (*Vernonia patula*) from the genus *Vernonia* (reinstating the genus *Cyanthillium* of BLUME, 1825), on account of its 4—5-angular achenes and its uniseriate, caducous pappus. In other sections of *Vernonia*, however, we find also a uniseriate pappus and 4—5-angular achenes. Thus there is no reason to keep *Vernonia patula* and the closely allied *Vernonia moluccensis* apart from the genus *Vernonia*. It is desirable, however, to split up the section *Cyanopsis*, to which these two species belong, into two sections. For one of these the name *Claotrachelus* is proposed (in accordance with one of its species *Claotrachelus rupestris* of ZOLLINGER, 1845); the species belonging to this section are distinguished by a biseriate pappus, whereas the species with a uniseriate caducous pappus must be placed in the section *Cyanopsis* (s. str.). The section *Claotrachelus* agrees with *Tephrodes* in the biseriate, setaceous pappus, though the setae of the outer row are flattened and very short. The species of the section *Claotrachelus* have angular achenes like those of the sections *Cyanopsis* and *Lepidella*. The three species of the section *Decaneurum* in the Malay Archipelago are closely related. When more material of all three species will have been collected, it may appear necessary to combine them to one polymorphic species. *Vernonia obovata* (*Vernonia cuneata*) has been placed by DE CANDOLLE (1836) in the genus *Decaneurum* together with *Centratherum*, although in a different section. As a matter of fact both have a uniseriate pappus and oblong, ten-ribbed achenes. They are quite different, however, by the outer involucreal scales, which are foliaceous in *Centratherum frutescens*, but

in *Vernonia cuneata* they are bracteaceous like the inner ones. The new section *Congestae* is characterized by the small glomerules of small few-flowered heads; it is hardly related to the other sections of *Vernonia* in the Malay Archipelago. It might even be considered as a genus of its own. MIQUEL was the only one, who described a species of this section, but he placed it in the section *Cyanopis*.

*Elephantopus scaber*, up to the present time considered to be pan-tropical, appears now to be indigenous in tropical Asia and Africa only. It is not introduced into the Malay Archipelago, as has been supposed by most authors, but it is original there. (cf. p. 460).

Only few species of the very large genus *Eupatorium* are either introduced or indigenous in the Malay Archipelago. It is not possible therefore, to check the value of its sections, but according to BENTHAM and HOOKER (1873—1876) they are difficult to separate.

*Mikania cordata* is the only Asiatic species of the very large, chiefly American species. The forms of this very variable species are not worthy of being called varieties, differing only in unimportant features.

In the present paper forms have been distinguished only in those cases, where one unimportant characteristic could be stated, such as differences in the dentation or the indumentum of the leaves.

The „var. typica” of a species is always based on the type specimen of the species concerned in the present paper.

Type specimens have been studied of 23 species and 10 varieties. In the present paper 1 new section, 13 new species, 14 new varieties and 3 new forms have been proposed.

The diagnoses of the species and varieties have been described in accordance with the type specimens (if they could be studied) and all the variations of the other specimens have been added. If the type specimen could not be obtained, the description was made in accordance with all specimens available.

### Morphological notes.

The leaves of the *Compositae* are very variable. BENTHAM (1873) used the characteristics of the indumentum of the leaves now and then to distinguish species. In the Malay *Vernoniae* and *Eupatorieae* leaf characteristics are too variable to be of specific value, if not in connection with other features (*Vernonia*, *Adenostemma*, *Eupatorium*).

The heads are considered as compressed spikes, racemes (VELENOVSKY, 1905—1913; PARKIN, 1914) or umbels (SMALL, 1907—1909); they are

centripetal. The heads may consist of stalked, reduced heads, instead of flowers, surrounded by the involucre (a so-called hen-and-chicken form). Such a monstrous form has been found in a specimen of *Vernonia cinerea* var. *parviflora*, collected in Banda.

In the *Vernonieae* and the *Eupatorieae* no scales are to be found on the receptacle. The receptacle rarely yields valuable taxonomical features.

Number, shape and arrangement of the involucre scales have been used by BENTHAM (1873) as good features for the genera. In the *Vernonieae* and *Eupatorieae* of the Malay Archipelago their shape and the number of their rows appeared to produce valuable characteristics for the sections (*Vernonia*), the species (*Vernonia*, *Eupatorium*) and the varieties (*Centratherum*). The involucre scales are usually considered as metamorphosed bracts of the spikes, etc. Specimens have been discovered of *Vernonia patula* var. *pubescens*, *Vernonia cinerea* var. *typica*, *Vernonia cinerea* var. *lanata* and *Vernonia arborea* var. *celebica*, where many of the heads consist of bracts only; by some cause bracts have been formed instead of the normal flower parts.

The number of flowers in a head varies from numerous to one in the *Vernonieae*. According to GLEASON (1905—1907) the few-flowered heads should be primitive here; on the other hand D'O. GOOD (1931) considers few-flowered heads to be reduced and many-flowered heads to be primitive. In some specimens of *Vernonia cinerea* and *Vernonia cymosa* the outer achenes are longer and thinner than the inner ones and moreover sterile. CLARKE (Comp. Ind., 1876, 21) has also noticed this fact. To *Vernonia cinerea* LESS. var. *ludens* CLARKE he added: „achenia dimorpha; alia normalia, alia (praesertim latiora) apice elongata quasi-rostrata, colore dilutiora, semine destituta. Ex Assam, Burma, Singapore adstant exempla”. We may interpret this as a tendency to reduce the number of flowers in the head. BENTHAM (1873) noticed reductions in the number of flowers in the head to few or one in many genera. This number of flowers have been used as features for sections (*Vernonia*) and species (*Ethulia*, *Vernonia*, *Eupatorium*) in the present paper. As a rule, the flowers are sessile; a monstrous form of *Vernonia lanceolata* has been collected in Ceram, where the flowers are stalked.

We may agree with VON UEXKÜLL-GYLLENBAND (1901) regarding her view, that the original type of flower is the tubular bisexual one in the *Compositae*. In an early stage flowers, which afterwards become female, occasionally are bisexual (VON UEXKÜLL-GYLLENBAND, 1901). Accordingly, *Vernonieae* and the *Eupatorieae* have primitive corollas. The shape of

the corolla is hardly of any taxonomical value in the *Compositae* dealt with. Only in *Adenostemma* it has been used as a specific feature. In *Adenostemma* all the corollas drop together, clinging to each other by means of the hairs (YAPP, 1906; RIDLEY, 1930); at the same moment the styles drop (YAPP, 1906). In abnormal cases the corolla may be incised to the base, which has been found in a specimen of *Vernonia lanceolata*.

It is a well-known fact, that the anthers of the *Compositae* form a tube together. According to VELENOVSKY (1905—1913) the anthers only cling to each other, but BRIQUET (1917) is convinced, that the tissues of two neighbouring anthers have grown together. In a monstrous form of *Vernonia lanceolata*, collected in Ceram, the anthers are not connate. As a rule, the anthers have apical and basal appendages. BENTHAM (1873) stated the taxonomical importance of these appendages; he does not ascribe them a function, but SMALL (1917—1919) mentioned their biological function in pushing the pollen outward. Mostly the appendages are sterile; they appear at an early stage (BRIQUET, 1917). The anthers of the *Eupatorieae* have, as a rule, an apical appendage, but no basal ones. The *Piquerinae* have no appendages at all. The genus *Vernonia* is generally considered to possess obtuse basal appendages at the anthers; however, they are often acute, as BOERLAGE (1899) and EKMAN (1914) have stated before. The pollen consists of round grains with small prickles or edges; their shape has been studied by CLARKE (1876), but appeared of little taxonomical value. The stamens of the *Vernonieae* and the *Eupatorieae* are not irritable in contradistinction to those of many other *Compositae*.

The pappus is often considered as a metamorphosed calyx (BENTHAM, 1873; TREUB, 1873; RIDLEY, 1930; D'O. GOOD, 1931): the original five sepals might have grown together with the achene and the ribs of the achene might represent the nerves of the sepals. In cases, where the pappus exists of five setae or prickles this view can be accepted, the setae or the prickles being the tips of the adnate sepals (*Elephantopus scaber*, *Ageratum conyzoides*). It is, however, less suitable in cases, where the number of the ribs of the achene is not a multiple of five (moreover, this number often varies in specimens of the same species) or where the pappus consists of numerous setae (*Vernonia*, *Eupatorium*, etc.). In such cases we can better agree with another view (HIRSCH, 1901; SMALL, 1917—1919): the hairs and scales of the pappus are inserted on the rudimental rim of the calyx; then the pappus might represent the indumentum of the former calyx. According to BENTHAM



(1873) the existing or non-existing of the pappus has little taxonomical value; he considers its nature of more importance. GLEASON (1905—1907) concludes from his study of the N. American *Vernonieae*, that the structure of the pappus is often valuable as a specific feature; for the same purpose he uses the shape of the achenes. In the Malay *Vernonieae* the achenes as well as the pappus have proved to be good characteristics for distinguishing the sections (*Vernonia*) and the species (*Ethulia*, *Vernonia*). In the Malay *Eupatorieae* the surface and the indumentum of the achenes are used as specific features (*Adenostemma*, *Eupatorium*). BENTHAM (1873) and D'O. GOOD (1931) do not attach much value to the pappus as a means of dispersal of the fruit; it should be useful only for short distances. Moreover there are many widely distributed species without a pappus at all. Some of the first species, that showed themselves in Krakatau after the eruption in 1883, however, were *Compositae* with a setaceous pappus (*Vernonia cinerea*, *Mikania cordata*). Probably they have been transported by the wind, though partly they may have arrived by means of sea currents. RIDLEY (1930) discovered, that plumed fruits are able to go a distance up to 960 km. He considers plants with plumed fruits characteristic for open lands, moores and river banks; they should not be found in heavy rain forests. However, all species of the section *Strobocalyx* of *Vernonia*, many other species of *Vernonia*, some species of *Eupatorium* and *Mikania cordata* have in the Malay Archipelago usually been collected in forests. SMALL (1917—1919) constructed an apparatus for studying the dispersal by wind. He concluded that, if there is little moisture in the air and the direction of the wind does not change, the dispersal possibility by wind is unlimited.

In moist air, however, the pappus closes and the achene soon falls to the ground. HIRSCH (1901) noticed, that the closing of the setae of the pappus in the *Eupatorieae* is effected by cells without intercellular cavities at the base of the setae; they swell by means of imbibition. In a dry state they lose water and shrink: the setae spread out. The achenes of the genus *Adenostemma* have a sticky pappus and they may be often dispersed by means of people's clothes and hairs and feathers of animals. YAPP (1906) noticed that, as soon as the corollas have dropped in *Adenostemma Lavenia*, the glands on the tips of the setae of the pappus produce a viscid liquid. At the same time the setae move into a horizontal position, which is effected by basal swellings of the setae, consisting of cells without intercellular cavities. YAPP (1906) suggests that the movement is due to the cells, which are losing water during the

ripening of the achene. Some *Compositae*, like *Elephantopus scaber* and *Ageratum conyzoides* have pointed and rigid setae. They attach themselves to people's clothing, etc. Many achenes are very light and thus they are able to float on the water. In *Struchium Sparganophorum* the pappus seems to be suitable for making the achene float on the water. If the pappus is taken away, the achene sinks, whereas it floats as long as the pappus is extant. Moreover this species mostly has been collected near the water and thus the pappus seems important for the dispersal by water here. BAKER (Fl. Bras. VI 2, 1873—1876, 7) and RIDLEY (Fl. Mal. Penins., 1923, 179) do not consider the cup, crowning the achene, to be a pappus in this species.

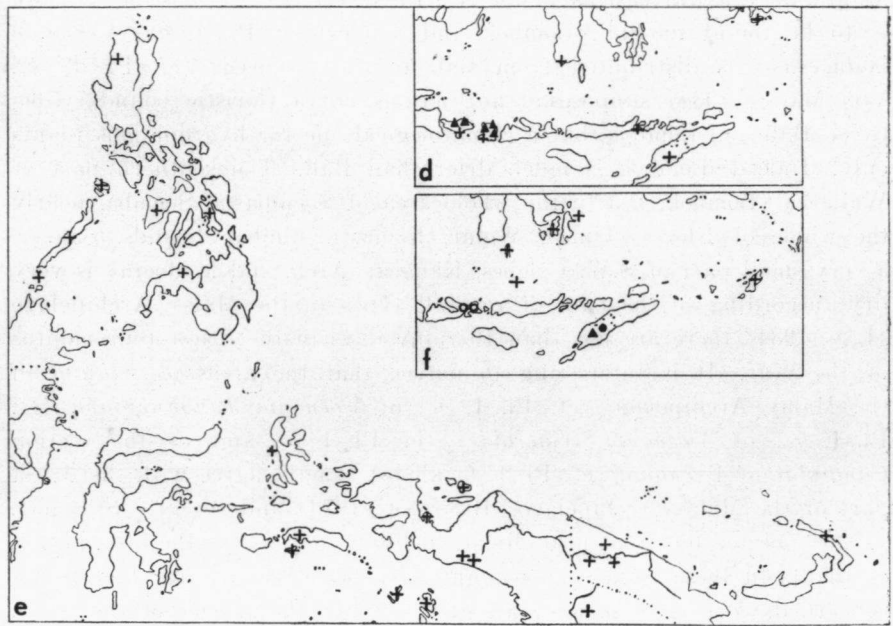
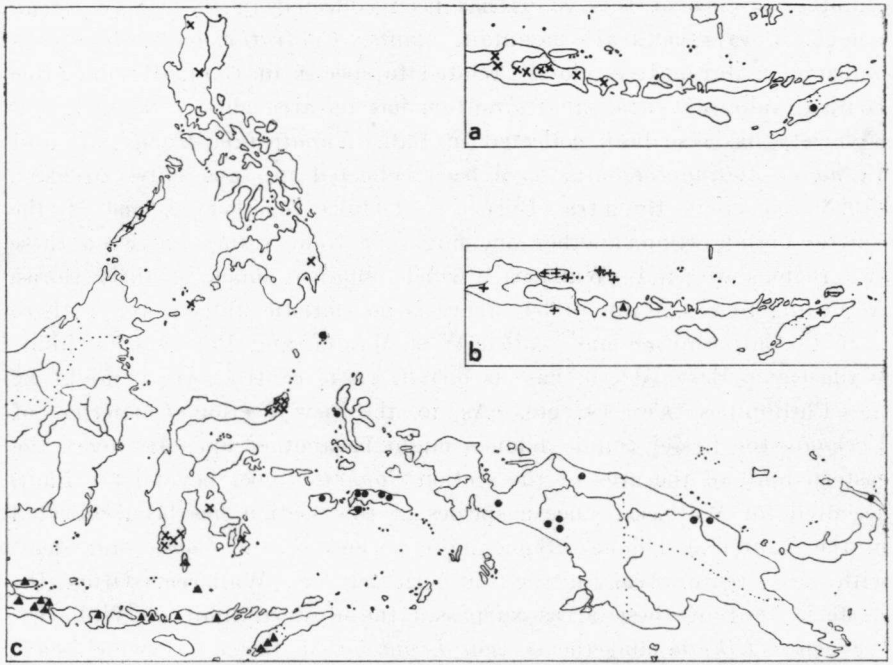
#### Phytogeographical notes (cf. Pl. I).

The *Compositae* are, as a rule, bad objects for phytogeographical studies, because of their easy distribution over long distances by means of their pappus (some genera like *Ethulia* excepted).

The tropical Asiatic region, to which the Malay Archipelago belongs, possesses relatively few *Compositae*. BENTHAM (1873) remarked, that no endemic genera are to be found. This view has been proved to be correct as to the *Vernoniae* and the *Eupatorieae*. However, his prophecy: „it is not probable, that future investigations will add very materially to the *Compositae* of the region”, has not been confirmed, since many new species have been added to the genus *Vernonia*.

In the phytogeographic literature concerning the Malay Archipelago some floristic relations have been noticed. Sumatra is closely related to the Malay Peninsula in this respect (MERRILL, 1926). In Sumatra two species of the section *Strobocalyx* of *Vernonia* (*Vernonia patentissima* and *Vernonia durifolia*) and one of its section *Decaneurum* (*Vernonia Forbesii*) seem to be endemic. The southern (and western) part of Borneo is floristically closely related to the Malay Peninsula and Sumatra (DIELS and HACKENBERG, 1926). According to MERRILL (1926) Borneo has no great floristic relation to the Philippines. However, *Vernonia fimbrillata* probably occurs both in the Philippines (Luzon, Busuanga Island) and in Borneo, whereas *Vernonia phanerophlebia* is a species from Luzon, possessing a variety in Borneo. According to LAM (1929) Java is floristically not very similar to Sumatra. Yet *Vernonia cymosa* has been collected in Java and Sumatra only. Java has hardly any floristic relations to Borneo (LAM, 1929). *Ethulia megacephala* is chiefly a Javanese species; it has been collected in Middle and East Java and in Bali. With the exception of *Ethulia triflora* from Timor

no other species of this genus has been collected in the Malay Archipelago. Both species are mountain plants. *Centratherum frutescens* is endemic in Java. It is closely related to species of *Centratherum* from British India. *Adenostemma hirsutum* has its area chiefly in Java, but a variety has also been collected in Bali. *Eupatorium Horsfieldii* and *Vernonia Zollingerianoides* have been collected in Java only. MERRILL (1923) considers Sumatra, Borneo and Java together as one of the centres of migration, another one might be New Guinea; between these two regions we find „Wallacea”, which obtained much of their floras. According to VON MALM (1934) there is no floristic unity here, as there is in the adjacent regions (called West Malesia and Papuasias by him). Wallacea or East Malesia has its own floristic centres, which might be the Philippines, Celebes, etc. As to the new section *Congestae* of *Vernonia* the Lesser Sunda Islands might be another one. However, the eastern limit of the area of the section *Congestae* goes beyond the limit, accepted for Wallacea, since a species of this section has been collected in the Tanimbar Islands. Some more species of the *Compositae* dealt with have there areas in the southern part of Wallacea. Often the western limit of these areas surpasses the western limit of Wallacea: the genus *Ethulia* and the section *Lepidella* of *Vernonia* (which have about the same distribution in the Malay Archipelago) occur from Middle Java as far east as Timor (cf. Pl. I, a and b), *Vernonia laxiflora* is to be found in Bali, Lombok and Timor (cf. Pl. I, d), *Vernonia moluccensis* is distributed from Bali to the Moluccas (cf. Pl. I, d). VON MALM (1934) supposes, that there is not a floristic boundary between Bali and Lombok, but a climatological one for hygrophilous plants only. Indeed, Lombok is much drier than Bali. The southern part of Wallacea (Lombok, nearly the whole area of Soembawa, Soemba, nearly the whole of Flores, Timor, Wetar, Roma, Tanimbar Islands, Saleier, a very small part of S.W. Celebes, Kangean Arch. and Madoera) is very dry; according to the map of rainfall types in the Malay Archipelago (LAM, 1934) there are less than 10 rainy days in the driest four months of the year. It is interesting to notice, that the areas of *Ethulia* in the Malay Archipelago (cf. Pl. I, a), of *Vernonia Junghuhniana* (cf. Pl. I, b), of *Vernonia erigeroides* (cf. Pl. I, c) and of the section *Congestae* of *Vernonia* (cf. Pl. I, f) almost exactly agree with the driest part of the Malay Archipelago. BENTHAM (1873) and recently SETCHELL (1929) pointed out, that also climatical limits may affect the distribution of plants in these parts. This might have been the case for the species concerned. We have to make an exception for the species of the genus



*Ethulia*, however, as they are growing on mountain slopes, which are always very moist. The habitats of *Vernonia arborea* (widely distributed all over the Malay Archipelago and the southern part of the Asiatic Continent) in Sumatra and Java are in the same time the most rainy parts of those islands, according to the maps of rainfall types in the Netherlands Indies (BOEREMA, Verh. Kon. Meteor. Obs. Bat. 14 and 24).

There is hardly any floristic relation between the Lesser Sunda Islands and Australia (VON MALM, 1934); as a matter of fact, only three or four species of the indigenous Malay *Vernonieae* and *Eupatorieae*, dealt with, occur in Australia (viz. *Vernonia cinerea*, *Vernonia erigeroides*?, *Elephantopus scaber* and *Adenostemma Lavenia*). The three species which are undoubtedly occurring in Australia are widely distributed all over the Malay Archipelago and abroad. Only *Vernonia cinerea* var. *lanata* is restricted to the Moluccas, Australia and New Caledonia.

Though no endemics of some other families (LAM, 1927, 1932) appear to occur in the Lesser Sunda Islands, yet the assertion of VON MALM (1934): „im allgemeinen ist der Endemismus nirgends im ganzen Malayischen Archipel so schwach wie gerade auf den kleinen Sunda-Inseln”, could not be confirmed, as to the *Vernonieae* and *Eupatorieae*. For most of the probably endemic species have been collected in the Lesser Sunda Islands (*Ethulia triflora*, *Vernonia Tengwallii*, *Vernonia coerulea*, *Vernonia wetarensis*, *Vernonia floresiana*, *Vernonia letiënsis*, *Vernonia capituliflora*, *Vernonia Walshae*, *Vernonia timorensis* and *Adenostemma Renschii*).

We meet with a peculiar distribution in the following closely allied species: the area of *Vernonia lanceolata* (Moluccas, Talaud Islands, New Guinea, Bismarck Archipelago) belongs to Papuaasia; the area of *Vernonia Elmeri* (Celebes and Philippines) belongs for the greater part to Wallacea; both areas are adjoining.

Celebes is floristically closely related to the Philippines (MERRILL, 1926) and New Guinea (LAM, 1934). *Vernonia subtilis* and *Vernonia Reinwardtiana* have been collected in Celebes only. *Vernonia kabaënsis* is endemic in an island near Celebes, Kabaena. The Moluccas are also

PL I.

a: *Ethulia megacephala* SCH.-BIP. ×, *E. triflora* nov. spec. ●; b: *Vernonia albifolia* KOSTER ▲, *V. Junghuhniana* nov. comb. +; c: *V. erigeroides* DC. ▲, *V. Elmeri* MERRILL ×, *V. lanceolata* (WARBG) MATTF. ●; d: *V. laxiflora* LESS. ▲, *V. moluocensis* (BL.) MIQ. +; e: *V. cuneata* LESS. +; f: *V. capituliflora* MIQ. ○, *V. actaea* KOSTER +, *V. timorensis* nov. spec. ●, *V. Walshae* nov. spec. ▲.

closely related to Celebes, the Philippines (MERRILL, 1926) and New Guinea (LAM, 1934). *Eupatorium Toppingianum* is restricted to the Moluccas and the Philippines. *Vernonia amboinensis* is endemic in Amboina.

All the Malay sections of *Vernonia*, except the endemic Malay section *Congestae*, are also represented in Africa, but not in America. The species of the section *Claotrachelus* occur in the eastern part of Java, the Lesser Sunda Islands and N.E. Celebes. All these species, except *Vernonia erigeroides*, are collected once and may be endemic.

The boundary of the area of the section *Decaneurum* in tropical Asia seems to be found in the Malay Archipelago. The Malay species of this section have been collected in Sumatra, the northern part of Borneo, the Philippines, the Moluccas, New Guinea and the Aroe and Kai Islands. The principal Asiatic region of this section is the southern part of the Asiatic Continent. The south-eastern part of the Malay Archipelago may be considered to be the limit of the area of *Eupatorium* in Asia. In the Malay Archipelago indigenous species of the genus *Eupatorium* are only to be found in Java, Lombok and Ceram.

The widely distributed species of the *Compositae*, here dealt with, are very variable, those with a restricted area are more or less uniform.

HILL (1929) supposes, that the primitive species of *Vernonia* have developed in Antarctica and have been distributed from there into S. America, Africa and India; from those the recent species should have evolved. GLEASON (1905—1907) accepts two centres of distribution of *Vernonia*, viz. S. America and S. Africa. It is here, that we find the most primitive *Vernonias* (GLEASON, 1905—1907; HILL, 1929). SMALL (1917—1919) takes Brazil to be the centre of the *Vernonieae*; he suggests a migration from this region along the Pacific Islands.

BENTHAM (1873) takes the *Eupatorieae* to be of American origin; he noticed a great similarity between the species in the Old World and some in N.E. America. SMALL (1917—1919) supposes the centre of the *Eupatorieae* to be in Mexico.

#### Introduced species.

Many of the species dealt with have been introduced from America, most probably by men. *Struchium Sparganophorum* was collected for the first time in 1875 near Batavia by O. KUNTZE (BACKER, 1932). Now it is widely distributed over the Malay Archipelago. *Elephantopus tomentosus* was introduced into the Philippines from America (MERRILL, 1923). It may have been introduced from the Philippines into Celebes and Borneo. RIDLEY (1923) wonders, how this species may have arrived

in the Malay Peninsula, as it was not known to him from the Malay Archipelago. However, it seems comprehensible now, that it reached the Malay Peninsula from Borneo, but it may have been introduced directly from America as well. *Pseudelephantopus spicatus* was collected in West Java for the first time in 1917 by WEEHUIZEN (BACKER, 1932). DE CANDOLLE (1836) recorded this species already from the Philippines. *Rolandra fruticosa* was collected in Java for the first time in 1896; it certainly escaped from the botanical garden at Buitenzorg. *Ageratum* is chiefly an American genus. Two species have been introduced into the Malay Archipelago. *Ageratum conyzoides* is now distributed all over the Malay Archipelago. It was introduced here between 1812 and 1816 (ZOLLINGER, 1854) by the English (according to the natives). The natives of P. Karakelang (Talaud Islands) assured, that this species has been introduced there from Manado about 1890 (LAM, label of 2604). In 1854 it was already a dreaded weed in Java (ZOLLINGER). JUNGHUHN (1857) mentions this species as a weed in coffee estates; in his second zône (600—1350 m), wherever the primeval forests have been cut down, it is to be found in great quantities. With increasing altitude the flower colour turns from white to more and more intensely bluish violet (VAN DER PLJL, 1934). The second *Ageratum* species, *Ageratum Houstonianum*, has only been collected in Java in the Malay Archipelago. *Eupatorium* is chiefly a tropical American genus. Five species have been introduced from America into the Malay Archipelago. *Eupatorium triplinerve* was already known by BLUME (1825) to have been introduced into Java. It has been cultivated for medical purposes and has naturalised (MERRILL, 1923); it still maintains itself even after the disappearance of the natives' dwellings, near which it had been cultivated. *Eupatorium inulifolium* has been dispersed from the Java botanical gardens. BOERLAGE collected this species for the first time in 1888. Now it is widely distributed especially in West Java and it has also been collected in Sumatra and in Amboina. *Eupatorium riparium* and *Eupatorium sordidum* have undoubtedly escaped from the botanical garden at Tjibodas. In 1922 (VAN SLOOTEN) and afterwards in 1934 again a recently introduced American species has been collected in West Java: *Eupatorium adenophorum*.

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## TAXONOMICAL PART

### The Compositae of the Malay Archipelago.

BURM. Fl. ind. (1768) 174; WILLD. Spec. Pl. III (1804) 1477; BL. Bijdr. (1825) 885; LESS. in Linnaea IV (1829) 240; LESS. in Linnaea VI (1831) 624; LESS. Syn. Comp. (1832); ROXB. Fl. Ind. (1832) 402; DC. WIGHT Contr. Bot. Ind. (1834) 1; DC. Prod. V (1836) 4; DC. Prod. VI (1837) 1; DC. Prod. VII (1838) 263; WIGHT Ic. Pl. Ind. III (1840) t. 1076—1152; ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Fl. Ind. Bat. II (1856) 1; BENTH. Fl. Hongkong. (1861) 165; MIQ. Sumatra (1862) 210; BENTH. Fl. Austr. III (1866) 447; BENTH. et HOOK. Gen. Pl. II (1873—1876) 163; CLARKE Comp. Ind. (1876); HOOK. Fl. Br. Ind. III (1882) 219; BAILL. Hist. Pl. VIII (1886) 1; HOFFM. in ENGL-PRANTL Nat. Pfl. IV 5 (1894) 87; TRIMEN Fl. Ceylon III (1895) 3; BOERL. Fl. Ned. Ind. II (1899) 147; ELMER Leaf. Phil. Bot. I (1906) 83; KOORDERS Exc. Fl. Java III (1912) 305; RIDLEY Fl. Mal. Penins. II (1923) 177; MERRILL Enum. Phil. III (1923) 591; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 488; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1429; MATTF. in Engl. Bot. Jahrb. LXII (1929) 386; ALSTON Suppl. Trimen Fl. Ceylon VI (1931) 161; HOCHREUTINER in Candollea V (1931—1934) 296; BACKER Handb. Suikerr. VII (1932) 745.

Herbs, shrubs, rarely trees, glabrous or variously pubescent, often glandular. *Leaves* opposite or alternate, entire or variously cut, without stipulae. *Flowers* congested to heads. *Heads* single, corymbose or paniculate, heterogamous (disc-flowers bisexual, rarely male, ray-flowers usually female) or homogamous (ray-flowers wanting, flowers all bisexual, rarely unisexual), consisting of one to numerous flowers, surrounded by an involucre. *Scales of the involucre* few or many, one- to many-seriate, variously shaped, coriaceous, membranous or foliaceous, glabrous or pubescent, often glandular. *Calyx* wanting. *Corolla* of the disc-flowers tubular or infundibuliform, having 5, rarely 4 lobes at the top, of the ray-flowers linear or filiform, corolla red, blue, violet, yellow or white. *Anthers* usually 5, alternate with the lobes of the corolla, connated, linear or oblong, two-celled, longitudinally dehiscent inside; *filaments* inserted in the tube of the corolla. *Ovary* inferior, uni-celled. *Ovulum*

anotropous. *Style* filiform, forked of the female and the bisexual flowers (branches usually covered with hairs and glands at the upper part), undivided of the male flowers. *Fruit* an achene, uni-celled, containing one seed, often crowned by a pappus. *Pappus* variously shaped, consisting of scales, setae or a cartilaginous ring, permanent or caducous, sometimes wanting. *Receptaculum* (metamorphosed tip of the peduncle) flat, conical or convex, with or without scales; cicatrices of the flowers variously shaped, sometimes having short hairs at the margins.

Tribes of the *Compositae*:

TUBIFLORAE, plants without milky juice, disc-flowers not ligulate: **Vernonieae, Eupatorieae, Astereae, Inuleae, Heliantheae, Helenieae, Anthemideae, Senecioneae, Calenduleae, Cinareae, Mutisieae.**

LIGULIFLORAE, plants with milky juice, disc-flowers ligulate: **Cichorieae.**

VERNONIEAE DC. Prod. V (1836) 9; HOFFMAN in ENGL-PRANTL. Nat. Pfl. IV 5 (1894) 120; *Vernoniaceae* BENTH. et HOOK. Gen. Pl. II (1873—1876) 165, 169.

Perennial herbs or shrubs, rarely trees or annuals. *Leaves* alternate, entire or dentate, very rarely lyrate pinnatifid. *Heads* discoid, homogamous. *Involucre* manyseriate, scales imbricate. *Flowers* bisexual, all fertil. *Corolla* regular, tubular, white, violet, red or blue, never yellow, limb 5-fid. *Anthers* sagittate, with terminal appendage, completely filled with pollen at the base, auricles obtuse or acute, usually connate to the end. *Style*-branches two, usually long and slender, attenuate to the top, acute or subacute, outside pubescent. *Achene* terete or slightly flattened, 10-ribbed or 4—5-angled. *Pappus* setaceous, setae in some genera flattened into scales or much reduced or wanting. *Receptacle* naked or slightly fimbriate.

**Key to the subtribes.**

- Heads not glomerate or shorter than 5 mm, one to numerous flowers in a head . . . . . I. *Vernoninae*, p. 369
- Heads glomerate longer than 5 mm, one to few flowers in a head. . . . . II. *Lychnophorinae*, p. 456

I. VERNONINAE HOFFM. l. c. 121 — *Euvernonieae* BENTH. et HOOK. l. c. 165.

*Heads* not clustered into heads of second order; heads one- to many-flowered.

## Key to the genera.

1. a. Achene with a pappus . . . . . 2  
 b. Achene without a pappus . . . . . 2. *Ethulia*, p. 373  
 2. a. Pappus consisting of 3 very thick white scales, afterwards connated  
 to a cup-shaped pappus . . . . . 1. *Struchium*, p. 370  
 b. Pappus consisting of setae or scales . . . . . 3  
 3. a. No outer herbaceous scales of the involucre; pappus usually biseriate,  
 occasionally uniseriate, permanent or caducous . . . . . 4. *Vernonia*, p. 380  
 b. Outer involucreal scales herbaceous; pappus uniseriate, caducous . . .  
 3. *Centratherum*, p. 376

## 1. STRUCHIUM.

STRUCHIUM P. BROWNE Jam. (1756) 312. t. 34 fig. 12; P. BROWNE in St. Hilaire Expos. I (1805) 406; GLEASON in Bull. N. Y. Bot. Gard. IV (1905—1907) 155; *Sparganophorus* VAILLANT Act. Soc. Par. (1719) 386; LESS. in Linnaea IV (1829) 335; LESS. Syn. Comp. (1832) 147; DC. Prod. V (1836) 11; BENTH. et HOOK. Gen. Pl. II (1873—1876) 223; OLIVER Fl. trop. Afr. III (1877) 262; BAILL. Hist. Pl. VIII (1886) 126; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 123; BOERL. Fl. Ned. Ind. II (1899) 170; KOORDERS Exc. Fl. Java III (1912) 312; RIDLEY Fl. Mal. Penins. II (1923) 179.

A monotypic genus in tropical America, introduced into Africa and the Malay Archipelago.

(1) *Struchium Sparganophorum* (L.) O. K. Rev. Gen. Pl. I (1891) 366; GLEASON in Bull. N. Y. Bot. Gard. IV (1905—1907) 155; *Ethulia Sparganophora* L. Sp. Pl. ed. II (1763) 1171; BURM. Fl. Ind. (1768) 176; WILLD. Sp. Pl. III (1804) 1740; *Sparganophorus Vaillantii* CRANTZ Inst. I (1766) 261; GAERTN. Fruct. II (1791) 395 t. 165 fig. 4; PERS. Syn. Ench. II (1807) 398; DC. Prod. V (1836) 12; BAKER in Fl. Bras. VI 2 (1873—1876) 7; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 123 fig. 72A; BOERL. Fl. Ned. Ind. II (1899) 170, 234; KOORDERS Exc. Fl. Java III (1912) 312; MERRILL Journ. R. As. Soc. (1921) 586; RIDLEY Fl. Mal. Penins. II (1923) 179; HUMBERT Comp. Madagascar (1923) 25; BACKER Handb. Suikerr. VII (1932) 750; *Sparganophorus Struchium* PERS. Ench. II (1807) 398.

Annual herb, 25—70 cm high. Subsoil stem horizontal, with numerous roots. *Stem* one or more together, erect or somewhat zigzag, branched especially at the lower part or without branches, subterete or irregularly angular, glabrous or slightly pubescent, striate or nearly smooth, glandular, 4—5 mm thick at base, gradually attenuate to the top (to 1 mm);

side-branches  $1\frac{1}{2}$ —25 cm long, bearing many heads and small leaves. Internodes 1—6 cm long. *Leaves* sessile or very shortly petiolate (petiole 5—13 mm long, 1—3 mm thick), broadly or narrowly elliptic or obovate-elliptic, acuminate (top obtuse or nearly acute), gradually and long narrowed to the base, serrate or repandate and entire at the lower narrowed part (teeth on a distance of 2—6 mm,  $\frac{1}{2}$ —1 mm long, rather obtuse, directed forward), sometimes entire (especially those of the side-branches), pinninerved (lateral nerves prominent beneath, about 7—12 on each side), glabrous (younger leaves and midrib of the older ones pubescent), glandular on both sides, more or less warty above, chartaceous or membranous; blades 5—16 cm long, 2—6 cm broad, of the upper ones narrowly elliptic to lanceolate, 3—15 cm long,  $\frac{1}{2}$ — $5\frac{1}{2}$  cm broad; leaves of the side-branches subentire,  $2\frac{1}{2}$ —5 cm long, 1—2 cm broad. *Heads* glomerate in the axils, 1—8 together, sessile, sometimes with one or more, small elliptic leaves at the base ( $1-1\frac{1}{2}$  cm long, 3—4 mm broad), hemispheric, 40—50-flowered, 3 mm long, 5 mm thick. *Involucre* basin-shaped, 3-seriate; scales about 20, ovate, acutely cuspidate, glabrous, one-nerved, scarious and fringed at the margin, convexly bent, 2 mm broad, 3 mm long; the outer ones  $\frac{1}{2}$  mm broad and 1 mm long. *Corolla* campanulate, glabrous, glandular, 2 mm long, tube slender, less than 1 mm long; limb 3-lobed, lobes acute, more than half as long as the limb. *Anthers* 3; basal auricles acute. *Style* shortly forked, thickened and papillous below the bifurcation,  $2\frac{1}{2}$  mm long; branches less than  $\frac{1}{2}$  mm long, slender, rather obtuse. *Achene* turbinate, irregularly 3—4-angular, convexly bent, glabrous, glandular,  $1-1\frac{1}{2}$  mm long, nearly 1 mm thick. *Pappus* consisting of 3 very thick white, ovate or irregularly shaped scales, afterwards connated to one cup-shaped, irregularly and obtusely dentate, cartilagineous pappus. *Receptacle* flat.

Distribution in the Malay Archipelago:

**S u m a t r a:** *East Coast:* near Medan: LÖRZING 3717 (B), 3126 (B) — Serdang, LÖRZING 3429 (B) — Deli, Belawan, LÖRZING 3453 (B) — East Coast, YATES 1090 (B); *Tapanoeli:* Sibolangit, near Bintanmariah, LÖRZING 5404 (K, L); *Djambi:* Selamboekoe, POSTHUMUS 774 (B); *Lampongs:* Wailima near Telokbetong, IBOET 311 (L) — Negararatoe near Telokbetong, DE VOGEL 1915 (B) — Telokbetong, coll. unkn. 3 V 1908 (B) — P. Sebesie near Telokbetong, DOCTERS VAN LEEUWEN 5424 (B).

**Simaloer:** ACHMAD 496 (L).

**Bangka:** Soengei Liat, BÜNNEMEYER 1704 (L) — Bentja, BÜNNEMEYER 2279 (L) — Bangka, BÜNNEMEYER 1975 (B).

Riouw Arch: Papan, BÜNNEMEYER 7784 (L, K).

Lingga Arch: Lingga, BÜNNEMEYER 6754 (L) — P. Singkep, BÜNNEMEYER 7302 (L).

Anambas Islands: P. Siantan, VAN STEENIS 1026 (L) — Temaja, HENDERSON 20483 (B, K).

Mentawai Islands: P. Siberoet, IBOET 159 (L).

Java: *West Java*: Menes, BACKER 7080 (B) — Rangkasbitong, BACKER 2156 (B) — Buitenzorg, BOERLAGE V 1888 (L), BAKHUIZEN VAN DEN BRINK 654 (L), herb. HASSKARL (L), HALLIER 154a, b, c, d, (B), BAKHUIZEN VAN DEN BRINK 1016 (B), DE VRIES 39 (B), BACKER 32026 (B) — north of Buitenzorg, BACKER 22204 (B) — Buitenzorg, Oud Kedoenghalang, VAN STEENIS 1583 (B) — Batavia, KOORDERS 32627 (L), BACKER 32032 (B) — Batavia, north, BAKHUIZEN VAN DEN BRINK 2111 (B) — S.W. of Weltevreden, BACKER 32021 (B) — Weltevreden, BACKER 32030 (B), WEEHUIZEN 2 (B) — south of Leuwiliang, BAKHUIZEN VAN DEN BRINK 7160 (B) — Depok, KOORDERS 31323 (B) — Tjitjadas, VAN STEENIS 5374 (B) — Tjiampea, KOORDERS 31449 (B) — N.E. of Poerwakarta, BACKER 13779 (B) — Soekaboemi, BACKER 2156 (B) — Bandoeng, BACKER 5153 (B) — Tjiandjoer, BACKER 13423 (B) — G. Gede, BACKER 3019 (B) — Tjilendek, RAAP 331 (L); *Middle Java*: Tirto near Pekalongan, DOCTERS VAN LEEUWEN 30 (B, U) — Tegal, east, BEUMÉE 3726 (B) — Pekalongan, BACKER 15487 (B) — Pemalang, BACKER 23336 (B) — Keboemen, BRINKMAN 45 (B); *East Java*: Djember, BACKER 18298 (L, B) — Poeger, BACKER 18099 (B) — Djatiroto, BACKER 7841 (B).

Borneo: *S. and E. division of Borneo*: Pembliangan, north, AMDJAH 825 (L, K) — *Br. N. Borneo*, Sandakan, RAMOS 1338 (B).

Celebes: Loewoe, Palopo (one specimen in a swamp), KJELLBERG s.n. (B).

Moluccas: *Amboina*: Karang Pandjang, RANT 263 (B) — Amboina, ROBINSON 1843 (L, K).

Flowers white (KJELLBERG), greyish green (LÖRZING), creamy white (BAKHUIZEN VAN DEN BRINK); styles violet (KJELLBERG, LÖRZING), white or pale violet (BACKER).

vernacular names: *awa lanaroeh*, *patjar hoetang* (all Java).

Hab.: More or less frequent, usually along edges of ditches and ponds, besides in rice-fields, along waysides, in a teak forest, in swamps along the coast, in ruderal places, in a european garden, in a damp grass field, in a river bed; in not too shady places (ex BACKER l.c.).

Altitude: 0—700 m.

Flowers during the whole year.

Distribution: America (Brazil, Ecuador!, Guiana!, West Indies!); Africa!

Madagascar!, Asia (Siam, Malay Peninsula!),. Originally from trop. America, introduced into Africa and Asia.

## 2. ETHULIA.

ETHULIA L. Sp. Pl. ed. II (1763) 1171; LESS. in Linnaea IV (1829) 336; LESS. in Linnaea VI (1831) 682; LESS. Syn. Comp. (1832) 148; ROXB. Fl. Ind. III (1832) 413; DC. Prod. V (1836) 12; MIQ. Fl. Ind. Bat. II (1856) 8; BENTH. et HOOK. Gen. Pl. II (1873—1876) 224; CLARKE Comp. Ind. (1876) ii; OLIVER Fl. trop. Afr. III (1877) 262; HOOK. Fl. Br. Ind. III (1882) 226; BAILL. Hist. Pl. VIII (1886) 120; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 123; BOERL. Fl. Ned. Ind. II (1899) 171; ELMER Leafl. Phil. Bot. I (1906) 87; KOORDERS Exc. Fl. Java III (1912) 313; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 456; LEMÉE Dict. Genr. III (1931) 23.

Herbs. *Leaves* serrate, pinninerved. *Heads* small, loosely corymbose. *Involucre* campanulate; scales manyseriate with serious white edges; exterior ones gradually shorter. *Corolla tubular*, limb campanulate. *Anthers* with obtuse or rounded basal auricles. *Style*-branches glandularly hirsute, subulate at tip. *Achene* angular, 4—5-ribbed, glandular between the prominent ribs, truncate, with a callose ring at the top. *Pappus* wanting. *Receptacle* flat or convex, naked.

About 10 species: 5 in trop. Africa (Congo, Uganda, South-Egypt!, Sansibar! Abyssinia!, Nubia!, Haut-Oubangui!, Comores); 1 in Madagascar and 3 or 4 in trop. Asia (Bengal!, Assam!, Burma!, Indo-Chine!, Formosa, Luzon!, Java!, Bali!, Timor!).

### Key to the species.

1. a. Heads many-flowered, subglobose, about 6 mm long and as wide; achene 5—6-angular with thickened ribs . . . . . (1) *E. megacephala*.
- b. Heads 3-flowered, ovoid-oblong, 4 mm long; achene 3-angular with prominent ribs . . . . . (2) *E. triflora*.

(1) *Ethulia megacephala* SCH.-BIP.! in ZOLL. Syst. Verz. Ind. Arch. (1854) 119 (nomen); MIQ.! Pl. Jungh. (1854) 495 (descriptio); MIQ.! Fl. Ind. Bat. II (1856) 8; CLARKE Comp. Ind. (1876) 1; BOERL. Fl. Ned. Ind. II (1899) 171, 234; KOORDERS! Exc. Fl. Java III (1912) 313; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 456; VAN STEENIS in Bull. Jard. Bot. Buit. Sér. III Vol. XIII (1934) 188; *Pseudalomia orientalis* ZOLL. in Nat. Gen. Arch. Neêrl. Ind. I (1844) 484 (nomen); *Ethulia conyzoides* ZOLL.! in Nat. Gen. Arch. Neêrl. Ind. II (1845) 224 (non L.) — Pl. I, a; Pl. II, 1—2.

Herb (acc. to JUNGHUHN nearly a shrub), 35—60 cm high, branched or without branches. *Stem* erect, terete or subterete, ribbed, glandular, appressedly pubescent, subglabrous on the lower part, upper part 3—6 mm thick, lower part about 8 mm thick, lower part leafless. Scars of the leaves obvious. Subsoil stem horizontal, glabrous with sparse roots. *Leaves* subsessile or petiolate (petiole  $\frac{1}{2}$ —2 cm long, deltoidly widened at the base, 1— $1\frac{1}{2}$  mm thick at tip, 2— $3\frac{1}{2}$  cm thick at the base) lanceolate-oblong to lanceolate, narrowed at both ends, long acuminate at tip (top acute), dentate (distance of the teeth 2—10 mm, teeth acute, directed forward) or subentire, subcoriaceous, penninerved (lateral nerves 16—28; extreme ones reticulate), shortly pubescent or subglabrous above, rusty pubescent beneath on the nerves only or subglabrous, glandular at both sides,  $7\frac{1}{2}$ —17 cm long, 1—4 cm broad, superior ones 4— $6\frac{1}{2}$  cm long,  $\frac{1}{2}$ —1 cm broad. *Inflorescence* terminal, corymbose, dichotomous, dense, consisting of many heads, much branched, 8—18 cm high, 6—16 cm wide; branches long (to 10 cm), densely and shortly rusty felty pubescent, glandular, with linear pubescent bracts at the base or higher on (bracts about 3—9 mm long). *Heads* many-flowered, pedunculate (peduncles felty pubescent,  $\frac{1}{2}$ —2 cm long, 1 mm wide) subglobose, 5—7 mm wide and as long. *Involucre* imbricate, hemispheric, 3—4-seriate, shorter than the flowers; scales about 30, convexly bent, uni-nerved, shortly pubescent, glandular; interior ones oblong, more or less rounded at the top, irregularly dentate at the upper part, with scarious edges, 6 mm long,  $1\frac{1}{2}$  mm broad; exterior ones oblong-elliptic, acute at tip, with ciliate edges,  $1\frac{1}{2}$ —4 mm long,  $\frac{1}{2}$ — $1\frac{1}{2}$  mm broad. *Corolla* fleshy?, glabrous, glandular,  $4\frac{1}{2}$  mm long; limb campanulate, 5-lobed (lobes acute at tip, more than half as long as the limb); tube short,  $1\frac{1}{2}$  mm long. *Anthers* obtuse at tip; auricles rather obtuse. *Style* papillous below the bifurcation; branches papillous beneath, 1 mm long, obtuse at tip. *Achene* obpyramidate, 5—6-angular, with thickened ribs, slightly bent, glandular (glands in regular rows between the ribs), truncate at the top, crowned by a round disc and a central small cylinder (surrounding the style at the base and remaining, when the corolla has dropped), achene 2—3 mm long, 1— $1\frac{1}{2}$  mm thick. *Pappus* wanting.

Distribution in the Malay Archipelago:

*Java*: *Middle Java*: G. Soembing, JUNGHUHN? V—VI, det. MIQ. (U), 339 (L), DOCTERS VAN LEEUWEN 8730 (B), LÖRZING 30a (B) — G. Oengarang, north slope, JUNGHUHN? V—VI, det. MIQ. (U); *East Java*: G. Lawoe, crater, Sarangan, RANT 1922 (L), id. south-east slope; ELBERT s.n. (L), id., BACKER 6803 (B) — G. Wilis, higher area, Herb. JUNGHUHN



375 det. MIQ. (L.U), id., coll. unknown 931-1-632 (B) — G. Ardjoeno, north slope, Lalidjiwo, RANT (L), KOORDERS 43865 (L), G. Ardjoeno, ARENS s.n. (B), BREMEKAMP s.n. (B), KOORDERS 43729 (B), 43723 (B) — G. Kawi, KOOPAL s.n. (B) — Idjen, RANT s.n. (B), Herb. REINWARDT, 1591 det. MIQ. (L), ZOLLINGER 2830 (Br. M.), id. Kawah-Idjen, BACKER 25303 (B), id. Gending waloë, KOORDERS 43359 (B) — G. Walirang, ZOLLINGER 3173 (L, Br. M.) — Idjen, G. Ongop Ongop, VAN DER PIJL 140a (B); Java, WURTH s.n. (B); Java, mountains, WAITZ s.n. (L).

Bali: coll. unknown, H. L. B. 900-282-26 (L).

Corolla violet (ZOLLINGER, KOORDERS), pale violet (DOCTERS VAN LEEUWEN). Flowers badly smelling (BACKER). Herb 1½ m high (KOORDERS, DOCTERS VAN LEEUWEN).

DE CANDOLLE describes a very small coroniform fleshy entire pappus in this genus and is followed as to this by MIQUEL (l.c. 8). The species dealt with has no pappus. The small cylindrical disc, surrounding the style at the base, cannot be considered as a pappus, being inside the corolla.

Vernacular names: *tjoengoelan* (Jav.), *katoetoengkoel* (Sund.).

Hab.: rare, as a rule, usually some specimens together, in Casuarina forests, in grassy fields and on slopes, in open places in the forests as well as in shady places.

Altitude: 1400—3000 m, descending to 330 m, acc. to JUNGHUEN.

Flowers: Febr., April—Nov.

MIQUEL, HOOKER and BOERLAGE record *Ethulia conyzoides* L. from Java, (with a ♀, however) and MIQUEL and HOOKER from the Sunda Archipelago. However, not a single specimen of *Ethulia conyzoides* L. from the Dutch East Indies has thus far been found in the herbaria consulted. This species differs from *Ethulia megacephala* SCH.-BIP. in the long side-branches (up to 30 cm long), the oblong-elliptic leaves, the compound corymbose inflorescences, the small heads (3 mm long and as wide) on slender peduncles (1½ mm wide), the 3-seriate involucre, the achenes with prominent ribs, 1½—2 mm long, 1 mm wide and the corolla, which is 1½ mm long and 1 mm wide, with lobes not much longer than half the limb.

Distribution: Asia (Bengal!, Assam!, Burma, Tongking, Laos, CochinChina, Formosa), Australia, Africa!, Madagascar.

The Philippine specimens in the Leiden Herbarium, identified as *Ethulia conyzoides* L. (Luzon, MERRILL 11703, ELMER 8360, RAMOS B. Sci. 5432, For. Bur. 16124) are herbs of the habit of *E. megacephala*, branched at the upper part or without side-branches, 36—115 cm high, with elliptic leaves on rather long petioles (1—1.2 cm long); the upper part of the stem is densely felty pubescent; the inflorescences are small, corymbose, consisting of few heads; the heads are 4—5 mm long and as wide, the corolla is 3 mm long and 1 mm wide with lobes, which are nearly as long as the limb; the achenes are 1½ mm long and 1 mm wide, with ribs like those of *E. megacephala*; involucre 3-seriate. These Philippine specimens seem to be different from those in Java and Bali.

(2) *Ethulia triflora* nov. spec.; *Ethulia* n. sp. VAN STEENIS in Bull. Jard. Bot. Buit. Sér. III Vol. XIII (1934) 188; Pl. I, a; II, 3—5.

Herba, plusquam 30 cm alta. Rami teretes, multo-striati, glanduloso-puberuli, 2—3½ mm crassi, internodiis 1½—3 cm longis. *Folia* alterna, petiolata (petiolo ½—1 cm longo, glanduloso-puberulo), oblongo-elliptica, apice longe acuminata, acuta, ad basin longe attenuata in petiolum, serrata (partibus superiori et inferiori integris), pinninervia (nervis plus minusve 20, breviter distantibus), membranacea, utrinque breviter puberula, subtus nigro-punctata; laminae 5½—6 cm longae, 1½—2 cm latae, superiores sensim minores. *Capitula* parva, compacte corymbosa, triflora, ovato-oblonga, 4 mm longa, 1½ mm crassa, brevissime pedunculata. *Involucrum* biseriatum; squami interiores 3, elliptici, margine scariosi, apice acuti, 3-nervati, glandulosi, parce puberuli; exterior 1, minor. *Flores* bisexuales. *Corolla* infundibuliformis, glandulosa, 3½ mm longa; tubus brevis, tenuis, 1 mm longus; limbus 5-lobatus, lobis lanceolatis, apice acutis, tubo longioribus. *Antherae* ad basin sagittatae, apice acutae, auriculis rotundatis. *Stylus* bifurcatus; rami breves, externe glanduloso-hirtelli, apice acuti. *Achenium* incrassatum, subobpyramidatum, apice truncatum et annulo crasso, calloso, irregulariter triquetrum, glandulosum praeditum, costis prominentibus, 1½ mm longum, 1 mm crassum. *Receptaculum* parvum, planum, nudum.

Distribution in the Malay Archipelago:

South Central Timor, Moetis, Nenas — WALSH 310 (B), type specimen.

Vernacular names: *hoen honi* (Timor).

Hab.: in grassy fields in the mountains, numerous (WALSH).

Altitude: 1250 m.

Flowers: May.

### 3. CENTRATHERUM.

CENTRATHERUM CASS. in Bull. Soc. phil. (1817) 31; LESS. in Linnaea IV (1829) 19; DC. Prod. V (1836) 70; BENTH. Fl. Austr. III (1866) 460; BENTH. et HOOK. Gen. Pl. II (1873—1876) 225; CLARKE Comp. Ind. (1876) ii, 1; HOOK. Fl. Br. Ind. III (1882) 227; BAILL. Hist. Pl. VIII (1886) 121; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 123; BOERL. Fl. Ned. Ind. II (1899) 171; GLEASON in Bull. N. Y. Bot. Gard. IV (1905—1907) 156; ELMER Leaf. Phil. Bot. I (1906) 87; KOORDERS Exc. Fl. Java III (1912) 313; LEMÉE Dict. Genr. II (1930) 17; *Phyllocephalum* BL. Bijdr. (1825) 888; *Amphirephis* H. B. K. Nov. Gen. IV (1820) 32; LESS. Syn. Comp. (1832) 148.

Herbs. *Leaves* petiolate, serrate. *Heads* pedunculate, solitary or corymbose, many-flowered. *Involucre* campanulate or hemispheric, many-seriate; outer scales herbaceous, often leafy; inner ones scarious or membranous. *Corolla* tubular, narrowly 5-fid. *Anthers* appendiculate at tip; basal auricles obtuse. *Style*-branches long, pubescent, subulate at tip. *Achene* oblong, 8—10-ribbed, glabrous, glandular. *Pappus* 1-seriate, short, setaceous, caducous. *Receptacle* nearly flat, naked, sometimes alveolate.

About 18 species: 4 species in trop. America (Mexico, Paraguay!, Venezuela, Brazil!, Guyana!, Columbia!, West Indies!), of these 1 also in Australia!; 1 in New Zealand; 11 in trop. Asia (Madras!, Bengal!, Burma!, Mal. Penins.!, Luzon!, Java!); 2 in trop. Africa (Congo), 1 of these also in Madagascar!

(1) *Centratherum frutescens* (BL.) BENTH. et HOOK. Gen. Pl. II (1873—1876) 225; VAN STEENIS in Bull. Jard. Bot. Buit. Sér. III Vol. XIII (1934) 186.

Shrub, rigid. *Stem* terete, narrowly ribbed, more or less densely rusty or fulvously villous or shortly greyish pubescent, upper part 2—3 mm thick, lower part 4—6 mm thick; internodes 3—9 cm long; side-branches 4—28 cm long, densely leaved. *Leaves* petiolate or sessile (petioles villous,  $\frac{1}{2}$ —2 cm long, 1—2 cm thick), elliptic or oblong-elliptic, acuminate at tip, shortly narrowed to the base, acute at both ends, shortly mucronately dentate or subcrenate, densely whitish woolly tomentose, greyish shortly pubescent or subglabrous beneath, dark coloured, glandular, strigose (hairs arising from tubercles), rugose above, pinninerved (lateral nerves about 10 pairs; reticulation prominent), blades of the upper leaves  $2\frac{1}{2}$ — $6\frac{1}{2}$  cm long, 1— $2\frac{1}{2}$  cm broad, of the lower ones 6— $14\frac{1}{2}$  cm long, 2— $4\frac{1}{2}$  cm broad, of the side-branches mostly much smaller ( $1\frac{1}{2}$ —8 cm long, 1—3 cm broad). *Heads* solitary, terminal and in the axils of the two upper leaves, sessile or pedunculate (peduncles 1—7 cm long,  $1\frac{1}{2}$  mm thick, tomentose like the branches) with 1—4 foliaceous bracts at the base (bracts ovate at the base, acuminate at the top, glandular, rusty tomentose beneath, 1—3 cm long,  $\frac{1}{2}$ —1 cm broad), hemispheric or subglobose, many-flowered, 8—15 mm long, 11—25 mm wide. *Involucre* hemispheric, imbricate, 4-seriate; the two inner rows consisting of oblong scarious, glabrous, 3—5-nerved scales, 7—11 mm long,  $1\frac{1}{2}$ —2 mm broad, sharply acuminate, entire or irregularly dentate at tip; scales of the outer rows variable. *Corolla* infundibuliform, 5-lobed (lobes much more than half as long as

the limb, narrow, recurved, acute, densely glandular at tip), glandular; limb 4 mm long, tube 5 mm long, with long white hairs outside. *Style* 7 mm long, rather thick, with short hairy branches; branches  $1\frac{1}{2}$  mm long, subacute, grooved inside. *Anthers* shortly sagittate (tails subobtusate), subacute at tip; filaments inserted somewhat below the lobes. *Achene* oblong, glabrous, with 10 prominent light coloured ribs and brownish grooves between; top flat, subpubescent; achene 1 mm thick, 3 mm long. *Pappus* consisting of about 20 nearly similar, slightly bent, dingy whitish, ciliate setae, 2 mm long. *Receptacle* alveolate.

Distribution: Java.

1. var. *typicum*; *Phyllocephalum frutescens* BL.! Bijdr. (1825) 889; *Decaneurum frutescens* DC. Prod. V (1836) 66; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 222; MIQ.! Pl. Jungh. (1854) 496; MIQ.! Fl. Ind. Bat. II (1856) 20; *Gymnanthemum frutescens* SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 120; *Centratherum frutescens* BENTH. et Hook. Gen. Pl. II (1873—1876) 225; CLARKE Comp. Ind. (1876) 5; BOERL. Fl. Ned. Ind. II (1899) 172, 234; KOORDERS Exc. Fl. Java III (1912) 313.

*Stem* more or less densely rusty or fulvously villous (hairs crispy, many-celled, articulate, purplish-brownish striate, mixed with one-celled erect shorter hairs). *Leaves* densely whitish woolly tomentose beneath (nerves villous like the stem). *Heads* hemispheric, 1— $1\frac{1}{2}$  cm high,  $1\frac{1}{2}$ — $2\frac{1}{2}$  cm wide. *Involucral scales* of the third row ovate, scariosus, glabrous, 5-nerved, 11 mm long, 2 mm broad, with a foliaceous, shortly pubescent, long and narrow tip; of the outermost row consisting of a broadly ovate or nearly round upper part (sparsely rusty villous) and a shorter more narrow lower part, sharply acinate to filiform at the top (tip 2 mm long), foliaceous, glandular with ciliate edges, 5-nerved (ultimate nerves reticulate), 8—12 mm long, 3—6 mm broad, as long as or longer than the inner rows.

Distribution in the Malay Archipelago:

**J a v a:** *West Java:* Tjimahi, KORTHALS s.n. (L) — near Telegapantengan, S.W. of Bandoeng, JUNGHUHN 382 (L), det. MIQ. sub nomine *Decaneurum frutescens* DC. — G. Papandajan, VAN STEENIS 4398 (L), 4368 (L, K), 4874 (B) — G. Patoeha, west, VAN STEENIS 4427 (L) — Java, BLUME H. L. B. 900, 194—167, —168, —171, —172, —174 (L), sub nomine *Phyllocephalum frutescens*, BLUME s.n. (Br. M.), JUNGHUHN s.n. (L), FORBES 950 (L).

Flowers purple (BOERLAGE); whitish (JUNGHUHN). Shrub partly climbing, partly hanging (VAN STEENIS), to 2 m high (id.); hairs bright purple (id.).

Hab.: in swampy places (BLUME).

Altitude: 1700 m, 2040 m.

Flowers: March, June.

2. var. *javanicum* (MIQ.) nov. comb.; *Decaneurum javanicum* MIQ.! Pl. Jungh. (1854) 496; MIQ.! Fl. Ind. Bat. II (1856) 20; *Centratherum javanicum* (MIQ.) BOERL. Fl. Ned. Ind. II (1899) 172, 234; KOORDERS Exc. Fl. Java III (1912) 313; MOORE in Journ. Bot. LXIII (1925) suppl. 54; HOCHREUTINER in Candollea V (1931—1934) 296.

*Stem* shortly greyish pubescent (most of the hairs one-celled, not articulated; only few hairs articulate and crispy). *Leaves* subglabrous (except on the nerves) or greyish shortly pubescent, glandular beneath; younger ones whitish woolly tomentose beneath. *Heads* subglobose, 8—15 mm long, 11—17 mm wide. *Scales of the involucre* gradually shorter to the exterior ones, glandular, all 3-nerved; of the third row mucronate at tip, 3—4 mm long; of the outer row ovate, foliaceous, mucronate, pubescent, 5—7 mm long, 2—3 mm broad, shorter than the inner rows.

Distribution in the Malay Archipelago:

J a v a: *West Java*: G. Malabar, DENKER 108 (L), JUNGHUHN 352 (L), s.n. (U), det. MIQUEL, SUMMIT, VAN SLOOTEN 303 (L) — Tirtasari near Bandoeng, SMITH and RANT 179 (L); *East Java*: G. Wilis, in the highest forests, Herb. WATZ s.n. (L); *Middle Java*: Dieng, Herb. KUNTZE 5512 (K); Java, S.E., FORBES 950 (Br. M.), 973b (Br. M.), 964 (Br. M.), HORSFIELD 9 (K).

2 m. high (HOCHREUTINER), heads white, violet to the margin (id.):

BOERLAGE (l.c. 172) already remarked, that this variety should perhaps better be considered as a form of *Centratherum frutescens*.

Altitude: 1500—2300 m.

Flowers: April, June, July, Dec.

3. var. *papandaianense* nov. var.

*Caulis* pubescens. *Folia* subglabra vel pubescentia, subtus glandulosa. *Capitula* hemispherica. *Involucris* squamae serierum duorum interiorum subaequilongae, interdum purpurascens, oblongo-lanceolatae; squamae exteriores parce breviores, anguste ovatae, apice longissime et acutissime acuminatae, parte superiori pubescenti.

Distribution in the Malay Archipelago:

J a v a: *West Java*: G. Papandajan, WENT s.n. (L), type specimen, TEYSMANN s.n. (B), BOERLAGE s.n. (L) — G. Papandajan, near Tjileuleu, KLEINHOONTE 1 (B) — Java, JUNGHUHN s.n. (L).

This variety seems to be found only on the G. Papandajan.

*Centratherum frutescens* is much allied to *C. reticulatum* (DC.) BENTH., of which the leaves are obtuse at tip, more or less ovate, conspicuously reticulate nerved, all nerves prominent beneath.

## 4. VERNONIA.

VERNONIA SCHREB. Gen. Pl. II (1791) 541; Bl. Bijdr. (1825) 893; LESS. in Linnaea IV (1829) 244; LESS. Syn. Comp. (1832) 146; DC. Prod. (1836) 15; MIQ. Fl. Ind. Bat. II (1856) 9; BENTH. Fl. Austr. III (1866) 459; BENTH. et HOOK. Gen. Pl. II (1873—1876) 226; CLARKE Comp. Ind. (1876) ii, 2; OLIVER Fl. trop. Afr. III (1877) 266; HOOK. Fl. Br. Ind. III (1882) 229; BAILL. Hist. Pl. VIII (1886) 126; HOFFM. in ENGL.-PRANTL IV 5 (1894) 124; TRIMEN Fl. Ceylon III (1895) 5; BOERL. Fl. Ned. Ind. II (1899) 172; KOORDERS et VALETON in Meded. L. Pl. XXXIII (1900) 50; GLEASON in Bull. N. Y. Bot. Gard. IV (1905—1907) 164; ELMER Leaflet. Phil. Bot. I (1906) 88; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV (1910) 25; KOORDERS Exc. Fl. Java III (1912) 313; RIDLEY Fl. Mal. Penins. II (1923) 186; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 462.

Herbs, shrubs or trees, sometimes climbers. *Leaves* mostly petiolate, entire or dentate, pinninerved, often glandular, very rarely opposite. *Heads* one- to many-flowered, very variable in size, paniculate or rarely solitary. *Involucre* campanulate or oblong; scales loosely or appressedly imbricate, few- or many-seriate, gradually shorter to the exterior ones. *Corolla* tubular. *Anthers* with acute or obtuse basal auricles. *Style*-branches slender, pubescent, subacute at tip. *Achene* cylindric or turbinate, terete, ribbed or angular, with a callose foot. *Pappus* usually biseriate, rarely uniseriate; interior row consisting of setae, exterior row much shorter, setaceous or paleaceous; setae ciliate. *Receptacle* flat, naked, rarely with short hairs, often alveolate or foveolate.

About 650 species in trop. and temperate America, Africa, Madagascar and Asia.

## Key to the sections.

- |                                                                                                                     |                       |
|---------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1. a. Pappus 1-seriate (if 2-seriate, inner involucre scales caducous afterwards); heads 1—10-flowered . . . . .    | 2                     |
| b. Pappus 2-seriate . . . . .                                                                                       | 4                     |
| 2. a. Achene angular . . . . .                                                                                      | 3                     |
| b. Achene 10-ribbed . . . . .                                                                                       | VI Decaneurum, p. 446 |
| 3. a. Heads many-flowered; involucre scales linear-lanceolate to oblong, acute to very pointed at tip . . . . .     | IV Cyanopsis, p. 429  |
| b. Heads few (1—10)-flowered; involucre scales oblong or ovate, small, obtuse at tip . . . . .                      | I Strobocalyx, p. 381 |
| 4. a. Achene angular, glabrous or pilose; outer row of the pappus consisting of flattened setae or scales . . . . . | 5                     |
| b. Achene subterete or terete, more or less clearly ribbed; more or less . . . . .                                  |                       |

- appressed pubescent; setae of the outer row of the pappus filiform  
 III. Tephrodes, p. 406
5. a. Heads paniculate or corymbose, or few together, pedunculate; 12- to  
 many-flowered . . . . . 6
- b. Heads glomerate, sessile or subsessile, 2—9-flowered VII. Congestae, p. 451
6. a. Outer row of the pappus consisting of flattened setae . . . . .  
 V. Claotrachelus, p. 437
- b. Outer row of the pappus consisting of scales . . . . . II. Lepidella, p. 403

I. Sectio **Strobocalyx** BL. in DC. Prod. V (1836) 21 (incl. *Monosis* sect. *Eumonosis* DC. l. c. 21) ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 217; MIQ. Fl. Ind. Bat. II (1856) 9; BENTH. et HOOK. Gen. Pl. II (1873—1876) 230; OLIVER Fl. trop. Afr. III (1877) 269; HOFFM. in ENGL.-PRANTL IV 5 (1894) 125; MATTF. in Engl. Bot. Jahrb. LXII (1929) 397.

Trees or shrubs. *Leaves* petiolate, oblong, ovate, obovate or lanceolate, entire, sometimes dentate, pinninerved, acuminate at tip, rotundate at the base or attenuate into the petiole, subcoriaceous, glabrous or pubescent, glandular beneath. *Heads* numerous, broadly corymbose-paniculate, usually small, oblong, shortly pedunculate or sessile, few-flowered (flowers 1—10; an African species many-flowered according to OLIVER l. c.). *Involucre* campanulate, ovoid; scales oblong or ovate (lanceolate in an African species according to OLIVER l. c.), small, obtuse at tip; inner ones caducous afterwards. *Anthers* usually long-tailed; tails mostly acute, sometimes obtuse. *Achene* oblong-turbinate, irregularly angular, glabrous or subpubescent, glandular. *Pappus* uni- or biseriata; setae strawy, coarse, dingy whitish; of the outer row, if present, much shorter, scarce.

Trop. Asia and Africa.

**Key to the species.**

1. a. Heads more than one-flowered. Pappus uniseriate of nearly biseriata . . . . . 2  
 b. Heads one-flowered. Pappus biseriata . . . . . (5) V. kabaënsis.
2. a. Heads ten-flowered . . . . . 3  
 b. Heads 3—7-flowered . . . . . 4
3. a. Heads 11 mm long; inner involucre scales oblong, rounded at tip; corolla 9 mm long . . . . . (2) V. patentissima.  
 b. Heads 8 mm long; inner involucre scales elliptic, obtuse at tip; corolla 5½—6½ mm long . . . . . (6) V. fimbriolata.
4. a. Heads 5—7-flowered . . . . . 5  
 b. Heads 2—3-flowered . . . . . (3) V. amboinensis.
5. a. Leaves obovate-elliptic, numerous, small; blades 3½—6 cm long, 2—2½ cm broad; petioles short, ½—1 cm long. Heads 6—7-flowered; involucre 5—6-seriate . . . . . (7) V. phanerophlebia var. dulltensis.

- b. Leaves broadly elliptic, tips broad; blades 6—9 cm long, 4—6½ cm broad; petioles 1—2½ cm long. Heads 5-flowered; involucre regularly 6—7-seriate, loosely imbricate . . . . . (4) *V. durifolia*.
- c. Leaves obovate-elliptic, oblong-elliptic or broadly elliptic (tips narrow); blades 10—20 cm long, 3—2 cm broad; petioles 1—3½ cm long. Heads 5—6-flowered; involucre 5—6-seriate . . . . . (1) *V. arborea*.

(1) *Vernonia arborea* HAM. in Trans. Linn. Soc. XIV (1825) 218.

Tree up to 36 m. *Stem* erect, flowering branches subterete, striate, glabrous (except the younger villous parts, glandular, 4—8 mm thick; internodes 1—3½ cm long; cicatrices of the petioles subdeltoid. *Leaves* petiolate (petioles very straight, widened at the base, glabrous or villous, 1—3½ cm long, 1—2 mm thick), elliptic or ovate, suddenly acuminate at tip, more or less attenuated, rounded or subacute, sometimes inaequilateral at the base, entire, pinnerved (nerves prominent beneath, glabrous at both sides or fulvously shortly villous beneath, lateral ones 8—14 pairs, arcuately connected at tip, extreme ones reticulate), subcoriaceous or coriaceous, glabrous, glandularly spotted, more or less shining above, glabrous, pubescent, villous or tomentose, glandular beneath; blades 10—20 cm long, 3—8 cm broad; superior ones gradually smaller. *Inflorescence* large, terminal and in the axils of the upper leaves, more or less corymbosely pyramidally copiously paniculate, to 24 cm broad, to 28 cm high, branches spreading, nearly rectangular on the principal axis (smaller branches repeating this ramification), more or less crispy fulvously woolly tomentose; the lowest branches having a small leaf or a bract at the base. *Heads* shortly pedunculate (peduncles crispy fulvously woolly tomentose, 1—4 mm long, ½ mm thick), oblong 5—6-flowered, 8—9 mm high, 3½ mm wide. *Involucre* 5—6-seriate, oblong campanulate; scales attenuate, subacute or obtuse at the top, glossy inside, glabrous, pubescent, villous or tomentose, glandular at tip, ciliate at the edges, spreading, when the achene has ripened; interior scales ovate-oblong, 2—3 mm long, about 1 mm broad; the next ones ovate-oblong; the extreme ones ovate, minute, villous. *Corolla* tubular-infundibuliform, covered with spreading hairs, very variable in length, 5—7 mm long, nearly 1 mm wide; limb gradually narrowed into the tube; lobes 5, lanceolate, acute at the top, about 1½ mm long. *Style*-branches long, slender, acute at tip, pubescent. *Anthers* sagittate, tailed at the base, acuminate, acute at tip. *Achene* subtriangular, turbinate-oblong, flattened at two sides, semi-terete at the third side, irregularly ribbed (ribs about 8), glandular, glabrous or pubescent, 2—3 mm long, nearly 1 mm thick with a basal callose ring. *Pappus* subbiserial, setaceous; setae flat, obscurely ciliate, dingy whitish, of the inner row



numerous, 5—7 mm long, of the outer row few or hardly any, less than 1 mm long. *Receptacle* small, glabrous; cicatrices of the achenes subangular with a small thornlike projection, fitting to the basal ring of the achene.

Distribution: British India, Indo-China, Mal. Penins., S. China, Philippines, Malay Archipelago.

**Key to the varieties:**

- 1. a. Leaves and involucreal scales glabrous or nearly so . . . . . 2
- 4. Leaves and involucreal scales variously pubescent (involucreal scales sometimes glabrous), rarely leaves glabrous and involucreal scales villous . . . . . 4
- 2. a. Pappus biseriate; leaves attenuate at the base . . . . . 9. var. *celebica*.
- b. Pappus uniseriate or nearly so; leaves attenuate or rounded at the base . . . . . 3
- 3. a. Corolla small, 3½—4 mm long, lobes spreading afterwards; achene densely minutely glandular . . . . . 10. var. *sumatrensis*
- b. Corolla infundibuliform-tubular, 5—7 mm long; achene glandular or without glands . . . . . 1. var. *typica*.
- 4. a. Leaves crispy fulvously greyish or rusty woolly tomentose beneath . . . . . 5
- b. Leaves differently pubescent beneath . . . . . 8
- 5. a. Leaves conspicuously glandularly spotted on both sides, shortly and broadly acuminate at the top. Inflorescence corymbose . . . . . 8. var. *papanensis*.
- b. Leaves not clearly glandularly spotted, inflorescence corymbosely paniculate . . . . . 6
- 6. a. Involucreal scales glabrous . . . . . 4. var. *incana*.
- b. Involucreal scales villous or tomentose . . . . . 7
- 7. a. Leaves elliptic, shortly tapering at the base, long acuminate at the top; hairs on the main nerves mixed with long flexible ones . . . . . 3. var. *conferta*.
- b. Leaves ovate, elliptic-ovate or oblong-elliptic, more or less attenuate, rounded or subacute at the base, suddenly acuminate at tip; without long hairs mixed with the crispy ones of the main nerves . . . . . 2. var. *javanica*.
- 8. a. Branches and leaves beneath covered with long hairs (3—5 mm long); leaves shortly petiolate or sessile (petioles 1½—1 cm long); obovate-oblong or elliptic-oblong . . . . . 13. var. *pilifera*.
- b. Without extremely long hairs on branches and leaves; leaves variously shaped; petioles 1—3½ cm long . . . . . 9
- 9. a. Involucreal scales glabrous or nearly so . . . . . 10
- b. Involucreal scales villous . . . . . 12
- 10. a. Hairs of the leaves short, nearly straight, not swollen at the base . . . . . 7. var. *simalurensis*.
- b. Hairs of the leaves short, curved, often swollen at the base . . . . . 11

11. a. Inflorescence corymbose . . . . . 11. var. *kenepaiensis*.  
 b. Inflorescence paniculate . . . . . 12. var. *grandifolia*.  
 12. a. Leaves densely velvety villous, petioles 1—3½ cm long. Involucral  
 scales villous. Achene glandular . . . . . 5. var. *mollissima*.  
 b. Leaves shortly thinly pubescent beneath, petioles very long (1½—5 cm  
 long). Involucral scales densely villous. Achene clearly glandular,  
 glands often prominent . . . . . 6. var. *obovata*.

1. var. *typica*; *Vernonia arborea* HAM. in Trans. Linn. Soc. XIV (1825) 218; DC. Prod. V (1836) 22; CLARKE Comp. Ind. (1876) 23; KURZ in Journ. As. Soc. Beng. XLVI 2 (1877) 202; HOOK. Fl. Br. Ind. III (1882) 239; BOERL. Fl. Ned. Ind. II (1899) 234; KOORDERS et VALETON in Meded. L. Pl. XXXIII (1900) 53; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV 2 (1905) 26; ELMER Leaflet. Phil. Bot. I (1906) 90; LAUTEBACH in Nova Guinea VIII 4 (1912) 863; KOORDERS Exc. Fl. Java III (1912) 314; GIBBS in Journ. Linn. Soc. XLII (1914) 97; MERRILL in Journ. R. As. Soc. (1921) 586; MERRILL Enum. Phil. III (1923) 592; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 466; MERRILL Univ. Calif. Publ. Bot. XV (1929) 300 — MATTF. in Engl. Bot. Jahrb. LXII (1929) 398; *Conzya arborea* WALL. 3074 comp. 184; *Conzya acuminata* WALL.! Cat. (1828) 3034 comp. 144; *Vernonia Blumeana* DC. Prod. V (1836) 22; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 218; MIQ. Fl. Ned. Ind. Bat. II (1856) 10; *Vernonia acuminata* DC. Prod. V (1836) 32 (non LESS.); *Vernonia arborea* HAM. var. *glabra* KOORDERS! et VALETON! in Meded. L. Pl. XXXIII (1900) 54; *Vernonia arborea* HAM. var. *Blumeana* KOORDERS! et VALETON! l. c. 54; *Vernonia Wallichii* RIDLEY! Fl. Mal. Penins. II (1923) 186 — Pl. II, 6.

*Branches* and petioles of the type specimen shortly rusty pubescent. *Leaves* narrowly oblong-elliptic or broadly elliptic (oblong of the type specimen), tip ½—2 cm long (of the type specimen 1½ cm long), narrow, obtuse (acute of the type specimen) sometimes curved, blades rounded at the base, glabrous (of the highest leaves sometimes scarcely crispy fulvously villous), dull beneath, 27 cm long, 9½ cm broad of the type specimen. *Involucre* 5-seriate (of the type specimen); scales glabrous (of the type specimen) or nearly so and slightly pubescent at the top, hardly ciliate at the edges (of the type specimen). *Achene* glabrous (of the type specimen) or scarcely pubescent, glandular or without glands (of the type specimen). *Pappus* uniseriate (of the type specimen).

The type specimen is preserved in the herbarium of the Royal Botanic Garden Edinburgh. On the label is written most probably by the handwriting of HAMILTON: „*Vernonia arborea*. Gualpara, 19<sup>th</sup> Sept. 1806”. Thereto has been added: „Herb. Francis (Buchanan). Original

n. 1849. Hamilton M. D.; F. R. S". The specimen has been studied by C. B. CLARKE, as has been written on the sheet.

Distribution in the Malay Archipelago:

**Sumatra:** *East Coast:* Semeloengan, Marehat Hoeta, BOSCHPR. 4878 (L, B) — near Kisaran (young tree with small leaves), KRUKOFF 318 (B) — East Coast, YATES 978 (B); *Tapanoeli:* Central Habinsaran, near Sibosar, LÖRZING 8017 (L); *West Coast:* G. Singalang, BECCARI 341 (L) — Moearo laboeh, Timboeloen, BOSCHPR. 6006 (B) — Sumatra, FORBES 2900 (L, Br. M.).

**Java:** *West Java:* Poeloesari (Bantam), KOORDERS 2802 (L) — Karang, BLUME s.n. (L); *Middle-Java:* Noesa Kembangan, KOORDERS 26869 (L), 15660 (L, K, B), 39280 (L, K, B, U), 26868 (L), 24551 (L), 20035 (L), 20113 (B), 2782 (B), 30328 (B), coll. unkn. s.n. (L).

**Celebes:** Todjamboe, KJELLBERG 1704 (L), 2958 (L) — Rante Lemo, KJELLBERG 1603a, very young, (L) — Minahassa, KOORDERS 16507 (L), 19218 (L), 16508 (B).

**Borneo:** Br. N. Borneo: G. Kinabaloe, falls near Loema, CLEMENS 29951 (L, B, K) — id., margin of Kinitaki river, CLEMENS 32980 (B) — Tenompok, CLEMENS 29263 (L, B, K), 28431 (L, B, K), 28875 (B) — Kamboeranga, CLEMENS 28993 (L, B, K) — G. Noenkok, CLEMENS 32682 (L, B) — Marai Parai, CLEMENS 32512 (L, B) — Colombon river, CLEMENS 34175 (L), 34173 (B), 40043 (B) — Peniboekan, CLEMENS 30955 (L, B), 30758 (L, B), 31495 (L, B).

Flowers white (KOORDERS), violet (KJELLBERG); pink, whitish grey, lavender blue, white, faintly purplish striped (CLEMENS); style white (KJELLBERG); tree 6—25 m high (CLEMENS), 15—40 cm thick (KOORDERS); 3—5 m high (KJELLBERG).

Vernacular names: *sarimarnaik*, *smargaloengoeng*, *madang sitapoeng* (all Sumatra), *dedek (jorit)*, *merangan* (all Noesa Kembangan).

Hab.: in forests, on jungle rocks.

Altitude: 700—2100 m.

Flowers: Jan.—April, June, Sept., Oct., Dec.

Distribution: Trop. Asia: Ceylon, Nepal, Bengal, Assam!, Burma!, Tongking!, Laos, Annam, Mal. Penins., Penang, China, Philippines (Luzon!, Mindanao!, Basilan!), New Guinea.

The length of the corolla is very variable, but the shape is fairly constant. Though the involucreal scales of *Vernonia arborea* Ham. var. *glabra* K. et V. are fairly narrow (slightly more than  $\frac{1}{2}$  mm wide), this variety can hardly be separated from *Vernonia arborea* var. *typica*, as KOORDERS and VALETON suppose.

The specimens from Celebes quite agree with some of the Philippine specimens (Luzon, ELMER 17085 — Mindanao, ELMER 11289) having some trifling differences with the other specimens of this variety, such as the very long tips of the leaves, the long pappus and the elongate inflorescence.

The Sumatran specimens have large involucreal scales (inner ones to  $3\frac{1}{2}$  mm

long; the leaves of the sterile branches are minutely and distantly dentate.

In Borneo specimens with obovate-elliptic leaves have been collected (CLEMENS 28993, 29263).

2. var. *javanica* DC. CLARKE Comp. Ind. (1876) 23; KOORDERS et VALETON in Meded. L. Pl. XXXIII (1900) 54; KOORDERS in Nat. Tijdschr. Ned. Ind. LX (1901) 253; *Eupatorium javanicum* BL.! Bijdr. (1825) 903; *Vernonia javanica* DC. Prod. V (1836) 22; ZOLL.! in Nat. Gen. Arch. Neêrl. Ind. II (1845) 217; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ.! Pl. Jungh. (1854) 495; MIQ. Fl. Ind. Bat. II (1856) 10; MIQ. Sumatra (1862) 210; *Vernonia arborea* KURZ in Journ. As. Soc. Beng. XLVI 2 (1877) 202 p.p.; Hook. Fl. Br. Ind. III (1882) 239 p.p.; TRIMEN Fl. Ceylon III (1895) 11; BOERL. Fl. Ned. Ind. II (1899) 234 p.p.; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV (1905) 26 p.p.; KOORDERS Exc. Fl. III (1912) 213 p.p.; GAGNEP. in LÆC. Fl. Indo-Chine III (1924) 466 p.p.; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1430 — Pl. II, 7.

Flowering *branches* shortly, densely, glandularly, fulvously or rusty velvety villous (almost bullate); sterile branches subglabrous. *Leaves* of the flowering branches broadly ovate or elliptic-ovate or oblong-elliptic, sometimes subcordate at base, more or less densely, crispy, fulvously, greyish or rusty woolly tomentose beneath; younger leaves tomentose above also; blades 6—7 cm long, 2½—11 cm broad; 6—17 pairs of lateral nerves. Leaves of the sterile branches entire or sharply and minutely dentate (teeth short, very pointed, deltoid), almost glabrous or glabrous, chartaceous or subcoriaceous. *Involucre* 4—5-seriate; scales ovate-elliptic, obtuse or acute at tip, more or less densely fulvously villous. *Corolla* 4½—6 mm long; lobes long (2 mm long). *Achene* sparsely pubescent or glabrous, minutely glandular.

Distribution in the Malay Archipelago:

Sumatra: *Atjeh*: Takongan, BOSCHPR. 7621 (B); *East Coast*: Karo-plateau, Wampoe-valley, GALOENGI 441 (B); id. near Brastagi, Sibolangit, LÖRZING 5927 (L, U) — Brastagi, RIDLEY s.n. (K) — Karo-districts, BOSCHPR. 10455 (B) — Lab. Batoe, BOSCHPR. 10347 (B); *Tapanoeli*: Toba-plateau, Pargompoelan, BOSCHPR. 2 (B) — Silindoeng, BOSCHPR. 5258 (B) — Siborong siborong, BOSCHPR. 3834 (L, B); *West Coast*: Fort van de Capellen, BOSCHPR. 6091 (B), 5825 (B) — G. Merapi, BÜNNEMEYER 4637 (B) — Pajacombo, Moenggoeng, BOSCHPR. 7 (B), 5168 (B) — Priaman, DIEPENHORST s.n. (U, K) — G. Koerintji, BÜNNEMEYER 8696 (L, U, B), 8971 (B), id. ROBINSON and KLOSS 7300 (K); id. S. Kembang, ROBINSON and KLOSS s.n. (Br. M.) — lake of

Koerintji, BÜNNEMEYER 8312 (B) — Padang Pandjang, BOSCHPR. 5503 (B) — Painan, BOSCHPR. S. W. K. I. 8 (B, U) — Soepaijong, TEYSMANN s.n. (U, B), 1048 (U) — G. Sago, BÜNNEMEYER 4332 (L); *Benkoelen*: Lebong, Bt. Daoen, DE VOOGD 15422 (B); *Lampongs*: P. Sebesie, Sunda Straits, DOCTERS VAN LEEUWEN 5420 (B); *Palembang*: District of Pasemak, BOSCHPR. 8134 (B), 8112 (B), 8681 (B) — Batoe radja, TEYSMANN 3526 (U) — Martapoera, BAL 13 (B) — Batoe Pantjek, FORBES 2690 (L); Central Sum., KOORDERS 21398 (B); Sumatra, KORTHALS s.n. (L); TEYSMANN 98 (L); DE VRIESE and TEYSMANN, s.n. (L); FORBES, 791 (Br. M.), 2690 (Br. M.):

Bangka: S. Bangka, Rias, BOSCHPR. 15413 (B); Bangka, Herb. HASSKARL s.n. (L).

Billiton: Tandjoengpandan, BOSCHPR. 8403 (B).

Anambas and Natoena Islands: P. Boengoeran, G. Ranai, VAN STEENIS 1095 (B).

Java: *West Java*: Pendjaloe, Priangan, KOORDERS 275 (L, B) — G. Malabar, FORBES, 791 (L, B), 990a (L, Br. M.), ROELOFFSEN 6288 (B) — G. Moenarah, SALMOENDI 23 (L, B) — Tjibodas, KOORDERS 42028 (B), 41815 (B), 41773 (B), 41956 (B), 13299 (B), 2798 (B), 2797 (B), 2804 (B), 2803 (L) — Tjinjiroean, RANT s.n. (B) — near Tjampea, Buitenzorg, KOORDERS 30602 (B) — Depok, KOORDERS 30946 (B) — G. Pangisian, Bantam, KOORDERS 2786 (B) — Tjidadap, south of Tjibeber, Priangan, BAKHUIZEN VAN DEN BRINK 36 (L), 3889 (L); id., WINCKEL 1160 (B) — Kemedjan, near Bandoeng, DOCTERS VAN LEEUWEN 2609 (L) — West Patoeha, near Rantjawalini, Priangan, LÖRZING 1327 (L) — Takoka, Tjiandjoer, KOORDERS 15346 (L, B), 15347 (L, B), 15348 (L, B), 25674 (L, B), 15206 (L, B), 32671 (B), 2774 (B), 36660 (B) — G. Boender, Batavia, VAN STEENIS 4006 (B) — Tjikoja, Batavia, ZOLLINGER 1039 (L, K) — res. Bantam, herb. REINWARDT s.n. (L) — Buitenzorg, BLUME? s.n. (L) — Tjihandjavar, Buitenzorg, BACKER 6246 (L, B) — G. Tjissalak, coll. unknown (L) — G. Papandajan, KORTHALS? s.n. (L) — near Buitenzorg, KORTHALS s.n. (L) — G. Gede, PLOEM s.n. (L) — Palaboeanratoe, Soekaboemi, south coast, KOORDERS 33047 (L, B), 2790 (B), 11721 (B), 2788 (B), 2789 (B) — Pagentjongan, Priangan, KOORDERS 26640 (L) — Priangan, FORBES 308 (B, Br. M.) — Nanggoeng, west of Buitenzorg, BACKER 10510 (B) — G. Kendeng, near Buitenzorg, BACKER 25871 (L, B) — Baroesoelam, Bandoeng, BOSCHPR. 1333 (B) — Tjigenteng, Bandoeng, BOSCHPR. 1418 (B) — G. Galoenggoeng, KOORDERS 9915 (B) — Bandoeng, KOORDERS 2768 (B), 2799 (B) — Telagabodas, Garoet, KOORDERS 26640 (B) — between G. Semboeng and Margalangoe, BACKER 12314 (B) — near Pasir Madang, Batavia, BACKER 10476 (B) —

Bandjar, Bantardawa, Priangan, BACKER s.n. (B) — between Bajak and Langkop, Bantam, BACKER 1686 (B) — Djampangkoelon, Soekaboemi, KOORDERS 2805 (B) — Pasawahan, Priangan, BACKER 2211 (B) — near Tjipanas, Bantam, BACKER 2006 (B) — Priangan, BLUME, sub nomine *Eupatorium arboreum* (L); *Middle Java*: Pringombo (Banjoemas), KOORDERS 27113 (L) — Noesa Kembangan, TEYSMANN s.n. (L) — Dieng, Batoer, VAN DER GOOT s.n. (B) — between Madjenang and Tjijalak (Banjoemas), BACKER 18475 (B) — G. Slamet, KOORDERS 9979 (B), 2795 (B), 11862 (B), 2777 (B), 2778 (B) — Oengaran, KOORDERS 2767 (L) — Soemanding (Koedoes, Japara), BOSCHPR. 1809 (B) — Bandjarnegara (Banjoemas), KOORDERS 11177 (B), 2780 (B), 27113 (B), 33838 (B), 2779 (B), 33900 (B) — G. Kembang (Bagelen), KOORDERS 10903 (B), 37426 (B) — N.W. Prahoe (Pekalongan), KOORDERS 2787 (B) — G. Telemojo, KOORDERS 2787 (B); *East Java*: G. Wilis, BACKER 1130 (B); id. Ngebel, KOORDERS 29798 (B, L), 38833 (B), 29799 (L, B); id. G. Raidoh, KOORDERS 2769 (L, B), 34190 (B) — G. Wanasegara, BACKER 11560 (B) — Rogodjampi, KOORDERS 39023 (L) — Idjen, KOORDERS 14402 (U, L), 14401 (B) — Tjoeramanis (Djember), KOORDERS 2783 (B), 20950 (B), 2784 (B), 2785 (B), 2792 (B), 38571 (B) — Djonggo, near Poenten (Pasoeroean), ULTÉE s.n. (B) — Soekaradja (Kediri), KOORDERS 23022 (B), 23831 (B) — G. Parang, KOORDERS 23044 (L, B, U); id. Gadoengan Pare, KOORDERS 22866 (B) — G. Taroeop, summit, ZOLLINGER 606 (B) — G. Tengger, MOUSSET 227 (B) — id., Tosari, KOBUS s.n. (L, B), RIDLEY s.n. (K, Br. M.) — id., near Nongkodjadjar, BREMEKAMP s.n. (B) — Lawang (Pasoeroean), GUSDORF 125 (L) — Tjobanrondo, Poedjon (Pasoeroean), VAN STEENIS 2546 (B) — Banjoewangi, KOORDERS 22432 (B), 39023 (B) — Tangkil, Southern hills, KOORDERS 23662 (B) — Pantjoer-Idjen (Sitoebondo), KOORDERS 32398 (B), 14403 (B) — near Maësan (Bondowoso), ZOLLINGER 2634 (B) — Banjoewangi, G. Blaoe, BOSCHPR. 2154 (B) — north of Djoengga, BURGER 6677 (B) — Pasoeroean, Sunda Straits, BACKER 7259 (B); Java, JUNGHUHN s.n. (L, Br. M.), Pl. Jungh. ined. 53 (L, K), BLUME (sub *Eupatorium javanicum* det. BLUME) H. L. B. 901, 93—125, 126, 127, 145, 146, 147, Herb. REINW., (L), BLUME 1436 (L), BLUME s.n. (L), KORTHALS H. L. B. 901, 93 — 123, 124 (L), TEYSMANN s.n. (L), JUNGHUHN 50 (L), BOERLAGE s.n. (L), HORSFIELD 7 (K), 64 (Br. M.).

Soemba: G. Watoeata, summit, BOSCHPR. 6908 (B).

Soembawa: Rate, BOSCHPR. 13992 (B).

Borneo: *Br. N. Borneo*: near Long Kapa, G. Doelit, RICHARDS 1954 (K) — Liang gagang, HALLEDER 2962 (L, B).

Flowers greyish white (BÜNNEMEYER), white (FORBES a.o.) pale violet (ZOLLINGER, KOORDERS), pale green (BOSCHPR.). Anthers blackish purple (RICHARDS). Young achenes green, old ones black (BOSCHPR.). Tree 5—34 m high, 15—104 cm thick (BOSCHPR. a.o.); stem sinuous with thick edges (KALSHOVEN).

Vernacular names: *semboeng kebo*, *semboeng gentoeng*, (*semboeng*) *dedek*, *semboeng goenoeng*, *semboeng sapi*, *semboeng koewoek*, *semboeng(an)*, *semboeng gedé*, *semboeng gilang*, *semboeng (koe)wanglot*, *hambiroeng*, *ki hamiroeng*, *kihoe-oet*, *kajoe temoe hiram* (all Java), *sibernaik*, *siarsap*, *saroemarnaëk*, *kajoe njari badak*, *meramboeng*, *sikoebes*, *teta dapoer*, *simar galoenggoeng*, *landajoek*, (*si*) *tepong*, *temoe hiram*, *tilam* (all Sumatra), *nepetoeng* (Bangka), *mente poegan* (Billiton), *kajoe simboo*, *marambang*, *bareh-bareh*.

Hab.: in all kinds of forests: primeval f., second growth f., mixed f., rain f., *Pinus* f. (Sumatra), in jungles, in an along along field, along waysides, on slopes and in ravines; acc. to KOORDERS and VALETON sometimes close to the sea. On clay, volcanic sand, limestone and on rocky soils, solitary or numerous.

Altitude: 10—3000 m. JUNGHUHN (1857) noticed this variety in the mountain forests of his second zone (600—1350 m).

Flowers during the whole year.

Use: According to HEYNE l.c. the wood is very light, not strong and not durable and it is not much used. In Kediri it is used for making matches and match-boxes (acc. to HEYNE). Though the wood is soft, it is sometimes used for building houses (acc. to KOORDERS), but, as a rule, the wood is considered to yield a bad timber. In Sumatra the bast is used against spruce (acc. to HEYNE).

Distribution: Ceylon!, Burma! (leaves very white beneath), Assam!, Mal. Penins.!, Penang!

Small galls are to be found sometimes on the lower side of the leaves (Noesa Kembangan, TEYSMANN s.n., L).

Though the extreme forms of *V. arborea* and *V. javanica* are to be distinguished well, in some specimens of *V. javanica* the involucreal scales are nearly quite glabrous, the leaves are thinly crispy tomentose beneath (which we find occasionally also in specimens of *V. arborea*: Bandjar, Bantardawa, BACKER—Bondowoso, near Maësan, ZOLLINGER). For this reason I prefer to follow CLARKE in considering *V. javanica* as a variety of the closely allied *V. arborea*.

A specimen of *V. arborea* var. *javanica* with extremely small involucreal scales (inner ones not longer than 1½ mm) has been collected in the Mentawai Islands (P. Siberoet, BODEN-KLOSS 14631, B).

MIQUEL distinguishes *Vernonia javanica* (BL.) DC. var. *oblongata* MIQ.! (Fl. Ind. Bat. II (1856) 10), which has oblong or sublanceolate leaves. It does not seem possible to distinguish this variety, as the leaves in *Vernonia javanica* are very variable.

3. var. *conferta* (DC.) nov. comb.; *Vernonia javanica* (BL.) DC. var. *conferta* DC. Prod. V (1836) 22; ZOLL. in Nat. Gen. Arch. Neêrl. II (1845) 218; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Fl. Ind. Bat. II (1856) 10.

Internodes short. *Leaves* elliptic, shortly tapering at the base, fairly long acuminate at the top, acute or nearly so at both ends; upper

ones thinly villous, tomentose on the nerves beneath (hairs of the leaves crispy, rusty, on the main nerves mixed with long flexible greyish ones), lower leaves subglabrous beneath (except on the nerves); nerves very prominent beneath; lateral ones about 12 pairs; blades 8—17½ cm long, 2½—5½ cm broad; petioles 1—2½ cm long. *Inflorescence* compact, densely branched, shortly and broadly pyramid-formed, 9—13 cm wide, 8—10 cm high. *Involucre* large, 3—4 mm long, densely rusty tomentose like the branches of the inflorescence. *Corolla* and *achene* like those of *V. arborea* var. *javanica*. *Pappus*-hairs coarse. .

Distribution in the Malay Archipelago:

**J a v a:** *West Java:* W. Patoeha, near Rantjawalini, LÖRZING 1307 (L, B) — G. Salak, Tjiapoës, waterfalls, KORTHALS? (L) — G. Papan-dajan, KORTHALS s.n. (L) — G. Malabar, Poentjak gedeh, MONTÉRIE 29 (L, B, K) — Tjibodas, KOORDERS 12480 (L, B), 2806 (B), 2807 (L), HALLIER 416 (B), SAPIIN 209 (U) — Geger Bintang (Priangan), DEN BERGER 553 (B) — G. Telagabodas, KOORDERS 26716 (B) — Kandang badak, KORTHALS s.n. (L) — G. Semboeng (Batavia), north slope, near Tjisaroea, VAN STEENIS 5159 (B) — Java, JUNGHUHN s.n. (L), KOORDERS 2800 (L), 12481 (L, K), 12483 (L), 12601 (L); Java ?, BLUME s.n. (L).

Flowers dingy white (KOORDERS). Tree 10—23 m high, 35—70 cm thick.

Hab.: in primeval forests.

Altitude: 900—2000 m.

Flowers: Jan.—March, June, Sept.

Though I did not find the type specimen of this variety, the specimens cited most probably belong here, as they quite agree with the description of DE CANDOLLE. It is not always easy to separate this variety from *V. arborea* var. *javanica*, when the shape of the leaves is about the same. In this case the scarce pubescence of the leaves and the long hairs on the midrib are differences, though on some specimens of *Vernonia arborea* var. *javanica* some long hairs may be found on the midrib as well.

4. var. *incana* KOORDERS! et VALETON! in Meded. L. Pl. XXXIII (1900), 54; *Vernonia javanica* (BL.) DC. var. *minor* Miq.! Fl. Ind. Bat. II (1856) 10.

*Leaves* and *branches* more or less densely crispy pale greyish fulvously villous beneath. Leaves smaller, elliptic or ovate; blades 4—10 cm long, 1½—3½ cm broad. *Inflorescence* leafy. *Involucral scales* glabrous or nearly so. *Achene* glabrous, minutely glandular.

Distribution in the Malay Archipelago:

**J a v a:** *West Java:* Takoka (Tjiandjoer), KOORDERS 25554 (L, B); *East Java:* Sitoebondo, Pantjoer-Idjen, KOORDERS 2809, det. VALETON (B) — G. Wilis, Ngebel, KOORDERS 23091, det. KOORDERS s.n. (L, B), 2765 (L) — near Malang, KALSHOVEN XVII (B) — Rogodjampi (Djember),



KOORDERS 22432 (B), 2770 (L, Br. M.), 2772 (L) — Bantoer (Pasoe-roean), BACKER 30459 (L) — Blambangan (Djember), HORSFIELD s.n. (L, K, U) — Koedoes, BOSCHPR. 1798 (B), leaves subacute at the base; Java, ZOLLINGER 1039 (K), DE VRIESE et TEYSMANN s.n. (L).

Vernacular names: *semboengan* (Java).

Tree 10—31 m high, 31—40 cm thick (BOSCHPR., KALSHOVEN).

Hab.: in forests, on a rocky soil; rather common.

Altitude: 300—800 m.

Flowers: March—June, Aug., Oct., Nov.

The type specimen of *Vernonia javanica* (BL.) DC. var. *minor* MIQ. (H. A. B. T. 026662) is provided with a label, on which is written in the handwriting of MIQUEL: „*Vernonia javanica* DC. var. *minor*—Java—Horsfield”. In the Leiden Herbarium another specimen is to be found, which seems to be collected from the same tree. To this specimen a label is added, on which is written by MIQUEL: „Java” (H. L. B. 904, 235—98). Both specimens may have been collected in Blambangan, according to MIQUEL l.c. Some specimens of this variety, where the leaves are thinly villous beneath, are difficult to be distinguished from *Vernonia arborea* var. *typica*.

5. var. *mollissima* (RIDLEY) nov. comb.; *Vernonia javanica* DC. var. *mollissima* RIDLEY! Fl. Mal. Penins. II (1923) 187.

*Branches* and *leaves* beneath densely velvety villous; hairs not crisped, but curved or nearly straight. *Involucral scales* villous. *Corolla* 5—6 mm long, lobes 1½—2 mm long. *Achene* subglabrous or glabrous, glandular.

Distribution in the Malay Archipelago:

**Sumatra:** *East Coast:* Asahan, plateau of Karo, BARTLETT and LA RUE 234 (L) — id., Goerach Batoe, YATES 1854 (B), 2115 (L, B) — Semeloengan, BOSCHPR. 4888 (L, B) — near Brastagi, Sibolangit, LÖRZING 4126 (B) — East Coast, YATES 1294 (L, B); *Tapanoeli:* Angkola and Sapirook, BOSCHPR. 4164 (L, B), 5639 (L, B); *Lampongs:* G. Soegih, GUSDORF 125 (L, B); Sumatra, KORTHALS 998 (L).

**Borneo:** *Br. N. Borneo:* G. Kinabaloë, Penataran basin, CLEMENS 34161 (L, B); Banguëy Island, CASTRO and MELEGRITO 1508 (B, Br. M.), 1487 (B); N. Borneo, G. Moeëara Togal, AMDJAH 138 (B, K).

Flowers pale green (LÖRZING), white (GUSDORF), grey (CLEMENS).

Vernacular names: *saroeng marnakik*, *kajoe temoe hiram*, *smar galoengoeng*, *bernails* (all Sumatra).

Hab.: in second growth jungle, in old forests.

Altitude: 30—1600 m.

Flowers: April—July, Sept., Oct.

Distribution: Mal. Penins.!

6. var. *obovata* MOORE in Journ. Bot. LXI (1923) suppl. 27; *Vernonia arborea* LAUTERBACH! in Nova Guinea VIII 4 (1912) 863 (non alior.)

Flowering *branches* shortly glandularly ferruginously villous (hairs nearly straight), 5—10 mm thick; lower parts subglabrous, glandular. *Leaves* long petiolate (petioles 1½—5 cm long, villous like the branches), broadly elliptic, obovate-elliptic, rarely ovate-elliptic, very shortly abruptly acuminate at tip (tip broad or narrow, blunt, ½—1½ cm long), very rarely rounded at tip, shortly thinly pubescent beneath (hairs very short, nearly straight) rarely glabrous, clearly glandularly spotted at both sides, rigidly coriaceous; blades 7—33 cm long, 4—10 cm broad; very young leaves densely villous at both sides. *Involucral scales* spreading, densely villous, glandular at the superior part (hairs appressed), rounded at tip ciliate at the edges; interior ones oblong. *Achene* glabrous, clearly glandular (glands often prominent). *Pappus* uniseriate.

Distribution in the Malay Archipelago:

**Sumatra:** *West Coast:* G. Koerintji, ROBINSON and KLOSS 45 (Br. M.); *Djambi:* Pahoe, POSTHUMUS 1060 (U, B); *Palembang:* PRAETORIUS s.n. (L), coll. unknown (U); *Middle Sumatra:* S. Glawan, KOORDERS 21386 (B).

**Bangka:** coll. unknown (L, B, U).

**Borneo:** *West:* G. Kenepai, foot, HALLIER, 1613 (L, B) — P. Lemoekoetan, HALLIER 303 (L, B) — Sanggouw, HALLIER 899 (L, B) — G. Klam, foot, HALLIER, 2497 (L, B, K); *Karimata Arch.,* P. Karimati besar, MONDI 202 (L, B) — S. Rikai, HALLIER 1297 (L, B) — S. Aja Kapoeas, TEYSMANN 8305 (B) — Kapoeas, Sei Bakambat, ABAR BIN ADAN 2145 (B) — Pontianak, BOSCHPR. 12635 (B) — S. Kapis, DELMAAR 1914 (L, B); *South East:* Sampit, KAHAR 2011 (L, B) — Banjarmasin, KORTHALS s.n. (L), MOH. DACHLAN 16b (B), MOTLEY 68 (K) — Pleihari, BOSCHPR. 1832 (B), 14161 (B) — Balikpapan, BOSCHPR. 13917 (B) — Poewelitjahoe, near kampong Toepoeli, BOSCHPR. 10604 (B) — near Tanah grogot, BOSCHPR. 9546 (B) — Central Doesoan, BOSCHPR. 3893 (B); *Sarawak:* upper Rejang River, Gat, CLEMENS 22182 (B, K) — Koetjing, BARTLETT s.n. (Br. M.) — Sarawak River, HAVILAND 88 (K) — P. Laboan, MOTLEY 385 (K) — Sarawak, NATIVE COLL. 728 (Br. M.); *Br. N. Borneo:* Sandakan, Lumat, Beaufort, PASCUAL 2380 (B) — Tawao, ELMER 21030 (B, U, Br. M.) — Raningan, plain near Apin Apin, GIBBS 2973 (K, Br. M.) — Kg. Lasak, GOBLIN 2498 (K) — Tenompok, CLEMENS 26873 (L, B, K) — G. Boengal, CLEMENS 11207 (B) — Peniboekan, G. Kalawat, CLEMENS 30537 (L, B), 11176 (B); *Borneo:* KORTHALS s.n. (L), JAHERI s.n. (B), BECCARI 288 (B, K), LEWE 36 (K), BARTER s.n. (K).

**Celebes:** *Minahassa,* near Ratatotok, KOORDERS 16504 (L, B) — id. near Kajoewati, KOORDERS 16495 (L, B), 19220 (L, B) — id. near

G. Lokon, KOORDERS 16507 (L, B) — id. G. Klabat, KOORDERS 19218 (L, B) — id. near Kawoeng, KOORDERS 16504 (B) — Kendari, Poehara, KJELLBERG 741 (B) — G. Kendari, KJELLBERG 672 (L, B) — P. Moena, Wakadea, BOSCHPR. 5424 (L, B, K).

**Moluccas:** *Ternate:* Foradiahi, BEGUIN 1163 (B), 1468 (L, B).

Flowers pale green (KOORDERS), pale yellow (KOORDERS, BOSCHPR.), dirty yellow and violet (KOORDERS), pale green with violet tip (BEGUIN), white (CLEMENS, GOBLIN), dirty flesh-coloured, grey (CLEMENS), violet-white (KJELLBERG); strongly smelling of honey (KJELLBERG), having a ranced smell (BOSCHPR.). Tree 9—30 m high, 9—49 cm thick, branches spreading (CLEMENS), stem sinuous, lower part much grooved (BEGUIN).

Vernacular names: *raimanto, kajoe tima, panialoe, meramboetang* (all Sumatra), *retepoegan* (Bangka), *tapon tapon, mremboeng, mariamboeng, mentepoeng, naman boeng, maramboeng, latong, slepong, taoe otjang, katotepong* (all Borneo), *molo-patoeng* (Dajak), *lelema, naloso, lajo, kai tai* (all Celebes), *rogo monggané* (Moena), *gofasa gaba* (Ternate).

Hab.: in forests, in jungles, also close to the water; on clayish, sandy and boggy soils, on volcanic sand, on tuff; rare to common.

Altitude: 0—2250 m.

Flowers: Sept.—April, June, July.

Use: the wood is soft and not to be used for timber (coll. of Bangka). KOORDERS, however, mentions it to be useful and MOTLEY considers it excellent for house-work. It is reddish white (MOTLEY).

Distribution: New Guinea, FORBES 523 (L), 653 (L, K), GJELLERUP 413 (L, B, K, U), LANE POOLE 429 (K).

Though the specimens from New Guinea and Ternate have obovate leaves with narrow long tips and those from Sumatra, Borneo and Celebes have broadly elliptic leaves with short broad tips, as a rule, there is no reason to keep them apart.

7. var. *simalurensis* nov. var.

*Folia* late elliptica, apice abrupte longe et anguste acuminata (acumine ad 2 cm longo), subtus breviter pubescentia (pilis suberectis), laminae 11—18½ cm longae, 6—9 cm latae. *Squamae involucris* subglabrae. *Corolla* tubuloso-infundibuliformis, 4½ mm longa; lobis 1½ mm longis. *Achenium* glabrum, parce glandulosum.

Distribution in the Malay Archipelago:

*Simaloer*, near Sumatra, ACHMAD 250 (L), type specimen, (B, U), 17 (L), 722 (L), 170 (L).

Vernacular names: *boelwai, betoe betoe balal valah, kapeh dotan* (oeding).

Flowers: Jan., Febr., Nov.

8. var. *papanensis* nov. var.

*Rami* parte superiori ferrugineo-villosi. *Folia* elliptica vel obovato-elliptica, apice brevissime et late acuminata, subtus sparse crispe pubescentia, utrinque manifeste glanduloso-punctata, coriacea; laminae 10—

15 cm longae, 4½—6½ cm latae. *Paniculae* corymbosae. *Squamae involucri* ovato-ellipticae, subglabrae, glandulosae, apice obtusae, margine ciliatae. *Achenium* glaberrimum, dense glandulosum.

Distribution in the Malay Archipelago:

Riouw Arch.: P. Papan, BÜNNEMEYER 7791 (L), type specimen, (B, U).

Sumatra: *West Coast*: Baros, TEYSMANN 1040 (B, U) — Padang, HEYNE 18 (B).

Borneo: Boekit Batoe Lessoe, AMDJAH s.n. (B), very young buds; Borneo, KORTHALS s.n. (L).

Vernacular name: *merantong*.

Altitude: 15 m.

Flowers: Sept.

Distribution: Mal. Penins.!

This variety is allied to *V. arborea* var. *obovata*, but it is to be distinguished by the involueral scales.

9. var. *celebica* (BL.) nov. comb.; *Eupatorium celebicum* BL. Bijdr. (1825) 903; *Vernonia celebica* DC. Prod. V (1836) 21; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 217; MIQ. Fl. Ind. Bat. II (1856) 9; KOORDERS in Meded. L. Pl. XIX (1898) 510; *Vernonia arborea* HOOK. Fl. Br. Ind. III (1882) 239 (p.p.); GAGNEP. in LEC. Fl. Indo-Chine III (1924) 466 (p.p.).

*Leaves* elliptic-oblong or oblanceolate-oblong, more or less attenuate at the base, abruptly acuminate at the top (tip narrow, often elongate, ½—2 cm long, obtuse or nearly acute), glabrous or subglabrous beneath, glabrous above, glandularly spotted at both sides; lateral nerves 6—9 pairs; blades 6—14 cm long, 2—4 cm broad. *Heads* 4—5-flowered. *Involucre* 4—5-seriate; scales glabrous or subglabrous, ciliate along the margin, narrowly oblong (½—1 mm broad), obtuse or acute at the top. *Achene* glabrous, glandular. *Pappus* biseriate.

Distribution in the Malay Archipelago:

Celebes: *S.W. Celebes*: G. Bonthain, BÜNNEMEYER 11982 (L, B, U, K) — Bonthain, BOSCHPR. 5463 (B), TEYSMANN 14041 (B) — Lombasang, BÜNNEMEYER 11701 (L, B); Celebes, Todjamboe, KJELLBERG 1821a (B) — G. Loekon ?, coll. unknown, det. MIQ. (U), Celebes, BLUME s.n. (L), KORTHALS s.n. (L).

Flowers pale violet, fragrant (BÜNNEMEYER).

Vernacular name: *soengoe mamai*.

Hab.: in forests.

Altitude: 1000—2200 m.

Flowers: Jan., April—August.

In two specimens (TEYSMANN 14041, BÜNNEMEYER 11701) we find instead of some of the heads dense glomerules (5 mm long and as thick), consisting of very small hirsute bracts, which are uni-nerved,  $2\frac{1}{2}$ —4 mm long and  $\frac{1}{2}$ —1 mm broad and of which the lower part is glabrous and thickened. The outer rows of the involucre scales are normal.

In the Leiden Herbarium two specimens of this variety seem to be confused. To H. L. B. 901, 93—115 is added a label on which KORTHALS has written: „*Eupatorium celebicum*-Herbar”. To H. L. B. 901, 93—114 two labels are added: one, on which DECAISNE has written: „*Strobocalyx celebicus* Bl.—Java—Blume 1836” and another one, on which MIQUEL has written: „*Vernonia celebica* DC. — an e Java!” Moreover a specimen of *Microglossa volubilis* DC. is preserved in the Leiden Herbarium (H. L. B. 900, 361—245), to which is added a label of the Herbarium Reinwardtianum and another one, on which REINWARDT has written „1009 a *Eupatorium arboreum* — Celebes, montis Lukkon et Bumangan — October 1821”. MIQUEL had added a label to this sheet, on which he has written: „*Vernonia celebica* DC”. BOERLAGE supposed, as appears from labels added to each of the specimens dealt with, that H. L. B. 901, 93—115 was the specimen of *Vernonia celebica* (BL.) DC. of REINWARDT, cited by MIQUEL, of which the labels might have been commutated with those of the specimen of *Microglossa volubilis* DC. (H. L. B. 900, 361—245), which had been collected by KORTHALS in Java. H. L. B. 901, 93—114 might be a duplicate of the specimen, cited by MIQUEL and sent to Paris by BLUME, but returned with a wrong label.

This supposition is not supported by the following facts:

1. KORTHALS wrote on the label of H. L. B. 901, 93—115: „*Eupatorium celebicum*”.

2. The name „*Eupatorium arboreum*”, that was given by REINWARDT to *Microglossa volubilis* DC., is also to be found on the labels of the specimens H. L. B. 900, 148—465 and H. L. B. 900, 361—246 (both specimens of *Microglossa volubilis* DC.) and was written by REINWARDT. Besides BLUME has written on a label of REINWARDT, added to H. L. B. 900, 148—465: „*Conyza prolifera* L”. This was the name, BLUME gave to *Microglossa volubilis* DC., as appears from a label, belonging to another specimen of this species (H. L. B. 900, 361—231), on which BLUME wrote: „*Conyza prolifera* Lam.—Java” and his initials.

We may therefore conclude:

1. No type specimen of *Vernonia celebica* (BL.) DC. is to be found in the Leiden Herbarium, but there is a specimen of BLUME, labelled by DECAISNE; it is erroneously recorded from Java.

2. *Eupatorium arboreum* REINW. is a synonym to *Microglossa volubilis* DC., as well as *Conyza prolifera* BL.

3. The specimen of *Vernonia celebica* (BL.) DC., cited by MIQUEL, is not extant in the Leiden Herbarium.

4. MIQUEL has confused a specimen of *Microglossa volubilis* DC. with fairly young heads with *Vernonia celebica* (BL.) DC.

*Vernonia celebica* is not the species described by ELMER (Leaf. Phil. Bot. VII, 1915, 2591) and named *Vernonia urdanetense*, as ELMER l.c. and MERRILL (Enum. Phil. III, 1923, 595) suppose. In the latter the achenes are densely pubescent and without glands, the involucre scales are pubescent.

10. var. *sumatrensis* nov. var.

*Folia* oblongo-elliptica, glabra. *Capitula* 4—5-flora. *Squamae involucri* glabrae. *Corolla* parva, demum eglandulosa, 3½—4 mm longa, tubo tenui, aequicrasso, 1½—2 mm longo; limbo 2 mm longo; lobis limbo subaequilongis, angustis, lanceolatis, apice acutis, patentibus. *Achenium* dense minute glandulosum, glabrum.

Distribution in the Malay Archipelago:

**S u m a t r a:** *Bengkoelen*: Liwa, DE VOOGD 50 (L), type specimen, (B) — Soeban ajam, Exped. JACOBSON 269 (L, B) — Redjang, ENDERT 1069 (L, B); *West Coast*: G. Koerintji, BÜNNEMEYER 8998 (L, B, K), 9088 (B), 9160 (B, U).

Flowers white, grey (BÜNNEMEYER). Tree 20 m high, 35 cm thick (ENDERT); shrub (BÜNNEMEYER).

Vernacular names: *meramboeng redjang, samahian*.

Hab.: in a forest.

Altitude: 800—2000 m.

Flowers: March—July, Dec.

The specimens of Bengkoelen have small leaves, which are oblong-lanceolate; blades 5½—12½ cm long, 1½—2½ cm broad.

11. var. *kenepaiensis* nov. var.

*Folia* elliptica, utrinque sensim attenuata, acuta, longe petiolata (petiolo 1½—2 cm longo), subtus sparse hirsuta (pilis brevibus, curvatis, ad basin saepe bullatis), paulo glandulosa. *Inflorescentia* corymbosa. *Squamae involucri* glabrae. *Achenium* glabrum, minute glandulosum.

Distribution in the Malay Archipelago:

**B o r n e o:** G. Kenepai — HALLIER 1858 (L), type specimen, (B, K).

12. var. *grandifolia* nov. var. \*)

*Leaves* broadly elliptic, shortly acuminate at the top (tip nearly rounded, 5 mm broad), gradually attenuate at the base, subacute or subobtusate, sparsely pilose, slightly glandular above, pubescent beneath, (hairs short, curved, thickened at the base) extreme nerves minutely reticulate, very prominent at each side. *Heads* 6-flowered, 12 mm long. *Involucral scales* glabrous. *Corolla* narrowly tubular, 7—8 mm long; lobes linear-lanceolate, very acute at the top, 2 mm long. *Achene* glabrous, minutely glandular, 3½ mm long.

Distribution in the Malay Archipelago:

**B o r n e o:** Sarawak, G. Doelit, RICHARDS 1734 (K), type specimen.

Hab.: on bank of stream on edge of cliff.

Altitude: 1200 m.

Flowers: Sept.

\*) The latin description will be published in „Bulletin of miscellaneous information, Royal Botanic Gardens, Kew.”

13. var. *pilifera* nov. var.

*Rami* crebre foliati, pilis longis fulvis irregulariter vestiti (pilis ad  $\frac{1}{2}$  cm longis, nonnullis brevibus bullosis et glandulis cylindricis numerosis intermixtis); internodia 2—15 mm longa. *Folia* breviter petiolata vel subsessilia (petiolo  $\frac{1}{2}$ —1 cm longo, piloso, glanduloso-verrucoso), obovato-oblonga vel elliptica-oblonga, apice breviter attenuata vel abrupte breviter acuminata (acumine  $\frac{1}{2}$  cm longo, obtusa vel sub-acuto), nervis subtus pilis longis (3 mm longis), fulvis et pilis brevissimis bullosis dense vestitis, laminis supra glabris (nervo primario piloso excepto), utrinque dense glanduloso-verrucosis (glandulis prominentibus), subtus sparse pilosis (pilis brevibus curvatis, ad basin incrassatis),  $5\frac{1}{2}$ —17 cm longis,  $2\frac{1}{2}$ —5 cm latis; folia iunioria pilis longis dense vestita. *Rami inflorescentiae* nervorum modo dense vestiti. *Involucri squamae* subglabrae.

Distribution in the Malay Archipelago:

**Sumatra:** *East Coast:* Karo-districts, BOSCHPR. 2767 (B), type specimen, (L), 8616 (B), 6231 (B) — Karo-plateau, HOUTVESTER SUM. WESTKUST 7 (B); *West Coast:* Oud Agam, BOSCHPR. 5519 (B), 5841 (B), 6673 (B).

Flowers white, non-odoriferous (BOSCHPR.). Tree 25—36 m high, 45—65 cm thick.

Vernacular names: *maramboeng*, *sibernaik*, *madang gadjah*, *boernaik* (all Sumatra).

*Hab.:* in old forests; on a clayish or a stony soil; scattered or many together; locally common.

Altitude: 1000—1500 m.

Flowers: Jan.—April, July.

On the sterile branches the leaves are sparingly dentate, up to  $14\frac{1}{2}$  cm long and 7 cm broad.

*Vernonia floescens* ELMER! (Leaf. Phil. Bot. II, 1910, 685) seems to be merely a form of *Vernonia arborea*, having no essential differences; its leaves are slightly crispy pubescent beneath.

(2) *Vernonia patentissima* nov. spec.

*Arbor. Rami* floriferi, 3—7 mm crassi, subteretes, striati, breviter fusco-pubescentes, internodiis  $2-\frac{1}{2}$  cm longis, cicatricibus foliorum deltoideis. *Folia* alterna, petiolata (petiolo 1—2 cm longo, fusco-pubescenti, gracili, plus minusve 1 mm crasso, subtereti), obovato-oblonga, basi sub-acuta, saepe inaequalia, apice breviter et obtuse mucronata (mucrone 2—7 mm longo), coriacea, integerrima, pinninervia (nervis utrinque prominentibus, lateralibus 24—30, apice arcuate connectis; extremis distincte reticulatis), supra minutissime verruculosa, subluceida, utrinque glaberrima (nervo centrali pubescenti excepto), laminis  $6\frac{1}{2}$ —14 cm

longis, 3—5 cm latis. *Inflorescentia* terminalis et apice ramulorum superiorum, paniculata, ampla (12—24 cm lata, 16—24 cm alta), ramis alternis, inferioribus in axillis foliorum, in parte inferiore nudis, apice ramosis, subangulosis, fusco-pubescentibus, extremis dense fulvo-villosis, capitula 2—3 ferentibus. *Capitula* homogama, cylindracea, longe pedunculata (pedunculo 3—8 mm longo, dense fulvo-villoso, interdum parte superiore bracteis 2 vel 3 minutissimis praedito), 10-flora, 11 mm longa. *Involucrum* 5—6 seriatum, squamis externe decrescentibus, margine ciliatis, interne lucidis, dorso glabris, vel apice parce pubescentibus, serierum interiorum late oblongis, apice rotundatis, 2 mm latis, 3½ mm longis, exteriorum late ovatis, apice rotundato-obtusis; serieri extremi subdeltoideis, apice obtusis, 1½ mm longis et latis. *Flores* bisexuales. *Corolla* tubuliformis, apice 5-lobata (lobis brevibus, apice acutis, 1½ mm longis, minusquam ½ mm latis), glabra, eglandulosa, 9 mm longa. *Antherae* ad basin sagittatae, apice subacutae. *Stylus* bifurcatus, rami 4 mm longi, subacuti, externe papilloso. *Achenium* (immaturum) turbinatum, costatum, glabrum, (apice subpubescenti excepto), eglandulosum, obscurum; basi annulo cartilagineo praedito. *Pappus* subuniseriatus, setosus, 8 mm longus, setis fulvo-albidis, ciliatis, aequilongis, perpauca brevissimis intermixtis. *Receptaculum* planum, foveolatum, cicatricibus florum angulosis, processo centrali aculeiformi praedito.

Distribution in the Malay Archipelago:

Sumatra: *Benkoelen*, Lebong, RENWARIN 2297 (L), type specimen, (K).

Flowers white (RENWARIN). Tree 33 m high, 39 cm thick.

Vernacular name: *mamboeng oetan* (Sumatra).

Hab.: in an old mountain forest.

Flowers: July.

Allied to *Vernonia arborea*, but easy to be distinguished by the 10-flowered heads and the involucreal scales, which are rounded at the top. To be distinguished from *Vernonia talaumifolia* HOOK. f. et TH. by the shape of the leaves.

(3) *Vernonia amboinensis* nov. spec.

Arborea? *Rami* floriferi lignosi, teretes, obsolete striati, breviter fulvo-albide glanduloso-villosi, lenticellati, parte superiore sensim attenuati, 3—7 mm crassi. *Folia* alterna, petiolata (petiolo breviter villosa modo ramorum, 2½—4½ cm longo, 1½ mm crasso), oblonga vel ovato-oblonga, basi breviter attenuata, acuta vel rotundata, inaequilateralis, apice acuminata (apice multo attenuato, interdum angustissimo, 1—2 mm lato, satis longo vel longissimo, 1—2½ cm longo, obtuso vel subacuto) vel rotundata, pinninervia (nervis lateralibus utrinque 9—11, subtus prominentibus, extremis reticulatis), integra, utrinque glabra (nervo princi-



pali parce pubescenti, subtus glandulosa; laminis  $11\frac{1}{2}$ —20 cm longis, 4—7 cm latis, cicatricibus foliorum triangularis. *Inflorescentia* terminalis, ampla, paniculata, 17—28 cm lata, 20 cm alta, ramis teretibus, obsolete striatis, breviter fulvo-albide glanduloso-villosis, parte inferiore maiore eramoso, inferioribus sensim longioribus, nonnullis ramificationibus minoribus basi folio parvo vel bractea lineari villosa (1—4 mm longa) praedito, extremis capitula 2—4 ferentibus. *Capitula* pedunculata vel subsessilia (pedunculo ad 1 mm longo), oblonga, homogama, 2—3-flora, 8—10 mm longa. *Involucrum* parvum, 4-seriatum, subcampanulatum, squamis subglabris vel apice parce pubescentibus, glandulosis, margine ciliatis, apice obtusis, oblongo-ovatis; interioribus 2 mm longis. *Flores* bisexuales. *Corolla* anguste infundibuliformis, sparse glandulosa, 6—8 mm longa, 5-lobata, lobis lanceolatis, acutis, 2 mm longis. *Stylus* bifurcatus; rami subacuti. *Antherae* ad basin longiter sagittatae, apice subobtusae. *Achenium* turbinatum, uno latere complanato, costatum (costis plus minusve 8), glandulosum, pubescens, 2 mm longum, annulo basali calloso praeditum. *Pappus* setaceus, uniseriatus,  $5\frac{1}{2}$  mm longus; setis albidis, nonnullis brevibus intermixtis. *Receptaculum* planum, cicatricibus florum disciformibus, processo centrali aculeiformi praeditis.

Distribution in the Malay Archipelago:

**Moluccas:** Amboina, DE VRIESE et TEYSMANN s.n. (L) H. L. B. 901, 93—89, type specimen, TEYSMANN 5112 (U, B).

Flowers violet (TEYSMANN).

To be distinguished from *Vernonia arborea* by the 2—3-flowered heads.

(4) ***Vernonia durifolia*** nov. spec. — Pl. II, 9—10.

**Arborea.** *Rami* floriferi subteretes, lignosi, 6—8 mm crassi, crebre foliati, in parte superiore dense breviter fusco-villosi, obsolete striati, cicatricibus foliorum magnis, deltoideis; internodiis brevibus, plus minusve 1 cm longis. *Folia* alterna, petiolata (petiolo 1— $2\frac{1}{2}$  cm longo, dense fusco-villoso, supra sulcato, 2—3 mm crasso) late elliptica, basi rotundata vel subrotundata, apice abrupte brevissime mucronata (mucrone lato, obtuso, vel subrotundato), integra, pinninervia (nervis utrinque prominentibus, nervo primario utrinque, nervis lateralibus subtus dense fusco-villosis; lateralibus utrinque 6—7, apice arcuatim connectis; extremis reticulatis, supra glabra vel subglabra, lucida, subtus pubescentia, utrinque dense glandulosa (glandulis prominentibus), manifeste coriacea; laminae 6—9 cm longae, 4— $6\frac{1}{2}$  cm latae; superiores minores. *Inflorescentia* et terminalis et apice ramorum superiorum, compacte corymboso-paniculata, 10—20 cm lata, 5—12 cm alta, ramis alternis in axillis foliorum minorum (laminis 6— $2\frac{1}{2}$  cm longis, 4—2 cm latis), fusco-villosis, interdum medio

foliis parvis nonnullis praeditis, parte inferiore eramosa, apice ramosissima; ramificationibus extremis fusco-villosis bractaea minuta fusco-villosa praeditis. *Capitula* pedunculata (pedunculo fusco-villoso, 1—3 cm longo, 1 mm crasso), 1 cm longa, 5-flora, homogama, cylindracea. *Involucrum* oblongum regulariter 6—7 seriatum, laxe imbricatum, squamis plus minusve 12, parce pubescentibus vel glabris, margine ciliatis, glandulosis; seriei interioris oblongo-ellipticis, apice obtusis vel rotundatis, 3—2½ mm longis, 1½ mm latis; serierum exteriorum late ovatis vel deltoideis, apice obtusis; seriei secundae 2 mm longis, 2 mm latis; seriei tertiae 1½ mm longis, 2 mm latis; extremis minutis. *Flores* bisexuales. *Corolla* anguste infundibuliformis, 6—7 mm longa, eglandulosa, 5-lobata; lobis linearibus, apice attenuatis, acutis, 3 mm longis. *Antherae* ad basin sagittatae, apice subacutae. *Stylus* bifurcatus; rami incrassati, breves, apice subobtusis. *Achenium* oblongum, basi attenuatum, sub-semiteres, lateraliter compressum, sub-5-angulatum, glabrum, dense minute glandulosum, 3 mm longum, 1 mm crassum, basi annulo cartilagineo praeditum. *Pappus* subbiseriatus, setosus; setis fulvo-albidis, 6—7 mm longis, nonnullis parvis intermixtis (1 mm longis). *Receptaculum* parvum, planum; cicatricibus florum disciformibus, processo centrali aculeiformi praeditis.

Distribution in the Malay Archipelago:

**S u m a t r a:** *West-Coast:* G. Malintang, BÜNNEMEYER 4062 (L), type specimen, G. Talamau, N.W. slope, BÜNNEMEYER 793 (L) — G. Merapi, BÜNNEMEYER 5000 (B), 4676 (B).

Flowers white (BÜNNEMEYER).

Hab.: in jungles.

Altitude: 2000—2600 m.

Flowers: May, July, Sept.

Though this species is closely allied to *Vernonia arborea* var. *papanensis* it seems to be a good species, differing in the shape of the leaves, the involucre and the corolla. It is limited to some few mountains close together. The specimens examined are very uniform.

(5) *Vernonia kabaënsis* KOSTER in Fedde Repert. XXXIV (1933)  
1 — PL II, 11—12.

Tree? *Branches* woody, terete, obscurely ribbed, densely leaved, densely and shortly fulvously villous, 3 mm thick; cicatrices of the leaves thickened, nearly semi-circular. *Leaves* shortly petiolate (petiole 3 mm long, 1 mm thick, curvate and thickened at the base), elliptic-obovate, attenuate, acute or obtuse at the base, shortly acute or obtuse at the top, entire, pinni-nerved (nerves prominent at both sides, 4—6 pairs of lateral nerves; extreme ones reticulate) subglabrous except the slightly pubescent nerves, black-spotted, densely glandular at both sides, recurved

at the edges, coriaceous, dark green above, paler beneath; blades  $1\frac{1}{2}$ —3 cm broad,  $4\frac{1}{2}$ — $8\frac{1}{2}$  cm long. *Inflorescence* paniculate, terminal, to 8 cm wide, to 15 cm long; branches alternate, fulvously villous, having a small leave at the base and bearing many corymbosely clustered heads. *Heads* cylindric, pedunculate (peduncles 1—2 mm long), one-flowered, 1 cm long. *Involucre* 5-seriate; scales caducous, shortly pubescent at the top, ciliate along the margins; interior ones oblong, more or less acute at the top, 1 mm broad, 5 mm long, exterior ones ovate, obtuse at the top, more than  $\frac{1}{2}$  mm broad, 1 mm long. *Flowers* 9 mm long. *Corolla* tubular, densely glandular, 6 mm long, 1 mm wide, 5-lobed (lobes 2 mm long, acute at the top, lanceolate). *Anthers* long sagittate at the base, obtuse at the top. *Style*-branches long, acute. *Achene* narrowly turbinate, 10-ribbed, densely glandular, glabrous,  $2\frac{1}{2}$  mm long. *Pappus* dingy whitish, biseriate, setaceous; inner row 6 mm long; exterior one 2 mm long. *Receptacle* flat, glabrous, small.

Distribution in the Malay Archipelago:

Celebes: P. Kabaena, Sangia-wita hills, GRÜNDLER 3453 (L); 3495 (L).

Hab.: in jungles; on a dry soil.

Altitude: 600—900 m.

Flowers: Oct.

(6) *Vernonia fimbrillata* nov. spec. — Pl. II, 8.

Arborea? *Rami* floriferi striati, scabride hirsuti (pilis curvatis, brunneis), glandulosi, 3 mm crassi, internodiis 1—2 cm longis. *Folia* alterna, pedunculata (pedunculo scabride hirsuto,  $1-1\frac{1}{2}$  cm longo), obovato-elliptica, basi longe in petiolum attenuata, apice abrupte acuminata ibi lato, obtuso vel subrotundato, plus minusve  $\frac{1}{2}$  cm longo, pinninervia (nervis lateralibus utrinque 6—7, extremis reticulatis; omnibus prominentibus) utrinque glandulosissima, supra subnitida, glabra, subtus glabra, coriacea, integra; laminae  $6-8\frac{1}{2}$  cm longae, 2.3—3 cm latae; superiorum gradatim minori, ad 1.3 cm latae, 3 cm longae. *Inflorescentia* corymboso-paniculata; rami in axillis foliorum parvorum inferne nudi; superne capitula plus minusve 10 ferentes. *Capitula* pedunculata (pedunculis 2—5 mm longis, hirsutis), 8 mm longa, 5—6 mm crassa, 10-flora. *Involucrum* 5-seriatum; squamis externe sensim decrescentibus purpurascens, sparse glandulosis, apice obtusis, parte superiore hirsutis, margine longe brunneo-fimbrillatis; interioribus ellipticis,  $3\frac{1}{2}$  mm longis,  $1\frac{1}{2}$  mm latis exterioribus ovatis. *Flores* bisexuales. *Corolla* tubuloso-infundibuliformis, paulo minus 1 mm crassa,  $5\frac{1}{2}$ — $6\frac{1}{2}$  mm longa, 5-lobata; lobis 2 mm longis, lanceolatis, subobtusis. *Antherae* ad basin

sagittatae, apice acutae. *Stylus* bifurcatus; rami pubescentes. *Achenium* turbinatum, subangulatum, plus minusve 6-costatum, paulo curvatum, glandulosum, paulo pilosum, 2 mm longum. *Pappus* uniseriatus, fulvide albus; setis pluribus, 6 mm longis, latis, ciliatis. *Receptaculum* planum, alveolatum.

Distribution in the Malay Archipelago:

Borneo: Upper Bosam, G. Lemabok, MOULTON 6675 (K), type specimen.

Altitude: 1200 m.

Flowers: Nov.

In the Philippines a specimen has been collected, that seems to be very closely related to this species; the involucreal scales are not so long fringed, however, but shortly ciliate along the margin, and subacute, the achenes are densely glandular and glabrous: Luzon, Bontoc, VAN OVERBERGH 689 (K, L). A specimen from Busuanga Island, South of Luzon, LOPEZ 41367 (L) has leaves with narrow tips (leaves to 5½ cm broad, 16 cm long); it apparently belongs to the same species. From *Vernonia arborea* this species is to be distinguished by the 10-flowered heads. From *Vernonia patentissima* it is to be distinguished by the involucreal scales, the length of the corolla and the size of the heads.

(7) *Vernonia phanerophlebia* MERRILL var. *dulitensis* nov. var. \*)

Small tree. *Branches* subterete, rigid, densely leaved, densely brownish villous, 2—4 mm thick. *Leaves* numerous, shortly petiolate (petiole villous like the branches, 5—10 mm long, 1 mm thick), obovate-elliptic, obtuse or nearly so at the top, attenuate, subacute at the base; entire, dark coloured, glossy, glabrous (except the villous central nerve) above, slightly paler, shortly brownish villous beneath, very glandular at both sides (glands numerous, prominent), pinni-nerved (7—8 pairs of lateral nerves, arcuately connected at the top, prominent at both sides; extreme ones reticulated, prominent above), rigidly coriaceous; blades 3½—6 cm long, 2—2½ cm broad. *Inflorescence* terminal and at the top of the upper branches, corymbosely paniculate; branches rigid, thick, bearing 2—4 heads at the top. *Heads* oblong, 6—7-flowered, 8 mm long. *Involucrum* 5—6-seriate; scales oblong-elliptic, broadly obtuse at the top, glandular (glands prominent), villous at the superior part, glabrous and minutely glandular at the largest inferior part; long ciliate along the margin; inner scales 4 mm long. *Corolla* tubular-infundibuliform, 5-lobed, 6 mm long; lobes lanceolate, very acute at the top, 1½ mm long, having some prominent glands at the top. *Style*-branches densely pubescent, long, acute. *Anthers* distinctly sagittate at the base. *Achene*

\*) The Latin description will be published in „Bulletin of miscellaneous information, Royal Botanic Gardens, Kew”.

oblong-turbinate, irregularly 5-ribbed, 2½ mm long, minutely glandular, glabrous. *Pappus* uniseriate, setaceous, 5 mm long; setae fulvous, numerous. *Receptacle* small, flat; cicatrices of the flowers having a central projection.

Distribution in the Malay Archipelago:

Borneo: *Sarawak*, G. Dulit, RICHARDS 1618 (K), type specimen.

Tree 6—7 m high.

Hab.: in a moss forest.

Altitude: 1230 m.

Flowers: Sept.

This Bornean variety differs from the typical species from Luzon by the pubescence of the branches, which are glabrous in the typical species, whereas the branchlets are distinctly appressed-pubescent. The heads of the typical species are 7—8-flowered, in the Bornean variety they are 6—7-flowered.

II. Sectio *Lepidella* OLIV. et HIERN. Fl. trop. Afr. III (1877) 267; BENTH. et HOOK. Gen. Pl. II (1873—1876) 230; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 126.

Herbs or shrubs. *Leaves* petiolate or sessile, ovate, obovate, elliptic or linear, attenuate at both ends (rarely rounded at the base), acute or obtuse at the top, entire or dentate, glabrous, tomentose or pubescent beneath. *Heads* pedunculate, campanulate, 12- to many-flowered, single, paniculate or corymbose. *Involucral scales* lanceolate or oblong, obtuse or acute at the top, pilose or glabrous. *Anther-tails* short, obtuse or acute. *Achene* angular; ribs 4—10, glabrous or pilose. *Pappus* biseriate; inner row setaceous, outer row consisting of small scales.

Trop. Asia and Africa.

### Key to the species.

1. a. Inflorescence pseudodichasial, elongated, diffuse. Outer involucral scales having long, spreading, crispy, brownish striate articulate hairs. Achene very densely covered with appressed long white hairs. Outer row of the pappus consisting of lanceolate, pale salmon-coloured scales . . . . .

(9) *V. Junghuhniana*.

b. Inflorescence small (consisting of 5—8 heads), corymbose; branches dichotomous. Outer involucral scales whitish pilose. Achene glabrous. Outer row of the pappus consisting of very short white scales . . . (8) *V. albifolia*.

(8) *Vernonia albifolia* KOSTER in Fedde Repert. XXXIV (1933) 5 — Pl. I, b; II, 13—14.

Herb, branched. *Stem* and *branches* terete, striate, fulvously whitish silky tomentose, 3½ mm thick. *Leaves* sessile or very shortly petiolate (petiole 2 mm long), elliptic-lanceolate or oblong-elliptic, long attenuate

and acute at both ends, entire or mucronately dentate or repandate, sparsely whitish pilose or subglabrous, dark-coloured above, densely silky white tomentose beneath, pinni-nerved (nerves prominent beneath, 6—12 pairs of lateral ones); 6—12 cm long, 1—3 cm broad. *Inflorescence* small (consisting of 5—8 heads), corymbose, terminal; branches dichotomous; upper ones ending into corymbs, much longer than the terminal corymb. *Heads* crowded, pedunculate (peduncle 1—3 mm long), about 40-flowered, cylindric, 7—8 mm long, 4—5 mm thick. *Involucre* campanulate, 5-seriate; scales whitish pilose, occasionally purplish at the top; outer ones lanceolate, sharply acuminate at the top; inner ones oblong mucronate at the top, glandular. *Flowers* exceeding the involucre, 7 mm long. *Corolla* tubular-infundibuliform, pink (when dry), 5-lobed, 5 mm long; lobes lanceolate, subacute at the top, white pilose at the superior part, 2 mm long. *Anthers* sagittate at the base, acute at the top. *Style*-branches acute at the top, hirsute. *Achene* turbinate, 4—5-angular (ribs prominent) attenuate at the base, glabrous, glandular, 1 mm long, with a thick ring at the top. *Pappus* biseriate, white; setae of the inner row caducous, 4 mm long; of the outer row paleaceous, permanent, flattened, very short. *Receptacle* slightly convex, alveolate.

Distribution in the Malay Archipelago:

**L o m b o k :** G. Rindjani, Sadjang, ELBERT 773 (L), 830 (L) — id., Sembaloen-plateau, ELBERT 1587 (L) — id., near Sembaloen river, ELBERT 1467 (L).

**Hab.:** in a monsoon forest, in jungles; on a clayish, more or less dry soil.

**Altitude:** 500—1265 m.

**Flowers:** April, May.

To be distinguished from *Vernonia patula* by the pilose corolla, the outer row of the pappus and the lanceolate whitish tomentose leaves.

(9) ***Vernonia Junghuhniana*** nov. nom.; *Vernonia Moritziana* SCH.-BIP.! in ZOLL. Syst. Verz. Ind. Arch. (1854) 119, non SCH.-BIP. in Linnaea XX (1847) 511; MIQ.! Fl. Ind. Bat. II (1856) 17; BOERL. Fl. Ned. Ind. II (1899) 235; KOORDERS Exc. Fl. Java III (1912) 315 — Pl. I, b; II, 15.

Herbaceous, 30—110 cm high. *Roots* crowded, short, numerous. *Stem* terete or angular, ribbed, fulvously pubescent, glandular, 5 mm thick; younger *branches* greyish villous, branched at the upper part only; internodes  $2\frac{1}{2}$ — $8\frac{1}{2}$  cm long. *Leaves* very variable, few, lanceolate, elliptic, ovate, spathulate-lanceolate, or elliptic-oblong, subsessile or petiolate (petiole  $\frac{1}{2}$ — $1\frac{1}{2}$  cm long), long attenuate into the petiole, sub-obtuse and mucronate at the top (sometimes long attenuate at the top), entire or undistinctly mucronulate or repandate, appressed-pubescent,

glandular, warty above; pubescent, glandularly spotted beneath, membranous, pinni-nerved (nerves obscure, 4—10 pairs of lateral nerves), 2—10½ cm long, 2—30 mm broad. *Inflorescence* pseudodichasial, terminal and axillary, elongated, diffuse; branches thin, greyish villous, glandular; extreme ones sometimes with a small linear villous (hairs articulate) bract at the base or halfway. *Heads* on long peduncles (peduncles 5—12 mm long, thin, ½ mm thick), nearly globose, 6—8 mm wide and as long, 20—25-flowered. *Involucre* 3—4 seriate; scales very glandular; inner ones lanceolate, long acuminate and sharply acute at the top, 3-nerved, appressedly greyish pubescent, 5—6 mm long, 1 mm broad; outer ones linear, subulate at the top, villous with long spreading crispy brownish striate articulate hairs. *Flowers* not exerting the involucre. *Corolla* narrowly infundibuliform, 4½ mm long, 5-lobed; lobes short, acute, pilose at the top, less than ½ mm long; limb 2 mm long, gradually attenuate into the thin tube. *Style* pilose at the superior part; branches short, acute, pilose. *Anthers* acute at the top; shortly sagittate at the base. *Achene* oblong, attenuate at the base, obscurely 4—5-ribbed, very densely covered with appressed long white hairs, slightly glandular, 1½—2 mm long, ½ mm thick, with a callose ring at the base. *Pappus* biseriate; inner row setaceous setae ciliate, white, about 20.4 mm long; exterior row paleaceous, scales ciliate, lanceolate, flat, pale salmon-coloured or pale orange, about 20.5 mm long. *Receptacle* flat, alveolate.

Distribution in the Malay Archipelago:

**J a v a:** *Djakakarta*, G. Gamping, JUNGHUHN 389 (L, U) — Djember, Noesa Baroeng, ZOLLINGER s.n. (U).

**M a d o e r a:** South of Temberoe, BACKER 20486 (L) — Rapa, BACKER 20237 (B) — P. Poeteran, BACKER 20798 (B) — Balega, TEYSMANN 1739 (B) — Kemanden tanah, coll. unknown (L).

**K a n g e a n A r c h.:** P. Sepandjang, BACKER 28775 (B), 28747 (B) — P. Sepapan, BACKER 28463 (B) — P. Saboenten, BACKER 29648 (B) — P. Kangean, Kajoe waroe, BACKER 28110 (B) — P. Saseel, BACKER 28621 (B) — P. Bangko, BACKER 29243 (B) — P. Paliat, BACKER 29302 (B).

**T i m o r:** Portuguese Timor, Maliena, WALSH 481 (B)

Flowers pale violet (BACKER).

Vernacular name: *ai koedaroëin* (Timor).

**Hab.:** on limestone rocks, on slopes, in grassy and deserted fields, along waysides, in jungles; locally common.

Altitude : 1—100 m, in Timor 300 mm.

Flowers: May—June.

MIQUEL, who described this species, which SCHULTZ—BIPONTINUS had named,

added to a fragment of one specimen of JUNGHUHN (H. A. R. T. 02921 A) a label on which he wrote „*Vernonia Moritziana* Sch.—Bip. Insula Nus. Baron, Archipel Sund., Zoll.”; to other specimens of JUNGHUHN (L, U) he applied the name *Vernonia cinerea* LESS. (U) and *Vernonia cinerea* var. (L.). — From *Vernonia cinerea* this species is at once to be distinguished by the outer row of the pappus, the articulate brownish striate long hairs of the involucre, the very densely hirsute, obscurely ribbed achene and the pseudodichasial inflorescence. The name given by SCHULTZ—BIPONTINUS was a homonym. SCHULTZ—BIPONTINUS described another *Vernonia Moritziana* from Colombia in *Linnæa* XX (1847) 511; so the one collected on Noesa Baroeng by ZOLLINGER, named by SCHULTZ—BIPONTINUS and described by MIQUEL, ought to receive another name, as MOORE (*Journ. Bot.* XLIII, 1925, 54) noticed already. The name *Vernonia Junghuhniana* is proposed instead. This species was placed in the section *Tephrodes*.

III. Sectio *Tephrodes* DC. Prod. V (1836) 24; ZOLL. in *Nat. Gen. Arch. Néerl. Ind.* II (1845) 218; MIQ. *Fl. Ind. Bat.* II (1856) 11; BENTH. et HOOK. *Gen. Pl.* II (1873—1876) 230; CLARKE *Comp. Ind.* (1876) 8; OLIVER *Fl. trop. Afr.* III (1877) 267; HOFFM. in ENGL.-PRANTL *Nat. Pfl.* IV 5 (1894) 126.

Herbs (rarely shrubs), pubescent, glandular. *Leaves* petiolate or sessile, variable in shape, elliptic, ovate, linear, attenuate or acute or nearly rounded at the base, acute or obtuse at the top, dentate, repandate or entire, pinni-nerved, glandular, pubescent beneath. *Heads* small, campanulate, pedunculate, corymbosely paniculate few or numerous, 10—25-flowered. *Involucral scales* lanceolate, mostly very pointed, seldom mucronate at the top, pilose. *Anther-tails* short, acute (rarely obtuse). *Achene* subterete, more or less clearly ribbed, more or less appressed, most often densely pilose, glandular (rarely without glands). *Pappus* biseriate, setaceous, white; setae of the outer row short to minute.

Trop. Asia and Africa.

Key to the species.

- 1. a. Outer involucral scales lanceolate, long and sharply attenuate at the top or ending into a soft prickle. Achene oblong, obscurely 5—6-angular or obscurely ribbed, pilose . . . . . 2
- b. Outer involucral scales nearly needle-shaped. Achene clearly ribbed (ribs prominent), white pilose between the ribs (14) *V. laxiflora*.
- 2. a. Achene turbinate-cylindric, obovate-oblong, oblong, subangular, 4—6-costate or striate . . . . . 3
- b. Achene narrowly cylindric, attenuate at the base, terete or subterete (faintly ribbed) . . . . . (10) *V. cinerea*.
- 3. a. Outer setae of the pappus short, but not minute, ½—1 mm long. . . . . 4
- b. Outer setae of the pappus minute . . . . . 6



- 4. a. Involucrum 3—4-seriate, 4—7 mm long . . . . . 5
- b. Involucrum 2—3-seriate, short, 2½ mm long . . . (15) *V. subtilis*.
- 5. a. Heads 6—7 mm long and as wide; peduncles nearly always naked. Corolla narrowly tubular, 5—6 mm long . . . (12) *V. lanceolata*.
- b. Heads 8—10 mm long, about 7 mm wide; peduncles bearing 1—4 linear small bracts. Corolla narrowly infundibuliform, 8—9 mm long . . . . . (11) *V. Elmeri*.
- 6. a. Leaves serrate, mucronately repandate or subentire. Heads 6—9 mm long, 4—5 mm wide. Involucral scales subobtusate and mucronate, or nearly rounded, or sharply acuminate or long attenuate at the top . . . 7
- b. Leaves entire or nearly so, often rhomboid-elliptic. Heads small, 5—5½ mm long, 3—4 mm wide. Involucral scales deltoid or nearly rounded, obtuse at the top . . . . . (16) *V. coerulea*.
- 7. a. Involucral scales subobtusate and mucronate or nearly rounded or sharply attenuate at the top. Achene narrowly oblong, obscurely 5-angular, glandular, sparsely whitish appressedly pubescent . . . (17) *V. cymosa*.
- b. Involucral scales very long acuminate, filiform, flexible at the top. Achene turbinate, striate, without glands, densely hirsute . . . . . (13) *V. Tengwallii*.

(10) *Vernonia cinerea* (L) LESS. in *Linnaea* IV (1829) 291.

Erect herb, more or less branched at the upper part, 15—80 cm high. *Stem* terete, ribbed, glandular, more or less greyish pubescent, 1—2 mm thick above, 2—5 mm beneath; internodes 1½—6 cm long. *Roots* crowded, short. *Leaves* petiolate (petioles ½—3 cm long, difficulty to be separated from the blades) or sessile, lower ones very variable; superior ones sessile, narrowly elliptic, ovate, narrowly subspathulate, lanceolate or linear; all more or less abruptly or gradually attenuate into the petiole, obtuse or acute at the top, repandate-serrate, undulate or subentire, pinni-nerved (nerves more or less prominent; lateral ones 4—5 pairs), submembranaceous or chartaceous, edges slightly recurved, dark green coloured, densely minutely warty, more or less scabrid above, greyish or pale green, glandularly black-spotted, greyish or fulvously pubescent, villous or glabrous beneath; blades of the lower leaves 3—8½ cm long, 1½—3½ cm broad, of the higher ones 1—7 cm long, 3—15 mm broad. *Panicles* terminal, compound, corymbose, 5—35 cm high, 5—15 cm wide, branches appressedly greyish pubescent, ½—1 mm thick, slender, dichotomous, ending into 2 peduncles, many of them having a minute linear bract at the base or halfway; panicles very variable in shape and size. *Heads* numerous, pedunculate (peduncles very thin, long, greyish pubescent, flexible, filiform, 2—14 mm long, having a minute linear bract halfway), subcylindrical, 6—7 mm long, 4—5 mm wide, 18—20-flowered, with 2 minute, linear bracts at the base. *Involucre* campanulate, 4-seriate, much shorter than the head, 4—5 mm long;

scales lanceolate, one-nerved, keeled, very pointed at the top, ending into a soft prickle, appressedly greyish pilose, with few shining glands, more or less pale purplish (when dry), about 30, of the inner row 4—5 mm long, less than 1 mm broad, of the outer row  $1\frac{1}{2}$  mm long, less than  $\frac{1}{2}$  mm broad. *Corolla* 4 mm long, slender, narrowly infundibuliform, 5-lobed, slightly glandular; lobes narrow, lanceolate, nearly 1 mm long, pilose at the top; tube slender, filiform. *Style*-branches short, subobtusate, pubescent; undivided part of the style pubescent above. *Anthers* clearly sagittate at the base; sterile superior part acute, nearly half as long as the anther. *Achene* narrowly cylindrical, attenuate at the base, terete or subterete, faintly ribbed, appressedly whitish pubescent, densely brownish glandular,  $1\frac{1}{2}$ —2 mm long, less than  $\frac{1}{2}$  mm thick, with a basal cartilaginous disc. *Pappus* biseriata, white, setaceous; setae of the inner row 4—5 mm long, silky, ciliate; of the outer row minute, ciliate, flat. *Receptacle* flat, alveolate.

Distribution: Arabia, Baluchistan, Br. India, Mal. Penins., Indo-China, S. China, Japan, Formosa, Philippines, Mal. Arch., New Guinea, Australia, Pacific Islands, Africa; introduced into S. America.

#### Key to the varieties.

- |       |                                                                                                                                      |                               |
|-------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1. a. | Heads 6—7 mm long; involucre 4—5 mm long . . . . .                                                                                   | 2                             |
| b.    | Heads small, 4—5 mm long; involucre $2\frac{1}{2}$ — $3\frac{1}{2}$ mm long. Leaves often broadly ovate or nearly circular . . . . . | 2. var. <i>parviflora</i> .   |
| 2. a. | Leaves greyish or fulvously pubescent or villous beneath . . . . .                                                                   | 3                             |
| b.    | Leaves glabrous at both sides . . . . .                                                                                              | 5. var. <i>glabriuscula</i> . |
| 3. a. | Leaves densely villous beneath . . . . .                                                                                             | 4                             |
| b.    | Leaves pubescent beneath . . . . .                                                                                                   | 5                             |
| 4. a. | Leaves mucronately serrate at the margin, densely fulvously villous beneath . . . . .                                                | 6. var. <i>montana</i> .      |
| b.    | Leaves undulate at the margin; densely greyish villous. . . . .                                                                      | 4. var. <i>lanata</i> .       |
| 5. a. | Leaves linear-lanceolate or lanceolate-elliptic, edges recurved. Inflorescences small . . . . .                                      | 3. var. <i>linifolia</i>      |
| b.    | Leaves more or less elliptic or ovate, without recurved edges . . . . .                                                              | 6                             |
| 6. a. | Involucral scales very pointed at the top . . . . .                                                                                  | 1. var. <i>typica</i> .       |
| b.    | Involucral scales obtuse at the top . . . . .                                                                                        | 7. var. <i>obtusa</i> .       |

1. var. *typica*; *Conyza cinerea* L.! Sp. Pl. ed. I (1753) 862, ed. II (1763) 1208; WILLD. Sp. Pl. III (1804) 1925; BURM. Fl. ind. (1768) 179; *Vernonia cinerea* LESS. in Linnaea IV (1829) 291; LESS. in Linnaea VI (1831) 673; DC. in WIGHT Contr. (1834) 6; DC. Prod. V (1836) 24; ZOLL. in Nat. Gen. Arch. Néerl. Ind. II (1845) 219; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Pl. Jungh. (1854) 495; MIQ. Fl. Ind. Bat. II (1856) 11; MIQ. Sumatra (1862) 210; BENTH. Fl. Hongk. (1861) 169;

BENTH. Fl. Austr. III (1866) 459; CLARKE Comp. Ind. (1876) 20; KURZ in Journ. As. Soc. Beng. XLVI (1877) 200; HOOK. Fl. Br. Ind. III (1882) 233; FORBES et HEMSLEY in Journ. Linn. Soc. XXIII (1886—1888) 401; CLARKE in Journ. Linn. Soc. Bot. XXV (1890) 35; WARBURG in Engl. Bot. Jahrb. XIII (1891) 448; TRIMEN Fl. Ceylon III (1895) 7; KOORDERS in Meded. L. Pl. XIX (1898) 510; BOERL. Fl. Ned. Ind. II (1899) 235; CLARKE in Bot. Tidsskr. XXIV (1902) 242; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV 2 (1905) 27; ELMER Leaf. Phil. Bot. I (1906) 94; GLEASON in Bull. N. Y. Bot. Gard. IV (1906) 174; HAYATA in Journ. Sci. Tokyo XXV (1908) 120; LAUTERBACH! in Nova Guinea VIII 2 (1910) 335; KOORDERS Exc. Java III (1912) 314; EKMAN in Ark. Bot. XIII (1914) 95; MERRILL Int. Rumph. Amb. (1917) 497; MERRILL Journ. R. As. Soc. (1921) 586; GAMBLE Fl. Madras IV (1921) 676; MERRILL Enum. Phil. Pl. III (1923) 592; MOORE in Journ. Bot. LXI (1923) suppl., 27; RIDLEY Fl. Mal. Penins. II (1923) 188; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 484; MOORE in Journ. Bot. LXIII (1925) suppl., 54; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1430; STANDLEY in Contr. U. S. Nat. Herb. XXVII (1928) 375; MATTF. in Engl. Bot. Jahrb. LXII (1929) 401; BACKER Handb. Suikerr. Java VII (1932) 751 (syn. excl.); KOSTER in Fedde Repert. XXXIV (1933) 2; HOCHREUTNER in Candollea V (1931—1934) 296; *Olus scrofinum* RUMPH. Amb. VI (1750) t. 14 fig. 1; *Conyza cinerascens* WALL. Cat. (1828) 3062 Comp. 172; *Conyza subsimplex* WALL. Cat. (1828) 3003 Comp. 113; *Serratula cinerea* ROXB. Fl. ind. III (1832) 406; *Vernonia prolifera* DECAISNE Herb. Timor. (1835) 80 (syn. excl.); *Vernonia abbreviata* DC. Prod. V (1836) 25; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Fl. Ind. Bat. II (1856) 12; *Vernonia leptophylla* DC. Prod. V (1836) 25; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 220; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Fl. Ind. Bat. II (1856) 12.

CLARKE, KURZ, HOOKER, KING and GAMBLE and GAGNEPAIN mention many more synonyms, among which *Vernonia laxiflora* LESS. at least has to be lifted out.

*Leaves* rhomboid-elliptic (of the type specimen), rhomboid-ovate, ovate-elliptic, narrowly elliptic or ovate, greyish or fulvously pubescent (all over or only on the nerves).

Distribution in the Malay Archipelago:

Sumatra: *Atjeh*: P. Simaloer, ACHMAD 307 (L) — near Koeta-tjané, Alas-valley, LÖRZING 11113 (B); *East Coast*: near Medan, LÖRZING 3723 (B), 3019 (L, B), 3646 (B) — near Badjalingga, south of Tebingtinggi, LÖRZING 7545 (B) — Asahan, BARTLETT and LA RUE, 387 (L) —

Sibolangit, LÖRZING 3901 (B) — East of Loeboepakam, LÖRZING 3278 (B) — P. Roepat, BRUNIER 23 (B); *Tapanoeli*: Toba, OUWEHAND 42 (B) — Nias, VAN RÖMER s.n. (B); *West Coast*: G. Malintang, foot, BÜNNEMEYER 4451 (B) — Ophir-district, Soekamenanti, BÜNNEMEYER 269 (B) — G. Singalang, BÜNNEMEYER 2523 (K); *Djambi*: Koerintji, Bt. Tebakar, BÜNNEMEYER 7928 (L) — near Bangko, Merangin River, POSTHUMUS 509 (B); *Lampongs*: Negara Ratoe-estate, DE VOGEL s.n. (L) — Wai Lima, IBOET 356 (B) — near Talangbatoe, IDENBURG 37 (B) — P. Sebesie, DOCTERS VAN LEEUWEN 5393 (B). Sumatra, CUMING 2442 (K, Br. M.).

Riouw Arch.: P. Toedjoeh Ajar Soear, BÜNNEMEYER 5988 (L) — Soegi bawah, BÜNNEMEYER 7711 (L) — P. Bintan, BÜNNEMEYER 6120 (L).

Lingga Arch.: P. Lingga, BÜNNEMEYER 6771 (L), 6979 (B), 6598 (B) — P. Selajar, BÜNNEMEYER 7434 (L) — P. Singkep, BÜNNEMEYER 7103 (B) — P. Bakong, BÜNNEMEYER 7579 (B).

Bangka: South Bangka, BÜNNEMEYER 2272 (B) — Kepo Toboali, BÜNNEMEYER 2343 (B).

Java: *West Java*: G. Goentoer, KOORDERS 41703 (L), KOENS 33 (B), BACKER 5264 (B) — south of Tjibeber, Tjidadap, BAKHUIZEN VAN DEN BRINK 6386 (B) — Padjangan, Tjitarik (Priangan), BAKHUIZEN VAN DEN BRINK 3194 (B) — S.W. of Kali Poentjang (Priangan), BACKER 4493 (B) — Priangan, Zandbaai, plain behind the beach, BACKER 801 (B) — Tjiandjoer, BACKER 3082 (B) — Garoet, BURCK s.n. (B) — Plered (Batavia), BACKER 13959 (B) — near Buitenzorg, BACKER 21367 (B) — between Tjileles and Goenoengkantjana, BACKER 1200 (B) — Wanajasa (Batavia), BACKER 14348 (B) — near Sadjira (Bantam), BACKER 2073 (B) — between Penjawaengan and Bajak (Bantam), BACKER 1620 (B) — Goenoengkantjana, KOORDERS 41338 (B) — Bodjongmanik (Bantam), KOORDERS 40875 (B); *Middle Java*: on the Boroboedoer, KOORDERS 36661 (B), 36665 (B), 36728 (B) — between Doro and Bandar (Pekalongan), BACKER 15568 (B) — Madjenang (Banjoemas), BACKER 18776 (B) — Ngawen, forestry (Rembang), BEUMÉE 812 (B) — Poerworedjo, LEEFMANS 80 (B) — P. Karimondjawa, KOORDERS 40412 (B); *Djocjakarta*: Wonosari, BACKER 2596 (B) — G. Gamping, JUNGHUHN 325 (L); *Soerakarta*: Klaten, ADMIN. OF GEMAMPIR-ESTATE s.n. (B); *East Java*: G. Tengger, BULJSMAN s.n. (U) — Bendo (Kediri), OTTOLANDER 388 (B) — Toeloengagoeng (Kediri), LÖRZING 990 (B) — between Poeger and Sabrang, BACKER 18061 (B) — Djember, BACKER 17722 (B), ULTÉE s.n. (B) — south of Bantoer, BACKER 3874 (B) — Djatiroto (Paseroean), BACKER 7964 (B), 8062 (B) — Saradan (Madioen), WISSE 157 (B) —

G. Lawoe, JACOBSON s.n. (B); Java, KORTHALS s.n. (L), ZOLLINGER 2704 (Br. M.), 2772 (Br. M.), det. MIQ. (U).

Kangean Arch.: P. Paliat, BACKER 29515 (B).

Saleier: WEBER s.n. (L).

Lombok: Baoen Poessok, ELBERT 2503 (L) — G. Rindjani, Laboan Tjarik, ELBERT 552 (L).

Timor: ZIPPELIUS s.n. (L).

Wetar: above Iliwaki, ELBERT 44109 (L).

Celebes: *Minahassa*: G. Sapoetan, STEUP 53 (B) — *Minahassa*, KOORDERS 16501 (B).

Talau Islands: P. Karakelang, east of Beo, LAM 2589 (B).

Moluccas: *Amboina*: Mahya, BOERLAGE 228 (B) — G. Malintang near Galela, RANT 793 (B) — Waai, RANT 624 (B) — *Boeroe*: Fakel, TOXOPEUS 525 (B).

Aroe Islands (ex WARBURG).

Borneo: *W. Borneo*: Karimata besar, MONDI 198 (L, B); *S.E. Borneo*: Banjarmasin, KORTHALS s.n. (L) — Tikoeng, AMDJAH 780 (U); *Sarawak*: upper Rejang River, CLEMENS 21433 (B) — Rejang, Siboe, HAVILAND 3608 (K); Borneo, RIDLEY 12362 (K), GRABOWSKY s.n. (Br. M.).

Flowers purplish or bluish violet (KJELLBERG a.o.), white (LAM); tube of the corolla white, lobes violet or pink (BACKER l.c.). Involucral scales brown, recurved (id.). Pappus-hairs of the inner row dropping afterwards (id.). Herb up to 160 cm high (id.).

Vernacular names: *tî margalonggoeng*, *taroe taroe*, *tenoe hoeloengoe*, *pidak bangkong*, *moenerie koendiembie*, *rante pit*, *tjapeu toehoer*, *marènè*, *ning tjining*, *semboeng (kebo)* (all Java), *ambong ambong*, *djalantir* (all Sumatra), *roempoet soesoep* (Bangka), *gofoe montiara* (Ternate), *tempoeloet babie* (Borneo), *roempoet tai babie* (Karimata Arch.).

Hab.: along waysides, in grassy fields, in a dry rice field, in teak, Eucalyptus and monsoon forests; on a dry open sandy soil, on stony lava-slopes, on the beach, in rubber and tea plantations (BACKER l.c.), on dunes (BACKER l.c.), on weathered lime, on rather dry volcanic tuff; common, except in the Kangean Arch.

Altitude: 0—1000 m.

Flowers during the whole year.

Use: Bruised leaves against injuries; leaves against eye troubles and as a febrifuge. Root against cough (HEYNE l.c.).

Distribution: Trop. Asia: Arabia!, Baluchistan!, Bombay!, Punjab!, Madras!, Ceylon! (leaves nearly quite glabrous), Himalaya! (up to 1500 m), Garhwal! (leaves very pubescent, crispy pubescent above, leaves crowded), Behar!, Bengall!, Sikkim!, Assam!, Delhi!, Burma!, Andaman Islands!, Siam!, Annam!, Cambodge!, Cochinchina!, Laos, Tonking!, Mal. Penins., China (Hainan), Japan, Formosa, Philippines (Luzon!, Mindanao!), New Guinea! (Merauke, KOCH: leaves very long and narrow, lanceolate, upper ones to 8 cm long, ½ cm broad); Polynesia: Solomon Islands!, Carolines!, Cape Verde Islands!; New Caledonia!, Australia!; Africa!, Madagascar,

Mauritius. Introduced into South America! (Surinam!, West Indies!). BAKER (Fl. Bras. VI 2, 1873—1876) does not mention this *Vernonia*, so it must have been introduced into S. America in the latest sixty years.

The specimens of Amboina, collected by RANT, have many heads of which the involucre contains, instead of flowers, peduncles bearing several rows of pilose linear bracts. MIQUEL added to the specimen from Djokjakarta (JUNGHUHN 325) a label on which he wrote „var. minor Miq.” but he did not publish this variety in his Fl. Ind. Bat. I cannot find a reason to separate this specimen from the other ones of *Vernonia cinerea* (L.) LESS.

2. var. *parviflora* (BL.) DC. Prod. V (1836) 24; ZOLL.! in Nat. Gen. Arch. Neêrl. Ind. II (1845) 219; HASSK. Pl. jav. rar. (1848) 527; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; FORBES Mal. Arch. (1886) 216; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 484; *Vernonia parviflora*, REINW. in BL.! Bijdr. (1825) 893; MIQ.! Fl. Ind. Bat. II (1856) 11; MIQ. Sumatra (1862) 210; *Vernonia cinerea* LESS., Ed. HOHENACKER (1847) 3 Ind. Or., Terr. Canara! (var. *angustifolia* SCH.-BIP. incl.).

Herb. 12½—20 cm or higher. Lower leaves elliptic-ovate or broadly ovate to nearly circular, sparingly pubescent beneath. Heads small, 4—5 mm long. Involucre 2½—3½ mm long. Corolla 2½—3 mm long. Achene 1—1½ mm long.

Distribution in the Malay Archipelago:

Sumatra: *East Coast*: Serdang, LÖRZING 3415 (B) — id. near Pantaitjermin, LÖRZING 9254 (B) — Upper Bila-plain, Aekboero, LÖRZING 9632 (B); *West Coast*: Padang, HALLIER C 194 (L), BOERLAGE s.n. (L), coll. unknown (B); Palembang: Palembang, DE VOOGD 404 (B); Lampung: Telokbetong, BACKER 31601 (B).

Bangka: Pankalpinang, VAN DER VECHT 15 (B) — Moentok, BÜNNEMEYER 1422 (L).

Riouw Arch.: P. Bintan, BÜNNEMEYER 6246 (B).

Lingga Arch.: P. Senajan, BÜNNEMEYER 7467 (L) — P. Lingga, BÜNNEMEYER 6650 (B) — P. Sinkep, BÜNNEMEYER 7174 (B).

Krakatau: Zwarte Hoek, DOCTERS VAN LEEUWEN s.n. (B) — Lang Eiland, DOCTERS VAN LEEUWEN s.n. (B) — Krakatau, BOERLAGE s.n. (B).

Java: *West Java*: Bantam, FORBES 49 (Br. M.) — Pandeglang, BACKER 7502 (B) — Java's eerste punt, BACKER 21338 (B) — Goenoengkantjana, KOORDERS 41146 (B) — Batavia, coll. unknown (K), REINWARDT s.n. (L), VORDERMAN s.n. (B), PIEPERS s.n. (B), VAN DER VEEN s.n. (L) — Weltevreden, Koningsplein, KOORDERS 32660 (B), JUNGHUHN 364 (L), 329 (L), BACKER 21368 (B) — Buitenzorg, KOORDERS 32614 (B), BOERLAGE s.n. (L), HALLIER 156 (L), BAKHUIZEN VAN DEN BRINK 1629 (B), R. J.

BAKHUIZEN VAN DEN BRINK 46 (B), 3815 (B), BURCK and DE MONCHY s.n. (B), SOEGANDIRENJA s.n. (B), HALLIER 156a (B, L), RAAP 25 (L) — east of Poerwakarta, HARMSSEN 10 (B) — Depok, KOORDERS 40508 (B) — Tjampea, KOORDERS 31464 (B) — Krawang, BEUMÉE 4575 (B) — south of Djasinga, BACKER 10048 (B) — P. Dapoer, VAN STEENIS 4478 (B) — P. Alkmaar, MOUSSET 527a (B) — P. Edam, BACKER 21337 (B), 31019 (B), BOSCHMA 14 (B) — Thousand Islands, P. Noordwachter, BOSCHMA 78 (B), BACKER and VAN SLOOTEN 35084 (B) — Bandoeng, BACKER 12129 (B) — Lampegan, G. Rosa (Priangan), LEEFMANS s.n. (B) — Sindanglaja (Priangan), VALETON s.n. (B) — Tjiratjap (Priangan), BACKER 17408 (B) — Banjar (Priangan), BACKER 21343 (B) — Indramajoe, BACKER 16702 (B) — Karang ampel (Cheribon), BACKER 16814 (B) — Tjikoja, Batavia, ZOLLINGER 24 (L, K); *Middle Java*: Tegal, WINCKEL s.n. (L), 616 (B), BEUMÉE 3697 (B) — Keboemen, BRINKMAN 8 (B) — Madjenang, BACKER 18563 (B) — between Slawi and Balapoelang, BACKER 15385 (B) — Brebes, BACKER 15442 (B) — Maos, Poerwokerto, BACKER 11 (B) — Soeboh (Pekalongan), BEUMÉE 3781 (B) — Pekalongan, BEUMÉE 192 (B) — near Tjilatjap, WOLFF VON WÜLFING W 38 (B) — Karanganjat, KOORDERS 26218 (B, L) — Salatiga, BACKER 30115 (B) — Kendal, BACKER 16316 (B) — res. Semarang, BEUMÉE 1164 (B), DOCTERS VAN LEEUWEN-REYNVAAN s.n. (U) — Ambarawa, BACKER 30347 (B) — Ngarengan (Semarang), BEUMÉE 5018 (B) — P. Karimondjawa, KARTA 223 (L, B) — Kedoengdjati, KOORDERS 25000 (B); *Soerakarta*: Soerakarta, HEMKEN s.n. (B) — Klaten, ADMIN. OF GEMAMPIR 2 (B), 58 (B); *East Java*: Morokreman, navy aerodrome, VAN SLOOTEN 2015 (B) — Probolinggo, BACKER 24376 (B) — Madioen, BACKER 6987 (B) — Djember, ULTÉE 13 (B); *Java*: ZOLLINGER s.n. (L), HORSFIELD 16 (K), 17 (K), s.n. (U), COOK s.n. (Br. M.).

*Kangean Arch.*: P. Kangean: Ardjasa, BACKER 26868 (B) — south of Tambajagan, BACKER 27499 (B) — Kali Sangka, BACKER 29993 (B) — P. Saebi, BACKER 28402 (B), MAHLMEISTER 19 (B) — P. Sepapan, BACKER 28462 (B).

*Madoera*: Sampang, BACKER 19710 (B) — between Bangkalan and Arosbaja, BACKER 19277 (B).

*Lombok*: WALLACE s.n. (K).

*Soemba*: TEYSMANN 8822 (B).

*Timorlaoet (Tanimbar Islands)*: FORBES 3357 (Br. M.).

*Borneo*: *S.E. Borneo*, Banjermassin, MOTLEY 291 (B), KORTHALS s.n. (L); *Br. N. Borneo*, CREAGH s.n. (Br. M.); *Borneo*, HAVILAND 3024 (K, L), KORTHALS s.n. (L), Seriboe, GRESHOFF s.n. (B).

Celebes: *Minahassa*, KOORDERS 16494 (L) — Bonto Parang (S.W. Celebes), BÜNNEMEYER 10570 (B) — Gorontalo, Adj. Veearts 5a. (B), RIEDEL s.n. (K) — Moeara Sainpara, KJELLBERG 1320 (B).

Moluccas: *Banda*, coll. unknown (L), G. Api, TREUB s.n. (B) — *Ceram*: Atiahoe, KORNASSI 791 (B, U, L), *Ceram*, FORSTEN s.n. (L) — *Amboina*: ROBINSON 426 (K, L) — *Ternate*: BEGUIN 821 (B).

Kai Islands: P. Elat, JENSEN 175 (B) — P. Toeal, JENSEN 350 (B, L).

Though most specimens are rather easy to be distinguished, there are many other ones, which may belong to *Vernonia cinerea* var. *typica* as well. In both varieties the leaves are very variable.

Vernacular names: *samboeng lalaki*, *eran eran*, *koeripan*, *boejoeng boejoeng*, *tepaküman*, *gletang* (all Java).

Hab.: along waysides, in grassy fields, in teak forests, in a dry rice field, in gardens and fields close to the sea, on the beach; few to fairly many.

Altitude: 0—1200 m.

Flowers during the whole year.

Distribution: Trop. Asia: Br. India (Ceylon!, Laccadive Islands!, Mangalor!, Madras!, Selangor!), Siam! Indo-China!, Philippines (Luzon!), New Guinea!, Bismarck Arch.! Polynesia: Marianne Islands!, Fiji Islands!, Tuamotos Islands! Hawaiian Islands!, Keeling Islands.

A specimen from Banda, TREUB s.n. (B), is a monstrous form: its heads consist of a poorly developed involucre, which contains long stalked, reduced heads, consisting of small, lanceolate, pilose bracts surrounding some reduced flowers.

3. var. *linifolia* (BL.) nov. comb.; *Vernonia linifolia* BL. Bijdr. (1825) 893; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 220; MIQ. Fl. Ind. Bat. II (1856) 13.

*Stem* and *branches* more or less elongated. *Leaves* sessile, linear-lanceolate or lanceolate-elliptic, entire or mucronulate at the edges, scabrous above, fulvously sparsely pubescent beneath, coriaceous; edges recurved; nerves prominent beneath; blades 1½—7 cm long, 3—10 mm broad. *Inflorescence* small, diffuse. *Corolla* elongated, 5—6 mm long.

BLUME's type specimen is not to be found in the Leiden Herbarium (as MIQUEL stated already), but there is a *Vernonia*, to which a label is added, on which is written by BLUME „*Vernonia linifolia* mihi 1992”; there is no indication, where the plant has been collected. BOERLAGE has written on another label, added to this *Vernonia* „*Vernonia cinerea* DC var. *angustifolia* Sch.-Bip.”. Instead of *Vernonia linifolia* BLUME this plant seems to be the upper part of a specimen of *Vernonia cinerea* LESS. BLUME's label probably belonged to another specimen. The leaves of *Vernonia cinerea* are very variable and there are intermediate forms to the leaves of *Vernonia linifolia*, the length of the corolla of *Vernonia cinerea* is not constant; so it seems preferable to put this species to the varieties of *Vernonia cinerea* LESS.



## Distribution in the Malay Archipelago:

**Sumatra:** *East Coast:* Karo-plateau, LÖRZING 6237 (L), 8571 (B) — id., near Raja, LÖRZING 4872 (B) — id., Brastagi, RIDLEY s.n. (K); *Tapanoeli:* Habisaran-plateau, LÖRZING 6491 (L) — N.W. of the lake of Toba, LÖRZING 9332 (B), 7230 (B) — Parsoboeran (Habinsaran), LÖRZING 7785 (B).

**Java:** *West Java:* Tjibeber, Priangan, BAKHUIZEN VAN DEN BRINK 6895 (L), 75a (L), 3721 (B) — Tjitjoeroeg, Priangan, BACKER 17215 (B) — north of Tjiandjoer, Priangan, BACKER 23556 (B) — Tjiogrek, s.e. of Buitenzorg, coll. unknown (B) — near Takoka, Priangan, KOORDERS 15245 (B) — Buitenzorg, HALLIER s.n. (B); *East Java:* Sempol, near Sitoebondo, KOORDERS 20836 (B) — Idjen, KOORDERS 19881 (B).

**Celebes:** *S.W. Celebes:* Lombasang, BÜNNEMEYER 11640 (B), 11359 (B), 10957 (B) — G. Bonthain, BÜNNEMEYER 11256 (B) — Kendari, KJELLBERG 454a (B) — G. Galesang, near Malmo, BÜNNEMEYER 10814 (B) — Tanette, BÜNNEMEYER 12518 (B) — Malakadji, BOUMAN-HOUTMAN 69 (B) — Malino, POSTHUMUS 3456 (B).

Flowers red (HALLIER).

Hab.: along waysides, along the edges of a forest, in grassy fields; few or many together; fairly common.

Altitude: 100—1500 m.

Flowers: Jan.—June, Nov.

Distribution: Burma!

Some specimens from Celebes (POSTHUMUS 3456, B) are small herbs, 12—20 cm high and very much branched at the base.

4. var. *lanata* nov. var.; *Vernonia salvaefolia* ZIPPELIUS 244 (L).

Folia oblongo-elliptica (superiora lanceolata), margine undulata, subtus dense incane villosa, apice obtusa vel subrotundata, mucronata. *Inflorescentia* ramosa; ramuli et pedicelli graciles.

Distribution in the Malay Archipelago:

**Moluccas:** *Amboina:* ZIPPELIUS 244 (L), type specimen — G. Malintang, near Galela, RANT 791 (B); *Boeroe:* Kajeli, BINNENDIJK s.n. (B).

This variety has been noticed by BENTHAM (Fl. Austr. III, 1866, 460) already, but not named, nor described. It cannot be named *V. cinerea* (L) LESS. var. *salvaefolia* on account of *Vernonia salvifolia* WIGHT in CLARKE Comp. Ind. (1876) 20.

Distribution: Australia!, New Caledonia!

In Amboina a monstrous form has been collected, RANT 791 (B), with long pedunculate heads (peduncles sometimes with numerous minute linear bracts), of which the involucre surrounds fairly long peduncles, bearing many rows of very small lanceolate, pointed bracts at the top.

5. var. *glabriuscula* DC Prod. V (1836) 24; ZOLL. in Nat. Gen. Arch. Néerl. Ind. II (1845) 219; *Vernonia sinulata* MIQ. in Fl. Ind. Bat. II (1856) 18; BOERL. Fl. Ned. Ind. II (1899) 235; KOORDERS Exc. Fl. Java III (1912) 316.

*Stem* quite glabrous. *Leaves* large, thin, obovate-rhomboid (upper ones elliptic-lanceolate), obtuse at the top, suddenly attenuate at the base, afterwards gradually attenuate into the petiole, quite glabrous at both sides, glandular beneath, undulate at the edges; blades 8—9 cm long, 3½—4½ cm broad; upper ones ½—2 cm broad, 5—7½ cm long; petioles 3—3½ cm long.

Distribution in the Malay Archipelago:

J a v a: *West Java*: Tjikoja, Batavia, ZOLL. et MOR. 215 (ex. ZOLL. l. c.); *Soerakarta*: HORSFIELD s.n. (U); *Java*: HORSFIELD 18 (K).

In the Br. Mus. another specimen of *Vernonia sinulata* MIQ. is to be found without a label. Though in the type specimen the leaves are elliptic-rhomboid, DE CANDOLLE's variety and MIQUEL's species are not very much different.

Distribution: Br. India (Madras ex MIQ. l. c.).

6. var. *montana* CLARKE Comp. Ind. (1876) 21.

*Branches* fulvously villous; hairs appressed, crisped, mixed with brownish striate short, erect ones. *Leaves* sessile or shortly petiolate, small, elliptic, sharply mucronately serrate, recurved at the margin, coriaceous, scabrid and villous above, densely fulvously villous, glandular beneath; blades 1½—2½ cm long, ½—2 cm broad. *Heads* numerous. 8 mm long, about 15-flowered. *Involucral scales* very long pointed at the top, recurved at the top. *Pappus* fulvous.

Distribution in the Malay Archipelago:

S u m a t r a: *Atjeh*: Gajo and Alas-districts, WIND 9831 (B), id., G. Api, exped. VAN DAALEN 288 (L, B); *East Coast*: Brastagi, BEUMÉE 808 (B); *Tapanoeli*: Toba, RUTTNER 45 (B) — north of the lake of Toba, LÖRZING 9782 (B).

Flowers violet (WIND, BEUMÉE).

Hab.: in grassy fields, on a swampy soil, on a rocky slope; locally common, scattered.

Altitude: about 1400 m.

Flowers: April, May, Aug., Dec.

Distribution: Khasia (ex Clarke l. c.).

Though I did not see the type specimen of this variety, it is very probable, according to CLARKE's description (however short it may be), that the Sumatran mountain forms, described above, belong to the same variety.

7. var. *obtusa* nov. var.

*Folia* rhomboideo-elliptica, parce pubescentia. *Capitula* parva, 5 mm longa; *squamis involucris* apice obtusis.

## Distribution in the Malay Archipelago:

Timor: Soë (South Central Timor), WALSH 38 (B), type specimen.

Flowers pale violet (WALSH).

Hab.: along waysides, on marly soils; numerous.

Altitude: 880 m.

Flowers: Jan.

Differs from *Vernonia physalifolia* DC. var. *glabrescens* DC. (Prod. V, 1836, 24) in the shape of the leaves.

*Vernonia borneensis* Miquel (Fl. Ind. Bat. II, 1856, 16; Boerl. Fl. Ned. Ind. II, 1899, 235; Merrill in Journ. R. As. Soc., 1921, 586) is, just as Merrill supposes, merely a form of *Vernonia cinerea* (L.) Less., where some inferior leaves are more deeply incised, which makes the leaves coarsely serrate to lobulate instead of repanded-serrate.

We find these leaves not only in Bornean specimens, Borneo, S. Pary, Jaheri 1144 (B), N. Borneo, Pladjoe, AMDJAH (19 (L), Borneo, Korthals†, det. Miquel (L), but also in those from Java, Bantam, Bodjongmanik, G. Liman, Koorders 40875 (B) and from Sumatra, Lampongs, 200 m, Iboet 356 (L).

Hasskarl (Pl. jav. rar., 1848, 526) mentioned a herb, identifying it as *Vernonia cinerea* (L.) Less. var. *rotundifolia* Wight, which is very common near Batavia. The leaves were described as being much larger than those of *Vernonia cinerea* (L.) Less.: 7½—12 cm long, 3—6 cm broad. The achene is quadrangular, with sharp angles, the pappus is uniseriate. It cannot belong to *Vernonia cinerea* (L.) Less. on account of these characteristics; it may be not even a *Vernonia* at all.

(11) *Vernonia Elmeri* Merrill! in Phil. Journ. Sci. V (1910) 252; Merrill Enum. Phil. III (1923) 593; *Gynura angulosa* Elmer (non DC.) ex Merrill; Elmer Leaflet Phil. Bot. I (1906) 146 (syn. excl.); *Vernonia lanceolata*, Koster in Fedde Repert. XXXIV (1933) 3, non Matf. — Pl. I, c.

Herbaceous, scandent; stem terete, clearly and much ribbed, glandular, pubescent (hairs greyish, appressed), 4 mm thick; internodes 2—6 cm long. Leaves shortly petiolate (petiole 2—7 mm long) chartaceous or submembranaceous, elliptic, elliptic-ovate or elliptic-oblong, more or less long acuminate and acute or obtuse and mucronate at the top, shortly acute or nearly rounded at the base, distantly and mucronately dentate all over or at the upper part only and entire at the lower part, or quite entire, pinni-nerved (nerves not much prominent; lateral ones 4—5 pairs; extreme ones reticulate), glandularly spotted, sparingly appressedly fulvously pubescent (most pubescent on the nerves) beneath, subglabrous or very shortly and distantly pubescent above; blades 6—8½ cm long, 2—5 cm broad; upper ones smaller and more narrow, to elliptic-lanceolate, 4—6 cm long, 1—2 cm broad. Inflorescence corymbosely paniculate, terminal; branches with a small leaf or a linear bract at the base. Heads pedunculate (peduncles 8—25 mm long, filiform, flexible,

$\frac{1}{2}$  mm thick, pubescent, bearing 1—4 linear small bracts), campanulate, about 20-flowered, 8—10 mm long, about 7 mm wide. *Involucre* campanulate, 4-seriate; scales very glandular, more or less pubescent; of the inner row lanceolate, 3-nerved (central nerve prominent), 6—7 mm long, very sharply and long acuminate, subulate at the top; of the outer rows linear, subulate at the top, uni-nerved. *Corolla* narrowly infundibuliform, more or less glandular, 8—9 mm long, long exerting the pappus, 5-lobed; lobes subacute at the top, 2 mm long, pubescent at the top,  $\frac{1}{2}$  mm wide. *Style*-branches filiform, pubescent, exerting the corolla. *Anthers* elongated, shortly sagittate at the base, subacute at the top. *Achene* oblong, sub-angular, afterwards subterete, obscurely ribbed (ribs 8), hirsute (hairs spreading), densely glandular. *Pappus* setaceous, biseriate, white, inner row 5 mm long; outer row 1 mm long. *Receptacle* flat, alveolate, naked.

Distribution in the Malay Archipelago:

Celebes: *Manado*: Manado, KOORDERS 16509 (L), 16510 (L), 16469 (L) — Minahassa, Ratahan, LAM 2420 (B) — Tondano, FORBES s.n. (L), KRUYFF 64 (B) — G. Klabat, KOORDERS 16503 (B), 16496 (B) — near Kajowatoo, KOORDERS 16525 (B) — G. Lokon, summit, KOORDERS 16499 (B) — Tawas rintok, way to Taniki-diata, DE LA SAVINIERRE 153 (K); *S.W. Celebes*: near Lombasang, BÜNNEMEYER 11496 (L) — G. Bonthain, BÜNNEMEYER 12401 (B) — Malino, near Makassar, BÜNNEMEYER 10723 (B), RANT 476 (B) — Kalibankere, TEYSMANN 12589 (B); *S.E. Celebes*: Mengkoka, Baola, ELBERT 3211 (L); Celebes, Sassak, RACHMAD 956 (B); *P. Boetjan*: Kaboengka, KJELLBERG 235 (B).

Flowers violet (KJELLBERG a.o.), blue (BÜNNEMEYER), white (LAM); almost a shrub, 2½ m high (LAM).

Vernacular name: *lawet rinteh* (Celebes).

This *Vernonia* is to be distinguished from the next species, to which it is closely related, by the much larger heads, the flexible filiform peduncles bearing 1—4 linear bracts, the smaller and thinner inflorescence and the much longer infundibuliform corolla. From *Vernonia cinerea* (L.) LESS. it is different by the ribbed achene, the scandent habit, the large heads and the shape of the corolla. To 3 m high (ex MATTFELD).

*Hab.*: in primeval and other forests, in jungles, in and along hedges, along waysides; on volcanic tuff and sand, on clay, on a swampy as well as on a rocky soil; not very common.

Altitude: 50—2000 m.

Flowers: Jan.—Oct.

Distribution: Philippines (Luzon!, Palawan!, Mindanao!), Soeloe Archipelago!

(12) *Vernonia lanceolata* (WARBG.) MATTF. in Engl. Bot. Jahrb. LXII (1929) 401, 494; id. in Nova Guinea XIV (1928) 517, non

KOSTER in Fedde Repert. XXXIV (1933) 3; *Blumea lanceolata* WARBURG (ex MATTF. l.c.) in Engl. Bot. Jahrb. XIII (1891) 446; LAUTERBACH in Nova Guinea VIII 4 (1912) 864; BOERL. Fl. Ned. Ind. II (1899) 239 — Pl. I, c; III, 27—28.

Herbaceous, often scandent (ex MATTF. l.c.); *stem* subterete, ribbed, fulvously appressed-pubescent, (lower part glabrous), glandular, 4—7 mm thick; internodes 2—6½ cm long. *Leaves* petiolate (petioles 6—15 mm long, of the upper leaves short, 2 mm long), elliptic or elliptic-ovate, attenuate (sometimes shortly at the base) and acute at both ends (sometimes acuminate at the top), entire or mucronulate at the edges, submembranous, fulvously sparingly pubescent at both sides (most pubescent on the principal nerve beneath) pale coloured, glandularly black-spotted beneath, warty above, pinni-nerved (lateral nerves 4—6 pairs, not very prominent, extreme nerves reticulate); blades 6—14½ cm long, 2—5½ cm broad; upper leaves smaller and more narrow, to lanceolate-elliptic, 2½ cm long, 1 cm broad. *Heads* numerous, in terminal ample corymbose panicles, to 18—25 cm wide; branches of the inflorescence gradually thinner to the top, bare except the small branched superior part, ribbed, cinnamomeously tomentose; leafless at the base except the 1—3 lowest branches, having one small leaf at the base or halfway. *Heads* pedunculate (peduncles rigid, ribbed, cinnamomeously tomentose, 1—1½ cm long, ½ mm thick, without bracts or rarely having one small linear bract), about 25-flowered, 6—7 mm long and as wide. *Involucre* campanulate, 3—4 seriate, 4—5 mm long; scales linear, long and sharply acuminate, of the inner row 3-nerved, (midrib prominent), outer ones 1-nerved, all glandular, shortly pubescent. *Flowers* not much exerting the pappus. *Corolla* narrowly tubular (nearly filiform), sparingly pubescent or subglabrous, 5-lobed, 5—6 mm long; lobes linear, sparingly pubescent at the top, 1—1½ mm long. *Style*-branches filiform, pubescent, not much exerting the corolla. *Anthers* acute at the top. *Achene* oblong, more or less angular, obscurely ribbed (ribs 5—8), shortly pubescent (hairs spreading), glandular, 2 mm long. *Pappus* biseriate, setaceous, dirty whitish; inner row 4—5 mm long, outer row 1 mm long. *Receptacle* flat, alveolate.

Distribution in the Malay Archipelago:

Talaud Islands: *P. Karakelang*, east of Beo, LAM 2630 (B).

Moluccas: *Boeroe*: Na'Besì, TOXOPEUS 190 (L); *Amboina*: Soja, TREUB s.n. (B), Amboina, ROBINSON 1834 (L, K); *Ceram*: Amahey, TREUB s.n. (B) — W. Ceram, north of Melila, RUTTEN 1638 (L) — W. Ceram, near Wai Nalo, RUTTEN 1584 (B) — Roho, KORNASSI 479 (B)

— N. Ceram, near the River Toeloearang, KORNASSI 88 (B) — N. Central Ceram, Wai Moela, RUTTEN 128 (B); *Halmahera*, P. Tidore, G. Mala Mala, LAM 3709 (B).

Flowers blue (RUTTEN, KORNASSI), pale violet (TOXOPEUS), bluish violet (RUTTEN), violet (RUTTEN). Herb or nearly shrub 1—2½ m high, (ex MATTF. l.c.).

Vernacular name: *dina kape* (Moluccas), *gorang gelaba* (Tidore).

Hab.: in primeval forests, along waysides, in an alang alang field, on riverbanks, as a weed in gardens; on a stony soil, in a sunny place.

Altitude: 30—1000 m.

Flowers: April—Nov.

Distribution: New Guinea!, Bismarck Archipelago (New Ireland!).

To be distinguished from *Vernonia cinerea* (L.) LESS. by the shape of the leaves (which are often large), the ribbed achene and the scandent habit. Much allied to *Vernonia Elmeri* MERRILL, which MATTFELD placed to the synonyms of *Vernonia lanceolata* (WARBURG) MATTF., but it has much smaller heads; the branches of the inflorescences and the peduncles are nearly always naked, shape and size of the corolla is different, the peduncles are rather thick and rigid, the leaves are larger.

Two specimens from Ceram, TREUB s.n. (B), are monstrous forms with heads, which possess stalked flowers. The hirsute, fairly thick peduncles of the flowers pass into the achenes, which are glandular like in normal flowers, but reduced. Corolla incised to the base, anthers not connate, pappus much shorter than usual, peduncles of the heads often bearing one or two bracts.

(13) *Vernonia Tengwallii* nov. spec. — Pl. II, 20.

Herbacea, flexuosa, elongata, foliosa. *Caulis* subteres, striatus (costis densis), glandulosus, ferrugineo-pubescentibus (pilis appressis), 2—3 mm crassus; in axillis foliorum rami breves vel longiores, folia minora ferentes, internodiis 2—3 cm longis. *Folia* alterna, sessilia vel subpetiolata, lanceolata, basi sensim angustata, apice longissime attenuata, acuta, margine repande mucronata (mucronulis tenuibus) vel subintegra, pinninervia (nervis lateralibus circiter 14, subtus prominentibus, omnibus breviter pubescentibus, reticulatione obscura); supra scabra, subtus subglabra (nervis exceptis) subtus minutissime nigro-punctata, membranacea; 7—15 mm lata, 7—12 cm longa; superiora paulo minora. *Inflorescentia* terminalis, corymboso-paniculata, laxa, foliosa, ramis tenuibus, dense ferrugineo-pubescentibus (pilis appressis), in axillis foliorum minorum, ramulis extremis pedunculos duos ferentibus. *Capitula* longe pedunculata, pedunculis tenuibus 1—2 cm longis, flexuosis, ferrugineo-pubescentibus, (pilis appressis), nudis vel bractaea parva filiformi medio vel basi praeditis, homogama, campanulata, circiter 15-flora, 8—9 mm longa, 4—5 mm crassa. *Involucrum* 4-seriatum, campanulatum, 7—8 mm longum, squamis sensim decrescentibus, lanceolatis, apice longissime attenuatis, filiformibus, flexuosis, ½ mm latis; interioribus scabride pubescentibus (pilis

brevissimis, albidis); exterioribus sparse tomentosis (pilis longis, purpureo-striatis). *Flores* bisexuales, involucri paulo superantes. *Corolla* infundibuliformis, sparse glandulosa, 5-lobata, 6 mm longa, lobis lanceolatis, longis, apice acutis, parce pilosis, dense glandulosis,  $2\frac{1}{2}$  mm longis. *Stylus* bifurcatus; rami acuti, pilosi, crassi, corollam paulo superantes. *Antherae* ad basin breviter sagittatae, apice acuminatae, acutissimae. *Achenium* turbinatum, striatum (costis 8—10), eglandulosum, dense hirsutum,  $1\frac{1}{2}$  mm longum. *Pappus* biseriatus, setaceus; setis interioribus caducis, ciliatis,  $4\frac{1}{2}$  mm longis; setis exterioribus applanatis, ciliatis, minutis. *Receptaculum* parvum, planum, alveolatum.

Distribution in the Malay Archipelago:

L o m b o k : G. Rindjani, TENGWALL 33 (L), type specimen, (B, K).

Altitude: 2000—3000 m.

Flowers: Oct.

This *Vernonia* is to be distinguished from the allied species *V. lanceolata* and *V. Elmeri* by the very long attenuate, flexible involucrial scales, the achene without glands and the leafy inflorescence. From *Vernonia Teysmanniana* it is to be distinguished by the ribbed achene.

(14) *Vernonia laxiflora* LESS. in *Linnaea* VI (1831) 646; DC. *Prod.* V (1836) 25; ZOLL. in *Nat. Gen. Arch. Néerl. Ind.* II (1845) 221; *Miq. Fl. Ind. Bat.* II (1856) 14; KOSTER in *Fedde Repert.* XXXIV (1933) 2 — Pl. I, *d*; II, 17—19.

Herbaceous more or less branched, 25—80 cm high; *roots* short, numerous; *stem* and *branches* thinly pubescent (hairs fairly long), terete, ribbed (ribs prominent), glandular; branches dichotomous; internodes 2—7 cm long. *Leaves* petiolate (petioles 1—4 cm long), elliptic, broadly elliptic-ovate, nearly round or rhomboid-elliptic, gradually attenuate to the top, abruptly attenuate at the base, continued by a narrow part along the petiole, acute at the top, serrate (teeth and top sharply mucronate) or subentire, sparsely hirsute, scabrid above, glandular, pubescent beneath, membranous, pinni-nerved (lateral nerves 4—5 pairs), blades 1— $6\frac{1}{2}$  cm long,  $1\frac{1}{2}$ —3 cm broad; upper leaves sessile, narrowly rhomboid-elliptic or lanceolate-elliptic; blades 1—4 cm long,  $\frac{1}{2}$ —1 cm broad. *Inflorescence* small, leafy, loosely paniculate; heads 3—8 together at the top of the extreme ramifications, forming small corymbose panicles in the axils of the upper leaves; lower branches of the inflorescence often longer than the superior ones. *Heads* pedunculate (peduncles slender, pubescent,  $\frac{1}{2}$ —1 cm long, having a linear bract halfway), narrowly campanulate, 10—20-flowered, 6 mm long,  $4\frac{1}{2}$ —5 mm thick. *Involucre* campanulate, 4-seriate, as long as the flowers, 6 mm long; scales slightly pubescent, glandular; of the inner row lanceolate, 3-nerved,

ending into a soft prickle at the top, of the outer rows very narrow, nearly needle-shaped, gradually widened at the base, 1-nerved, spreading. *Corolla* infundibuliform, 5-lobed, 4 mm long; lobes long, subacute, nearly as long as the limb, pilose, with some shining glands, tube slender. *Anthers* shortly sagittate at the base, subacute at the top. *Style* pilose at the upper part; branches long, subobtusate, pilose. *Achene* oblong-ovate, ribbed (ribs 6—8, prominent), white-pilose between the ribs, minutely glandular, 1—1½ mm long, less than ½ mm to ½ mm thick. *Pappus* white, biseriate, setaceous; inner row caducous, 3½ mm long, outer row ½ mm long, all ciliate. *Receptacle* flat, slightly alveolate.

Distribution in the Malay Archipelago:

Bali: Boeileng, ROBINSON 2526 (L) — Singaradja, VERMEULEN 5 (B).

Lombok: G. Rindjani, Laboean Tjarik, ELBERT 608 (L) — id. Pringabaja, ELBERT 2071 (L) — id., Sadjang, ELBERT 748 (L) — id., Bajan, ELBERT 688 (L).

Timor: FORBES 4059 (L, K), 3816 (B).

Hab.: in monsoon forests, near a river, in jungles; on a more or less dry soil, on sand or clay, in a sunny place; frequent.

Altitude: 20—700 m.

Flowers: April, June.

*Vernonia laeviflora* is recorded from Malacca by DE CANDOLLE; BIDLEY (Fl. Mal. Penins. II) does not mention it from the Peninsula; KING and GAMBLE (in Journ. As. Soc. Beng. LXXIV 2, 1905, 27) consider it as a synonym of *Vernonia cinerea*.

This *Vernonia*, having a clearly ribbed achene, is not quite in the right place in the sectio *Tephrodes*; however, it does not fit in one of the other sections of *Vernonia*.

(15) *Vernonia subtilis* nov. spec. — Pl. II, 16.

Herbacea, gracilis, parce vel non ramosa, 30—50 cm alta. *Caulis* tenuis, teres, striatus, villosus (pilis articulatis, crispis fulvis), 1½—2 mm crassus, internodiis 4—5 cm longis. *Folia* alterna, petiolata (petiolis ½ cm longis), late ovata, subrotundata, vel ovato-elliptica, apice acuta vel subobtusata (superiora breviter acuminata), mucronata, abrupte attenuata in petiolum, serrata (dentibus obtusis, mucronatis), pinninervia (nervis lateralibus 6—10), supra sparse villosa (ut in caule), verruculosa; subtus in nervis pubescentia, nigro-punctata, membranacea; laminae 3½—10 cm longae, 2—6 cm latae, eae foliorum superiorum sensim minores. *Paniculae* terminales et in axillis foliorum summorum duorum, parvae, capitulis paucis. *Capitula* longe pedunculata (pedunculis gracilibus, ½—2 cm longis, minus quam ½ mm crassis, bracteis minutis praeditis), campanulata, homogama, 18-flora, 6 mm longa, 3 mm crassa. *Involucrum*



2—3-seriatum, breve,  $2\frac{1}{2}$  mm longum; squamis oblongis, apice subobtusis et mucronatis, uni-nervibus (nervo dorso incrassato, villosa), circiter 15, in parte superiore purpurascens,  $\frac{1}{2}$  mm latis; extremis lanceolatis, apice acutissimis, 1 mm longis. *Flores* bisexuales. *Corolla* angusta, tubularis, 5-lobata, 4 mm longa; lobis lanceolatis, apice subobtusis, incrassatis,  $1\frac{1}{2}$  mm longis. *Antherae* apice breviter acuminatae, subobtusae, basi breviter obtuse sagittatae. *Stylus* pubescens, ramis brevibus, acutis. *Achenium* obovato-oblongum, obsolete 4—5 angulatum, densiuscule albo-pubescens, obsolete glandulosum, plus quam 1 mm longum,  $\frac{1}{2}$  mm crassum. *Pappus* biseriatatus, setaceus, fulvido-albus; setis internis 4 mm longis, externis paulo minus  $\frac{1}{2}$  mm longis, omnibus ciliatis. *Receptaculum* parvum, alveolatum.

Distribution in the Malay Archipelago:

Celebes: *S.W. Celebes*, Boeloe Tanah, near Lombasang, BÜNNEMEYER 11530 (L), type specimen — id., near Lombasang, BÜNNEMEYER 11648 (B), 11783 (B) — id., near Malino, BÜNNEMEYER 10895 (B).

Flowers (pale) violet (BÜNNEMEYER).

Hab.: in forests, along waysides.

Altitude: 300—850 m.

Flowers: April, May.

Probably endemic.

To be distinguished from *Vernonia cymosa* var. *eupatorioides* by the short involucre, the longer outer row of the pappus and the shape of the leaves.

(16) *Vernonia coerulea* nov. spec. — Pl. II, 21.

Herbacea? *Caulis* teres, striatus, breviter fulvide villosus, 2—4 mm crassus, internodiis 1—7 cm longis. *Folia* alterna, subsessilia vel brevissime petiolata (petiolo 0— $1\frac{1}{2}$  cm longo, incrassato), rhomboideo-elliptica, oblongo-elliptica, elliptica vel ovata, apice longe vel longissime acuminata, acuta vel obtusa, minute mucronata, ad basin sensim attenuata in petiolum, chartacea, subintegra et margine minutissime mucronulata vel integra, subtus glandulosa, pallidiora, pinninervia (nervis lateralibus 12—16, apice arcuate connectis, tertiis anastomosantibus); laminae 6—12 cm longis,  $1\frac{1}{2}$ — $4\frac{1}{2}$  cm latis; folia superiora angustiora, elliptico-lanceolata, 1 cm lata, 6 cm longa. *Inflorescentia* terminalis et in axillis foliorum superiorum, parva, corymbosa; capitulis paucis; ramis dichotomis, breviter fulvide villosis, basi nudis vel bractea parva lineari praeditis. *Capitula* homogama, parva, pedunculata (pedunculo villosa, 1—6 mm longo), campanulata, circiter 15-flora, 3—4 mm crassa, 5— $5\frac{1}{2}$  mm longa. *Involucrum* 3-seriatum, campanulatum, squamae externe sensim decrescentes, villosae, parce glandulosae, interiores aequales, oblongae apice deltoideae vel subrotundatae, obtusae, uni-nerviae, 3— $3\frac{1}{2}$  mm

longae exteriores lanceolato-lineares, apice acutissimae, 1—2 mm longae. *Flores* bisexuales, 4—5 mm longi. *Corolla* anguste infundibuliformis, 5-lobata, 3—4 mm longa, lobis subobtusis,  $1\frac{1}{2}$  mm longis. *Stylus* in parte superiore ciliatus, ramis brevibus. *Antherae* ad basin breviter obtuse sagittatae apice subobtusae. *Achenium* turbinato-cylindricum, subangulatum, 5—6 costatum, dense pubescens, (pilis albidis) minutissime glanduloso-punctatum,  $1\frac{1}{2}$ —2 mm longum,  $\frac{1}{2}$  mm crassum. *Pappus* biseriatus, setaceus, albus; setae interiores caducae, ciliatae, 3—4 mm longae; exteriores minutae. *Receptaculum* subplanum, alveolatum.

1. var. *typica*

*Folia* supra scabra et parce glandulosa, subtus breviter ferrugineo-villosa, minutissime et dense glandulosa.

Distribution in the Malay Archipelago

Timor: Soemba Madoemba, TEYSMANN 8781 (L), type specimen, (B, K).

This variety seems to be allied to *V. cymosa* var. *eupatorioides*; it is to be distinguished by the small heads, the involueral scales and by the entire or nearly entire leaves.

2. var. *glabrata* nov. var.

*Folia* utrinque subglabra vel subtus parce pubescentia; subtus glandulosissima.

Distribution in the Malay Archipelago:

Soemba: Maomarroe, IBOET 406 (L), type specimen, (B, K) — Laora, IBOET 205 (L, B, U).

Flowers (pale) blue (IBOET).

Vernacular names: *tandalapowa*, *tegoelawa*.

Hab.: in a forest.

Flowers: April, May.

(17) *Vernonia cymosa* BL.! Bijdr. (1825) 894 — Pl. II, 23—24.

Robustly herbaceous or nearly a shrub, more or less branched, 25—170 cm high. *Stem* and *branches* terete, ribbed (ribs prominent), pubescent, villous or subglabrous, glandular, more or less purplish; stem 8—10 mm thick at the base; internodes 2—9 cm long. *Leaves* petiolate (petioles  $\frac{1}{2}$ —2 cm long, 1 mm broad), oblong-lanceolate, elliptic-oblong or ovate-elliptic, attenuate at both ends, more or less long acuminate, acute at the top, narrowed into the petiole at the base, more or less rugose, paler beneath, membranous or chartaceous, serrate (teeth  $\frac{1}{2}$  mm long, broadly mucronate, subobtuse, 3—5 mm distant, directed forward) or subentire, warty, subglabrous or sparsely pilose above; glandularly spotted, pubescent or villous beneath, pinni-nerved (lateral nerves 5—12 pairs; extreme ones reticulate, often prominent beneath); blades

7—16 cm long, 2—5 cm broad; upper leaves subsessile, lanceolate,  $2\frac{1}{2}$ — $6\frac{1}{2}$  cm long,  $\frac{1}{2}$ —2 cm broad. *Panicles* terminal, luxurious, ample, corymbose, 5—12 cm high, 9—18 cm broad, branches dichotomous, pubescent, lower ones having a small leaf at the base. *Heads* campanulate, pedunculate (peduncles long, thin, 1—2 cm long, pubescent having 1—3 villous linear bracts at the top of halfway), about 20-flowered, 6—7 mm long, 4—5 mm thick. *Involucre* campanulate, 4-seriate; scales lanceolate, tomentose, glandular, 1-nerved; of the inner row  $3\frac{1}{2}$ —5 mm long,  $\frac{1}{2}$  or nearly 1 mm broad, subobtusate and mucronate or nearly rounded, sometimes minutely serrate at the top; of the outer rows narrow, sharply acuminate; of the extreme row 1 mm long. *Flowers* exceeding the involucre. *Corolla* infundibuliform, glandular, 4—5 mm long, 5-lobed; lobes lanceolate-linear, subobtusate, slightly pubescent at the top, 1—2 mm long. *Style*-branches pubescent. *Anthers* shortly sagittate at the base (tails subobtusate), acute at the top. *Achene* narrowly oblong, obscurely 5-angular, glandular, sparsely whitish appressed-pubescent, 1— $1\frac{1}{2}$  mm long,  $\frac{1}{2}$  mm wide. *Pappus* biseriate; setae of the inner row silky, white minutely ciliate, 4—5 mm long; outer row existing of minute flattened hairs, permanent, forming a strawy fringe at the top of the achene. *Receptacle* flat, alveolate; margins of the pits paleaceous.

Distribution: Sumatra, Java.

1. var. *typica*; *Vernonia cymosa* BL.! Bijdr. (1825) 894; DC. Prod. V (1836) 26; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 221; MIQ.! Fl. Ind. Bat. II (1856) 13; BOERL. Fl. Ned. Ind. II (1899) 235; *Vernonia rugosa* BL.! Bijdr. (1825) 894; DC. Prod. V (1836) 26; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 221; MIQ.! Fl. Ind. Bat. II (1856) 13; BOERL.! Fl. Ned. Ind. II (1899) 235; KOORDERS Exc. Fl. Java III (1912) 315; HOCHREUTNER in Candollea V (1931—1934) 298; *Vernonia vialis* SCH.-BIP.! (non DC.) in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Fl. Ind. Bat. II (1856) 12; BOERL. Fl. Ned. Ind. II (1899) 235.

*Stem* and *branches* thinly appressed-pubescent on the ribs (hairs fulvous or greyish, straight) or subglabrous; *leaves* more or less pubescent on the nerves beneath.

Distribution in the Malay Archipelago:

Sumatra: *West Coast*: G. Singalang, BÜNNEMEYER 2523 (L), 2578 (L), 2589 (B), 2976 (B) — G. Merapi, BÜNNEMEYER 1256 (B), 4521 (L, U), 4778 (L) — G. Malintang, BÜNNEMEYER 3514 (L) — G. Talang, BÜNNEMEYER 5176 (L) — Boekit Batoe, Banting, JACOBSON s.n. (B) — G. Koeriman, LKoto, BÜNNEMEYER 3288 (B) — S. A. Ramboetan, LKoto, BÜNNEMEYER

MEYER 3408 (L) — Fort de Kock, Karbouwengat, BÜNNEMEYER 1301 (B).

**J a v a:** *West Java:* Tjibodas, Priangan, SAPIIN 2567 (U, B), BOERLAGE s.n. (L, B), HALLIER 80 (B), 442 (B), RAAP 660 (L), KOORDERS 31833 (B), BRUGGEMAN 189 (B), VAN STEENIS 1863 (B) — Tjihandjavar, near Wanajasa, s. of Poerwakarta, BAKHUIZEN VAN DEN BRINK 4320 (L, K) — Tjikopo, Buitenzorg, BOERLAGE s.n. (L) — Kapala tjiburum, G. Gede, BLUME s.n. (L) — G. Papandajan, BOERLAGE s.n. (L), KORTHALS s.n. (L) — Tankoban Prahoe, KORTHALS s.n. (L) — Bandoeng, VAN DER VEEN s.n. (L) — id., Tjinjiroean, DOCTERS VAN LEEUWEN s.n. (B), SMITH and RANT 548 (B), ZEYLSTRA 3 (B), coll. unknown (B) — Priangan, plant. Malabar, PULLE 2661 (U), DENKER 107 (B) — G. Malabar, ANDERSON 350 (K) — G. Telagabodas, Priangan, BACKER s.n. (B), KOENS 281 (B) — G. Mandalagiri, LAM 203 (B) — Buitenzorg, HALLIER s.n. (B) — Garoet, BURCK 147 (B), VAN VUUREN s.n. (B), KOORDERS 26650 (B) — Noesagede in the lake of Pendjaloe, KOORDERS 48002 (B) — G. Galoengoeng, BACKER 8623 (B) — G. Boerangrang, BACKER 14176 (B), Wanajasa, BAKHUIZEN VAN DEN BRINK 4652 (B) — G. Goentoer, KOENS 379 (B) — G. Gede, south slope, BACKER 15191 (B), id. Tjisaroea, VAN STEENIS 4448 (B) — Sindanglaya, Priangan, VALETON s.n. (B) — Bandoeng, SOEGANDIREDA 257 (B) — Rongga, near Bandoeng, LÖRZING 1256 (B) — Lembang, near Bandoeng, VAN WELSEME 7 (B) — Njalindoeng, BACKER 14580 (B) — G. Tjikoraj, BACKER 5338 (B) — W. Patoeha, near Rantjawalini, Priangan, LÖRZING 1298 (B) — Tjibeber, WINCKEL 1475 (B), BAKHUIZEN VAN DEN BRINK 628 (B) — G. Karang, KOORDERS 40655 (B) — G. Tjere-mai, BACKER 4776 (B), 4870 (B), 4916 (B) — G. Beser, near Tjiandjoer, VAN STEENIS 5468 (B); *Middle Java:* G. Prahoe, VAN DER PLJL 291 (B); *Java:* Oepan Oepan, WAITZ? s.n. (L); Oengaran-Garoeng, DOCTERS VAN LEEUWEN-REYNVAAN s.n. (U); Java, ZOLLINGER 1096 (Br. M.), WAITZ s.n. (L), KORTHALS s.n. (L), BLUME s.n. (L, sub nomine *Vernonia cymosa* BL.), HORSFIELD 13 (K, sub nomine *Vernonia eupatorioides* BL. var. *Horsfieldiana* MIQ.), Pl. Junghuhniana ineditae 52 (K); Java, Jatikalangan, JUNGHUHN 315 (L, U).

Flowers blue (BÜNNEMEYER), violet (KOORDERS a.o.) red (HALLIER); limb of the corolla and style-branches pale lilac; corolla for the rest white (VAN STEENIS). Involucral scales greenish brown (LAM), pale green (VAN STEENIS). Up to 1 m high (VAN STEENIS).

Vernacular names: *ambong ambong* (Sumatra), *sitoehoe* (Sumatra), *djonghege* (Soend.), *semboeng* (*beureum*) (Soend.).

Hab.: along waysides, in primeval and second growth forests, in jungles, in Cinchona and tea plantations, as a weed in gardens, along rice-fields; common, many together.

Altitude: 500—2000 m.

Flowers: Jan., March, May, Nov.

Use: the Javanese use the fresh plant after crushing against stomach ache (WARZ); on Sumatra drawn as tea for the same purpose (BÜNNEMEYER).

The Sumatran specimens have, as a rule, very luxurious inflorescences and small elliptic leaves, sometimes obtuse and mucronate at the top.

The type specimen of *Vernonia cymosa* BL. has very young buds only; it agrees with the type specimen of *V. rugosa* BL.

2. var. *eupatorioides* (BL.) nov. comb.; *Vernonia eupatorioides* BL.! Bijdr. (1825) 894; ZOLL.! in Nat. Gen. Arch. Neêrl. Ind. II (1845) 222; MIQ.! Pl. Jungh. (1854) 495; MIQ.! Fl. Ind. Bat. II (1856) 14; DC. Prod. V (1836) 26; BOERL. Fl. Ned. Ind. II (1899) 235; KOORDERS! Exc. Fl. Java III (1912) 315; id. in Nat. Tijdschr. Ned. Ind. LX (1901) 253; HOCHREUTINER in Candollea V (1931—1934) 297; *Vernonia Horsfieldi* MIQ. in Herb. (U), Java, HORSFIELD; *Vernonia eupatorioides* BL. var. *Horsfieldiana* MIQ. in Herb. (K), HORSFIELD 13; *Vernonia eupatorioides* BL. var. *erythrolepis* MIQ.! Pl. Jungh. (1854) 495; MIQ.! Fl. Ind. Bat. II (1856) 15; HOCHREUTINER in Candollea V (1931—1934) 297; *Vernonia eupatorioides* var. *tenggerensis* HOCHREUTINER l.c.; *Vernonia eupatorioides* BL. var. *parviflora* MIQ. Fl. Ind. Bat. II (1856) 15; *Vernonia vialis* SCH.-BIP.? in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Fl. Ind. Bat. II (1856) 12.

*Stem and branches, leaves beneath* (especially on the nerves) and peduncles villous (hairs spreading, crisped, purplish-brownish striate). Peduncles rigid. *Heads* often large, to 8 mm high, 6 mm thick; *involucral scales* oblong-lanceolate, to 1 mm broad, to 6 mm long, more or less purplish to dark purple. *Corolla* to 6 mm long.

Distribution in the Malay Archipelago:

**Java:** *West Java:* G. Boerangrang, summit (ex BLUME l.c.) — G. Tankoeban Prahoe, JUNGHUHN 318 (L) — Tjimahi, Priangan, VAN OORT, det. KORTHALS s.n. (L); *Middle Java:* G. Dieng, WIRIOSAPOETRO 41 (L), JUNGHUHN 361 (L, U), det. MIQUEL *Vernonia eupatorioides* BL. var. *erythrolepis* MIQ., TEYSMANN s.n. (B), BRINKMAN 181 (B), VAN STEENIS 4513 (B), BACKER 21627 (B), id., summit, BLOKHUIS s.n. (B), id. south slope, BACKER 21851 (B) — id., G. Pangonau, VAN STEENIS 4555 (L) — G. Merapi, JUNGHUHN 318 (L) — G. Merbaboe, JUNGHUHN 361 (L), det. MIQ. *Vernonia eupatorioides* BL. var. *erythrolepis* MIQ., BACKER 30248 (B), id., south east slope, DEN BERGER 94 (B) — G. Soembing, north north east slope, LÖRZING 30 (B) — Petoeng Kriono, Pekalongan, BACKER 15813 (B) — Josoredjo, Pekalongan, BACKER 16122 (B) — G. Prahoe, LÖRZING 480 (B); *East Java:* G. Tengger, WENT s.n. (L),

SCHIMPER s.n. (L), ZOLLINGER s.n. (L), KOORDERS 37428 (B), KOBUS s.n. (B), MOUSSET 855 (L), s.n. (Br. M.), HOCHREUTINER 2738 (G) — id., Ngadisari, KOORDERS 37427 (L, K), 37395 (B) — id., Tosari, VAN DER MEER MOHR s.n. (B) — id., Bromo, JESWIET s.n. (B) — id., Oengoeop Oengoeop, ZOLLINGER s.n. (L) — Katjep, Sitoebondo, OTTOLANDER 350 (B) — Plateau of Idjen, BACKER 25137 (B), KOORDERS 20808 (B), 22212 (B), CLASON-LAARMAN D 89 (B) — id., between Sempal and G. Merapi, BACKER 25267 (B) — Pantjoer-Idjen, Sitoebondo, KOORDERS 28502 (B), 28535 (L), 28532 (L), 32554 (B) — Kawah-Idjen, KOORDERS 43354 (L) — Gendingwaloe, KOORDERS 43356 (L), 43355 (B), 43353 (B) — G. Ardjoeno, BREMEKAMP s.n. (B), RANT s.n. (B) — Nongkodjadjar, WISSE 560 (B) — G. Bafoeran, CLASON-LAARMAN F 117 (B) — G. Sigogor, Madioen, KOORDERS 29184 (B) — near the lake of Ngebel, WISSE 734 (B); Java: BLUME 1443 (L), JUNGHUHN s.n. (L), Pl. Junghuhnianae ineditae 52 (L), ZOLLINGER 2171 (Br. M.), HORSFIELD s.n. (U), det. MIQUEL sub nomine *Vernonia Horsfieldi* MIQ.

Flowers purplish or bluish violet (ZOLLINGER a.o.), pink (BRINKMAN), slightly fragrant (LÖRZING); up to 2 m high (BACKER, MOUSSET). More or less decumbent at the base, erect for the rest (LÖRZING).

Vernacular names: *trasen*, *semboeng (an)*, *semboeng lakki*, *djoenggoelan*, *bak-roembaän* (all Java).

Hab.: in Casuarina- and other forests, in jungles, on grassy hills, along waysides, in a ravine, as a weed in gardens, along the edge of a crater; on a sandy dry soil; few or numerous together; common.

Altitude: 600—2700 m.

Flowers during the whole year.

Up to the present time *Vernonia rugosa* and *Vernonia eupatorioides* have considered as two different species. Though the type specimens seem to be sufficiently different, all kinds of intermediate forms are to be found: the specimen from Bandoeng (SOEGANDIRENJA 257) has an indumentum like *Vernonia rugosa*, but there are some articulate, crisped hairs mixed. Most of the specimens of *Vernonia eupatorioides*, collected on the G. Dieng are thinly villous.

Both species are mostly identified as *Vernonia cinerea* (L.) LESS. They are easy to be distinguished from that species by the achenes which are 5-angular, the shape of the leaves and the involucreal scales, which are obtuse and mucronate at the top.

3. var. *Teysmanniana* (MIQ.) nov. comb.; *Vernonia Teysmanniana* MIQ.! Fl. Ind. Bat. II (1856) 14; BOERL. Fl. Ned. Ind. II (1899) 235.

*Stem, branches and leaves* thinly villous (hairs spreading, crisped, striate) beneath. *Leaves* lanceolate, sessile, long attenuate and acute at both ends; 7—8 cm long, 1—1½ cm broad. Scales of the *involucrum* linear-lanceolate, very long and sharply gradually attenuate at the top.

Distribution in the Malay Archipelago:

**J a v a:** *East Java:* G. Wilis, TEYSMANN s.n. (U, K) det. MIQUEL, TEYSMANN, Herb. Sulp. KURZ s.n. (B).

4. var. *incana* nov. var.

*Caulis, rami* et pedunculi dense pilis incanis appressis vestiti. *Folia* elliptico-oblonga vel oblongo-lanceolata, longe mucronato-serrata (mucronibus dentium 1 mm longis, acutis), nervis fulvide lanato-villosis subtus; reticulatio subtus valde prominens. Squamae *involucri* interiores apice longe et acutissime acuminatae.

Distribution in the Malay Archipelago:

**J a v a:** *East Java:* G. Hijang, KOORDERS 43637 (B), type specimen, BACKER 9586 (B) — id. G. Argopoero, BACKER 13296 (B) — G. Tengger, BEUMÉE A 631 (B), ZOLLINGER 1486? (L), sub *Vernonia vialis* DC.? det. ZOLLINGER — G. Andjasmoro, west slope, above Segoeneng, WINCKEL 82 (B) — Nongkodjadar, VAN OOSTEN s.n. (B) — G. Kawi, DOCTERS VAN LEEUWEN 12470 (B); **J a v a:** JUNGHUHN pl. ineditae 52 (L).

Flowers (pale) violet (ZOLLINGER a.o.); shrub (DOCTERS VAN LEEUWEN).

The indumentum of the branches of the specimen from Gendingwaloch (KOORDERS 43353 (B)) is partly like that of *Vernonia cymosa* Bl. var. *eupatorioides*, partly like that of *Vernonia cymosa* Bl. var. *incana*.

IV. Sectio *Cyanopis* Bl. Fl. Javae (1828) VI (nomen nudum); DC. Prod. V (1836) 69; MIQ. Fl. Ind. Bat. II (1856) 18; BENTH. et HOOK. Gen. Pl. II (1873—1876) 229 (p.p.); OLIVER Fl. trop. Afr. III (1877) 268 (p.p.); HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 126 (p.p.); *Cyanthillium* Bl. Bijdr. (1825) 889.

Pubescent herbs. *Leaves* subsessile or shortly petiolate; narrowed into the petiole, pilose or white tomentose, often glandular beneath. *Heads* broadly campanulate, pedunculate, many-flowered, cymose or corymbose, or few together at the top of dichotomous branches. *Involucral scales* linear-lanceolate to oblong, acute to very pointed at the top. *Anthers-tails* acute or subobtusely. *Achene* 4—7 (mostly 5)-angular, glandular, glabrous or subglabrous. *Pappus* uniseriate, caducous.

Trop. Asia and Africa.

#### Key to the species.

1. a. Heads 5—10 mm long, 4—10 mm wide; involucral scales lanceolate, very acute at the top or ending into a prickle; inner ones with scarious edges. Achene 1—1½ mm long, having a thickened ring at the top. (18) *V. patula*.
- b. Heads large, 10—11 mm long, 9 mm wide; involucral scales oblong, having a long needle at the top and scarious fringed edges. Achene 1½—2 mm long, having a prominent disc at the top . . . (19) *V. moluccensis*.

(18) *Vernonia patula* (DRYAND.) MERRILL in Phil. Journ. Sci. III (1908) 439.

Herbaceous, nearly shrubby, 20—70 cm. high. *Roots* crowded, numerous. *Stem* much branched at the base and all along the stem, terete, ribbed, sparsely pubescent (hairs long, appressed), sometimes purplish, 2—8 mm thick; branches spreading, younger ones greyish villous; internodes  $\frac{1}{2}$ — $7\frac{1}{2}$  cm long. *Leaves* very variable, petiolate or sessile (petioles 3—20 mm long), more or less broadly ovate, ovate-elliptic, nearly circular or elliptic, suddenly attenuate into the petiole, acute at the base, acuminate and acute or obtuse and mucronate at the top, mucronately serrate or mucronately repandate or subentire, subglabrous or slightly pubescent, minutely warty, dark coloured above, greyish silky villous (hairs fairly long) or felty tomentose or subglabrous, glandular beneath, pinni-nerved (nerves more or less prominent beneath, lateral ones 3—5 pairs), membranous or chartaceous; blades  $2\frac{1}{2}$ — $10\frac{1}{2}$  cm long, 1— $4\frac{1}{2}$  cm broad; superior leaves sessile, smaller, to  $\frac{1}{2}$  cm broad and  $1\frac{1}{2}$  cm long. *Heads* fairly many, few together (3—5) at the top of dichotomous branches, pedunculate (peduncles 1— $4\frac{1}{2}$  cm long, in the axils of the upper leaves and at the top of the branches; bearing one or two heads (if two, the heads are on differently long peduncles, 3—15 mm long), having a linear bract at the base or higher on) campanulate, subglobular. *Involucre* 4-seriate, scales ending into a prickle, dark coloured on the upper central part, sparsely greyish villous, more or less glandular, sometimes purplish, attenuate at the top; inner ones oblong-lanceolate or lanceolate, mucronate at the top, 1—3-nerved, 1— $1\frac{1}{2}$  mm broad, with narrow scarious edges; outer ones subulate, 1-nerved; extreme ones 3 mm long, terminating into a prickle (1 mm long). *Flowers* hardly exceeding the involucre, numerous. *Corolla* infundibuliform (subcampanulate at the superior part), 5-lobed, lanceolate, oblong, subacute at the top, glandular, having few hairs at the superior part, about  $\frac{1}{3}$  of the length of the corolla. *Style*-branches short, acute. *Anthers* acuminate, acute at the top, sagittate at the base (tails long, subobtusate). *Achene* obovate-oblong, 4—6 (mostly 5)-angular (ribs prominent), glabrous, glandular, 1— $1\frac{1}{2}$  mm long,  $\frac{1}{2}$  mm wide, having a thickened ring at the top. *Pappus* uniseriate, caducous, setaceous; setae obscurely ciliate, white, 2 mm long. *Receptacle* nearly flat or convex, alveolate.

Distribution: Mal. Penins., Indo-Chine, S. China, Japan, Formosa, Philippines, Mal. Arch., New Guinea.

1. var. *typica*; *Conyza patula* DRYAND. in AITON Hort. Kew. III (1789) 184, WILLD. Sp. Pl. III (1804) 1919; *Vernonia patula* MERRILL.



in Phil. Journ. Sci III (1908) 439; MERRILL Enum. Phil. III (1923) 594; MATTF.! in Engl. Bot. Jahrb. LXII (1929) 400; BACKER Handb. Suikerr. VII (1932) 752; *Conyza chinensis* LAM. (non LINN.) Enc. II (1790) 83; *Cyanthillium villosum* BL.! Bijdr. (1825) 889, *Centratherum chinense* LESS. in Linnaea IV (1829) 320; *Vernonia chinensis* LESS. in Linnaea VI (1831) 105, 674; MIQ. Pl. Jungh. (1854) 496; BENTH. Fl. Hongk. (1861) 169; CLARKE! Comp. Ind. (1876) 18; KURZ in Journ. As. Beng. XLVI 2 (1877) 200; HOOK. Fl. Br. Ind. III (1882) 235; FORBES et HEMSLEY in Journ. Linn. Soc. Bot. XXIII (1886—1888) 401; WARBURG in Engl. Bot. Jahrb. XIII (1891) 448; BOERL. Fl. Ned. Ind. II (1899) 235; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV 2 (1905) 26; ELMER Leaf. Phil. Bot. I (1906) 93; MATSUMURA et HAYATA in Journ. Sci. Tokyo XXII (1906) 201; KOORDERS Exc. Fl. Java III (1912) 314; RIDLEY Fl. Mal. Penins. II (1923) 188; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 469; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1430; HOCHREUTINER in Candollea V (1931—1934) 297; *Cyanopsis villosa* DC. Prod. V (1836) 69; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 223; *Cyanopsis pubescens* (non DC.) Zoll.! in Nat. Gen. Arch. Neêrl. Ind. II (1845) 223; SCH.-BIF.! in Zoll. Syst. Verz. Ind. Arch. (1854) 120; *Vernonia accedens* MIQ.! Fl. Ind. Bat. II (1856) 18; BOERL. Fl. Ned. Ind. II (1899) 235; KOORDERS Excl. Fl. Java III (1912) 315; *Vernonia chinensis* LESS. var. *villosa* MIQ. Fl. Ind. Bat. II (1856) 18; *Cyanthillium chinense* (LAM.) GLEASON in Bull. Torr. Bot. Club XL (1913) 306.

*Leaves* more or less densely greyish silky villous, submembranous or chartaceous. *Heads* broadly campanulate, 75—100-flowered, 6—8 mm wide. *Involucre* broadly cup-shaped, nearly as long as the head, 6—8 mm long. *Corolla* 3—4 mm long.

Distribution in the Malay Archipelago:

Sumatra: *Atjeh*: Gajo and Alas-districts, Panampakan, Exped. VAN DAALEN 268 (L, B) — Takengon, VAN STEENIS 6152 (B) — Alas-valley, near Koetatjane, LÖRZING 11114 (B); *East Coast*: near Medan, LÖRZING 3100 (B), 3729 (B), 3775 (B) — Sibolangit, LÖRZING 3884 (B) — plateau of Karo, near Singga manik, GALOENGI 3 (B) — Karo-districts, near Perbesi, LÖRZING 8814 (B) — Asahan, BARTLETT and LA RUE 150 (K) — Tandjoeng Morawa, LÖRZING 3987 (B); *Tapanoeli*: Toba, OUWEHAND 137 (B), 267 (B) — Baliga, near the lake of Toba, LÖRZING 8048 (B) — near Pangoeroeran, P. Samosir in the lake of Toba, LÖRZING 7659 (B); *West Coast*: Indrapoera, KORTHALS s.n. (L) — Koerintji, Bt. Tebakar, BÜNNEMEYER 7927 (L, K, U) — Koerintji, Singarong agong, ROBINSON and KLOSS 2450 (K, Br. M.) — Koerintji, Sandaran agong,

ROBINSON and KLOSS s.n. (K) — Koerintji, Kota Gadang, BÜNNEMEYER 8260 (B) — G. Sago, BÜNNEMEYER 3655 (B); *Djambi*: near Bangko, POSTHUMUS 553 (L, B) — Pahoe, POSTHUMUS 1078 (L, U, B, K) — Doessoen Baroe, POSTHUMUS 880 (B) — *Djambi*, POSTHUMUS 671 (B); *Lampongs*: estate Wai Lima, IBOET 331 (B); Sumatra, KORTHALS s.n. (L).

*Simaloer*: ACHMAD 731 (L, U).

*Riouw Arch.*: *P. Bintan*, Senggarang, BÜNNEMEYER 6505 (L, U, K).

*Lingga Arch.*: *P. Lingga*: Resoem, BÜNNEMEYER 6766 (L, K); *P. Lingga*, BÜNNEMEYER 7039 (L).

*Java*: *West Java*: Batavia, ZOLLINGER s.n. (L), RAYNAUD s.n. (L), PIEPERS s.n. (B), VORDERMAN s.n. (B), BACKER 32930 (B) — south of Tji Kampek, Batavia, VAN STEENIS 4751 (B) — between Buitenzorg and Tjipanas, WINTERSBOTTOM s.n. (K) — Buitenzorg, KOORDERS 32664 (B), SCHEFFER s.n. (B), BAKHUIZEN VAN DEN BRINK 2179 (B), HALLIER 155a (B) — Tjampea, KOORDERS 31473 (L) — Wanajasa BACKER 14362 (B) — Tjendo, Batavia, BACKER 24023 (B) — Depok, KOORDERS 31299 (L) — S.W. of Depok, BAKHUIZEN VAN DEN BRINK 5733 (L, B) — Krawangea, Batavia, BEUMÉE 5406 (B) — G. Salak, foot, BAKHUIZEN VAN DEN BRINK 335 (B), 3676 (L, U) — Pendjaloe, Priangan, KOORDERS 48003 (L) — west of G. Masigit, Priangan, VAN STEENIS 4437 (B) — G. Papandajan, foot, BOERLAGE s.n. (L) — Garoet, KOENS 315 (B), 42 (B), 160 (B), 60 (B), BURCK s.n. (B) — Bandoeng, EYKEN s.n. (B), BACKER 32933 (B) — Poerwakarto, BACKER 13778 (B) — Pasaoeran, Bantam, BACKER 7276 (B) — Rankasbitoeng, Bantam, BACKER 1008 (B) — near Krawang, KORTHALS s.n. (L), VAN STEENIS 4437 (B) — Radjamandala, Priangan, BACKER 13478 (B) — near Soekaboemi, G. Kate, BACKER 15055 (B) — Soekaboemi, BACKER 14627 (B) — near Tjebeber, Priangan, BACKER 22914 (B), BAKHUIZEN VAN DEN BRINK 56 (B) — between Tjiandjoer and G. Malabar, BACKER 3132 (B) — Bandjar, BACKER 4342 (B) — Tjitjalenka, WISSE 861 (B) — G. Goentoer, WINCKEL 1975 (B) — Sindanglaya, VALETON s.n. (B) — Pandaglang, BACKER 7503 (B) — Bandoeng, VAN STEENIS 1697 (B) — Tjisaroea, near Buitenzorg, RAAP 852 (L); *Middle Java*: Soebah, Pekalongan, KOORDERS 27345 (L) — G. Sendoro, LÖRZING 357 (B) — Brebes, BACKER 15423 (B) — Banjoemas, BACKER 18546 (B) — near Poerwokerto, BACKER 107 (B) — Wonosobo, Serajoe-valley, BRINKMAN 301 (B) — Semarang, KOORDERS 25215 (B) — G. Moeria, near Petjangaän, Koedoes, DOCTERS VAN LEEUWEN 771 (U, B) — Regaloh, Semarang, BEUMÉE 637 (B), 3945 (B) — Kedoengdjati, KOORDERS 24926 (L), 25073 (B), 27251 (B) — Djoewono, Semarang, TEYSMANN s.n. (B)

— between Randablatoeng and Blora, BLOKHUIS s.n. (B). — near Blora, BLOKHUIS s.n. (B). — Tempoeran, Semarang, BEUMÉE 5100 (B). — Djapara, Jawana, Semarang, KOORDERS 34928 (B). — Pasokan, Djapara, KOORDERS 41210 (B); *Soerakarta*: between Djepitoe and Kalak, G. Kidoel, BACKER 2808 (B). — Solo, HEMKEN s.n. (B); *East Java*: Madioen, KOORDERS 23370 (B). — S. Kediri, KRAMER 153 (B). — Poeger, Djember, KOORDERS 20549 (L), 20550 (L). — Blambangan, HORSFIELD, det. MIQ. sub nomine *Vernonia accedens* MIQ., s.n. (U). — Tjoeramanis, near Malang, KOORDERS 28748 (B). — Bondowoso, VORDERMAN 2772 (B); Java, BLUME, sub nomine *Cyanthillum villosum* BL., s.n. (L), KORTHALS s.n. (L), HORSFIELD 12, sub nomine *Vernonia accedens* MIQ., s.n. (K), JUNGHUHN s.n. (L), ZOLLINGER 2673 (Br. M.), 6 (L, K, Br. M.), det. SCH.-BIP. (L).

Kangean Arch.: *P. Sepandjang*, BACKER 28852 (B).

Borneo: *S. Borneo*, Banjermassin, MOTLEY 312 (K). — G. Pamat- tin, KORTHALS s.n. (L).

Celebes: Bontoparang, south of Makassar, Exped. VAN VUUREN 12 (L). — Baloe Parigi, near Tanetti, S.W. Celebes, BÜNNEMEYER 12485 (L). — P. Wali, VAN VUUREN 377 (B). — Badjo, Manado, VAN VUUREN 201 (B). — near Gorontalo, FORSTEN s.n. (L).

Moluccas: *Ceram*: RANT 189 (B).

Flowers purple (DOCTERS VAN LEEUWEN), pale violet (BAKHUIZEN VAN DEN BRINK), tube of the corolla white to pale violet, limb purple; rarely whole flower white (ex BACKER l.c.); branches of the style purple, anthers pale violet (ex BACKER l.c.). Erect herb, up to 1 m high (KOORDERS, LÖRZING).

Vernacular names: *gletang warak*, *menjawang menjawang*, *njawoenan*, *lontja piit*, *gletangan*, *singa tadjem*, *trasèn*, *wegètan*, *jawoen*, *tjamoening* (all Java), *boejoeng boejoeng* (Bali), *sriawan*, *proewangi*, *njirang poetih* (all Sum.), *galoengi karo karo timoelingga* (Karo-districts), *alioto oeding* (Simaloer).

Hab.: in teak and other forests, in jungles, in dry and wet rice-fields, in maize-fields, along waysides, ponds and ditches, in kampongs, in grassy fields, on dikes; mostly on sunny, sometimes shady, dry (rarely less dry) soils; on sandy soils, on marly limestone, on weathered tuff; common, few or numerous together.

Altitude: 0—1200 m.

Flowers during the whole year.

Distribution: Japan, China (Fukien!, Canton!, Yunnan!, Hainan!, Hongkong!, Kwantung!), Formosa!, Burma!, Annam!, Cochinchina!, Tonking!, Laos, Cambodge, Siam!, Mal. Penins., Penang!, Philippines (Luzon!, Negros!, Paragua, Mindoro!, Panay!), Carolines!, Marianne Islands!, New Guinea, Bismarck Arch. Introduced into America (ex MATTF. l.c.; West Indies, ex GLEASON l.c.).

2. var. *pubescens* (BL.) nov. comb.; *Cyanthillum pubescens* BL.! Bijdr. (1825) 890; *Cyanopsis pubescens* DC. Prod. V (1836) 69.

*Leaves* greyish thinly felty tomentose or subglabrous beneath, mem-

branous. *Heads* narrowly campanulate, 25—40-flowered, 4—6 mm wide. *Involucre* narrowly campanulate, 5—7 mm long. *Corolla* elongated, 4—5 mm long.

Distribution in the Malay Archipelago:

**J a v a:** *West Java:* Batavia, JUNGHUHN 334 (L), HALLIER 776 (B), chinese cemetery, HALLIER s.n. (B), KOORDERS 32928 (B) — Buitenzorg, BOERLAGE s.n. (L), BAKHUIZEN VAN DEN BRINK 6896 (B), KOORDERS 32617 (B), 32664 (B), SOEGANDIRENJA 117 (B), 118 (B), BACKER 5943 (B) — G. Batoe, Priangan, RAAF 566 (L); *Middle Java:* Poerwokerto, BACKER 4 (B) — Kradenan, Blora, WEDA 2985 (B) — Djapara, KOORDERS 33497 (B); *Soerakarta:* Klaten, LEEFMANS 123 (B), 131 (B); *East Java:* Ngawi, BACKER 6654 (B) — res. Madioen, WISSE s.n. (B) — Madioen, BACKER 6863 (B) — S. Soerabaja, BEUMÉE 2615 (B) — Gadoengan, Pare, KOORDERS 41498 (L) — Tangkil, Southern hills, KOORDERS 22656 (L) — near Manggis, near Soekoredjo, KOORDERS 22914 (B) — Kediri, BACKER 11264 (B) — Prigi, Kediri, BACKER 11856 (B) — Gondang, near Malang, BACKER 3460 (B) — Malang, WISSE 236 (B) — G. Tengger, BULJSMAN s.n. (U), MOUSSET 201 (B) — Kependjen, Malang, ISMAIL 31 (B) — G. Bentar, near Probolinggo, BACKER 24310 (B) — Lawang, BLOKHUIS s.n. (B) — Pasoeroean, DOCTERS VAN LEEUWEN 8994 (B) — Djatiroto, BACKER 8078 (B) — res. Pasoeroean, BACKER 24170 (B) — Bangil, BACKER 7589 (B) — Tarokan, Pasoeroean, BEUMÉE 2826 (B) — Ranoe Klakah, Pasoeroean, VAN SLOOTEN 2391 (B) — Soemberwaroe, Bondowoso, KOORDERS 43903 (L) — Tjoeramanis, Djember, KOORDERS 28748 (B), 28750 (B) — Asembagoes, Bondowoso, BACKER 8176 (B) — Sitoebondo, BACKER 24432 (B) — Ardjasa, near Sitoebondo, BACKER 24752 (B) — Poeger, BACKER 17772 (B) — G. Idjen, BACKER 24944 (B); *Java*, BLUME, sub nomine *Cyanthillium pubescens*, s.n. (L), HORSFIELD 14 (K), herb. SCH.-BIP. (K).

**M a d o e r a:** Soemenep, BACKER 20622 (B) — Amboenten, BACKER 21236 (B) — Pamekasan, BACKER 20344 (B) — Sampang, BACKER s.n. (B) — Tanahmerah, BACKER 19369 (B) — Kamal, DOCTERS VAN LEEUWEN s.n. (U, B) — Bangkalan, BACKER 19060 (B) — Rapa, BACKER 20276 (B) — Balega, BACKER 19520 (B) — Madoera, VORDERMAN 150 (B).

**B a l i:** N.W., VAN DER PAARDT 78 (B) — G. Kelatakan, MAIER 93 (L).

**T i m o r:** CURTIS s.n. (K).

**K a n g e a n A r c h.:** P. Sepapan, BACKER 28467 (B) — P. Mamboerit, BACKER 27256 (B) — P. Saebi, BACKER 28213 (B) — P. Kangean, BACKER 28034 (B) — P. Saseel, BACKER 28708 (B) — P. Saëboes,

BACKER 29092 (B) — P. Sapeken, BACKER 29284 (B) — P. Paliat, BACKER 29308 (B) — P. Saboenten, BACKER 29731 (B).

P. Kala o Tao, south of Celebes, DOCTERS VAN LEEUWEN 1362 (U, B).

H a l m a h e r a: TEYSMANN 5655 (B).

Hab.: in teak- and other forests, on hills and dunes, in jungles and grassy fields, along waysides, on an old wall; on a sandy, sometimes on a volcanic soil. As a rule abundant, very common.

Altitude: 1—1100 m.

Flowers during the whole year.

Twice a monstrous form of this variety has been collected: West Java: near Batavia, BACKER 32932 (B), East Java: Penanggal, Loemadjang, ZOLLINGER 2673 (B) (det. ZOLL. sub *Cyanopsis pubescens* monstrum). In these specimens the heads consist of a 6-seriate involucre with spirally inserted scales; they are like the external ones of a normal involucre of *Vernonia patula*. The peduncle of the head is elongated beyond the involucre scales and bears about 15 or more very short tomentose branches, covered with scales like the involucre scales, very closely spirally inserted; these branches (covered with scales) are clustered at the superior part (which is widened) of the elongated peduncle, which in normal heads is the receptacle. The elongated peduncle terminates into a bundle of scales. One of the collected plants has a branch, which bears monstrous heads as well as normal ones.

There are many intermediate forms between *Vernonia patula* and its variety *pubescens* on the one side, between *Vernonia patula* and its variety *multiflora* on the other hand.

3. *var. multiflora* nov. var.

*Folia* dense incane villosa, chartacea. *Capitula* pauca (2—3) apice ramulorum, magna, late campanulata, circiter 150-flora, 8—10 mm crassa. *Involucrum* late cupuliformis, 8—10 mm longum, squamis lanceolatis, acutissimis. *Corolla* 4 mm longa. *Achenium* 1½ mm longum.

Distribution:

Middle Java: Grobogan, Blora, DE BOER 26 (B), type specimen — Karangasem, Semarang, KOORDERS 28229 (L) — Sedan, Rembang, KOORDERS 36143 (B) — Bekoetok, Rembang, BLOKHUIS s.n. (B).

T a n i m b a r I s l a n d s (Timorlaet), RIEDEL s.n. (K).

New Guinea: Finschhafen, WEINLAND s.n. (B), New Ireland, PEEKEL 85 (L), Stephansort, LEWANDOWSKY s.n. (L).

Philippines: Luzon, Spec. Blancoanae 235 (L).

Hab.: in teak forests; on marly clay.

Altitude: 50—70 m.

Flowers: June, Aug.

Evidently this variety with large heads has its distribution in the eastern part of the Malay Archipelago.

(19) *Vernonia moluccensis* (BL.) MIQ.! Fl. Ind. Bat. II (1856)

19; BOERL. Fl. Ned. Ind. II (1899) 235; MERRILL in Phil. Journ. Sci. XI (1916) 138; *Vernonia aristata* REINW.! in Herb. Reinwardt. 1289; *Cyanthillium moluccense* BL.! Bijdr. (1825) 890; *Cyanopsis moluccensis* DC. Prod. V (1836) 69; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 223, 563 — Pl. I, d.

Herb, 40—50 cm high; branched at the base and all along the stem. *Stem* terete, densely ribbed, glandular, sparsely pubescent (hairs long, dingy whitish),  $2\frac{1}{2}$ — $3\frac{1}{2}$  mm thick; internodes  $2\frac{1}{2}$ — $4\frac{1}{2}$  cm long. *Leaves* sessile or nearly so, narrowly spathulate-oblong or oblong-lanceolate, more or less long and sharply acuminate at the top, long attenuate, cuneate at the base, minutely mucronately repandate, membranous, pinni-nerved (lateral nerves 6—10 pairs, nerves prominent beneath), sparsely pubescent (hairs long, appressed), glandularly spotted above, more or less densely appressedly silvery tomentose, glandular beneath;  $2\frac{1}{2}$ — $13\frac{1}{2}$  cm long,  $\frac{1}{2}$ — $3\frac{1}{2}$  cm broad; superior ones gradually smaller. *Heads* at the top of dichotomous branches, 2—4 together, inequally pedunculate (peduncle  $\frac{1}{2}$ —5 cm long, greyish tomentose), subglobose, large, campanulate, many-flowered, 10—11 mm long, 9 mm wide. *Involucre* campanulate, 5-seriate; scales pubescent or subglabrous, glandular, with broad scarious colourless fringed margins, 5-nerved; inner ones oblong, acute at the top, ending into a prickle (about 1 mm long), 9—11 mm long, 2— $2\frac{1}{2}$  mm broad; outer ones lanceolate to elliptic, with a gradually longer needle at the top; extreme ones  $3\frac{1}{2}$ —6 mm long (needle  $1\frac{1}{2}$ — $4\frac{1}{2}$  mm long, very long of the type specimen). *Flowers* numerous, hardly exceeding the involucre. *Corolla* infundibuliform, slender, 5-lobed, glandular, 7—8 mm long; lobes acute, pilose at the top, 3 mm long. *Style*-branches long, slender, acute. *Anthers* acute at the top. *Achene* obovate-oblong, 5—7 ribbed (ribs very prominent) glabrous, very glandular (glands prominent) between the ribs,  $1\frac{1}{2}$ —2 mm long, nearly 1 mm wide, with a scarious prominent disc at the top. *Pappus* uniseriate setaceous, caducous; setae ciliate, white, 4 mm long. *Receptacle* flat, alveolate.

Distribution in the Malay Archipelago:

Celebes: Djeneponto, to the south of Makasser, BOUMAN-HOUTMAN 10 (B).

Moluccas: BLUME, sub nomine *Cyanthillium moluccense*, s.n. (L); Amboina, ROBINSON 1334, 1839 (ex MERRILL l.c.).

Timor: Soembo Madoemba, TEYSMANN 8780 (L); P. Solor, near Timor, REINWARDT 1289 (L).

Lombok: ZOLLINGER 18 (L), RENSCH 388 (B).

Bali: Herb. PRAETORIUS s.n. (L, K).

Flowers violet (RENSCH).

Vernacular name: *biana peroempoean* (ex MERRILL l.c.).

Hab.: in bushes on the beach, in clearings in light forests (ex MERR. l.c.), on limestone-formation (ex MERR. l.c.).

Altitude: 0 m. (RENSCH), 175 m, 3000 m (ex MERR. l.c.).

Flowers: April, Aug. (ex MERR. l.c.), Sept. (ex MERR. l.c.).

*Vernonia moluccensis* is closely related to *Vernonia patula* and differs by the larger heads (though hardly larger than those of *Vernonia patula* var. *multiflora*), the oblong involucreal scales with scarious fringed edges and a long needle at the top and the longer achenes with a prominent scarious disc at the top.

*Vernonia (Cyanopsis) subsimplex* MIQ. Sumatra (1862) 535 is not a *Vernonia*, having heterogamous heads. The filiform ray-flowers are female, the central ones have only one degenerated anther and a style like the female ones. It seems to be a *Blumea*. On the same sheet (H. A. B. T. 03653) a specimen of *Conyza viscidula* WALL. is to be found, but MIQUEL's description certainly points to the species of *Blumea*.

V. Sectio *Claotrachelus* ZOLL. et MOR. (genus) in Nat. en Gen. Arch. Néerl. Ind. II (1845) 565; *Cyanopsis* BENTH. et HOOK. Gen. Pl. II (1873—1876) 229 (p.p.); OLIVER Fl. trop. Afr. III (1877) 268 (p.p.); HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 126 (p.p.).

Herbs or shrubs, pubescent, rarely glabrous. *Leaves* sessile or petio- late, lanceolate, elliptic, subspathulate, ovate, pubescent (rarely glabrous), glandular (rarely without glands) beneath. *Heads* paniculate, or few together, small, pedunculate, campanulate, 12—30- (mostly 20) flowered. *Involucreal scales* lanceolate, rarely oblong, mostly pubescent, usually acute at the top. *Anthems* shortly sagittate at the base; tails acute or obtuse. *Achene* 5-angular (rarely 3-angular), ribs often prominent, mostly densely glandular, glabrous, pubescent between or on the ribs. *Pappus* biseriate, setaceous; setae of the outer row short, often minute, flattened.

Trop. Asia and Africa.

The section *Claotrachelus* is based on the genus of the same name, described by ZOLLINGER in Nat. en Gen. Arch. Ned. Ind. II (1845) 267, 565. This genus contains one species, *C. rupestris* (*Vernonia Zollingeriana* SCH.-BIP.). ZOLLINGER indicates the pappus to be uniseriate and the setae to break off (when ripe) slightly above the foot, leaving a broadened setaceous, fringed border. This border, however, is the outer row of the pappus, consisting of short setae; thus the pappus is biseriate, the inner row being caducous.

## Key to the species.

1. a. Achene 5-angular, glabrous or pubescent between or on the ribs . . . 2  
 b. Achene pseudo-alate, 5-costate; grooves between the ribs puberulous.  
 (25) *V. floresiana*.  
 c. Achene 3-angular; outer side smooth, glabrous; the two inner sides  
 much grooved; ribs pilose . . . . . (26) *V. letiënsis*.
2. a. Inflorescence small, corymbosely paniculate or branches of the in-  
 florescence obliquely spreading or few heads (1—2) at the top of  
 the stem. Achene glabrous, pubescent or having few hairs on the ribs . . . 3  
 b. Branches of the inflorescence clearly dichotomous, spreading, rigid,  
 straight. Achene very white pubescent between the ribs . . . . .  
 (20) *V. erigeroides*.
3. a. Involucrum campanulate; scales pubescent or villous . . . . . 4  
 b. Involucrum nearly basin-shaped; scales glabrous . . . . .  
 (22) *V. Zollingerianoides*.
4. a. Stem fulvously appressed-tomentose or greyish villous. Leaves elliptic  
 or elliptic-lanceolate. Heads paniculate, 15—20-flowered . . . . . 5  
 b. Stem dispersed-hirsute (hairs spreading, perpendicular on the stem,  
 slightly curved). Leaves oblong-spathulate. Heads few, 1—2 together  
 at the top of the stem, 30-flowered . . . . . (23) *V. Zollingeriana*.
5. a. Leaves entire or slightly mucronulate; heads 20-flowered, 5—6 mm  
 long, 5 mm wide; peduncles short, 2—5 mm long. (21) *V. wetarensis*.  
 b. Leaves mucronately serrate. Heads 15-flowered, 7—8 mm long, 5—6 mm  
 wide; peduncles slender, 1—1½ cm long. (24) *V. Reinwardtiana*.

(20) *Vernonia erigeroides* DC. Prod. V (1836) 25; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 221; MIQ. Fl. Ind. Bat. (1856) 13; BOERL. Fl. Ned. Ind. II (1899) 235; KOSTER in Fedde Repert. XXXIV (1933) 3; *Cyanopis erigeroides* DC. in WIGHT Contr. Bot. Ind. (1834) 7; *Vernonia diffusa* DCNE! (non LESS.) Herb. Timor. (1835) 80; *Vernonia affinis* SCH.-BIP.! in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Fl. Ind. Bat. II (1856) 17; *Vernonia cinerea* (L.) LESS. var. *erigeroides* FORBES Wand. Mal. Arch. (1866) 216 — Pl. I, c; II, 25—26.

Herbaceous, much branched, especially at the upper part, to 1¼ m high. *Stem* pubescent or subglabrous, clearly ribbed, glandular, terete, 1½—6 mm thick; *branches* mostly thinly leaved, spreading, rigid, straight, elongated, obviously dichotomous, glandular, pubescent at the top; internodes 1½—2½ cm long. *Leaves* sessile or shortly petiolate (petioles 3 mm long), linear-lanceolate, long attenuate, acute or subacute at both ends, scabrous above; very glandular, greyish or fulvously thinly tomentose, paler beneath; chartaceous, pinni-nerved (4—8 pairs of lateral nerves; reticulation obscure), entire edges recurved; lower leaves lanceolate-elliptic or spathulate-elliptic, long attenuate at both ends, mucronately dentate at the upper part, more or less scabrous above, pubescent beneath,



(lateral nerves about 12 pairs); leaves of the stem 3—7 cm long, 2—20 mm broad; of the branches gradually smaller to the top; lower leaves 9—14 cm long,  $1\frac{1}{2}$ — $4\frac{1}{2}$  cm broad. *Inflorescence* loosely subpaniculate, to 25 cm wide; branches spreading, dichotomous, rigid, straight; heads 1 or 2 together at the top of clearly dichotomous ramifications (much differing in length), pedunculate (peduncles slender,  $\frac{1}{2}$  mm thick, with one or more minute linear bracts at the base or higher on; peduncles of the two heads at the top of the ramifications different in length, the shorter one 1—5 mm, the longer one 4—12 mm long), campanulate, 20-flowered, 5—6 mm long and nearly as wide. *Involucre* campanulate, 5-seriate; scales lanceolate, silky whitish pubescent, glandular, 1-nerved; of the inner row shortly acutely mucronate at the top, with membranous edges, 4— $4\frac{1}{2}$  mm long, nearly 1 mm broad; of the 4 outer rows needle-shaped, subulate, recurved at the upper part. *Flowers* exerting the involucre. *Corolla* infundibuliform, 5-lobed,  $4\frac{1}{2}$  mm long; limb glandular, 3 mm long; lobes subacute, half as long as the limb, slightly pilose at the top; tube very short. *Style* pubescent at the superior part; branches long, acute, shortly pubescent. *Anthers* shortly sagittate at the base (tails obtuse); acute at the top. *Achene* obovate-oblong, 5-angular (ribs prominent); densely covered with shining glands and shortly, very white, scarcely pubescent between the ribs, 1 mm long,  $\frac{1}{2}$  mm wide. *Pappus* setaceous, biseriate; setae white, ciliate, of the inner row silky, 3 mm long; of the outer row minute, flattened. *Receptacle* flat, alveolate.

Distribution in the Malay Archipelago:

**J a v a:** *East Java:* Pasoeroean, ALTMANN 116 (B) — id., Grati, BEUMÉE 2780 (B) — Kepoeh near Pasoeroean, BACKER 8296 (B), 24183 (B) — G. Hijang, Tjemoro Pandjang, CLASON-LAARMAN G 30 (B) — Asembagoes, Bondowoso, BACKER 8224 (B) — west of Panaroekan, BACKER 24677 (B) — Soemberwaroe, Bondowoso, KOORDERS 43933 (L) — G. Baloeran, foot, BACKER 24813 (B) — G. Idjen, north slope, BACKER 24945 (B) — Bondowoso, Rancee, ZOLLINGER 2762 (B); this specimen has many bracts on the peduncles — Bondowoso, BACKER 24503 (B) — Mandowora, CLASON-LAARMAN F 49 (B) — Cape of Sitoebondo, Doewet, ALTMANN 368 (B).

**M a d o e r a:** TEYSMANN 1739 (B).

**L o m b o k:** G. Rindjani, ELBERT 1943 (L).

**S o e m b a w a:** Bima, G. Kolo, ELBERT 3629 (L) — id., Donggo, ELBERT 3509 (L) — id., Toentoe, ELBERT 3550 (L) — id., Waworadja bay, GRÜNDLER 3843 (L) — id., south of Bima, POSTHUMUS 3018 (B) — Dompoe, RENSCH 829 (B).

**Flores:** Badjawa, HORST 18 (B) — Rana mose, RENSCH 1208 (B) — Endeh, RENSCH 978 (B) — Bari bay, WEBER s.n. (L) — Ndonga valley, between Woro-Toro and Ndetoe Sokka, POSTHUMUS 3098 (B).

**Timor:** Koepang, BROWN s.n. (L, Br. M.), TEYSMANN s.n. (L, B); West Timor, BOUMAN-HOUTMAN s.n. (B); north Moetis, Kaslioe, WALSH 331 (B); Timor, ZIPPELIUS s.n. (L), DECAISNE, sub nomine *Vernonia diffusa* DECAISNE, s.n. (L), coll. unknown (K).

**Saleier:** TEYSMANN 13880 (L), 13878 (B), DOCTERS VAN LEEUWEN 1834 (U, B); *P. Bonerate*, DOCTERS VAN LEEUWEN 1424 (U, B).

Flowers pink (BACKER), violet (RENSCH, DOCTERS VAN LEEUWEN), purple (DOCTERS VAN LEEUWEN, WALSH).

**Hab.:** in monsoon and teak forests, in jungles, in an along along field, along steep waysides, along the edge of a ditch, in bushes near the sea; usually on a dry, sometimes on a more or less wet soil; on sand, marl, clay, tuffs; few or numerous, scattered.

Altitude: 0—1800 m.

Flowers: Febr.—Aug., Nov., Dec.

Distribution: Australia (acc. to DC.; acc. to MIQUEL on the islands along the westcoast of Australia).

DE CANDOLLE was right in lifting out *Cyanopsis erigeroides* from that genus (which is now a section of *Vernonia*), placing it in the section *Tephrodes*.

(21) *Vernonia wetarensis* KOSTER in Fedde Repert. XXXIV (1933) 3 — PL. III, 29.

Herbaceous, small, 20—30 cm high; branched at the lower part. *Stem* terete, ribbed, greyish velvety villous, 2 mm thick; internodes  $\frac{1}{2}$ —2 mm long. *Leaves* petiolate (petioles  $\frac{1}{2}$ —1 cm long), elliptic, obtuse or acute at the top, attenuate into the petiole, entire or slightly mucronate, warty, glandular, shortly velvety above, paler, very glandular, velvety villous, pinni-nerved (nerves prominent beneath; lateral ones 6—8); blades 3—4 cm long, 12—20 mm broad, upper ones smaller. *Panicles* small, (existing of 4—6 heads), terminal and at the top of the branches; branches of the inflorescence obliquely spreading out, long extending over the terminal small panicle; lower part naked or nearly so; upper part branched, ending into a small panicle; branchlets of the panicles dichotomous, greyish velvety villous, bearing linear bracts. *Heads* pedunculate (peduncles 2—5 mm long, thin, bearing 1—3 linear, minute bracts), campanulate, 20-flowered, 5—6 mm long, 5 mm thick. *Involucre* campanulate, 3-seriate, 3—4 mm long; scales villous, hardly glandular, interior ones oblong, acute at the top, 3-nerved, exterior ones linear-lanceolate sharply acuminate at the top. *Corolla* infundibuliform, 5-lobed,  $4\frac{1}{2}$  mm long; lobes 2 mm long, subobtusate at the top, slightly pilose. *Style*-branches pubescent, short. *Anthers* subacute at the top;

tails subobtus. *Achene* obovate-oblong, 5-angular (ribs prominent), very glandular, glabrous,  $1\frac{1}{2}$  mm long,  $\frac{1}{2}$  mm thick. *Pappus* biseriate, white; setae of the inner row 3 mm long, of the outer row very small, scale-like; all ciliate. *Receptacle* flat, naked.

Distribution in the Malay Archipelago:

W e t a r: Iliwaki, slopes, ELBERT 4403 (L).

Hab.: in an Eucalyptus forest; on a dry soil, on volcanic tuffs.

Altitude: 150—450 m.

Flowers: Febr.

(22) *Vernonia Zollingerianoides* SCH.-BIP. ! in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ. Fl. Ind. Bat. II (1856) 16; BOERL. Fl. Ned. Ind. II (1899) 235; *Vernonia rupestris* HOOK. Index Kew. I (1895) 552; KOORDERS Exc. Fl. Java III (1912) 315, non GARD. — Pl. III, 33—35 (when the figures had been drawn, another much better specimen was obtained, in which the corolla appeared to be more incised, the achene pubescent and the inner involueral scales lanceolate-oblong).

Small herb. *Stem* quite glabrous, subterete, faintly ribbed, 2—3 mm thick; internodes 3—25 mm long. *Leaves* sessile, oblong-spathulate or elliptic-spathulate, entire, obtuse or nearly rounded at the top, gradually long attenuate at the base, glandularly black spotted beneath, minutely warty above, quite glabrous on both sides, fleshy (?), pinni-nerved (lateral nerves about 3 pairs, inconspicuous), 6—11 mm broad, 2— $4\frac{1}{2}$  cm long. *Heads* few together, 4—8, in thin corymbose panicles in the axils of the upper leaves or terminal, pedunculate (peduncles 1 mm wide, 5—12 mm long, with 5—7 minute linear bracts at the base and higher on), small, about 30-flowered,  $3\frac{1}{2}$ — $5\frac{1}{2}$  mm high, 6 mm wide. *Involucre* nearly basin-shaped, 4-seriate,  $2\frac{1}{2}$ — $3\frac{1}{2}$  mm long; scales minutely serrate, 1-nerved, glabrous, glandular; of the inner rows oblong or lanceolate-oblong, subobtus and shortly mucronate, of the outer rows lanceolate, sharply acuminate at the top. *Flowers* exceeding the pappus. *Corolla* tubular, 5-lobed, 3 mm long; limb long. *Anthers* sagittate at the base (tails acute); tip fairly long, subobtus. *Style*-branches short. *Achene* small, turbinate, 5-angular, subglabrous or pubescent, slightly glandular,  $\frac{1}{2}$ —1 mm long. *Pappus* biseriate, white; setae of the inner row ciliate,  $1\frac{1}{2}$ —2 mm long, caducous; setae of the outer row flattened, ciliate, very acute at the top, short, numerous (about 16), different in length, permanent. *Receptacle* flat, alveolate.

Distribution in the Malay Archipelago:

J a v a: East Java: Noesa Baron, to the south of Poeger, ZOLLINGER 2403, 2705 (ex SCH.-BIP. l.c.) — Poeger, Batocoele, ALTMANN 370 (B).

Flowers violet (ZOLLINGER).

Hab.: on (bare) rocks; scarce.

Altitude: 2 m.

Flowers: Oct.

In the Leiden herbarium, a *Vernonia* is to be found (H. L. B. 901, 94—108), to which a label is added, on which SCHULTZ—BIPONTINUS has written: „*Vernonia Zollingerianoides* Sz.-Bip! Batavia: Zollinger! 1849 n. 2403.” Though the origin is not clear, it may be the type specimen. In the herbarium at Buitenzorg a *Vernonia* (932. 1. 1304) is preserved, to which a label is added, on which ZOLLINGER has written: „2705 Z. M., *Claotrachelus* 2403 var. *glabra*; Fl. lilacini; Ad rupes In. Nusa Baron 21 II 45”. This specimen is *Vernonia cinerea* (L.) LESS. var. *parviflora* (BL.) DC. The original plant (probably the type specimen) may have been lost or commutated with the specimen in the herbarium at Leiden, mentioned above. There is no doubt, whether this species is a good one; it is to be distinguished at once by its glabrous, fleshy (?), spatulate leaves and its small heads. Only the leaves of *Vernonia actaea* are like those of *Vernonia Zollingerianoides*, but that species has narrow 7—9-flowered heads on very short peduncles. The name *Vernonia rupestris* (ZOLL.) HOOK. Index Kew. I (1895) 522, is invalid, as there exists a *Vernonia rupestris* GARD. in HOOK. Lond. Journ. Bot. IV (1845) 114 from Brazil. Thus the name *Vernonia Zollingerianoides* SCH.-BIP. has to be maintained.

*Vernonia Zollingerianoides* seems to be related to *Vernonia wetarensis* but it is quite glabrous, its involucre is much shorter, the outer row of the pappus is longer, shape and size of the corolla are different. With *Vernonia cinerea*, as KOORDERS supposes, it has scarcely any resemblance.

(23) *Vernonia Zollingeriana* SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 119; MIQ.! Fl. Ind. Bat. II (1856) 16; *Claotrachelus rupestris* ZOLL. et MOR. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 268, 565.

Small herb, 20 cm high. *Stem* subangular, ribbed, dispersed-hirsute (hairs spreading, perpendicular on the stem, slightly curved) without glands, 1½ mm thick; internodes irregular; here very short (1—2 mm long), there longer (½—1½ cm long). *Leaves* subsessile, oblong-spathulate, very long attenuate at the base, subacute at the top, entire, densely brownish hirsute on both sides (hairs like those of the stem), pinninerved (nerves hardly to be seen), without glands, coriaceous, fleshy (ex ZOLLINGER l.c.), 3 cm long, ½ cm broad at the upper part, 1 mm broad at the attenuate lower part. *Heads* few, 1 or 2 together at the top of the stem, long pedunculate (peduncles 1½—2 cm long, with 2—4 linear bracteoles), campanulate, about 30-flowered. *Involucre* campanulate, 4-seriate; scales without glands; inner ones linear-lanceolate, 3-nerved, pubescent, acute and mucronate at the top, 4 mm long; outer ones lanceolate, sharply acuminate at the top, 1-nerved, shortly hirsute (hairs spreading); extreme ones 1 mm long. *Corolla* (very young) tubular, glabrous, without glands, 5-lobed; limb long, tube short; lobes short, thickened and nearly rounded at the top. *Anthers* shortly sagittate at the base, tails and top obtuse. *Style*-branches pubescent. *Achene* (very

young) oblong, attenuate at the base, angular, 5-ribbed, glabrous. *Pappus* biseriate, setaceous, white; setae ciliate, of the outer row short. *Receptacle* flat, alveolate.

Distribution:

J a v a: Malang near Sri Gontjo, ZOLLINGER 2403 (ex SCH.-BIP. l.c.).

Flowers bluish violet (ex ZOLLINGER l.c.). Stem prostrate, branched (ex ZOLLINGER l.c.).

This description is prepared from a fairly bad specimen in the herbarium at Utrecht, to which is added only a label, on which MIQUEL has written: „*Vernonia Zollingeriana* Sch.-Bip., Java in rupibus, ZOLL.”. Most probable this is the type specimen (ZOLLINGER 2403), of which the label has got lost.

Hab.: on limestone rocks, very rare.

Flowers: Oct.

HOOKER (Fl. Br. Ind. III, 1882, 234), BOERLAGE (Fl. Ned. Ind. II, 1899, 235) and KOORDERS (Exc. Fl. Java III, 1912, 314) placed this species to the synonyms of *Vernonia cinerea*. It is to be distinguished from that species by the 5-angular glabrous achenes (which are very young), the spreading curved hairs, covering the whole plant, the fleshy leaves, and the absence of glands.

From *Vernonia Zollingerianoides* it is to be distinguished by the hairs, covering the whole plant, by the larger heads and by the involucre.

*Vernonia maritima* MERRILL in Phil. Journ. Sci. III (1908) 440 is very closely related, if not synonymous to this species. This cannot be decided with certainty, on account of the bad specimen of *Vernonia Zollingeriana*. Some trifling differences are to be found in *Vernonia maritima*: the peduncles are very short (2—4 mm long), but the specimen examined, Batanes Islands, FÉNIX 3670 (K), has only young heads; the involucral scales are glandular. Both specimens have been collected on rocks near the sea.

(24) *Vernonia Reinwardtiana* DE VRIESE et MIQ.! Fl. Ind. Bat. II (1856) 15; BOERL. Fl. Ned. Ind. II (1899) 235; KOORDERS in Meded. L. Pl. XIX (1898) 510 — Pl. II, 22.

Herb, or nearly shrub, 30 cm or higher, branched. *Stem* terete, obscurely ribbed, densely fulvously appressed-tomentose, 2 mm thick; internodes  $1\frac{1}{2}$ — $4\frac{1}{2}$  cm long. *Leaves* shortly petiolate (petioles 3 mm long, tomentose like the stem) small, elliptic or elliptic-lanceolate, gradually narrowed into the petiole at the base, acuminate, mucronate at the top, mucronately serrate (teeth sharp, directed forward, 3—5 mm distant), roughly warty, sparsely pubescent above, fulvously villous on the nerves, densely glandular, paler beneath, chartaceous or subcoriaceous, pinni-nerved (nerves prominent beneath, about 5 pairs of lateral nerves, extreme ones reticulate), upper ones not differing much in size; blades 3— $6\frac{1}{2}$  cm long, 7—24 mm broad; short leafy branches in the axils of the leaves. *Inflorescence* small, terminal, loosely corymbosely paniculate, dichotomous, leafless, 4—6 cm wide, 5—10 cm long. *Heads* campanulate,

pedunculate (peduncles long, slender 1—1½ cm long, having a minute, linear bract at the base of halfway), about 15-flowered, 5—6 mm wide, 7—8 mm long. *Involucre* 3-seriate, campanulate; scales villous, slightly grandular; of the inner row narrowly lanceolate, gradually narrowed, acute at the top, 4 mm long, ½ mm broad; of the second row linear-lanceolate, subulate at the top, of the outer row linear, subulate at the top, 1½ mm long. *Flowers* much exceeding the involucre, 7—8 mm long. *Corolla* 5-lobed, 5½—6½ mm long, exceeding the pappus; limb infundibuliform, 4½ mm long, lobes lanceolate, subacute at the top, pilose at the superior part, 2½ mm long. *Anthers* shortly sagittate at the base, subobtusate at the top (tip short). *Style* ciliate at the superior part, branches long. *Achene* narrowly barrel-shaped, angular 5-ribbed, densely covered with shining glands, glabrous or subglabrous (having few hairs on the ribs) 1½—2 mm long. *Pappus* biseriate, setaceous; setae ciliate, of the inner row 4 mm long, of the outer row numerous, short, nearly 1 mm long. *Receptacle* flat, alveolate.

Distribution in the Malay Archipelago:

Celebes: *Manado*: G. Sempo, summit, REINWARDT s.n. (L) — G. Sopoetan, around the crater, KOORDERS 16506 (L, B) — id., G. Rindengan, KOORDERS 16497 (L, B) — G. Lokon, summit, KOORDERS 16500 (B).

Flowers white (KOORDERS), violet (KOORDERS); herb to ½ m high.

Vernacular names: *lawet randang*, *kenal in taloen*, *roekoet weroe* (all Celebes).

Hab.: in primeval forests, in a barren open plain around the crater; on volcanic sand; not common. Apparently endemic.

Altitude: 1100—1500 m.

Flowers: Jan., May, Oct.

Related to *Vernonia cymosa*, from which it is to be distinguished by the small elliptic leaves, the sharp involucreal scales, the very glandular glabrous achene and the longer outer row of the pappus hairs.

As to the pappus this *Vernonia* seems to belong to the section *Tephrodes*, in which section MIQUEL placed it. On account of the angular achenes it is preferable to place this species in the section *Claotrachelus*.

(25) *Vernonia floresiana* nov. spec. — Pl. III, 30—31.

Herba parva, annua (?), 10—20 cm alta. *Radix* brevissimus. *Caulis* tennis, subangulatus, pubescens (pilis albidis, appressis), glandulosus, 1 mm crassus; internodiis 1 cm longis. *Folia* parva, alterna, subsessilia vel breviter petiolata (petiolis 0—3 mm longis), elliptica vel obovato-elliptica, apice subobtusata, mucronata, ad basin sensim attenuata, subtiliter argute serrata, pinninervia (nervis subtus prominentibus, laterali-bus 8—10, connectis; reticulatione obsolete), utrinque brevissime pubescentia (pilis nonnullis longis, fulvide striatis inter pilos brevissimos

intermixtis), subtus minutissime glandulosa, submembranacea, 2—2½ cm longa, ½—1 cm lata. *Inflorescentia* terminalis et in axillis foliorum superiorum, parva, (capitulis 10—15), corymboso-paniculata, ramis basi folium parvum, apice pedunculos duos ferentibus. *Capitula* pedunculata (pedunculis tenuis, 6—10 mm longis, bracteis filiformibus 1—3 praeditis), campanulata, 15-flora, 6—7 mm longa, 5 mm crassa. *Involucrum* 4-seriatum, 5 mm longum, squamis externe decrescentibus, interioribus oblongo-lanceolatis, acutis, apice acutissime mucronatis, parce glandulosis, albide pubescentibus, margine ciliatis, exterioribus subulatis angustissimis. *Flores* bisexuales, involucrum paulo superantes. *Corolla* anguste infundibuliformis, eglandulosa, 5-lobata, 5 mm longa; lobis lanceolatis, apice acutis, parce pilosis, 1½ mm longis. *Antherae* ad basin sagittatae, apice subacutae. *Stylus* bifurcatus; rami hirsuti, apice acuti, tenui. *Achenium* obovato-cylindricum, 5-costatum, crassum, glandulosum, 1½ mm longum, ½ mm latum, costis prominentibus, achenium quasi alatum, foveis inter alas albo-puberulis, alis glabris. *Pappus* biseriatus, setaceus, setis albis. ciliatis, interioribus caducis, 3½ mm longis, exterioribus persistentibus, applanatis, brevibus. *Receptaculum* planum, alveolatum.

Distribution in the Malay Archipelago

*Flores*: Badjawa, RENSCH 1064 (B), type specimen.

Flowers bluish violet (RENSCH).

*Hab.*: in an alang alang field; numerous.

Altitude: 1200 m.

Flowers: June.

This *Vernonia* differs from all others by the nearly winged achenes. For the rest it seems to be related to *Vernonia Zollingeriana*; the leaves of this species have a different pubescence, however, the heads contain about twice as much flowers. As the shape and size of the flowers of the only available fragmentary specimen of *Vernonia Zollingeriana* could not be examined very well, these important parts can hardly be compared. From *Vernonia wetarensis* this species differs in the achenes, the involucre, the size of the heads and the hairs of the leaves. From *Vernonia patula* it differs by the achenes and the pappus.

(26) *Vernonia letiënsis* nov. spec. — Pl. III, 32.

Herba plusquam 42 cm alta, ramosa. *Rami* elongati, sparse scabridi, in parte inferiore glabri, glandulosi, striati, rufescentes, 2—3 mm crassi; internodia 4 cm longa. *Folia* alterna, petiolata (petiolis scabride pubescentibus, 2—4 mm longis), ovata, apice subacuta et breviter mucronulata, ad basin subrotundata vel abrupte attenuata in petiolum, integra, margine revoluta, utrinque breviter et sparse scabrida, glandulosissima, supra nitida, chartacea, pinninervia (nervis lateralibus utrinque 3), 2—1½ cm longa, 1—1½ cm lata, superiora elliptica, utrinque attenuata, minora ad 1 cm longa, 4 mm lata. *Inflorescentia* diffusa, dichotoma; ramis in parte

inferiore longiter nudis; apice ramulos dichotomos ferentibus, terminantes in capitula 2 vel 1. *Capitula* pedunculata (pedunculis gracilibus, pubescentibus, 4—15 mm longis, bractaea parva lineari praeditis), homogama, campanulata, 20-flora, 7 mm longa, 6 mm crassa. *Involucrum* 4-seriatum; squamis sensim externe decrescentibus lineari-lanceolatis, parce pubescentibus, glandulosis, minus quam 1 mm latis, interioribus 3-nervatis, apice acutis, breviter mucronatis 5 mm longis, exterioribus 1-nervatis, acutissimis. *Flores* bisexuales. *Corolla* anguste infundibuliformis, sparse pilosa, glandulosa, 3½ mm longa, lobis lanceolatis, brevibus, pilosis, apice acutis, minusquam 1 mm longis. *Antherae* ad basin sagittatae, apice acutae. *Stylus* bifurcatus; rami breves. *Achenium* 1½ mm longum, paulo minus 1 mm crassum, obovatum, subtriquetrum, apice subratundatum, breve, crassum, glandulosum; latere externo sublaevo, glabro; lateribus interioribus profunde foveolatis, costis pilosis (pilis brevibus, superne appressis, albidis, nitidis). *Pappus* biseriatum, setis albis, ciliatis, interioribus 3 mm longis, exterioribus minutis, subplanis. *Receptaculum* planum, alveolatum, cicatricibus acheniorum angulatis.

Distribution in the Malay Archipelago:

P. Leti, near Timor, RIEDEL, comm. Dr. A. MEYER s.n. (K), type specimen.

Flowers: Aug.

This *Vernonia* is much related to *Vernonia floresiana* and *Vernonia wetarensis*, but it is a much taller herb; it is to be distinguished chiefly by the achenes.

VI. Sectio *Decaneurum* DC (genus, sect. *Gymnanthemum*) Prod. V (1836) 67; MIQ. (id.) Fl. Ind. Bat. II (1856) 21; OLIVER Fl. trop. Afr. III (1877) 268 (except the species with a pluriseriate pappus); HOFFM. in ENGL.-PRANTL IV 5 (1894) 26; *Gymnanthemum* BENTH. et HOOK. Gen. Pl. II (1873—1876) 229; CLARKE Comp. Ind. (1876) 7.

Herbs or shrubs, erect or scandent, glabrous or pubescent. *Leaves* petiolate or sessile, oblong, ovate, obovate, attenuate or acute at the base, acuminate and acute or obtuse at the top, entire or dentate, more or less pubescent beneath. *Heads* pedunculate, few, corymbose or paniculate, 5- to many-flowered. *Involucral scales* oblong or ovate, appressed, mostly glabrous, mucronate, acute or obtuse at the top. *Anther-tails* long or short, acute or obtuse. *Achene* oblong, subterete, 10-ribbed, mostly glabrous, sometimes pubescent, glandular or without glands. *Pappus* reddish, uniseriate or nearly so.

Distribution: Trop. Asia and Africa.



Key to the species.

- 1. a. Leaves brownish pubescent on the nerves or subglabrous beneath. Heads 9—13 mm long, 3½—7 mm wide . . . . . 2
- b. Leaves woolly tomentose beneath. Heads very large, 2½ cm long and as wide . . . . . (30) *V. Forbesii*.
- 2. a. Heads 5—7-flowered; achene glabrous, glandular . . . (27) *V. cuneata*.
- b. Heads 10—12-flowered; achene glabrous, without glands . . . . . (28) *V. vagans*.
- c. Heads 20—25-flowered; achene shortly pubescent, glandular . . . . . (29) *V. blanda*.

(27) *Vernonia cuneata* LESS. in *Linnaea* VI (1831) 644; non ELMER; *Gymnanthemum obovatum* GAUDICH. *Voy. Uran. Bot.* (1826) 471; *Decanuron? obovatum* DC. *Prod.* V (1836) 67; ZOLL. in *Nat. Gen. Arch. Neêrl. Ind.* II (1845) 223; MIQ. *Fl. Ind. Bat.* II (1856) 21; *Strobocalyx obovatus* SCH.-BIP. in *Pollichia* XVIII—XIX (1861) 172; *Vernonia obovata* BOERL. *Fl. Ned. Ind.* II (1899) 235; MATTF. in *Engl. Bot. Jahrb.* LXII (1929) 398; non LESS.; *Vernonia polyantha* WARBG. (ex MATTF.) in *Engl. Bot. Jahrb.* XIII (1891) 447; BOERL. *Fl. Ned. Ind.* II (1899) 235; *Vernonia lenticellata* ELMER! *Leafl. Phil. Bot.* I (1906) 91; MERRILL *Enum.* II (1923) 593; *Vernonia papuana* LAUTERBACH! in *Nova Guinea* VIII 2 (1910) 335; *Vernonia Klossii* S. MOORE! in *Journ. Bot.* XLI (1923) suppl. 27 — Pl. I, e.

Scandent shrub. *Stem* subterete, subglabrous or appressed, shortly pubescent, irregularly ribbed, warty glandular, to 4 mm thick; internodes 3—8 cm long. *Leaves* petiolate (petioles ½—1 cm long), broadly elliptic-ovate, long attenuate into the petiole, acute at the base, abruptly and very shortly narrowed at the top, sometimes apiculate (tip acute or blunt, shortly brownish crispy hirsute on the nerves only (younger ones pubescent), glandular beneath, glabrous above, subcoriaceous, entire, pinni-nerved (lateral nerves 5—10 pairs, arcuately connected at the top, extreme ones reticulated, nerves prominent beneath); blades 7—17 cm long, 3—7 cm broad; superior leaves elliptic, gradually narrowed to both ends. *Panicles* large, pyramidate, at the top of the side-branches, 24—30 cm long, 16—20 cm broad at the base; side-branches perpendicular (or nearly so) on the principal axis, shortly brownish pubescent, widened at the base, having a leaf (of the higher ones smaller) at the base. *Heads* shortly pedunculate (peduncles pubescent, 2 mm long, having a minute linear bract halfway), clustered at the top of the side-branches and the principal axis, cylindric, 5—7-flowered, 9—11 mm long, 3½ mm wide. *Involucre* cylindric, 4-seriate; scales stiff, subcoriaceous, convex, ciliate, 1—1½ mm broad, of the inner row oblong, subdeltoid and acute

at the top, glabrous, glandular, caducous, 5—6 mm long, of the outer row subglabrous, shortly narrowed and mucronate at the top, slightly glandular, afterwards spreading; of the second row oblong, 3 mm long, of the third row ovate, 2 mm long, of the outmost row ovate, 1 mm long. *Flowers* 1 cm long. *Corolla* tubular-infundibuliform, 5-lobed, 6—7 mm long; limb  $2\frac{1}{2}$ —3 mm long, gradually attenuate into the slender tube; lobes lanceolate, acute at the top, glandular, 2— $2\frac{1}{2}$  mm long. *Anthers* exceeding the corolla, long acuminate at the top (tip acute); tails obtuse. *Style*-branches short, slightly pubescent, obtuse. *Achene* narrowly oblong-turbinate, slender, about 10-ribbed, angular, glabrous, covered with shining glands,  $\frac{1}{2}$  mm wide, 4 mm long. *Pappus* uniseriate, more or less reddish, consisting of numerous obscurely ciliate setae, 7 mm long. *Receptacle* small, flat, alveolate.

Distribution in the Malay Archipelago:

**Moluccas:** *Amboina*, ZIPPELIUS s.n. (L), BINNENDIJK s.n. (B); *Ceram*, to the S.E. of Piroe, RUTTEN 2101 (L); *Halmahera*, P. Tidore Boekoe Mala Mala, LAM 3774 (B).

**Kai Islands:**, JAHERI 44 (B).

**Aroe Islands**, (ex MATIF.).

Leaves glossy, dark green, paler beneath (LAM).

Vernacular name: *gilaha* (Halmahera).

Altitude: 0—100 m.

Flowers: March, July.

Distribution: Philippines (Luzon!, Panay!); New Guinea!, Bismarck Arch., Rawak.

CLARKE (Comp. Ind., 1876, 26) and KURZ (in Journ. As. Soc. Beng. XLVI 2, 1877, 202) suggest *Decaneurum? obovatum* DC. to be a synonym of *Vernonia vagans* (WALL.) DC. Though the two species are closely related, *Vernonia vagans* (WALL.) DC. is different by the larger, 12-flowered heads, the narrower involucreal scales, the achene without glands and the narrower elliptic leaves. The geographical areas are adjoining.

(29) *Vernonia vagans* (WALL.) DC. Prod. V (1836) 32; CLARKE Comp. Ind. (1876) 26; *Conyza vagans* WALL.! Cat. (1828) 3040 comp. 150; *Conyza scandens* WALL.! Cat. (1828) 3060 comp. 170; *Vernonia scandens* DC. Prod. V (1836) 32; CLARKE Comp. Ind. (1876) 26 (syn. excl.); KURZ in Journ. As. Soc. Beng. XLVI 2 (1877) 202; Hook. Fl. Br. Ind. III (1882) 241.

Scandent. *Branches* terete, ribbed, brownish scabridly pubescent, glandular,  $2\frac{1}{2}$  mm thick; internodes 3— $4\frac{1}{2}$  cm long. *Leaves* petiolate (petioles  $\frac{1}{2}$  cm long), obovate, shortly acute at the top, gradually attenuate into the petiole, pinni-nerved (nerves prominent beneath, lateral ones about 5 at every side, arcuately connected at the top), entire,

chartaceous, glandular at both sides, glabrous above, brownish pubescent, especially on the nerves beneath; blades 4—6 cm long,  $2\frac{1}{2}$ —3 cm broad; of the higher leaves gradually smaller. *Inflorescence* paniculate, narrowly pyramidate; side-branches perpendicular on the principal axis, short ( $4\frac{1}{2}$ — $5\frac{1}{2}$  cm long), in the axil of a small leaf; 5—10 heads on every side-branch. *Heads* large, pedunculate (peduncles 2—5 mm long, occasionally bearing a linear small bract) oblong, 10—13 mm long, 5—6 mm wide, 10—12-flowered. *Involucre* 6-seriate; scales acute at the top, glandular, pubescent at the superior part, slightly fringed at the edges, inner ones oblong, 3-nerved, 6 mm long,  $1\frac{1}{2}$  mm broad; outer ones ovate, to 1 mm broad. *Corolla* sparsely glandular, 5-lobed, 7—8 mm long; tube very slender,  $4\frac{1}{2}$  mm long, limb widely infundibuliform, 3 mm long; lobes broad, acute, half as long as the limb. *Anthers* narrow, long, sagittate at the base, subobtuse at the top. *Style*-branches long, slender. *Achene* (immature), linear-oblong, glabrous, ribbed, without glands. *Pappus* reddish, uniseriate; setae ciliate, 8 mm long. *Receptacle* small, flat, alveolate, glabrous.

Distribution in the Malay Archipelago:

Sumatra: *Djambi*, S. Kembang, ROBINSON and KLOSS, Korintji exped. s.n. (K, Br. M.).

Altitude: 1350 m.

Flowers: April.

Distribution: Bengal, Himalaya, Silhet, Assam!, Sikkim, Burma.

(29) *Vernonia blanda* (WALL.) DC. Prod. V (1836) 32; CLARKE Comp. Ind. (1876) 25; KURZ in Journ. As. Soc. Beng. XLVI 2 (1877) 202; HOOK. Fl. Br. Ind. III (1882) 241; *Conyza blanda* WALL! Cat. (1828) 3033 comp. 143; *Vernonia scandens* GAGNEP. (non alior.) in LEC. Fl. Indo-Chine III (1924) 468.

Scandent, *branches* terete, ribbed, more or less glandular, glabrous or shortly greyish pubescent,  $2\frac{1}{2}$ —4 mm thick; internodes  $\frac{1}{2}$ —6 cm long. *Leaves* petiolate (petioles 2—4 mm long), elliptic-obovate, apiculate (tip acute or blunt), gradually narrowed into the petiole, entire, glabrous above, subglabrous beneath, except in the angles of the midrib and the lateral nerves, glandular beneath, pinni-nerved (nerves prominent beneath; lateral ones 4—5 at each side; extreme ones clearly reticulate), edges recurved, coriaceous, blades  $4\frac{1}{2}$ —11 cm long, 2—5 cm broad. *Heads* in small axillary and terminal, leafy panicles, consisting of about 5 heads or solitary in the axils of the upper leaves. Heads on long peduncles (peduncles greyish shortly pubescent, 8—18 cm long, bearing 3—5 minute leaves at the superior part), 20—25-flowered, 12—13 mm long, 7 mm

thick. *Involucre* 5—6-seriate; scales strawy, oblong-lanceolate, acute at the top, ciliate at the margins, glabrous, glandular, inner ones 7—8 mm long,  $1\frac{1}{2}$  mm broad, outer ones 2 mm long. *Flowers* 13 mm long. *Corolla* infundibuliform-tubular, 9 mm long, 5-lobed; tube slender, hardly longer than the narrow limb; lobes acute. *Anthers* acute at the top. *Style*-branches subacute. *Achene* narrowly oblong-turbinate, subterete, slightly angular, about 10-ribbed, glandular, shortly pubescent (hairs spreading),  $3\frac{1}{2}$ —4 mm oblong, 1 mm wide. *Pappus* uniseriate, consisting of numerous reddish, ciliate hairs (8 mm long). *Receptacle* flat, alveolate, glabrous.

Distribution in the Malay Archipelago:

Borneo: Br. N. Borneo: G. Kinabaloë, Tenompok, CLEMENS 28604 (L, B, K), leaves very small,  $3\frac{1}{2}$ —4 cm long,  $1\frac{1}{2}$ —2 cm broad; Banguë Island, KLOSS 19223 (B), CASTRO and MELEGRETTO 1515 (Br. M.), 1356 (K).

Hab.: in a jungle near a trail.

Altitude: 1500 m.

Flowers: April, Febr., Sept.

Distribution: Burma!, Siam, Laos, Cochinchina, Annam.

This species is much allied to *Vernonia scandens*, but the heads possess twice as many flowers and the achene is pubescent.

DC. (Prod. V, 1836, 32) has placed *Vernonia vagans*, *Vernonia scandens* and *Vernonia blanda* in the section *Lepidaploa*, CLARKE (Comp. Ind., 1876, 9) put them in the section *Strobocalyx*.

Much allied to *Vernonia blanda* is *Vernonia tavoyana* FISCHER (in Kew Bull., 1927, 92); it differs from *Vernonia blanda* in the involucre, which is 4—5-seriate; inner involucreal scales oblong-lanceolate, 8 mm long, 2 mm broad; outer ones ovate-oblong, shortly acute or obtuse at the top, ciliate at the margins, pubescent at the top; corolla glandular.

A specimen of *Vernonia tavoyana* from Pegu has been identified by CLARKE as *Vernonia blanda*.

(30) *Vernonia Forbesii* MOORE! in Journ. Bot. LXIII (1925) Suppl. 54.

Scandent; branches subterete, striate, densely pubescent. *Leaves* elliptic, mucronate at the top, narrowed into the petiole (petioles 6—8 mm long), entire or slightly repandate, scabrous above, woolly tomentose beneath, afterwards glabrous, glandularly spotted above, chartaceous, 4—8 cm long,  $1\frac{1}{2}$ — $3\frac{1}{2}$  cm broad. *Heads* in the axils of the upper leaves, pedunculate (peduncles fulvously pubescent, 2—3 cm long), very large,  $2\frac{1}{2}$  cm high and as wide, many-flowered. *Involucre* campanulate, 8-seriate; scales long acuminate, outer ones linear-lanceolate, pubescent, recurved, 5 mm long, inner ones lanceolate, herbaceous, pubescent, recurved, 9 mm long, innermost oblong, shorter acuminate, scarious,

herbaceous, pubescent on the upper part, 15 mm long. *Flowers* exceeding the involucre. *Corolla* infundibuliform-tubular, 1 cm long; limb 4 mm long, 5-lobed; tube slender; lobes oblong, obtuse, 2½ mm long. *Style*-branches 3½—4 mm long. *Achene* turbinate-linear, 10-ribbed, very shortly pubescent, glandular, 4 mm long. *Pappus* subuniseriate, reddish; setae numerous, ciliate, 12 mm long.

Distribution in the Malay Archipelago:

S u m a t r a: *Lampongs*, Kotta Djawa, FORBES 1402 (Br. M.).

Altitude: 90 m.

MOORE placed this species in the section *Strobocalyx*; it seems preferable however, to accept it as a member of the section *Decaneurum* DC., on account of the 10-ribbed turbinate-linear achene.

As to MOORE's suggestion: this species being conspecific with *Vernonia Morit-siana* SCH.-BIP. (1854), there is no doubt whether these two species are quite different.

VII. Sectio **Congestae** nov. sect. (cf. note at base of p. 455)

Herbae pubescentes vel glabrae. *Folia* petiolata vel subsessilia, elliptica, rhomboidea-elliptica, obovato-elliptica vel in parte superiore deltoidea vel subrotundato-ovata, sensim attenuata in petiolum, apice acute acuminata vel obtusa et mucronata, serrata vel subintegra, subtus pilosa vel glabra, interdum glandulosa, pinninervia. *Capitula* glomerata, (5—30), glomerulis parvis, pedunculatis, sessilia vel subsessilia, minima, oblonga, 2—9-flora. Squamae *involucri* paucae vel plures, oblongae, apice acute acuminatae ad subrotundatae, pubescentia vel glabra. *Antherae* satis longe sagittatae, apice acutae. *Achenium* turbinatum vel oblongum, 3—4-angulatum, glabrum, dense glandulosum, rariter eglandulosum. *Pappus* biseriatatus, albidus, setae serieri interioris caducae, exterioris applanatae, squamiformes, breves, persistentes. *Receptaculum* parvum.

Distribution: Islands to the south of Celebes, Timor, Soembawa.

Key to the species.

- 1. a. Stem and leaves pubescent (or leaves villous); heads 2—5-flowered . . . . . 2
- b. Stem and leaves very glabrous; leaves black-spotted; heads 7—9-flowered . . . . . (32) *V. actaea*.
- 2. a. Heads 2—3-flowered . . . . . 3
- b. Heads 5-flowered . . . . . (31) *V. capituliflora*.
- 3. a. Heads 3-flowered; involucre 3-seriate; scales about 12, inner ones 5, concave . . . . . (34) *V. timorensis*.
- b. Heads 2-flowered; involucre 2-seriate; scales about 6, inner ones 2, compressed . . . . . (33) *V. Walshae*.

(31) *Vernonia capituliflora* MIQ.! Fl. Ind. Bat. II (1856) 19; BOERL. Fl. Ned. Ind. II (1899) 235; *Cyanopis microcephala* SCH.-BIP.

in ZOLL. Syst. Verz. Ind. Arch. (1854) 120 (nomen nudum) — Pl. I, f.

Erect herb, about 30 cm high (ex MIQUEL), branched; *stem* terete, grooved, scabridly pubescent. *Leaves* petiolate or subsessile (petioles 0.1—3 cm long), elliptic-oblong, long acuminate or acute at the top, gradually long attenuate into the petiole (not to be separated), mucronately serrate or subentire, membranous, pale greyish villous beneath, subglabrous above, pinni-nerved (lateral nerves 4—5 pairs); blades 2—10 cm long,  $\frac{1}{2}$ — $3\frac{1}{2}$  cm broad; extreme ones smaller. *Heads* glomerate (15—30) at the top of peduncles (1— $2\frac{1}{2}$  cm long) in the axils of the upper leaves; heads small, subsessile, oblong, 5-flowered,  $3\frac{1}{2}$ —4 mm long, 1— $1\frac{1}{2}$  mm wide. *Involucre* 3—4-seriate, oblong; scales about 15, villous, minutely glandular, ciliate at the edges (hairs rather long, slack), inner ones elliptic-oblong, sharply acuminate, 3-nerved, 3 mm long, outer ones linear, long and sharply acuminate at the top, subulate, 1-nerved, extreme ones 1 mm long. *Flowers* exerting the involucre. *Corolla* 5-lobed, 2— $2\frac{1}{2}$  mm long; tube very narrow, longer than the limb ( $1\frac{1}{2}$  mm long); limb campanulate, lobes acute. *Style*-branches very short, acute at the top, pubescent; style sometimes undivided. *Anthers* long sagittate at the base, acute at the top. *Achene* turbinate, 3—4-angular, glabrous, densely glandular, less than 1 mm to  $\frac{1}{2}$  mm long. *Pappus* biseriate, whitish, inner row setaceous, shorter than the corolla,  $1\frac{1}{2}$  mm long, caducous, outer row consisting of flattened scale-like ciliated setae, much shorter, about  $\frac{1}{2}$  mm long, permanent. *Receptacle* small, flat, alveolate.

Distribution in the Malay Archipelago:

Soemba wa: Bima, Wooh Sahe, ZOLLINGER (det. MIQUEL) s.n.

(U) — Dompoe, RENSCH s.n. (B).

Flowers bluish violet (RENSCH).

Hab.: in jungles; on a dry soil; rare.

Altitude:: 80 m.

Flowers: May, Aug.

Endemic.

MIQUEL placed this species in the section *Cyanopsis*.

(32) *Vernonia actaea* KOSTER in Fedde Repert. XXXIV (1933) 4 — Pl. I, f; III, 36—37.

Herbaceous, much branched, 25—60 cm high; *stem* and *branches* terete, striate, glabrous (youngest parts pubescent), warty, pale green, sometimes purplish,  $1\frac{1}{2}$ —3 mm thick; internodes 1—5 cm long. *Leaves* shortly petiolate or sessile (petioles 0—1 cm long, not clearly to be separated from the blades), narrowly elliptic-oblong, obovate-oblong, elliptic, long attenuate at the base, shortly narrowed, obtuse and mucronate at the top, pale green, entire or remotely mucronulate along the

margin, pinni-nerved (nerves prominent beneath; lateral ones 3—6 pairs; no reticulations), most probably fleshy, densely glandularly black-spotted and very glabrous at both sides (youngest leaves slightly pubescent), warty above,  $3\frac{1}{2}$ —8 cm long, 1—2 cm broad. *Heads* glomerate (5—15 together) at the top of dichotomously branched axillar peduncles, small, oblong, shortly pedunculate (peduncles  $\frac{1}{2}$  mm long, 7—9-flowered, 4—5 mm long,  $1\frac{1}{2}$  mm wide). *Involucre* 4-seriate, oblong; scales oblong, concave, with membranous edges, entire or slightly serrate, glabrous or subglabrous, inner ones acute to nearly rounded and mucronate at the top, very glandular, 3-nerved,  $3\frac{1}{2}$ —4 mm long, outer ones very small, acute at the top, with ciliate edges,  $\frac{1}{2}$  mm long. *Corolla* tubular, glabrous, 4 mm long, 5-lobed; lobes as long as the tube narrow, acute. *Anthers* long sagittate at the base, acute at the top. *Style* hirsute, branches acute. *Achene* 4-angular, oblong, attenuate at the base, glabrous, very glandular,  $1\frac{1}{2}$  mm long. *Pappus* biseriate; setae white or dirty white, ciliate, of the inner row 2—3 mm long, caducous, of the outer row small, flattened, scale-like. *Receptacle* small, alveolate, flat.

Distribution in the Malay Archipelago:

Saleier, south, DOCTERS VAN LEEUWEN 1937 (B, U) — P. Bonerate, to the south of Saleier, DOCTERS VAN LEEUWEN 1423 (B, U) — P. Kajoeadi, to the south of Saleier, DOCTERS VAN LEEUWEN 1320 (B, U) — P. Passir Talloe, near Saleier, DOCTERS VAN LEEUWEN 1466 (B, U).

P. Moena, to the south-east of Celebes, KJELLBERG 120 (B).

Toekang besi Islands, P. Bonongko, ELBERT 2569 (L).

Timoer laet (Tanimbar Islands), RIEDEL s.n. (K).

Flowers violet (DOCTERS VAN LEEUWEN), white (id.); stem woody at the base (DOCTERS VAN LEEUWEN).

Hab.: on coral rocks near the sea, on sandy beaches, in jungles; on a dry soil. Altitude: 0—5 m.

Flowers: Febr., May, June, July.

Its succulent leaves are easy to be explained by the dry or physiologically dry habitats.

This species is closely related to the preceding one, but the following differences are to be found:

*Vernonia capituliflora* has membranous, greyish felty leaves, long acuminate at the top; 15—30 heads clustering; sharply pointed, villous involucreal scales and very small, 5-flowered heads.

In *Vernonia actaea* the leaves are most probably fleshy, they are obtuse and mucronate at the top, densely glandular; the heads in clusters of 5—15, are larger and 7—9-flowered; the involucreal scales are very glandular and varying from nearly rounded to acute at the top, being always mucronate with membranous margins.

The specimens of this species have been collected near the sea coast, on rocks

or on the beach at about sea-level, those of *Vernonia capituliflora* on a dry soil, altitude 80 m.

(33) *Vernonia Walshae* nov. spec. — Pl. I, f; III, 39—42.

Herba parva, 11—18 cm longa, multo vel paulo ramosa; ramis simplicibus. *Radix* brevis, tenuis, simplex vel paulo ramosa. *Caulis* tenuis, obscuriter striatus, glandulosus, pubescens, (pilis albidis, satis longis) 1—2 mm crassus, internodiis  $\frac{1}{2}$ — $1\frac{1}{2}$  cm longis. *Folia* alterna, subpetiolata, parva, membranacea, in parte superiore subrotundo-ovata vel deltoidea, apice acuta et mucronata, margine serrata, (dentibus acutis apice mucronulatis, curvatis), pinninervia (nervis lateralibus, 6, subtus prominentibus), utrinque sparse pubescentia (pilis curvatis, articulatis), parce glandulosa, 8—20 mm longa et lata; in parte inferiore abrupte et valde attenuata, integra, 1—3 cm longa, plusminusve 1 cm lata; folia superiora minora; folia ad basin saepe ramulo brevissimo praedita. *Capitula* glomerata, parva, (15—25); glomerulis pedunculatis, pedunculis tenuibus, 5—12 mm longis, basi folio parvo praeditis (parte superiore anguste ovata), ramulis glomerulorum brevissimis, bractaea lineari praeditis. *Capitula* sessilia vel subsessilia, tenuia, oblonga, 2-flora,  $4\frac{1}{2}$  longa. *Involucrum* biseriatum; squamis perpaucis, interioribus 2, subnavicularibus, purpurascens, pubescentibus (pilis appressis, nitidis, albidis), apice acute acuminatis et serratis, utrinque compressis, oblongis, 3 mm longis, minusquam 1 mm latis, exterioribus 3 vel 4, lanceolato-linearibus, apice subulatis, 1 mm longis, brevioribus. *Flores* bisexuales. *Corolla* anguste infundibuliformis,  $3\frac{1}{2}$  mm longa, 5-lobata, lobis lanceolatis, apice acutis et parce pilosis, 1 mm longis, tubo limbo subaequilongo. *Antherae* ad basin sagittatae, apice subacutae, filamentis medio incurvato. *Stylus* bifurcatus; rami breves, acuti, lati, pubescentes. *Achenium* (immaturum) turbinatum, 4-angulatum,  $\frac{1}{2}$  mm longum, glabrum, glandulosum. *Pappus* biseriatatus; setae seriei interioris caducae, paucae, ciliatae, albae,  $1\frac{1}{2}$  mm longae, exterioris squamiformes, minutae, applanatae, acutissimae, ciliatae. *Receptaculum* parvum.

Distribution in the Malay Archipelago:

Timor: South Central Timor, near Kaslio, N. Moetis, WALSH 328 (B), type specimen.

Flowers dark violet (WALSH).

Hab.: on a sunny slope; rare.

Altitude: 1350 m.

Flowers: May.

This species is at once to be distinguished from *Vernonia capituliflora* by the 2-flowered heads, the boat-shaped 2 inner involucral scales and by the shape of the leaves.



(34) *Vernonia timorensis* nov. spec. — Pl. I, f; III, 38.

Herba, 70 cm longa, in parte superiore ramosa, in parte inferiore simplex et efoliata. *Caulis* multo striatus (striis prominentibus), sparse albide pubescens (pilis articulatis, nonnullis tenuibus brevioribus intermixtis), 2½ mm crassus, in parte inferiore sublaevus, subglaber, internodiis 2—6 cm longis. *Folia* alterna, subsessilia, rhomboideo-elliptica, apice longissime et acute acuminata; ad basin primo abrupte, demum sensim valde attenuata, dentata (dentibus longis vel longissimis, 1 ad 3 mm longis, 1 mm latis, apice mucronulatis; interdum nonnullis minimis acutis intermixtis), membranacea, pinninervia (nervis lateralibus circiter 12, subtus prominentibus; extremis obsoletis), supra sparse pubescentia (pilis albidis, tenuibus, nonnullis crassioribus articulatis intermixtis), subtus canescentia, sparse pubescentia; 4—9 cm longa, 1½—3½ cm lata; superiora minora et angustiora, ad 2 cm longa, 4 mm lata. *Capitula* glomerata, (10—20), glomerulis breviter vel longe pedunculatis, pedunculo tenui, incano-pubescenti, ½—3½ cm longo, in axillis foliorum superiorum vel terminali. *Capitula* sessilia, parva, oblonga, tenuia, 3-flora, 4 mm longa. *Involucrum* 3-seriatum; squamis glandulosis, parce pubescentibus vel subglabris, interioribus 5, concavis, oblongis, apice acute mucronulatis, 3½ mm longis, exterioribus sensim minoribus, 4—6, subulatis, parce pubescentibus vel subglabris. *Florés* bisexuales. *Corolla* anguste infundibuliformis, 5-lobata, 3 mm longa, lobis lanceolatis, apice subacutis, glabris, 1½ mm longis. *Antherae* ad basin sagittatae, apice acutae breviter acuminatae. *Stylus* bifurcatus; *rami* pubescentes, acuti. *Achenium* (immaturum), turbinatum, glabrum, (pars superior breviter pubescens) eglandulosum, plusquam ½ mm longum. *Pappus* biseriatum; setae interiores paucae, ciliatae, 2 mm longae, caducae, exteriores squamiformes, applanatae, minutae, ciliatae. *Receptaculum* parvum.

Distribution in the Malay Archipelago:

Timor: North Central Timor, Soepa, Beboki, WALSH 409 (B), type specimen.

Altitude: 600 m.

Flowers: June.

This *Vernonia* is closely related to the preceding species; it is different by the 3-flowered heads, the involucre and the shape of the leaves. *Vernonia capituliflora* is different by the 5-flowered heads, the villous, minutely dentate, elliptic-oblong leaves and the villous involucreal scales.

Note: *Vernonia actaea*, *Vernonia capituliflora*, *Vernonia walshae*, *Vernonia timorensis* are quite different from the other *Vernonias*; at the same time they are very closely allied to each other. So it seems preferable to put them to a separate section, for which I propose the name „*Congestae*”.

II. LYCHNOPHORINAE HOFFMANN in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 121, 128 — *Lychnophoreae* BENTH. et HOOK. Gen. Pl. II (1873—1876) 165, 171.

*Heads* clustered to heads of second order; heads 1- to few-flowered. Nearly all in trop. America.

#### Key to the genera.

- |                                              |                                      |
|----------------------------------------------|--------------------------------------|
| 1. a. Heads 4-flowered . . . . .             | 2                                    |
| b. Heads 1-flowered . . . . .                | 7. <i>Rolandra</i> , p. 467          |
| 2. a. Glomerules on long peduncles . . . . . | 5. <i>Elephantopus</i> , p. 456      |
| b. Glomerules sessile, spicate . . . . .     | 6. <i>Pseudelephantopus</i> , p. 465 |

#### 5. ELEPHANTOPUS.

ELEPHANTOPUS L. Gen. Pl. ed. I (1737) 249; BL. Bijdr. (1825) 890; LESS. in *Linnaea* IV (1829) 323; LESS. Syn. (1832) 149; ROXB. Fl. Ind. III (1832) 445; DC. Prod. V (1836) 85; MIQ. Fl. Ind. Bat. II (1856) 21; BENTH. Fl. Austr. III (1866) 461; BENTH. et HOOK. Gen. Pl. II (1873—1876) 237; CLARKE Comp. Ind. (1876) iii; OLIVER Fl. trop. Afr. III (1877) 298; HOOK. Fl. Br. Ind. III (1882) 242; BAILLON Hist. Pl. VIII (1886) 126; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 130; TRIMEN Fl. Ceylon III (1895) 95; BOERL. Fl. Ned. Ind. II (1899) 173; GLEASON in Bull. N. Y. Bot. Gard. IV (1905—1907) 239; ELMER Leaf. Phil. Bot. I (1906) 95; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV (1910) 27; KOORDERS Exc. Fl. Java III (1912) 316; RIDLEY Fl. Mal. Penins. II (1923) 180; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 502; LEMÉE Dict. Genr. II (1930) 820; *Pseudelephantopus* ROHR Skrivt. Nat. Selsk. Kiob. II (1792) 213; GLEASON in Bull. N. Y. Bot. Gard. IV (1905—1907) 242; *Distreptus* CASS. Bull. Soc. Phil. (1817) 66; CASS. Dict. Sci. Nat. XIII (1819) 366.

Perennial, pilose, rigid herbs. *Leaves* sessile, entire or dentate, pinninerved. *Heads* few-flowered, in glomerules, surrounded by leaflike bracts. *Glomerules* on rigid peduncles. *Involucre* cylindric, compressed, biseriate, rows alternating; scales few, oblong, acute at the top. *Corolla* tubular, 5-fid, often deeper cleft on one side. *Anthers* appendiculate; basal auricles obtuse. *Style*-branches filiform, pilose, subulate at the top. *Achene* oblong, 10-ribbed, pilose. *Pappus* uniseriate; hairs few. *Receptacle* small, naked flat or nearly so. Occasionally the seeds germinate in the heads (BOERLAGE l.c.).

About 32 species, of which 25 in America (Texas!, Kentucky!, Missouri!, Mexico and all South America!); 5 species in trop. Africa

(Angola!) and Madagascar!; 2 species in trop. Asia (see distribution of *E. scaber*), of which one also in Australia and trop. Africa.

**Key to the species.**

- 1. a. Head-glomerules 1 cm long or longer; scales of the involucre with long, mostly spreading hairs; corolla 7—9 mm long; achene 4 mm long; setae of the pappus gradually dilate and pilose at the margin. Leaves spatulate, in a radical rosette, as a rule, obtuse at the top; hairs rigid, appressed, grey, most densely inserted on the principal nerves beneath . . . (1) *E. scaber*.
  - b. Head-glomerules 1 cm high or shorter; scales of the involucre subglabrous; corolla 5 mm long; achene 2½—3 mm long; setae of the pappus abruptly deltoid and subglabrous at the base. Leaves elliptic, acute at the top, scattered along the stem; hairs velvety silvery, equally densely inserted beneath . . . (2) *E. tomentosus*.
- (1) **Elephantopus scaber** L. Sp. Pl. ed. I (1753) 814.

Perennial rigid herb, 10—70 cm high. Creeping *root-stock* thick, having many roots, branched or simple. One to three stems arising from the base, distinctly dichotomous, terete, smooth or slightly ribbed, warty, densely strigosely hairy (hairs about 1 mm long, whitish, more or less appressed), 3—6 mm thick; internodes 5—13 cm long. *Leaves* paler beneath; radical ones numerous, forming a rosette, subsessile, variable subobtuse or nearly rounded, shortly acuminate at the top, gradually attenuate at the base (rarely attenuate into a long petiole, to 5 cm long), semiamplexicaul, pinni-nerved (nerves more or less prominent beneath, lateral ones 7—13 pairs, reticulations hardly visible), sparingly spreaded-hairy (hairs scabrid, erect) or subglabrous, warty above, scabridly greyish pubescent (hairs appressed, rigid, most numerous and longer on the principal nerves), densely glandular, greyish beneath, chartaceous or coriaceous, 5—38 cm long, 1—6 cm broad. Leaves of the stem of the flowering branches few or none, some higher ones sometimes small, much reduced, sessile, narrowly oblong, ovate or obovate, other leaves of the stem sessile, narrowly oblong, serrate or repandate or nearly entire, gradually attenuate at the base, acute at the top, often small, 3—15 cm long, 2—30 mm broad. Leaves of the non-flowering branches scattered along the stem, semiamplexicaul, for the rest like the radical ones of the flowering branches. *Heads* glomerate (exterior heads younger), about 20—50 together; glomerules single or double, on long dichotomous rigid peduncles (1—2 mm thick, 4—21 cm long with scabrid appressed whitish hairs), 1—1½ cm high, 1½—2½ cm broad, bearing at the base 3 cordate or deltoid-ovate, serrate, small leaves (1—2½ mm long, 8—15 mm broad, acuminate at the top; nerves prominent) pilose at both

sides, exceeding the glomerules or as long as the glomerules. *Glomerules* surrounded by a row of boat-shaped, long and very sharply acuminate scales; scales 7 mm long, 1-nerved having many long spreading grey hairs on the stout nerve. *Heads* oblong, 4-flowered, 8—10 mm long, 2 mm thick. *Involucre* biseriate; scales of the inner row 4, narrowly oblong, very acute at the top, 3-nerved, densely hirsute (hairs more or less spreading, grey, long), slightly glandular, 1 cm long; of the inner row 4, lanceolate, very acute at the top, submembranous, subglabrous, thinly hirsute, 5 mm long, alternating with the inner row. *Corolla* infundibuliform, 5-lobed, 7—9 mm long; lobes subobtusate, lanceolate, glabrous, 2—3 mm long. *Anthers* shortly sagittate at the base, subobtusate at the top, small. *Style* hairy at the upper part; branches subobtusate at the top, pubescent. *Achene* oblong-linear, clearly ribbed (ribs about 10), pubescent between the ribs, pale coloured, 4 mm long,  $\frac{1}{2}$  mm wide. *Pappus* existing of 5, rarely 6, spreading stiff bristles, gradually triangularly dilate and hairy at the base, 5 mm long. *Receptacle* flat, minute.

Distribution: Br. India, Mal. Penins., Indo-China, S. China, Formosa, Philippines, Mal. Arch., Australia, trop. Africa.

1. var. *typicus*; *Elephantopus scaber* L. Sp. Pl. ed. I (1753) 814; L. Sp. Pl. ed. II (1763) 1313; BURM. Fl. Ind. (1768) 185; WILLD. Sp. Pl. III (1804) 2386; LESS. in Linnaea IV (1829) 325; ROXB. Fl. Ind. III (1832) 445; WIGHT Contr. Bot. Ind. (1834) 8; WIGHT! Ic. (1840) t. 1068; DC.! Prod. V (1836) 86; ZOLL. in Nat. Gen. Neerl. Ind. II (1845) 224; MIQ.! Pl. Jungh. (1854) 496; MIQ.! Fl. Ind. Bat. II (1856) 21; BENTH. Fl. Hongkong. (1861) 170 (excl. syn.); MIQ. Sumatra (1862) 210; BENTH.! Fl. Austr. III (1866) 461; CLARKE Comp. Ind. (1876) 28; KURZ in Journ. As. Soc. Beng. XLVI 2 (1877) 198; HOOK. Fl. Br. Ind. III (1882) 242; FORBES et HEMSLEY in Journ. Linn. Soc. Bot. XXIII (1886—1888) 402; TRIMEN Fl. Ceylon III (1895) 12; BOERL. Fl. Ned. Ind. II (1899) 173, 235; CLARKE in Bot. Tidsskr. XXIV (1902) 243; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV 2 (1905) 28; GLEASON in Bull. N. Y. Bot. Gard. IV (1906) 241; ELMER Leaf. Phil. Bot. I (1906) 97; MATSUMURA et HAYATA in Journ. Sci. Tokyo XXII (1906) 202; KOORDERS! Exc. Fl. Java III (1912) 316; GIBBS in Journ. Linn. Soc. XLII (1914) 97; MERRILL in Journ. R. As. Soc. (1921) 586; GAMBLE Fl. Madras IV (1921) 676; RIDLEY Fl. Mal. Penins. II (1923) 180; MERRILL Enum. III (1923) 596; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 502; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1430; BACKER Handb. Suikerr. Java VII (1932) 753; KOSTER in Fedde Repert. XXXIV (1933) 6; HOCHREUTNER in Candollea V (1931—1934) 298.

Radical *leaves* spatulate-oblong or spatulate-obovate, crenate-serate (teeth on equal distances, directed forward, rounded at one side), scabridly greyish pubescent beneath, 5—17 cm long, 1—3½ cm broad.

Distribution in the Malay Archipelago:

**Sumatra:** *East Coast:* Karo-plateau, LÖRZING 8805 (B); *Tapanoeli:* Pangoeroeron, on P. Samosir in the lake of Toba, LÖRZING 7643 (B); *West Coast:* Fort van der Capellen, MATTHEW s.n. (K) — Taloe, BÜNNEMEYER 60 (B) — Koerintji, BÜNNEMEYER 7945 (B); *Djambi:* Djambi, POSTHUMUS 805 (L, B); *Palembang:* Palembang, DE VOOGD s.n. (B); Sumatra, coll. unknown (B).

**Riouw Arch.:** *P. Karimon,* G. Djantan, BÜNNEMEYER 7868 (L) — *P. Bintan,* Batoe hitam, BÜNNEMEYER 6404 (L).

**Bangka:** Muntok, AMAND 38 (U).

**Java:** *West Java:* Tjiastana, Priangan, BAKHUIZEN VAN DEN BRINK 5056 (B) — Tjadas Malang near Tjibeber, BAKHUIZEN VAN DEN BRINK 457 (L), WINCKEL 1541 (L, B) — near Tjibeber, WINCKEL 1165 (B) — Batavia, RAYNAUD s.n. (L), RAAP 2424 (L), WINTERSBOTTOM s.n. (K), BACKER s.n. (L) — Tjigentjah near Tjisalak, Priangan, BAKHUIZEN VAN DEN BRINK 5072 (L) — G. Goentoer, KOENS 155 (B) — G. Poetri near Garoet, KOENS 107 (B) — between Kali Poetjang and Pada Herang, Priangan, BACKER 4513 (B) — near Buitenzorg, BACKER 6244 (B), HALLIER 157c (L) — Batavia VAN DER VEEN s.n. (L) — between Lengkong and Tjitjoeroek, Priangan, BACKER 17148 (B) — Halimoen, estate, Priangan, coll. unknown 24 (B) — between Tji Sandawoet and Tjatjaban, Priangan, BACKER 12181 (B) — Tji Seroepan, Priangan, KOENS 488 (B) — Telaga Bodas, KOENS 277 (B) — Noesa gede in the lake of Pendjaloe, KOORDERS 47992 (B), 47993 (B) — Sindanglaya, BACKER 21511 (B) — Depok, KOORDERS 31298 (B); *Middle Java:* Karangasam, Semarang, KOORDERS 28466 (L) — G. Moeriah, DOCTERS VAN LEEUWEN—REYNVAAN 822 (U), 880 (B) — Kedoengdjati, KOORDERS 1896 (L) — north of Josedjo, Pekalongan, BACKER 16196 (B) — Kendal, BACKER 16355 (B) — Poerworedjo, LEEFMANS s.n. (B) — Poerwokerto, BACKER 54 (B); *East Java:* Poeger, KOORDERS 20565 (L) — G. Baloeran, foot, BACKER 24829 (B) — between Sripit and Prigi, Kediri, BACKER 11758 (B) — S.-Kediri, BEUMÉE 2366 (B) — G. Tengger, MOUSSET 73 (B), BULJSMAN s.n. (U) — near Blora, BLOKHUIS s.n. (B) — G. Idjen, BACKER 25346 (B), 24868 (B) — Pradjekan, Bondowoso, BACKER 24529 (B) Pantjoer ner Sitoebondo, OTTOLANDER 325 (B).

**Madoera:** Batang batang daja, BACKER 20890 (B).

Kangean Arch.: *P. Kangean*, Sawah Soemoer, DOMMERS 139 (B) — *P. Paliat*, BACKER 29328 (B).

Soembawa: Wawa, RENSCH 887 (B).

Timor: Koepang, TEYSMANN s.n. (B) — N. Moetis, Kaslioe, WALSH 332 (B).

Wetar: plateau of Mangowe, near Laswerang, ELBERT 4511 (L).

Borneo: Sandakan and vicinity, RAMOS 1823 (B).

Celebes: *Manado*: Manado, KOORDERS 16437 (B); *S.W. Celebes*: Lombasang, BÜNNEMEYER 11349 (B) — Bonto Parang, BÜNNEMEYER 10697 (B).

Flowers purple (KOORDERS, s.o.), white (WALSH), white and crimson (RENSCH), mostly reddish purple, sometimes white (BACKER), white to very pale violet, lobes pale violet (BAKHUIZEN VAN DEN BRINK); anthers and style white, branches of the style pale violet (BAKHUIZEN VAN DEN BRINK). The flowers open between 1 and 2 p. m. (BLOKHIJUS) and close at about 5 p. m. (BACKER). A depauperate form has been collected, having very small leaves (3 cm long, 0.8 mm broad) and one very shortly petiolate glomerule.

Vernacular names: *tapak liman*, *djoekoet tanghoer*, *tjangtjan*, *boenga tajajam*, *lokot male*, *tjengtjeng*, *semboeng lemprah*, *balagadoek*, *oempang* (all Java), *tampak dengdeng*, *tampak tanah* (all Kangean Arch.), *tampa tampa hallang*, *daoen saoe saoe boemi*, *ti marpira pira* (all Sumatra), *toetoeop boemi* (Borneo), *roempoeit petje* (Celebes).

Hab.: in teak, bamboo, Eucalyptus and other forests, in jungles, in grassy fields, along waysides, in a dry rice field, in a neglected garden, on a lava-stream (one of the first plants on the lava); on volcanic sand, sandy clay and marly lime; in sunny or rather shady places (ex BACKER l.c.); common, mostly numerous.

Altitude: 0—1500 m.

Flowers during the whole year.

Medical use: roots against malarial fever (HEYNE), decoction of the roots against bowel complaints (acc. to MIQUEL).

Distribution: South Asia: Madras (Malabar!, Calicut-district!, Courtalam!, Terr. Canara!, Nillgherry!), Bombay!, Bengal!, Nepal!, Himalaya!, Assam! (Khasia!), Burma!, Malay Peninsula!, Annam!, Cochinchina!, Tonking!, Laos, Cambodge; China (Yunnan!, Fukien!, Foochow!, Chekiang!, Kwantung, Hongkong!); Formosa; Philippines (Luzon!, Mindoro); Australia!, Trop. Africa!

Though this species usually has been considered to be pantropical (BENTHAM l.c., FORBES and HEMSLEY l.c., HOFFMANN l.c., RIDLEY l.c., MERRILL l.c.), this view does not seem to be correct. The species has not been mentioned in the Flora Brasiliensis and nor in the Kew Herbarium, nor in the Leiden Herbarium any specimen of this species is to be found. In many cases *Elephantopus scaber* must have been confounded with the very closely related tropical american *Elephantopus tomentosus* and *Elephantopus carolinianus*; the last species differs from *Elephantopus scaber* by its elliptic leaves, scattered along the stem, its smaller glomerules, its glabrous involucreal scales, its long hairs (about 1 mm long) sparingly equally distributed on the lower surface of the leaves. According to TORREY and GRAY (Fl. N. Am. II, 1838—1840, 61) *Elephantopus scaber* has been collected once in Louisiana;

no differences have been found after comparing it with specimens from China and the Malay Peninsula. GLEASON l.c. seems to have the right view in considering the species concerned to be distributed in the tropics of the Old World and sparingly introduced into the West Indies, Central America and South America.

It is not certain, whether this species occurs in Madagascar; according to the description of HUMBERT (Comp. Madagascar, 1923, 32) the species concerned seems to be *Elephantopus tomentosus*.

BACKER l.c. suggests this species to be introduced from tropical America, being collected in Java since 1858. Being indigenous, however, it may have been immigrated in Java from the Malay Peninsula.

MERRILL l.c. is convinced that *Elephantopus scaber* is introduced into the Philippines.

2. var. *sinuatus* MIQ. ! Pl. Jungh. (1854) 496; MIQ. ! Fl. Ind. Bat. II (1856) 22; *Elephantopus sinuatus* ZOLL. et MOR. in Syst. Verz. Ind. Arch. (1854) 120; *Elephantopus scaber* BL. ! Bijdr. (1825) 890; LESS. in Linnaea IV (1829) 325; DECAISNE Herb. Timor. (1835) 81.

Radical leaves often large, spatulate, narrowed into a winged petiole, often elongated, undulate-runcinate, thinly pilose beneath except on the principal nerves, 6—38 cm long, 2—6 cm broad; teeth of the margin on irregular distances.

In this variety two forms are to be distinguished: the form which MIQUEL describes is rather an intermediate form between the two extreme ones.

α. The dentation of the radical leaves is scarce; the teeth of the margins are small and acute ( $\frac{1}{2}$  mm long).

Distribution in the Malay Archipelago

Sumatra: *East Coast*: Medan, LÖRZING 4101 (B) — Sebaok, Bengkalis, BEGUIN 404 (L, B) — Asahan, BARTLETT and LA RUE 332 (L).

Java: *West Java*: Buitenzorg, HALLIER 157c (B) — Palaboean, KOORDERS 34649 (B); *Middle Java*: East Tegal, BEUMÉE 3694 (B) — Goendik, Blora, BACKER 6446 (B).

Madoera: Bangkalan, BACKER 19069 (B).

Flores: Endeh, RENSCH 1030 (B).

Celebes: South West, Lombasang, BÜNNEMEYER 11678 (L).

Moluccas: *Amboina*, WEBB s.n. (K) — *Banda Islands*: MOSELY s.n. (K).

β. The incision of the radical leaves reaches nearly half the breadth of the leaf; the teeth of the margin are different in shape; they are obtuse, deltoid and often large (to  $\frac{1}{2}$  mm long), or small and acute ( $\frac{1}{2}$  mm long).

Distribution in the Malay Archipelago:

Java: *West Java*: Batavia, VORDERMAN s.n. (B), BACKER s.n. (B)

— Depok, DE MONCHY and BURCK s.n. (B) — Poerwakarta, BACKER 13760 (B); *East Java*: Bondowoso, ETTY s.n. (B).

Moluccas: *Amboina*: ROBINSON 1842 (L).

Kangean Arch.: *P. Kangean*, Kajoe waroe, BACKER 2810 (B) — *P. Saeobi*, BACKER 28282 (B) — *P. Saboenten*, BACKER 29644 (B).

The following specimens could not be inserted in either of the forms mentioned, like that described by MIQUEL.

Distribution in the Malay Archipelago:

Sumatra: *Atjeh*: Alas-valley, near Koeta ajane, LÖRZING 11076 (B); *Tapanoeli*: Ankola, JUNGHUHN 303 (L), det. MIQ. — near the lake of Toba, LÖRZING 6422 (B); *West Coast*: Priaman, TEYSMANN 1042 (B) — Pladang, coll. 213 (B); Sumatra, CUMING 2428 (K).

Lingga Arch.: *P. Lingga*, Merawang, BÜNEMEYER 6813 (B).

Riouw Arch.: *P. Bintan*, BÜNEMEYER 6326 (B) — *P. Sedanan*, VAN STEENIS 1071 (B).

Java: *West Java*: Buitenzorg, HALLIER 157 (L, B), 157b (L), BACKER 5805 (B), KOORDERS 32616 (B) — between Rangkasbitoeng and Tjileles, BACKER 1096 (B) — between Panjawaengan and Bajah, BACKER 1564 (B) — Moentjang, Bantam, BACKER 1876 (B) — between G. Kentjana and G. Kendeng, BACKER 1290 (B) — Rangkasbitoeng, BACKER 1010 (B) — Batavia, KOORDERS 32663 (B), BACKER 3362 (B), 3363 (B), 3364 (B), 3365 (B) — Tjiloe, Priangan, BACKER 25625 (B) — Tjiandjoer, Priangan, BACKER 3020 (B) — Wanajasa, Krawang, BACKER 14265 (B) — Soekaboemi, BACKER 14551 (B) — north of Kiara Pajoeng, Priangan, BACKER 23913 (B) — Tjileungsie and Klappamoengal, Buitenzorg, FRILJINCK 15 (B) — east of Poerwakarta, HARMSSEN 75 (B) — Tjiseëng, Buitenzorg, BAKHUIZEN VAN DEN BRINK 7930 (B) — G. Tjerimai, BACKER 4989 (B); *Middle Java*: Pekalongan, BACKER 15467 (B) — Margasari, Tegal, BEUMÉE 378 (B) — between Doro and Bandar, Pekalongan, BACKER 15614 (B) — Tegal, BACKER 15235 (B) — between Slawi and Balapoeang, Tegal, BACKER 15395 (B) — between Madjenang and Tji Salak, BACKER 18474 (B) — Randoe Blatoeng, Blora, BACKER 6600 (B) — Grobogan, South Kradenan, DE BOER 3 (B) — Kedoengdjati, KOORDERS 25136 (B) — Djapara, Ngarengan, KOORDERS 33501 (B), 33491, 34920 (B) — Nanas, Rembang, BEUMÉE 885 (B) — Regaloh, Semarang, BEUMÉE 3958 (B) — Banteran, Banjoemas, ROELOFSEN 12 (B) — Semarang, KOORDERS 28014 (L) — Ngandang, Rembang, KOORDERS 36144 (B, L) — Salatiga, DOCTERS VAN LEEUWEN—REYNVAAN s.n. (U) — Manggar Koedoes, BEUMÉE 5416 (B) — Koendoeran, Blora, BEUMÉE 5227 (B) — Karang-anjar, KOORDERS 26224 (B) — Sepakoeng, Semarang, KOORDERS 35907



(B); *Djocjakarta*: Wonosari, BACKER 2583 (B); *Soerakarta*: Modjoragen, BACKER 8416 (B) — Klaten, ADMIN. GEMAMPIR 7 (B); *East Java*: Ngebel, Madioen, KOORDERS 29236 (B), 23175 (B) — res. Soerabaja, south, BEUMÉE 2432 (B) — Modjokerto, METSELAAR s.n. (B) — Manjoel, Madioen, STOUTJESDLJK 60 (B) — near Bodok, Kediri, KOORDERS 22872 (B) — Toeloengagoeng, BACKER 11701 (B) — Poenten, Malang, HOFSTEE 4 (B), LEEFMANS s.n. (B) — Poeger, BACKER 17779 (B) — Kepandjen, ISMAIL 22 (B) — G. Argopoero, BACKER 13216 (B) — Tarokan, BEUMÉE 2788 (B) — Dampit, BACKER 3799 (B) — near Soember Poetjong, BEUMÉE 2848 (B) — Djember, ULTÉE s.n. (B); *Java*, ZOLLINGER 7 (L, K).

*Madoera*: S.W. of Soemenep, BACKER 20629 (B) — Ketapang daja, BACKER 19856 (L, B) — Sampang, BACKER 19690 (L, B).

*Kangean Arch.*: *P. Kangean*, BACKER 26984 (B) — *P. Sepapan*, BACKER 28490 (B) — *P. Sepandjang*, BACKER 28785 (B).

*Bali*: Boeleleng, ROBINSON 2522 (B)

*Timor*: Soë, South Central Timor, WALSH 101 (B) — Timor, DECAISNE s.n. (L), WALSH s.n. (B).

*Borneo*: *West Borneo*: Mengkatja, DE MOL 144 (B); *S.E. Borneo*: Banjarmasin, MOTLEY s.n. (K).

*Celebes*: S.W. *Celebes*, near Tanette, BÜNNEMEYER 12439 (B), 12515 (B).

*Saleier*: DOCTERS VAN LEEUWEN 1701 (B).

*Moluccas*: *Ternate*, near Fort Oranje, BEGUIN 796 (B); *Amboina*, ROBINSON 1842 (B).

*Hab.*: in teak, bamboo and other forests, in grassy fields, along waysides, on a dry rice field, in coconut-gardens, on a railway-embankment, on the dikes of fish-ponds; on limestone, clay and volcanic sand; as a rule, abundant; very common.

*Altitude*: 1—1000 m.

*Flowers* during the whole year.

*Distribution*: Siam! Philippines (Luzon!).

BLUME's and DECAISNE's descriptions of *Elephantopus scaber* seem to refer to this variety *sinuatus*.

The chief distribution of this variety is the Malay Archipelago.

3. var. *angustatus* nov. var.

*Folia* radicalia oblanceolato-spathulata, elongata, subintegra, nervis marginibusque pubescentibus, 9—17 cm longa, 1½—2½ cm lata. Bractee glomerulorum breves, 8—10 mm longae. *Glomeruli* parvi, 8—10 mm longi. *Lobi corollae* angustissimi.

*Distribution* in the Malay Archipelago:

*Borneo*: Sandakan and vicinity, RAMOS 1823 (L), type specimen.

4. var. *serratus* nov. var.

*Rami* dense, longiter et rigide pilosi. *Folia* radicalia anguste elliptico-ovovata, acutissime serrata, 6—9 cm longa, 1—3½ cm lata, subtus nervi marginibusque pilosis. *Glomeruli* parvi, 1 cm longi, 1.2—1.5 cm lati. *Corolla* 6 mm longa, lobis 1½ mm longis. *Achenium* 3½ mm longum. *Pappi* setae 4 mm longae.

Distribution in the Malay Archipelago:

Riouw Arch.: *P. Papan*, BÜNNEMEYER 7796 (L)

Lingga Arch.: *P. Sinkep*, BÜNNEMEYER 7295 (L), type specimen.

Altitude: 10—15 m.

Flowers: Aug., Sept.

(2) *Elephantopus tomentosus* L. Sp. Pl. ed. I (1753) 814, ed. II (1763) 1314; WILLD. Sp. Pl. III (1804) 2390; LESS. in *Linnaea* IV (1829) 326; SCH.-BIP. in *Linnaea* XX (1847) 516; GLEASON in *Bull. N. Y. Bot. Gard.* IV (1906) 241; RIDLEY *Fl. Mal. Penins.* II (1923) 180; *Elephantopus mollis* H. B. K. (ex. SCH.-BIP. l.c.) *Nov. Gen.* IV (1820) 26; DC. *Prod.* V (1836) 86; ELMER *Leafl. Phil. Bot.* I (1906) 97; MERRILL in *Journ. R. As. Soc.* (1921) 586; MERRILL *Enum.* III (1923) 595; *Elephantopus Martii* GRAH. (ex. SCH.-BIP. l.c.) in *Edinb. New Phil. Journ.* (1830) 2; DC. *Prod.* V (1836) 86; HASKARL *Cat. II Hort. Bog.* (1844) 96; *Elephantopus scaber* L. var. *Martii* MIQ. *Fl. Ind. Bat.* II (1856) 22; *Elephantopus scaber* L. var. *tomentosus* BAKER *Fl. Bras.* VI 2 (1873—1876) 173.

Perennial, large herb, up to 2 m high. *Stem* elongated, much branched, terete, ribbed, pilose (hairs whitish, 1 mm long, spreading), glandular, 3 mm thick at the upper part; internodes 1—9 cm long; ramifications indistinctly dichotomously branched; younger parts yellowish densely hairy. *Leaves* scattered along the stem; serrate (teeth directed forward, mucronate), or subentire, acute at the top, equally velvety silvery tomentose (hairs suberect), glandular, beneath, subglabrous, rugose above, pinni-nerved (6—15 lateral nerves, smaller nerves prominent beneath), chartaceous; lower ones oblong-ovovate, narrowed into a winged petiole, ending into a dilate, triangular base, to 22 cm long, to 7 cm broad; higher ones elliptic or oblong-elliptic smaller (7—8 cm long, 1½ cm broad), subsessile or petiolate (petioles 2—3½ cm long), slightly greyish pubescent, warty above; highest ones very small, 3 cm long, 6 mm broad. *Heads* glomerate, 12—20 together; glomerules having 3 cordate leaves at the base (7—12 mm broad, 8—15 mm long, sometimes exceeding, but mostly not exceeding the heads), on long, slender peduncles (densely fulvously hairy, glandular, 1—6 cm long, ½ mm thick), 8—10 mm high,

1½—2 cm wide, consisting of 12—20 heads (exterior heads younger), surrounded by a row of boat-shaped long, sharply acuminate, 1-nerved scales (5 mm long, having few long hairs on the nerve). Heads oblong, small, 4-flowered. *Involucrad* biseriate; scales of the outer row 4, lanceolate-oblong, very pointed at the top, 1-nerved, keeled, subglabrous, or glabrous, 4—5 mm long, alternating with the inner row; scales of the inner row 4, elliptic-oblong, boat-shaped, acute at the top, 3-nerved, slightly shortly pubescent (hairs appressed), glandular, 7—8 mm long. *Corolla* infundibuliform, 5-lobed, 5 mm long; lower part filiform; lobes lanceolate, glabrous, subobtusate at the top, 1½ mm long. *Anthers* sagittate at the base. *Style*-branches slender, shortly pubescent. *Achene* oblong-linear, clearly ribbed (ribs 10) prominent, pubescent between the ribs, 3 mm long, ½ mm wide. *Pappus*-bristles stiff, filiform, suddenly deltoid at the base, subglabrous at the lower part, 4 mm long. *Receptacle* flat, minute.

Distribution in the Malay Archipelago:

Borneo: *Br. N. Borneo*, Sandakan, Bur. Sci. Manila 783 (L); *Br. N. Borneo*, CREAGH s.n. (K).

Celebes: *Manado*, Tondano, WISSE 29 (B) — near Amoerang, KOORDERS 16435 (L) — Ratahan, KOORDERS 16438 (L), LAM 2414 (B) — near Manado, KOORDERS 16439 (L) — G. Sapoetan, STEUP 54 (L) — Minahassa, KOORDERS 16436 (L), HOSE 797 (K); *S.E. Celebes*: Kendari, KJELLBERG 354 (L) — id., Liasa, KJELLBERG 2252 (B).

Flowers white (KOORDERS a.o.); herb 1½ m high (LAM).

Vernacular name: *soeiwoea* (Celebes).

Hab.: in primeval forests, along waysides, in coconut-gardens, on a damp bank of a brook; in the Minahassa very common, many together.

Altitude: 0—700 m.

Flowers: Jan.—April, July—Sept., Nov.

Distribution: Central (Mexico!) and South America (Brazil!, Colombia!, Venezuela!, Guyana!, West Indies!, Bolivia!, Guatemala!, Peruvia!, Paraguay!), Africa!, Madagascar!, Seychelles!, Mascarenes!, Marianne Islands, Caroline Islands, Formosa, Philippines (Luzon!, Palawan!, Mindoro!, Culion!, Mindanao), Mal. Penins.!, New Caledonia!

## 6. PSEUDELEPHANTOPUS.

PSEUDELEPHANTOPUS ROHR in Skrivit. Nat. Selsk. Kiob. II (1792) 213; GLEASON Bull. N. Y. Bot. Gard. IV (1906) 242; *Distreptus* CASS. Bull. Soc. Phil. (1817) 66; CASS. Dict. Sci. Nat. XIII (1819) 366.

Probably one species in Central and South America. According to GLEASON l.c. a second species may belong to the genus.

(1) *Pseudelephantopus spicatus* (JUSS.) ROHR in Skrivit. Nat. Selsk.

Kiob. II (1792) 213; GLEASON in Bull. N. Y. Bot. Gard. IV (1906) 242; STANDEY in Contr. U. S. Nat. Herb. XXVII (1928) 376; *Elephantopus spicatus* JUSS. in AUBL. Pl. Guian. II (1775) 808; BAKER in Fl. Bras. VI 2 (1873—1876) 177; ELMER-Leaflet. Phil. Bot. I (1906) 96; MATSUMURA et HAYATA in Journ. Sci. Tokyo XXII (1906) 202; MERRILL Enum. III (1923) 596; GAGNÉP. in Lec. Fl. Indo-Chine III (1924) 502; BACKER Handb. Suikerr. VII (1932) 754; *Distreptus spicatus* CASS. in Diet. Sci. Nat. XIII (1819) 367; LESS. in Linnaea IV (1829) 328; DC. Prod. V (1836) 87.

Large herb, 60—100 cm high, much branched; *stem* glabrous or sparingly hirsute, terete at the top, subangular, sparingly glandular, 3—10 mm thick at the base; branches terete, zigzag, striate, glandular; internodes clearly limited by the cicatrices of the dropped leaves, 2—3½ cm long. *Leaves* subsessile, subamplexicaul, entire or distantly serrate, pinni-nerved (8—11 nerves at each side), glossy, spreaded-scabridly pubescent or subglabrous, glandularly spotted above, slightly scabridly pubescent (especially on the nerves) or subglabrous, densely glandular beneath; lower ones spatulate-oblong, gradually narrowed, triangularly dilate to the base, subobtuse or shortly acute at the top; superior ones lanceolate-elliptic, gradually narrowed at both ends; lower ones 7—20 cm long, 1—5 cm broad; higher ones 2½—11½ cm long, ½—1½ cm broad. *Glomerules* sessile, spicate, consisting of 1—6 heads in the axil of a small lanceolate leaf (about as long as or longer than the heads); spikes terminal, narrow, elongated. *Heads* oblong, slightly compressed, 4-flowered, 10—12 cm long, 4 mm wide. *Involucre* about as long as the heads, 4-seriate; each row consisting of 2 opposite scales, gradually shorter to the exterior ones; scales glabrous, elliptic-oblong, shortly acuminate and acute at the top, one-nerved, dark coloured and glandular at the upper part, 1 cm long, 2 mm wide; midrib prominent, edges scarious, white. *Corolla* subtubular, 5-lobed, 7 mm long; lobes lanceolate, subobtuse at the top, long, glabrous; limb gradually attenuate into the slender, striped tube. *Anthers* shortly sagittate at the base; tip short, subobtuse. *Style*-branches slender. *Achenes* linear-oblong, ribbed, densely tomentose, glandular between the ribs, 6 mm long. *Pappus* 4 mm long, consisting of 2 long bristles, looped at the top, and about 7 smaller straight ones, inequally long, all scabrid. *Receptacle*, small.

Distribution in the Malay Archipelago:

J a v a: *West Java*: Buitenzorg, BAKHUIZEN VAN DEN BRINK 1934 (L, K) — id., Herbarium, VAN STEENIS 1804 (B) — Meester Cornelis, WEEHUIZEN 1 (B), BACKER 22841 (L, K).

Corolla white (VAN STEENIS); limb of the corolla milky white, afterwards brownish (ex BACKER l.c.). The flowers open between 11 and 12 a. m. (ex BACKER l.c.).

Vernacular name: *daoen kina* (Java, on account of its bitterness).

Hab.: as a weed in kampongs, in a grassy field; abundant.

Altitude: 25—250 m.

Flowers: June, July, Sept.

Distribution: All trop. Central and South America!, Africa!. Introduced into S. E. China (Hongkong!), Formosa, Marianne Islands!, Batan Islands, Philippines (Luzon!, Mindoro!, Mindanao!).

## 7. ROLANDRA.

ROLANDRA ROTTB. Coll. Soc. Med. Havn. II (1775) 256; LESS. in *Linnaea* IV (1829) 332; LESS. in *Linnaea* VI (1831) 693; LESS. Syn. (1832) 150; DC. Prod. V (1836) 90; BENTH. et HOOK. Gen. Pl. II (1873—1876) 237; BAILLON Hist. Pl. VIII (1886) 125; HOFFM. in ENGL.-PRANTL IV 5 (1894) 130.

A monotypic genus of South America; introduced into Japan and Java.

(1) *Rolandra fruticosa* (L.) O. K. Rev. Gen. Pl. I (1891) 360; GLEASON in Bull. N. Y. Bot. Gard. IV (1906) 242; *Echinops fruticosus* L. Sp. Pl. ed. I (1753) 815; *Rolandra argentea* ROTTB. Coll. Soc. Med. Havn. II (1775) 256; LESS. in *Linnaea* IV (1829) 332; DC. Prod. V (1836) 90; BAKER in Fl. Bras. VI 2 (1873—1876) 178; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 131.

Shrub, 40 cm high; *stem* terete, ribbed, sparingly silky tomentose (hairs appressed, long, greyish), nearly glabrous at the lower part, 2½—3½ mm thick; internodes 3—7 cm long. In the axils of the leaves short leafy branches or longer branches like the principal stem, or very short branches (1—2 cm long), bearing 1 or 2 small leaves (1—3 cm long, ½ cm broad) and a head-glomerule. *Leaves* petiolate, (petioles ½—1 cm long, triangularly dilate at the base), elliptic or lanceolate-elliptic, acute at both ends or gradually attenuate into the petiole, subentire or minutely mucronately serrate or slightly repandate, pinni-nerved (lateral nerves 7—14 pairs, prominent, silky greyish tomentose beneath), stout, glabrous, shining, warty above, glandularly spotted, densely silvery felty tomentose beneath, edges recurved; blades 3—9 cm long, ½—3 cm broad. *Heads* in dense glomerules, which are semiglobular, sessile, axillary, 7 mm high, 14 mm wide. Heads sessile, ovate, small, 1-flowered. *Involucre* consisting of 2 scales; scales boat-shaped, compressed from the sides, glabrous, exterior one having a prickle at the top, interior one shorter, 3 mm long. *Flower* exceeding the involucre. *Corolla* subtubular, 5-lobed; lobes lanco-

late, acute at the top, half as long as the corolla,  $3\frac{1}{2}$  mm long. *Anthers* sagittate at the base (tails long), acute at the top. *Style*-branches very short, acute, pubescent, slightly exceeding the corolla. *Achene* turbinate-ovate, triangular, covered with prominent glands at the top and the base, glabrous,  $1\frac{1}{2}$  mm long. *Pappus* coroniform, minute, serrate. *Receptacle* hardly perceptible.

Distribution in the Malay Archipelago:

**J a v a:** *West Java:* Buitenzorg, BACKER 21374 (B), 22837 (B), LAM 2300 (B) — id. near Tjiliwoeng, HALLIER s.n. (B) — Soekaradja near Buitenzorg, BAKHUIZEN VAN DEN BRINK 3821 (L), 374 (B) — Bodjong Ejot, N.E. of Buitenzorg, BAKHUIZEN VAN DEN BRINK 6344 (L) — Depok, BAKHUIZEN VAN DEN BRINK 1460 (L) — id. near Tjiliwoeng, BAKHUIZEN VAN DEN BRINK 1460 (B) — G. Pantjar, east of Buitenzorg, BAKHUIZEN VAN DEN BRINK 6030 (L).

Flowers white (LAM); erect shrub, up to  $1\frac{1}{2}$  m high, stem reddish purple (LAM); woody (HALLIER).

Hab.: in jungles, along waysides, near kampongs, in a Lantana-bush; numerous; common.

Altitude: 90—600 m.

Flowers: May—Sept., Dec.

Distribution: Trop. South America!; introduced into Japan.

EUPATORIEAE DC. Prod. V (1836) 103; HOFFMANN in ENGL.-PRANTL IV 5 (1894) 131; *Eupatoriaceae* BENTH. et HOOK. Gen. Pl. II (1873—1876) 165.

Herbs or shrubs, rarely trees or annuals. *Leaves* opposite, in a few genera alternate, entire or dentate, rarely divided. *Heads* discoid, homogamous. *Involucral scales* imbricate, manyseriate; in some genera reduced to 4, 5 or 6. *Flowers* bisexual, fertile. *Corolla* red, purple, bluish white or pale yellow, tubular, regular, with 5, rarely 4 short teeth. *Anthers* undivided, obtuse, with an apical appendage, as a rule. *Style*-branches terete or semi-cylindric, elongated, obtuse or club-shaped towards the end. *Achene* 4- or 5-angled, rarely flat, terete and 10-ribbed. *Pappus* usually uni- or biseriate; setae stiff, fine. *Receptacle* naked, as a rule, sometimes pubescent.

#### Key to the subtribes.

Anthers without appendages at tip . . . . I. *Piquerinae*, p. 468  
 Anthers with an apical appendage at tip . . . . II. *Ageratinae*, p. 483

I. PIQUERINAE HOFFM. l.c. 132; *Piquerieae* BENTH. et HOOK. l.c. 165, 172.

*Anthers* not appendiculate at the top, nor at the base, rounded at both ends, completely filled with pollen. *Style*-branches clavate at the top.

**8. ADENOSTEMMA.**

ADENOSTEMMA FORST. Nov. Gen. (1776) t. 45; LESS. Syn. Comp. (1832) 156; DC. Prod. V (1836) 110; MIQ. Fl. Ind. Bat. II (1856) 23; BENTH. Fl. Aust. III (1866) 462; BENTH. et HOOK. Gen. Pl. II (1873—1876) 239; CLARKE Comp. Ind. (1876) iii; OLIVER Fl. trop. Afr. III (1877) 299; HOOK. Fl. Br. Ind. III (1882) 242; BAILLON Hist. Pl. VIII (1886) 131; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 133; TRIMEN Fl. Ceylon III (1895) 12; BOERL. Fl. Ned. Ind. II (1899) 173; ELMER Leaflet. Phil. Bot. I (1906) 98; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV (1905) 28; KOORDERS Exc. Fl. Java III (1912) 316; RIDLEY Fl. Mal. Penins. II (1923) 182; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 499; LEMÉE Dict. I (1929) 82; *Lavenia* Bl. Bijdr. (1825) 904.

Herbs. *Leaves* petiolate, often serrate, pinni-nerved. *Heads* loosely corymbosely paniculate, pedunculate, small, many-flowered; *involucre* campanulate or basin-shaped, biseriate; scales subequal, herbaceous, more or less connate at the base, often glandular. *Corolla* tubular, small, 3—5-fid. *Anthers* without apex or shortly obtusely appendiculate. *Style*-branches slender, long thickened at the top. *Achene* obovate-oblong, sub-angular, 3—5-ribbed, glandular when young, afterwards glabrous or warty. *Pappus* consisting of few clavate setae, usually thickened at the top. *Receptacle* naked, nearly flat.

About 14 species: 6 species in trop. America (Mexico, Ecuador, Brazil!, West Indies!, Peruvia, Bolivia!); 4 species in Africa (South Africa, Abyssinia); 4 species in trop. Asia, of which one also in Australia! and New Guinea!

Most probably more species will be distinguished in British India.

**Key to the species.**

- 1. a. Achenes afterwards warty . . . . . 2
- b. Achenes afterwards glabrous . . . . . 3
- c. Achenes afterwards scabrid . . . . . (3) *A. hirsutum*.
- 2. a. Corolla infundibuliform (limb not to be separated from the tube), glandular especially at the lower, more or less hirsute at the upper part (hairs white), 1½—2 mm long. *Style*-branches long exserting the corolla . . . . . (1) *A. Lavenia*.
- b. Corolla very small, 1 mm long; limb campanulate, ½ mm long, glandular, densely tomentose, tube covered with stalked glands. *Style*-branches hardly exserting the corolla . . . . . (2) *A. parviflorum*.

3. a. Achene afterwards quite glabrous; corolla 3 mm long, limb tomentose, tube glandular. Leaves glabrous (very rarely scarcely pilose) at both sides, more or less shining above, when dry. (4) *A. macrophyllum*.

b. Achene always covered with glands; corolla  $1\frac{1}{2}$  mm long, covered with prominent glands. Leaves densely, shortly and scabridly hirsute.

(5) *B. Renschii*.

(1) **Adenostemma Lavenia** (L.) O. K. Rev. Gen. Pl. I (1891)  
304 — Pl. III, 43—44.

Herb, perennial (?), 25—75 cm high; lower part of the stem rooting, more or less creeping; *stem* subterete, ribbed, glandularly pubescent or subglabrous, 1—6 mm thick, sometimes reddish; internodes  $1\frac{1}{2}$ —8 cm long. *Leaves* petiolate (petioles  $\frac{1}{2}$ — $3\frac{1}{2}$  cm long) or sessile, superior ones ovate, oblong-ovate, elliptic-ovate, lanceolate or lanceolate-elliptic, acuminate at the top (top subobtuse or acute), suddenly narrowed, afterwards gradually attenuate into the petiole (superior ones nearly rounded at the base), angularly dentate, or coarsely serrate, sometimes double-serrate (teeth ending into a minute projection, subacute or obtuse, to 6 mm long), lower part entire, pinni-nerved (lateral nerves 5 on each side, candalabrum-like bent), lowest ones very long, reticulations obscure or subtrinnervate, glabrous or subglabrous on each side (except the slightly rusty pubescent nerves), warty on each side, (especially beneath), membranous, with petiole 2—25 cm long, 6—90 mm broad; higher ones smaller. *Heads* pedunculate (peduncles rusty glandularly pubescent, hairs articulate) slender, with a small linear bract at the base or halfway, 1—3 cm long), campanulate or subglobose, about 30-flowered,  $5\frac{1}{2}$ —7 mm long and about as wide, in terminal thin dichotomous paniculate corymbs. *Involute* campanulate, biseriate; scales connected at the base, subequal in length, glabrous or slightly pubescent at the lower part, with scattered glands, oblong-lanceolate or oblong-ovate, obtuse at the top, 3-nerved, foliaceous, 3—4 mm long,  $\frac{1}{2}$ —1 mm broad; of the inner row slightly broader; of the outer row sometimes ciliate at the edges. *Corolla* infundibuliform (limb not to be separated from the tube), glandular (especially on the lower part), more or less hirsute on the upper part (hairs white),  $1\frac{1}{2}$ —2 mm long, 4-lobed; lobes deltoid, acute at the top. *Anthers* obtuse at both ends, short, ovate. *Style*-branches dilate at the upper part, glabrous, much exceeding the corolla, about  $2\frac{1}{2}$  mm long. *Achene* obovate-oblong, irregularly subtriangular, densely glandularly warty (glands stalked, small, prominent), afterwards yellowish or brownish densely warty (warts small, cylindric, not broadened beneath, numerous), nearly 1 mm wide, 3—4 mm long, on a minute thickened callose stalk). *Pappus* consisting of 3 or 4 clavate setae,  $1\frac{1}{2}$  mm long, glandular on the upper thickened part,



connected by a ring at the base. *Receptacle* basin-shaped, deeply alveolate, glabrous, nearly flat, afterwards conical (cf. notes on p. 475—476).

Distribution: Br. India, Mal. Penins., Indo-China, S. China, Japan, Formosa, Philippines, Mal. Arch., New Guinea, Australia, Pacific Islands.

1. var. *typicum*; *Verbesina Lavenia* L. Sp. Pl. ed. I (1753) 902, ed. II (1763) 1271; BURM. Fl. Ind. (1768) 183; ROXB. Fl. Ind. III (1832) 442; *Adenostemma Lavenia* O. K. Rev. Gen. Pl. I (1891) 304; MERRILL Interpret. Herb. Amb. (1917) 497; MERRILL in Journ. R. As. Soc. (1921) 587; MERRILL ENUM. III (1923) 596; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1431 (syn. excl.); MERRILL Pl. Elm. Born. (1929) 300; MATTF. in Engl. Bot. Jahrb. LXII (1929) 403; ALSTON Suppl. Fl. Ceylon VI (1931) 160; BACKER Handb. Suikerr. Java VII (1932) 755 (excl. syn.) — *Olus scrofinum album* RUMPH. Herb. Amb. VI (1750) 34 t. 14 fig. 1; *Adenostemma viscosum* FORST.! Char. Gen. (1776) 90; DECAISNE Herb. Timor (1835) 85; DC. Prod. V (1836) 111; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 225; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. 1854) 120; MIQ. Fl. Ind. Bat. II (1856) 23; BENTH. Fl. Hongkong. (1861) 171; BENTH.! Fl. Austr. III (1866) 462; (non CLARKE! Comp. Ind., 1876, 28); KURZ in Journ. As. Soc. Beng. XLVI 2 (1877) 197; HOOK. Fl. Br. Ind. III (1882) 242; FORBES et HEMSLEY in Journ. Linn. Soc. XXIII (1886—1888) 403; TRIMEN Fl. Ceylon III (1895) 13; KOORDERS in Meded. L. Pl. XIX (1898) 505; BOERL. Fl. Ned. Ind. II (1899) 235; KOORDERS in Nat. Tijdschr. Ned. Ind. LX (1901) 254; CLARKE in Bot. Tidskr. XXIV (1902) 243; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV 2 (1905) 28; ELMER Leaflet. Phil. Bot. I (1906) 99; HAYATA in Journ. Sci. Tokyo XXV (1908) 124; KOORDERS Exe. Fl. Java III (1912) 316; GAMBLE Fl. Madras IV (1921) 677; RIDLEY Fl. Mal. Penins. II (1923) 182; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 499; RENDLE in Journ. Bot. LXIII suppl. (1925) 54; *Lavenia fastigiata* BL.! Bijdr. (1825) 906; *Adenostemma fastigiatum* DC. Prod. V (1836) 111; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 227; MIQ. Pl. Jungh. (1854) 497; MIQ. Fl. Ind. Bat. II (1856) 25; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 120; BOERL. Fl. Ned. Ind. II (1899) 236; *Adenostemma viscosum* FORST. var. *Fastigiatum* CLARKE Comp. Ind. (1876) 29; HOOK. Fl. Br. Ind. III (1882) 243.

*Leaves* petiolate, oblong-obovate or elliptic-ovate, acuminate at the top (top subobtusate or acute); with petiole 7—25 cm long, 2½—8 cm broad.

Distribution in the Malay Archipelago:

S u m a t r a : *East Coast*: Bandarbaroe, near Medan, LÖRZING 5833

(B); *Tapanoeli*: between Habinsaran-plateau and Toba-lake, LÖRZING 1631 (B) — Toba near Tarrambilan, OUWEHAND 316 (B) — Upper Bila, plain, LÖRZING 9721 (B) — Oeloe Bila, CRAMER 112 (B); *West Coast*: Ophir district, BÜNNEMEYER 270 (B); *Lampongs*: Telokbetong, BACKER s.n. (B) — P. Sebesie, DOCTERS VAN LEEUWEN 5124 (B); Sumatra, KORTHALS s.n. (L).

Simaloer: near Sumatra: ACHMAD 44 (L).

Batoe Islands: *P. Pini*, RAAP 455 (B) — *P. Tello*, RAAP 401 (B), 440 (B), 49 (B), leaves hardly serrate, but mucronate.

Lingga Arch.: *P. Lingga*, kampong Daik, BÜNNEMEYER 6641 (L) — *P. Singkep*, BÜNNEMEYER 7101 (B).

Riouw Arch.: *P. Bintan*, G. Bintan, BÜNNEMEYER 6105 (L) — *P. Papan*, BÜNNEMEYER 7783 (B) — *P. Toedjoeh*, BÜNNEMEYER 5987 (B).

Java: *West Java*: Buitenzorg, BACKER s.n. (L), BOERLAGE s.n. (L), HALLIER 158 (B), BAKHUIZEN VAN DEN BRINK 433 (B), SOEGANDIREDDJA 28 (B), BACKER 4088 (B), 5872 (B), 6190 (B), VAN STEENIS 420 (B) — Batavia, BACKER s.n. (L, B, U), VORDERMAN s.n. (B) — Meester Cornelis, BACKER s.n. (L, B) — Depok, KOORDERS 31290 (L), 44004 (B), BURCK and DE MONCHY s.n. (B), BACKER 31547 (B) — G. Salak, DE MONCHY s.n. (B), LAM 220 (B) — G. Gede near Tjibeureum, PULLE 4056 (U) — Kandangsapi, Batavia, KORTHALS s.n. (L) — Tjibodas, LÖRZING 1482 (U), HALLIER 382 (B), RAAP 294 (L) — Poerwakarta, BACKER 13848 (L) — near Bandjar, BACKER s.n. (L, U), 33020 (B) — Priangan, KOORDERS 34640 (L) — Tjibogo near Tjiledoeg, JUNGHUHN 388 (L) — Goenoengkantjana, KOORDERS 41149 (B) — Pandaglang, BEUMÉE A 615 (B), BACKER 7505 (B) — line from Batavia to Bantam, Tendjo, BACKER 24028 (B) — near Tjiandjoer, BACKER 23637 (B) — near Moentjang, Bantam, BACKER 1855 (B) — near Zandbaai, Djampangkoelon, BACKER 886 (B), 17528 (B) — Rankasbitoeng, BACKER 1011 (B) — near Buitenzorg, Tjiloeur, BERCK s.n. (B) — Kalipoetjang, Priangan, BACKER 4395 (B) — Menes, BACKER 7141 (B) — G. Tjikorai, BURCK s.n. (B) — Tjibadak, Priangan, BAKHUIZEN VAN DEN BRINK 3181 (B) — Leuwiliang, Buitenzorg, BACKER 26401 (B) — Batoetoelis near Buitenzorg, BAKHUIZEN VAN DEN BRINK 1121 (B), with very small leaves, 1—2 cm broad, 2½—3 cm long; petioles 1 cm long; plant 23 cm high — Radjamandjala, Priangan, BACKER 13481 (B); *Middle Java*: G. Prahoe, JUNGHUHN s.n. (U) — Salatiga, DOCTERS VAN LEEUWEN—REYNVAAN 71243 (B) — Djapara, KOORDERS 33490 (B) — Ngarengan, Djoewana, KOORDERS 33500 (B) — Noesa Kambangan, KOORDERS 30854 (B), VAN STRAELEN 37 (B) — Banteran, Banjoemas, BEUMÉE 1197 (B), 4854 (B) — Poerwakarta, BACKER

82 (B) — Madjenang, BACKER 18550 (B), 18721 (B) — Tegal, BEUMÉE 1905 (B) — Margasari, Pekalongan, BEUMÉE 5350 (B) — Soebah, Pekalongan, KOOPER 506b (B) — Bandjaraan, Koedoes, BEUMÉE 4102 (B) — Kendal, CORDES s.n. (B) — Oengaran, DE VISSER SMITTS s.n. (B); *East Java*: G. Hijang, BACKER 9743 (L) — near Rogodjampi, ZOLLINGER 3220 (L) — G. Wilis, coll. unkn. (B) — Gadoengan, Pare, Kediri, KOORDERS 40814 (B) — Dawoeng, Kediri, GRUTTERINK 3047 (B) — South-Kediri, BEUMÉE 2346 (B) — Kediri, KOORDERS 28228 (L) — Malang, BACKER 3504 (B) — Gondang near Malang, KOENS s.n. (B), ZOLLINGER 222 (B, K) — Prigi, Blitar, BACKER 11868 (B) — Soekaredjo, Blitar, KOORDERS 22823 (B) — Sitoebondo, BACKER 24437 (B) — Djember, ULTÉE s.n. (B); Java, ZOLLINGER 792 (K, L), s.n. (U), BLUME 1838 (L), HORSFIELD 70 (K), sub nomine *Adenostemma fastigiatum*, JUNGHUHN s.n. (U).

*Madoera*: Bilapoera, BREMEKAMP s.n. (B) — G. Geger, ZOLLINGER 1783 (L).

*Flores*: Endeh, RENSCH 1032 (B).

*Timor*: Koepang, BROWN s.n. (Br. M.); Timor, SPANOGHE s.n. (L).

*Borneo*: *Br. N. Borneo*: Tawao, ELMER 21252 (K, U, B); N. Borneo, Pladjoe, AMDJAH 20 (B); Br. N. Borneo, CASTRO and MELEGTRITO 1699 (B); *S.E. Borneo*: Banjermasin, KORTHALS s.n. (L), MOTLEY 364 (K) — Tanahboemboe, Batoelitjin, VAN SLOOTEN 2138 (B); *West Borneo*: P. Madjang, TEYSMANN 8304 (B), 8307 (B).

*Celebes*: *Manado*: near Manado, KOORDERS 245 (B), 16415 (B) — Tondano, KRUYFF 52 (B) — Minahassa, near Belang, LAM 2461 (B).

*Saleier*: *P. Kalao*, DOCTERS VAN LEEUWEN 1491 (U).

*Talaud Islands*: P. Salibaboe, G. Ajambanan, LAM 3088 (B).

*Moluccas*: *Ternate*: BEGUIN 966 (B); *Amboina*: Hitoe mesing, RANT 851 (B) — Amboina, ROBINSON 427 (L, B, K), WEBB s.n. (K), TEYSMANN s.n. (B); *Banda Islands*: MOSELEY s.n. (Br. M.); Banda, BLUME s.n. (L), BLUME identified this non-flowering specimen as *Pilea Kathurang* BL., but HALLIER, in Rec. Trav. Bot. Néerl. XV, 1918, 32, brought it to the right species.

*Kai Islands*: RIEDEL s.n. (K).

*Aroe Islands*: (ex MATTFELD l.c.).

In the specimens from Borneo, Lingga Arch. and Riouw Arch. the warts of the achenes are small and crowded; in those of Java and Sumatra they are mostly bigger.

Flowers white (BACKER a.o.); style white (ex BACKER l.c.); plant sticky (VAN SLOOTEN).

Vernacular names: *kedjo béjar*, *taspong*, *bandotan*, *trasèn*, *gletang warak*, *domdoman*, *seprah*, *daoen roempoet babie*, *orang aring*, *djoekoet mandel* (all Java),

*saimembah* (Sumatra), *sudaria* (Lingga Arch.), *tempoeloet babie* (Borneo), *saluwei*, *roekoet riritjet* (both Celebes), *tjofo roki* (Ternate), *ali oto*.

Hab.: in teak and other forests, in jungles, along edges of ditches and waysides, along the edge of a rice field, in fields, in kampongs, on a beach; in moist, more or less shady places; on sandy, volcanic and rocky soils; solitary or many together; scattered, locally common.

Altitude: 0—2100 m.

Flowers during the whole year.

Use: Food for pigs (ex HEYNE). Leaves together with salt against a sore throat (ex HEYNE). In case of head-ache the natives put the leaves on their foreheads (Riouw Arch., BÜNNEMEYER). Against sprue (ex HEYNE).

Distribution: South Asia: Punjab!, Himalaya!, Ceylon!, Madras!, Kanural!, Nepal!, Assam!, (Khasia!), Mal. Penins.!, Burma!, Cambodge!, Tonking!, Cochinchina!, Siam!, Annam!, Laos; China (Yun-nan-sen!, Canton!, Ichang!, Fokien, Hupeh, Kwantung, Hongkong, Luchu Arch.); Japan (Nagasaki!), Formosa, Philippines (Luzon!, Mindanao, Culion, Catanduanes, Leytel!, Babuyan Islands); New Guinea!, Marianne Islands, Bismarck Arch., Salomons Islands!, Samoa Islands!, Sandwich Islands!, Fiji Islands!, Marquesas Islands!, Rawak; Australia! (N.S. Wales, Queensland, S. Australia).

2. var. *lanceolatum* (Miq.) nov. comb.; *Adenostemma lanceolatum* MIQ.! Fl. Ind. Bat. II (1856) 24; BOERL. Fl. Ned. Ind. II (1899) 236.

*Leaves* lanceolate-elliptic, gradually attenuate into the petiole; blades 6—20 cm long, 2—5 cm broad. Warts of the *achene* thin.

Distribution in the Malay Archipelago:

Sumatra: Palembang, Mocara doea, DE VOGD 29 (B)

Java: HORSFIELD s.n., sub *Adenostemma lanceolatum* det. MIQUEL (U, K).

Celebes: *S.E. Celebes*, Kendari, KJELLBERG 466 (B).

Saleier: *P. Kalao*, DOCTERS VAN LEEUWEN 1491 (B).

Borneo: *N. Borneo*, Pladjoe, AMDJAH 106 (L); *S.E. Borneo*, Banjarmassin, KORTHALS s.n. (L) — DOESSON, KORTHALS s.n. (L).

Ceram: *N. Central Ceram*, KORNASSI 1365 (L); *E. Ceram*, Kraai, exp. RUTTEN 970 (L).

Flowers white (KJELLBERG a.o.).

Vernacular names: *watiloa* (Ceram), *tjampa poeloet* (Sumatra).

Hab.: in primeval and teak forests, on banks of brooks; frequent, except in Celebes; in very wet places.

Altitude: 0—300 m.

Flowers: Febr., May, June, Dec.

Distribution: New Guinea!

3. var. *microcephalum* (CLARKE) nov. comb.; *Adenostemma microcephalum* DC. Prod. V (1836) 111; *Lavenia viscida* WALL. Cat. (1828) 3222!; *Adenostemma viscosum* FORST. var. *microcephalum* CLARKE Comp. Ind. (1876) 29; KURZ in Journ. As. Soc. Beng. XLVI 2 (1877) 197.

Small herbs, 13—35 cm high. *Leaves* petiolate, ovate or elliptic-ovate, glabrous, obtuse at the top; blades 3—9½ cm long, 1½—3 cm broad. *Heads* few, small, 3—4 mm long, 4—5 mm wide, on long filiform peduncles. *Corolla* very small, 1 mm long; *style*-branches hardly exerting the corolla.

Distribution in the Malay Archipelago:

C e r a m : Moatipa, Central Ceram, RUTTEN 1998 (L, B).

Flowers white (RUTTEN).

Altitude: 1000—1300 m.

Flowers: Jan.

Distribution: Bengal, Assam (Khasia!), Burma; New Guinea!

4. var. *subsessilifolium* nov. var.

*Folia* parva, subsessilia, lanceolata, basi longe, apice breviter attenuata, apice subobtusa, 6—10 mm lata, 2—4 cm longa.

Distribution in the Malay Archipelago:

S u m a t r a : Atjeh, Kebajahan, near the river Laoet Tawar, FREY WYSSLING 55 (B), type specimen.

Hab.: in a former rice field.

Flowers: June.

This variety is to be distinguished from *Adenostemma Lavenia* (L.) O. K. var. *angustifolium* EDGEW. in CLARKE! Comp. Ind. (1876) 29, occurring in Ceylon!, Sikkim! and Siam!, by the achenes, which are in *Ad. Lavenia* (L.) O. K. var. *angustifolium* glabrous and glandular, afterwards quite glabrous, not warty. Most probably this plant belongs to a different species, on account of its glabrous achenes.

This species is usually considered to be pantropical (MERRILL, MATTFELD a.o.). Most probably it does not occur in Africa, nor in America. The American forms identified as *Adenostemma Lavenia*, have a quite glabrous, infundibuliform corolla, of which the long tube is glandular, and achenes, of which the glands are crowded and much prominent.

HUMBERT (Comp. Madagascar, 1923, 33) mentions *Adenostemma viscosum* from Madagascar; he describes the achenes as glabrous but he does not record anything about warts. Thus his determination is not quite certain.

*Adenostemma Perrottetii* DC. from Africa is much related to *Adenostemma Lavenia*; however, the warts of the achene are long and prominent, like those of the American forms, described above.

The species of *Adenostemma* are extremely difficult to separate. A specimen of FORSTER in the Kew Herbarium, to which is added a label, on which is written „*Adenostemma viscosa* (Forster); habitat in Jaheitu” is certainly a specimen of *Adenostemma parviflorum* (Bl.) DC. Though it is a bad specimen (as to the shape of the leaves and the corolla), the size of the corolla, the pubescence of the leaves and the warts of the achenes can be stated to agree with those of *Adenostemma parviflorum*. The type specimen of *Adenostemma viscosa* FORSTER in the herbarium of the British Museum quite agrees with the specimens of *Adenostemma Lavenia* (L.) O. K. examined. The specimen to which CLARKE has added „*Adenostemma viscosum* Forst. mihi typicum C. B. Clarke” (WALLICH  $\frac{8220}{830}$ , Silhet, to which is added „*Lavenia alba*

Wall.") belongs to a different species, on account of its achenes, afterwards quite glabrous, whereas the type specimen of FORSTER has achenes with small warts.

BENTH. and HOOK. l.c. 240 and CLARKE l.c. 30 suppose, that in the tropics of the Old World only one species of *Adenostemma* with many varieties is to be found; this was also accepted by HOOKER l.c. 242. In the Mal. Arch., however, there are 5 distinct species. *Adenostemma Lavenia* is very variable indeed.

(2) *Adenostemma parviflorum* (BL.) DC. Prod. V (1836) 111 (cum var. *divaricatum*); ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 227; MIQ. Fl. Ind. Bat. II (1856) 24; BOERL. Fl. Ned. Ind. II (1899) 236; *Lavenia parviflora* BL. Bijdr. (1825) 906; *Lavenia erecta* BL. Bijdr. (1825) 906 (non alior.); *Adenostemma ovatum* MIQ. Fl. Ind. Bat. II (1856) 25; *Adenostemma viscosum* FORST. var. *parviflora* HOOK. Fl. Br. Ind. III (1882) 242 (p.p.); *Adenostemma Lavenia* O. K. var. *parviflorum* HOCHREUTNER in Candollea V (1931—1934) 298 — Pl. III, 48—49.

Herb. 35—70 cm high, erect. *Stem* subterete of subangular, ribbed, glandularly pubescent, 2 mm thick, rooting at the lower part; internodes 3½—8 cm long. *Leaves* petiolate (petioles 1—3½ cm long), ovate or broadly ovate, obtuse at the top, suddenly attenuate at the base, afterwards shortly gradually attenuate into the petiole, serrate (teeth obtuse, subacute or acute), sparingly shortly strigose at both sides, submembranous or chartaceous, pinni-nerved (3-nerved from the base, inconspicuously reticulated) blades 4—16 cm long, 2—7 cm broad; of the higher leaves smaller. *Heads* thinly paniculate, panicles terminal. Heads pedunculate (peduncles hirsute, glandular, 7—25 mm long), subglobose, 25—40-flowered, 5 mm high, 5—6 mm wide. *Involucre* 1—2 seriate; scales 12—15, elliptic-oblong, subacute or obtuse at the top, hirsute all over, slightly glandular. *Corolla* very small, 1 mm long, 3- or 4-lobed; limb broadly campanulate, densely tomentose (hairs crispy, white, existing of more cells); tube much more narrow, glandular (glands stalked), dilate at the base; lobes broad, triangular, acute at the top. *Anthers* 3 or 4, broad, oblong, obtuse at both ends. *Style*-branches dilate at the top, shortly exserting the corolla. *Achene* obovate-oblong, subtriangular, slightly curved, densely glandularly tuberculate (tubercles afterwards conical, obtuse, thick), 2½ mm long, nearly 1 mm thick. *Pappus* consisting of 3 or 4 clavate projections, glandular at the superior, thickened part, connected by a thickened ring at the base, ½ mm long. *Receptacle* nearly flat, afterwards conical, alveolate.

Distribution in the Malay Archipelago:

S u m a t r a: *East Coast*: Asahan, Karo district, BARTLETT and LA RUE 146 (L) — to the west of G. Sinaboeng, LÖRZING 9041 (B) — Karo-

plateau near Brastagi, LÖRZING 6735 (B) — id. near Siosar, LÖRZING 8540 (B), 6173 (B) — Sibolangit near Medan, LÖRZING 3903 (B) — N.W. of the lake of Toba, foot of G. Piso-Piso, LÖRZING 9382 (B); *Tapanoeli*: Toba, Loegoe Roti, OUWEHAND 104 (B); *West Coast*: G. Koerintji, BÜNNEMEYER 9438 (L), 8760 (U), 8188 (B) — near Mangani, LKoto, BÜNNEMEYER 3024 (L) — G. Koeriman, LKoto, LÖRZING 3311 (B) — Fort de Kock, BÜNNEMEYER 1299 (B) — Brani, Agam, BÜNNEMEYER 3216 (B); *Palembang*: Ranau, DE VOOGD 533 (B) — near Ranau-lake, VAN STEENIS 3279 (B).

*Java*: *West Java*: Buitenzorg, BLUME s.n. (L), HALLIER 158 (L), 158c, g, (L), NATIVE COLL. s.n. (L), SOEGANDIREDOJO 191 (L), BURCK and DE MONCHY s.n. (B), BACKER s.n. (B) — G. Panemdjoan, West of Buitenzorg, BACKER 10588 (B) — Nirmala near Buitenzorg, BACKER 11169 (L) — Tjibeber, Priangan, BAKHUIZEN VAN DEN BRINK 1934 (L, B), SIHAJA s.n. (B), BACKER 22855 (B), 22378 (B), WINCKEL 1437 (L) — Tjiandjoer, Priangan, BACKER 3004 (B) — id. Takoka, KOORDERS 14962 (B) — Tasikmalaja, KOORDERS 47985 (L), 47986 (B) — Goenoengkantjana, KOORDERS 41045 (B) — Bandoeng, BACKER s.n. (L, U, B), 12219 (B), DOCTERS VAN LEEUWEN 2540 (B) — Sindanglaja, BACKER 21521 (L), VALETON 8 (B) — Tjibodas, KOORDERS 31928 (L), HALLIER 382 (L) — Soekaboemi, DE VISSER SMITS s.n. (B) — G. Pamindjoan near Soekaboemi, BACKER 14779 (B) — Djampangkoelon between Lenkong and Tjitoeroeg, BACKER 17151 (L) — G. Gede, KRAMER 106 (B) — G. Boerangrang, BACKER 14073 (B) — to the south of Nanggerang, Priangan, BACKER 33023 (B) — Dago, Priangan, KOORDERS 253 (B) — between Djasinga and Pasir Madang, Batavia, BACKER 10353 (B) — river Tjiseraï, BLUME s.n., sub nomine *Lavenia erecta* Sw. (L); *Middle Java*: Soerdjo, Batang, KOORDERS 23901 (L) — G. Slamet, BACKER 273 (B) — Doro, Pekalongan, BACKER 15731 (B) — G. Sendoro, LÖRZING 356 (B) — Pelemojo, Semarang, KOORDERS 27677 (B); *East Java*: Ngebel, Madioen, RANT s.n. (L), KOORDERS 29897 (L) — near Soekaredjo, Blitar, KOORDERS 22938 (L, B) — Tangkil, Southern hills, KOORDERS 23075 (B); *Java*, BLUME s.n. (L), det. SCH.-BIP. s.n. (L), det. MIQ. s.n. (U).

*Lombok*: Swela, RENSCH 86 (B).

*Flores*: Rana Mese, RENSCH 1298 (B).

*Borneo*, KORTHALS s.n. (L).

*Celebes*: *Manado*, near Tondano, FORBES? 133 (L) — Goeropahi, KAUDERN 81 (L); *S.W. Celebes*: Malino, LÖRZING 10771 (B) — G. Bonthain, BÜNNEMEYER 12622 (B).

Flowers white (BÜNNEMEYER, a.o.); plant reddish (VAN STEENIS).

Vernacular names: *taspong*, *djotang badah*, *kédjo béjar*, *djotang nabandoengan*, *domdoman*, *trasèn* (all Java), *pessel* (Sumatra), *djoekoet moeriah*.

Hab.: in bamboo and other forests, in jungles and grassy fields, in (dry) rice fields, along waysides, in a ditch; in moist, shady places; locally common, numerous.

Altitude: 300—1500 m.

Flowers during the whole year.

Distribution: Mal. Penins! (leaves extremely large), China (Yunnan!, leaves glabrous), Philippines (Panay!), New Guinea!, New Caledonia! (leaves very large), Hawaiian Islands!, Samoa Islands!, Society Islands!.

(3) *Adenostemma hirsutum* (Bl.) DC. Prod. V (1836) 113 — Pl. III, 45.

Herbaceous, not much branched, 30—100 cm high. *Stem* (especially superior parts) glandularly pubescent (gland-hairs crispy, purplish striate), slightly grooved, 3—4 mm thick; lower part of the stem creeping and rooting; internodes 2—7 cm long. *Leaves* petiolate (petioles 1—3 cm long), ovate, acute or subobtuse at the top, edges recurved, (gradually or suddenly at first, gradually afterwards) attenuate into the petiole, sharply, more or less coarsely serrate or repand-dentate, sparsely, shortly hirsute at both sides, paler beneath, pinni-nerved (3 or 4 pairs of lateral nerves; nerves scabridly pubescent beneath, extreme ones reticulate, more or less prominent beneath); blades 2½—13½ cm long, 2—8½ cm broad; superior ones smaller, to 2½ cm long, to 1½ cm broad; petioles ½ cm long. *Panicles* consisting of few heads (5—25), narrow, terminal; branches dichotomous, diffuse. *Heads* pedunculate (peduncles long, slender, pubescent, hairs purplish striate), 2½—3 cm long, having a small, linear bract at the base or half-way), subglobose or semi-globose, 20—30-flowered, 6—9 mm high, 7—10 mm wide. *Involucre* basin-shaped, subcampanulate, 1—2 seriate; scales about 12, oblong, acute or subobtuse at the top, hirsute, ciliate at the edges (hairs purplish striate), connected at the base, 4—5 mm long, 1 mm broad. *Corolla* slightly curved, 2½—3 mm long; limb narrowly campanulate, 5—4-lobed, tomentose at the top (hairs long, white); lobes short, triangular, acute at the top; tube as long as limb, glandularly hirsute (gland-hairs short, purplish). *Anthers* broad, truncate at both ends. *Style*-branches fairly long exerting the corolla, thickened, obtuse, obovate at the top, 3—5 mm long. *Achene* subtriangularly obovate, slightly bent, glandularly scabrid, never warty, 1 mm broad, 3½ mm long. *Pappus* consisting of 3 or 4 cartilaginous projections, thickened and glandular at the top, connected by a ring at the base. *Receptacle* nearly flat, afterwards subconical, alveolate.

Distribution: Java and Bali.



1. var. *typicum*; *Lavenia hirsuta* BLUME! Bijdr. (1825) 905; *Adenostemma hirsutum* DC. Prod. V (1836) 113; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 227; SCH.-BIP. in ZOLL. Verz. Ind. Arch. (1854) 120; MIQ. Pl. Jungh. (1854) 497; MIQ. Fl. Ind. Bat. II (1856) 26, incl. var.  $\beta$ ; BOERL. Fl. Ned. Ind. II (1899) 236; *Adenostemma Lavenia* O. K. var. *elatum* HOCHREUTNER in Candollea V (1931—1934) 298.

Leaves flat, ovate-oblong or broadly ovate, submembranous; blades 5—12 cm long, 2—7 cm broad.

Distribution in the Malay Archipelago:

J a v a: *West Java*: GAROET, BURCK 216 (L) — G. Kandang near Garoet, KOENS 220 (B) — G. Masigit, Rongga, LÖRZING 1243 (B) — Patoeha near Bandoeng, LÖRZING 1300 (B), 1285 (B) — G. Mandalagiri, LAM 339 (B), 272 (B) — G. Gede, BACKER 3192 (B) — id., Talaga Warna, HOCHREUTNER 1199 p.p. (G) — G. Pangerango, Tjibodas, VAN SLOOTEN 9 (B), VAN STEENIS 1869 (B) — G. Tjeremai, BACKER 5132 (B); *Middle Java*: G. Oengarang, JUNGHUHN 322, sub var.  $\beta$  MIQ. det. MIQ. (L); *Djocjakarta*: G. Gamping, JUNGHUHN s.n. (L); *East Java*: G. Hiang, ZOLLINGER 792 (B); South East Java, FORBES 1132c (Br. M.); Java, BLUME s.n. (L), JUNGHUHN 391 (L).

Flowers white (LAM, a.o.); whitish or partly purplish, when dry. Style white (LÖRZING).

Vernacular names: *leketang wara*, *tomboeron* (both Java).

Hab.: in primeval and other forests, along waysides, on limestone rocks; numerous, scattered.

Altitude: 1200—2000 m.

Flowers: March—Oct.

2. var. *bullatum* nov. var.

*Folia* bullata, deltoideo-ovata, subcoriacea, sparse scabride hirsuta; laminae 2½—13½ cm latae, supra nitidae, nervis subtus prominentibus.

Distribution in the Malay Archipelago:

J a v a: *West Java*: G. Papandajan, VAN STEENIS 4334 (B) — Tjibodas, KOORDERS 31887 (B) — Patoeha near Bandoeng, LÖRZING 1285 (B) — G. Malabar, Priangan, ANDERSON 335 (K); *Soerakarta*: G. Merbahoe, DEN BERGER 95 (B), type specimen, BACKER 30277 (B); *Middle Java*: G. Prahoe, LÖRZING 320 (B); *East Java*: G. Widodaren, summit, Malang, BACKER 3701 (L) — near Nonkodjadjar near Lawang, WISSE 543 (B) — G. Tengger, KOORDERS 37967 (L), 3777 (B) — near Ngadisari, Probolinggo, KOORDERS 37770 (K) — G. Raoeng, CLASON-LAARMAN 123 (B) — Idjen-plateau, KOORDERS 19878 (B).

Flowers white (KOORDERS), violet (LÖRZING, VAN STEENIS), reddish (LÖRZING); style whitish (LÖRZING). Taste bitter (LÖRZING).

Vernacular name: *trasèn*.

Hab.: in forests, in a former coffee plantation, in grassy fields and jungles, in a ravine; in shady places; few to many; not common.

Altitude: 1400—2400 m.

Flowers: March—June, Oct., Nov.

Of this variety a very small specimen, 15—25 cm high, branched at the base, has been collected in Bali. Leaves small; blades  $1\frac{1}{2}$ —2 cm long, 1— $1\frac{1}{2}$  cm broad, upper ones smaller; petioles  $\frac{1}{2}$ —1 cm long; few (1—5) heads in the inflorescence; corolla 2 mm long. This specimen has been collected on the G. Batoekoea, 1655 m, SARIP 42 (vernacular name: *teleded*).

(4) *Adenostemma macrophyllum* (BL.) DC. Prod. V (1836) 113; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 227; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 120; *Lavenia macrophylla* (incl. var. *repens*) BL.! Bijdr. (1825) 905; *Adenostemma Mudurensis* DC. in WIGHT Contr. Bot. Ind. (1834) 9; DC. Prod. V (1836) 113; *Adenostemma fastigiatum* DC. var. *macrophyllum* MIQ. Fl. Ind. Bat. II (1856) 25; BOERL. Fl. Ned. Ind. II (1899) 236. — Pl. III, 46—47.

Large herb, 30—100 cm high, branched; creeping and rooting at the lower part of the stem. Stem glabrous or pubescent at the upper part (hairs dark brownish-reddish striate), grooved, 2—7 mm thick; internodes 6—8 cm long. Leaves large, petiolate (petioles 2—9 cm long), broadly ovate, acuminate and acute at the top, suddenly, afterwards gradually attenuate into the petiole, often rugose, membranous or chartaceous, finely or more or less coarsely distantly serrate (teeth acute or obtuse, ending into a small projection) or mucronulate, entire at the lower part, or subentire, glabrous at both sides (rarely shortly pubescent on the nerves beneath), more or less shining above, paler green beneath, pinninerved (nerves more or less prominent beneath; lateral ones 4 pairs, candalabrum-shaped, lowest pair almost reaching the top; extreme nerves reticulate); blades 10—24 cm long, 5—14 cm broad, higher ones smaller. Inflorescence large, corymbose, terminal; branches dichotomous, slightly pubescent, having small linear bracts at the base. Heads pedunculate (peduncles long, pubescent,  $1\frac{1}{2}$ —3 cm long), campanulate, 25—30-flowered, 7—8 mm high, 5—7 mm wide. Involucre basin-shaped, 2-seriate; scales obovate-oblong, rounded at the top, subglabrous or puberulous at the basal part, glandular at the upper part, ciliate at the edges, 4—5 mm long, 1— $1\frac{1}{2}$  mm broad. Corolla narrowly campanulate, 4—5-lobed, 3 mm long; lobes short, deltoid, broad, acute at the top; limb tomentose, tube glandular, nearly as long as the limb. Anthers short, obtuse at both ends; filamentum dilate at the base. Style-branches elongated, clavate, thickened and obtuse at the top, glabrous, extremely long exerting the corolla, 4—5 mm long. Achene oblong, irregularly triangular, slightly

curved, glandular, smooth, afterwards blackish, quite glabrous, without glands, 3—3½ mm long. *Pappus* consisting of 3 or 4 clavate setae, 1½ mm long, glandular at the upper, thickened part, connected by a ring at the base. *Receptacle* alveolate, slightly basin-shaped, nearly flat, afterwards subconical.

Distribution in the Malay Archipelago:

**S u m a t r a:** *Atjeh:* Takengon, VAN STEENIS 5951 (B); *East Coast:* G. Sinaboeng, LÖRZING 8225 (B) — Brastagi near Medan, RIDLEY s.n. (K) — Bandarbaroe near Medan, LÖRZING 4691 (L, B); *West Coast:* G. Singgalang, BECCARI s.n. (L, K), BÜNNEMEYER 2580 (L), 2648 (B), 2625 (B), 2843 (B), LEEFMANS 19 (B), MATTHEW s.n. (K) — G. Talamau, BÜNNEMEYER 699 (B), 592 (B), 791 (B), 944 (B) — G. Malintang, BÜNNEMEYER 3890 (B), 3865 (B) — G. Talang, Laras Talang, BÜNNEMEYER 5602 (L) — G. Merapi, BÜNNEMEYER 4570 (L), 4522 (B), 4754 (B), MATTHEW s.n. (K) — G. Koerintji, BÜNNEMEYER 10255 (L); 10316 (L), 9125 (B, L), 9169 (B), 9668 (B), 8066 (B), 8848 (B), 10426 (B), 10550 (B), 10551 (B), 9861 (B) — id. S. Kembang, ROBINSON and KLOSS s.n. (K, Br. M.) — id., Barong Baroe Sapan, ROBINSON and KLOSS s.n. (K, Br. M.) — id., Koerintji Peak, ROBINSON and KLOSS s.n. (Br. M.) — Fort de Kock, YATES 2425 (L) — Padang Pandjang, MATTHEW s.n. (K); *Tapanoeli:* det. MIQUEL s.n. (U); *Bengkoelen:* along K. Soempang loenik, VAN DER PLJL 339 (B) — Pesagi, DE VOOGD 1542 (L); *Palembang:* G. Dempoe, AJOEB 422 (B); *Lampongs:* Tangamoes, DE VOOGD 170 (B).

**J a v a:** *West Java:* G. Tangkoeban Prahoe, JUNGHUHN s.n. (L), KORTHALS s.n. (L) — G. Boerangrang, Wanajasa, BACKER 14470 (L), BAKHUIZEN VAN DEN BRINK 4781 (L) — G. Boerangrang, BAKHUIZEN VAN DEN BRINK 4333 (L) — Tjibodas, BOERLAGE s.n. (L), SAPIIN 511 (B), DE MONCHY s.n. (B), HALLIER 382 (L), 449 (B), RAAP 661 (L) — Tjimahi, KORTHALS s.n. (L) — G. Gede, BLUME 443 (L) — id. south slope, BACKER 14981 (B) — id. Telaga Warna, HOCHREUTNER 1199 p.p. (G) — G. Mengamendoeng, coll. unknown (L) — G. Salak, west slope, LAM 2241 (L) — Geger Bintang, G. Pangerango, VAN STEENIS 5002 (B) — P. Patoha, LÖRZING 1360 (B) — P. Sarie, Bantam, BLUME s.n., sub nomine *Lavenia intermedia* (L) — G. Karang, KOORDERS 40699 (L, B); *West Java,* PLOEM s.n. (L); *Middle Java:* G. Slamati, south slope, BACKER 313 (B) — G. Rogodjembangan, BACKER 16174 (B) — Dieng-plateau, BACKER 21768 (B); *East Java:* G. Lamongan, ALTMANN 155 (B) — G. Hijang, ZOLLINGER 792 (B) — Ringgit Tjoerah Oedang, CLASON-LAARMAN F 29 (B); Java, HORSFIELD s.n. (U), 71 (K), mixed up with *Adenostemma Lavenia*, BLUME s.n. (L).

Lombok: ZOLLINGER s.n. (L).

Borneo: *Br. N. Borneo*, G. Kinabaloë, GIBBS 4118 (K, Br. M.) — id., Marai Parai, CLEMENS 32424 (B); id., Bambang river, CLEMENS 34234 (B).

Celebes: *S.W. Celebes*: G. Bonthain, BÜNNEMEYER 11841 (L), 11243 (L), 11618 (B), TEYSMANN 14083 (B) — Lombasang, BÜNNEMEYER 11713 (L), 11163 (B), 11820 (B), 11821 (B).

Moluccas: *Ceram*, Hatoemete, KORNASSI 592 (L); *Boeroe*, TOXOPEUS 113 (L).

Flowers white (ZOLLINGER a.o.), creamy green (CLEMENS), pink (ROBINSON and KLOSS); central flowers yellow, external ones white (BÜNNEMEYER); Herb 120 cm high (TOXOPEUS).

Vernacular names: *kédjo béjar* (Java), *sroenem*, *katjang katjang babie*, *bajam oelang*, *oempoeit tjé babai* (all Sumatra).

Hab.: in primeval and other forests, in jungles, along a river, on steep slopes; in shady, moist localities; common, one or more together, scattered.

Altitude: 600—3000 m.

Flowers during the whole year.

Distribution: Bengal, Sikkim, Assam, Mal. Penins.!

The size of the leaves in this species is very variable. Some of the specimens from Celebes have double-serrate leaves. Many of the Sumatran specimens have small ovate-oblong leaves, long tapering at both ends; petioles 1 cm long; blades 4—11 cm long,  $1\frac{1}{2}$ — $3\frac{1}{2}$  cm broad. A specimen has been collected in Atjeh, VAN STEENIS 5951 (B), with leaves, that are scarcely pilose above (hairs thick, short) and on the nerves beneath.

Much allied to this species is *Adenostemma reticulatum* DC. Prod. V (1836) 113 (Herb. WIGHT 1540! and 1541!) = *Adenostemma viscosum* FORST. var. *reticulatum* DC. in CLARKE Comp. Ind. (1876) 30, which differs by the much larger heads and the leaves, which are deltoid-ovate, always coarsely double-serrate, nearly always hirsute beneath; the style-branches are less exserting. In both species the achenes are black, glandular, afterwards quite smooth. Distribution of *Adenostemma reticulatum* DC.: Ceylon!, Madras!, Assam!, Burma!, Mal. Penins.!

Another species, much related to *Adenostemma macrophyllum* is *Adenostemma mauritanicum* DC.! from Africa! and the Mascarenes!, but the blades of this species are hirsute with spreading hairs and the heads are larger.

(5) *Adenostemma Renschii* nov. spec. — Pl. III, 50—51.

Herba magna, plus quam  $\frac{1}{2}$  m alta. *Caulis* subteres, parce striatus, glanduloso-verruculosus, scabride et breviter hirsutus, 6 mm crassus, internodiis  $4\frac{1}{2}$ — $5\frac{1}{2}$  cm longis, ramis subangulatis, 4 mm crassis. *Folia* opposita, petiolata (petiolis  $1\frac{1}{2}$ — $3\frac{1}{2}$  cm longis), acute serrata (dentibus deltoides, apice callosis) parte inferiore integra, apice breviter acuminata et subacuta, basi abrupte attenuata, deltoidea, acuta, chartacea, laminis late rhomboideo-ovatis, utrinque dense breviter et scabride hirsutis, pinninerviis (nervis lateralibus 8, subtus prominentibus, extremis, reticulatis,

5—12 cm longis, 3—8½ cm latis. *Inflorescentia* paniculata, terminalis; ramis apicem versus decrescentibus, dense hirsutis (pilis ferrugineo-striatis, crispis), glandulosis, basi bractea foliacea praeditis; inferioribus in parte superiore ramosis. *Capitula* homogama, hemi-globosa, pedunculata (pedunculis ½—2½ cm longis dense ferrugineo-hirsutis, ½ mm crassis), interdum basi bractea lineari praedita, 25-flora, 6 mm longa, 8 mm crassa. *Involucrum* patelliforme, 1—2-seriatum, squamis 14—18, elliptico-oblongis, apice acutis, hirsutis, 3 mm longis, paulo minus 1 mm latis. *Flores* bisexuales. *Corolla* subtubulosa, apice obliqua, glandulosa (glandulis prominentibus) 5-lobata, 1½ mm longa, limbo anguste campanulato, lobis deltoideis, apice acutis, parce tomentosis, tubo limbo brevior, crasso. *Stylus* 3 mm longus, ramis apice sensim incrassatis, 1½ mm longis. *Antherae* oblongae, apice obtusae, basi subsagittatae. *Achenium* oblongo-obovatum, leviter curvatum, glabrum, glandulis sparsis praeditum, 2½ mm longum. *Pappi* setae 3, ½ mm longae, parte inferiore maiore incrassata, glandulosa, basi annulo crasso connatae. *Receptaculum* planum, alveolatum.

Distribution in the Malay Archipelago:

*Flores*: Geli Moetoe, RENSCH 1500 (B), type specimen.

Flowers white (RENSCH).

From most other Malayan species at once to be distinguished by the glabrous achenes with scattered glands; from *Adenostemma macrophyllum* to be distinguished by the densely hirsute leaves, the bilateral symmetric corolla, etc.

Hab.: in Casuarina forests; fairly many.

Altitude: 1500 m.

Flowers: July.

Doubtful species: *Adenostemma rufescens* SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 120; MIQ. Fl. Ind. Bat. II (1856) 26; BOERL. Fl. Ned. Ind. II (1899) 236. No description of this species seems to exist and not a single specimen has been found in one of the herbaria examined.

II. *AGERATINAE* HOFFM. l.c. 132, 133; *Agerateae* BENTH. et HOOK. l.c. 165, 172.

*Anthers* appendiculate at the top; style-branches semicylindric, equal, obtuse or subobtuse at the top.

### Key to the genera.

- 1. a. More than 4 flowers in a head . . . . . 2
- Heads consisting of 4 flowers . . . . . 11. *Mikania*, p. 503
- 2. a. Pappus setaceous; setae numerous, filiform, scabrid. . . . . 10. *Eupatorium*, p. 492
- b. Pappus consisting of 5 or 10—20 narrowly paleaceous setae, acuminate at tip . . . . . 9. *Ageratum*, p. 484

9. **AGERATUM.**

**AGERATUM** L. Gen. Pl. ed. I (1737) 247; BL. Bijdr. (1825) 906; LESS. Syn. Comp. (1832) 155; ROXB. Fl. Ind. (1832) 415; DC. Prod. V (1836) 108; MIQ. Fl. Ind. Bat. II (1856) 22; BENTH. Fl. Austr. III (1866) 462; BENTH. et HOOK. Gen. Pl. II (1873—1876) 241; CLARKE Comp. Ind. (1876) iii; OLIVER Fl. trop. Afr. III (1877) 300; HOOK. Fl. Br. Ind. III (1882) 243; BAILLON Hist. Pl. VIII (1886) 130; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 137; BOERL. Fl. Ned. II (1899) 174; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV (1905) 29; ELMER Leaflet. Phil. Bot. I (1906) 99; KOORDERS Exc. Fl. III (1912) 317; RIDLEY Fl. Mal. Penins. II (1923) 182; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 500; LEMÉE Dict. Genr. I (1929) 119.

Erect herbs. *Leaves* petiolate, ovate, dentate. *Heads* corymbose or loosely paniculate, many-flowered, subglobose. *Involucre* campanulate, 2—3-seriate; scales linear acute and acuminate at the top. *Corolla* tubular, 5-fid. *Anthers* having an appendage at the top. *Style*-branches slender, long, obtuse and pubescent at the top. *Achene* oblong, 5-angular. *Pappus* uniseriate; setae 5 or 10—20; narrowly paleaceous, acuminate at the top. *Receptacle* naked, more or less convex.

About 60 species in trop. America (S. North America, Central and South America); one in trop. Africa and one in Cochinchina.

**Key to the species.**

1. a. *Leaves* ovate, rhomboid-ovate or deltoid-ovate. *Heads* 60—75-flowered. *Involucre* subglabrous. *Corolla* 1—1½ mm long . . . (1) ***A. conyzoides***.  
 b. *Leaves* deltoid. *Heads* 75—100-flowered. *Involucre* hirsute. *Corolla* 2—3 mm long; *style*-branches long exerting the *corolla*. . . (2) ***A. Houstonianum***.  
 (1) ***Ageratum conyzoides*** L. Sp. Pl. ed. I (1753) 839, ed. II (1863) 1175; WILLD. Sp. Pl. III (1804) 1773; DC. Prod. V (1836) 108; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 224; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 120; MIQ. Pl. Jungh. (1854) 497; MIQ. Fl. Ind. Bat. II (1856) 23; BENTH. Fl. Hongkong. (1862) 171; MIQ. Sumatra (1862) 210; BENTH. Fl. Austr. III (1866) 462; BAKER Fl. Bras. VI 2 (1873—1876) 194; CLARKE Comp. Ind. (1876) 30; KURZ in Journ. As. Soc. Beng. XLVI (1877) 197; HOOK. Fl. Br. Ind. III (1882) 243; FORBES et HEMSLEY in Journ. Linn. Soc. Bot. XXIII (1886) 403; CLARKE in Journ. Linn. Soc. Bot. XXV (1890) 36; KOORDERS in Meded. L. Pl. XIX (1898) 505; BOERL. Fl. Ned. Ind. II (1899) 236; CLARKE in Bot. Tidskr. XXIV (1902) 243; KING et GAMBLE in Journ. As. Soc. Beng.

LXXIV (1905) 29; HAYATA in Journ. Sci. Tokyo XXV (1908) 127; KOORDERS Exc. Fl. Java III (1912) 317; MERRILL Interpr. Rumph. Herb. Amb. (1917) 497; MERRILL Journ. R. As. Soc. (1921) 587; GAMBLE Fl. Madras IV (1921) 677; HUMBERT Comp. Madagascar (1923) 33; RIDLEY Fl. Mal. Penins. II (1923) 182; MERRILL Enum. III (1923) 597; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 500; RENDLE in Journ. Bot. LXIII (1925) suppl. 54; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1431; MATTF. in Engl. Bot. Jahrb. LXII (1929) 404; MERRILL! Pl. Elmer. Born. (1929) 301; ALSTON Suppl. Fl. Ceylon VI (1931) 160; BACKER Handb. Suikerr. Java VII (1932) 757; HOCHREUTNER in Candollea V (1931—1934) 299; *Olus scrofinum rubrum* RUMPH. Herb. Amb. VI (1750) 35; *Ageratum conyzoides* L. var. *pilosum* BL.! Bijdr. (1825) 906; *Ageratum cordifolium* ROXB.! Fl. Ind. III (1832) 415, leaves much pilose (this may be a variety, as DE CANDOLLE suggested).

Annual herb, 8—100 cm high. *Roots* crowded, much branched. *Stem* branched, terete, obscurely and irregularly ribbed, more or less hirsute (hairs spreading, grey), especially near the nodes and on the younger parts (hairs articulate), 1—5 mm thick; internodes 4—20 cm long; side-branches not branched; flowering branches often leafless, except the upper part. *Leaves* petiolate (petioles slender, hirsute,  $\frac{1}{2}$  mm thick, 2—50 mm long), more or less broadly ovate, deltoid-ovate, subrhomboid-ovate, elliptic-ovate, (higher ones deltoid-ovate), obtuse or subobtuse, sometimes long acuminate at the top, lower ones suddenly and shortly narrowed, acute at the base, higher ones abruptly cut off, nearly rounded at the base, membranous, paler beneath, serrate (teeth rounded or acute) or repandate, lower part entire, glandularly spotted, subglabrous (slightly hirsute on the nerves) or with spreading long hairs on both sides, pinnerved (lateral nerves 3—4 pairs, extreme ones reticulate), nearly 3-nerved from the base; blades 2—10 cm long,  $1\frac{1}{2}$ —5 cm broad, higher ones smaller. *Heads* in small, terminal, more or less dense corymbs, consisting of 8—15 heads. Heads pedunculate (peduncle filiform, pubescent, gradually thickened to the top, 5—17 mm long, having about 4 alternate linear bracts at the base and higher on), subglobose, 60—75-flowered, 4—6 mm long and as wide. *Involucre* campanulate, 2—3-seriate; scales lanceolate, irregularly serrate at the superior part, acute and acuminate at the top, glabrous or with few hairs along the edges, 2—3-nerved (nerves prominent), 3 mm long, less than 1 mm broad, sometimes purplish at the upper part. *Corolla* infundibuliform small, 5-lobed, about as long as the pappus, 1— $1\frac{1}{2}$  mm long; lobes short, deltoid, broad. *Anthers* obtuse at the base, subacute at the top. *Style*-branches long, thickened to the top,

obtuse at the top, ciliate at the upper part, exceeding the corolla. *Achene* linear-oblong, clearly 5-angular, black, glabrous or sparingly strigose at the ribs,  $\frac{1}{2}$ —2 mm long. *Pappus*-setae scale-like, 5, deltoid and fringed at the lower part, ending into a long prickle at the top, about as long as the corolla. *Receptacle* naked, convex, afterwards conical.

Distribution in the Malay Archipelago:

**Sumatra:** *Atjeh:* Gajoe and Alas districts, expd. VAN DAALEN s.n. (L), PRINGO ATMODOJO 302 (B) — Alas-valley, LÖRZING 11110 (B); *East Coast:* Medan, LÖRZING 3022 (B), 3561 (B), 3740 (B) — Asahan, Silau Meradja, BARTLETT and LA RUE 396 (L) — id. Slandi, BARTLETT and LA RUE 284 (L) — Pematang, Siantar, coll. unknown 7c (B), WINCKEL 1221 (B) — Serdang, LÖRZING 3416 (B) — Karo-plateau LÖRZING 8580 (B), 6292 (B) — id. near Raja, LÖRZING 4876 (B), id., Sarinembah, GALOENGI 7 (B) — south of Tebingtinggi, LÖRZING 7395 (B) — north of the Toba-lake, LÖRZING 9772 (B); *East Coast,* DOCTERS VAN LEEUWEN 3168 (B); *Tapanoeli:* Toba, Lagoë roti OUWEHAND 10 (B) — id., Bahal Batoe, near Siborong Siborong, HUTTEMA 4 (B) — N.W. of the Toba-lake, G. Siboeatan, foot, LÖRZING 7177 (B) — Samosir, Toba-lake, LÖRZING 7696 (B) — Habinsaran-plateau, E.S.E. of Toba-lake, LÖRZING 6473 (B) — P. Roepat, BRUNIER 26 (B); *West Coast:* G. Koerintji, BÜNNEMEYER 7933 (U, B), 9149 (L), ROBINSON and KLOSS 119 (Br. M.) — id. Barong baroe japan, ROBINSON and KLOSS s.n. (K) — id. S. Kembang, ROBINSON and KLOSS s.n. (K) — Fort de Kock, JACOBSON s.n. (B), 2054 (B), BÜNNEMEYER 1335 (B) — Padang, coll. unknown 215 (B) — id. N. Temaja, HENDERSON 20486 (B) — G. Merapi, BÜNNEMEYER 4809 (L) — G. Talamau, BÜNNEMEYER 1017 (L) — Ophir district, Laeb Sikaping, BÜNNEMEYER 1223 (B) — G. Talang, Laras Talang, BÜNNEMEYER 5096 (L) — G. Singgalang, BÜNNEMEYER 2590 (B) — Taloe, BÜNNEMEYER 146 (B) — Mangani, BÜNNEMEYER 3034 (B); *Lampongs:* Talang batoe, IDENBURG 39 (B) — Menggala, Goenoengtapa, IDENBURG 8 (B) — G. Rate Telanggaran, IBOET 99 (L); Palembang, S. Malanbetoeng, SZEMIAN 31 (L, B) — Martapoera, BAL 25 (B) — Palembang-Lampongs, SZEMIAN 8 (B); *Djambi:* near Bangko, POSTHUMUS 459 (L, B); Sumatra, Tanang Taloe BÜNNEMEYER 1040 (L); Sumatra, HEYNE s.n. (Br. M.).

**Simaloer:** near Sumatra, ACHMAD 306 (L).

**Nias:** near Sumatra, VAN RÖMER s.n. (B).

**Batoe Islands:** near Sumatra, Ladan T. Mana, RAAF 142 (B).

**Bangka:** KOBUS s.n. (B), AMAND s.n. (U) — S. Liat, Batem, BÜNNEMEYER 1606 (L) — Muntok, BÜNNEMEYER 1367 (L).

**Riouw Arch.:** *P. Bintan,* G. Bintan, BÜNNEMEYER 6107 (L) —



Laban, BÜNNEMEYER 6251 (L) — *P. Oedjan*, BÜNNEMEYER 6443 (B) — *P. Papan*, BÜNNEMEYER 7817 (B) — *P. Soegi bawah*, BÜNNEMEYER 7715 (B).

Lingga Arch.: *P. Lingga*, BÜNNEMEYER 6641 (L, B), 7041 (B) — *P. Singkep*, BÜNNEMEYER 7102 (B) — *P. Selajar*, BÜNNEMEYER 6563 (B), 7432 (B) — *P. Sebangka*, BÜNNEMEYER 7489 (B).

Anambas and Natoenas Islands: *P. Siantan*, east of Trempa, VAN STEENIS 771 (L, B) — *P. Sedanan*, Genting, VAN STEENIS 1042 (B).

Java: *West Java*: Buitenzorg, KOORDERS 32615 (L), coll. unknown (K), VAN STEENIS 80 (B), DE MONCHY s.n. (B), HALLIER 158g (B), 159a, b, c (B), BAKHUIZEN VAN DEN BRINK 1023 (B), 3816 (B), REINWARDT s.n. (L), SOEGANDIREDDJA 93 (B) — between Batavia and Buitenzorg, coll. unknown (K) — near Pandaglang, BACKER 26077 (L) — Depok, KOORDERS 44160 (L), 41683 (L), 31291 (B) — near Palaboean Ratoe, Soekaboemi, WINCKEL 1865 (L) — Tjiratjap, Soekaboemi, BACKER 17408 (B) — Bodjong terong near Tjibadak, Soekaboemi, AARTS 33 (B) — South of Soekaboemi, BACKER 14590 (B) — Bodjong Lopang, south of Soekaboemi, BACKER 16934 (B) — Palaboean, Soekaboemi, KOORDERS 34650 (B) — north of Tjiandjoer, ZWAARDEMAKER 8 (B), 40 (B), BACKER 23572 (B) — Batavia, VAN DER VEEN s.n. (L), SPRÉE s.n. (L) — Weltevreden, JUNGHUHN s.n. (L), 376 (L), BACKER 21340 (B), 21341 (B), 21339 (B), 21350 (B) — Batoetoelis near Buitenzorg, RAAP 8 (L), BACKER 21347 (B) — Tjiherang, N.E. of Masing, Buitenzorg, BAKHUIZEN VAN DEN BRINK 5782 (L) — Tjiomas, west of Buitenzorg, WENT s.n. (U) — S.W. of Masing, Buitenzorg, BAKHUIZEN VAN DEN BRINK 5561 (B) — Tjilengsie, Buitenzorg, FRIJLINK 5 (B) — near Tjampea, Buitenzorg, KOORDERS 31476 (B) — Dago, Buitenzorg, KOORDERS 47987 (B) — Tjibodas, KOORDERS 31713 (L), HALLIER 636 (B) — Djasinga, BACKER 10058 (B) — Takoka, Tjiandjoer, KOORDERS 15094 (L) — Garoet, KOORDERS 26495 (B), BURCK s.n. (B), very small specimen, 5 (B), KOENS 1 (B), 2 (B), 45 (B) — between Garoet and Tjipanas, BACKER 5197 (B) — G. Salak, BLUME s.n. (L), sub var. *pilosum*, BLUME s.n. (L), BACKER 9325 (B) — G. Pangerango, JUNGHUHN s.n. (L) — Tjidadap, Tjibeber, BAKHUIZEN VAN DEN BRINK 2983 (L) — south of Tjibeber, Leuwimanggoe, SIHAYA s.n. (B) — Taloen near Bandoeng, PULLE 3118 (U) — Bandoeng, LÖRZING 1134 (B), coll. unknown (B) — Poerwakarta, HARMSSEN 52 (B), BACKER 13906 (B) — Goenoengkantjana, KOORDERS 41204 (B) — Noesa gede in the lake of Pendjaloe, Tasikmalaja, KOORDERS 47988 (B) — Nirmala, BACKER 10657 (B) — Lembang, PARAVICINI s.n. (B) — near Tjikampek, Krawang,

BEUMÉE 4596 (B) — P. Noordwachter, north of Batavia, BOSCHMA 66 (B) — G. Patoeha, Kantja, LÖRZING s.n. (B) — Tjimahi, HEERING s.n. (B) — Java's eerste punt, Bantam, BACKER 21349 (B) — Tjipetir, DE MONCHY s.n. (B) — Bandjar, BACKER 21355 (B) — G. Bockittoengoel, DE MONCHY 49 (B) — G. Boerangrang, BACKER 14255 (B) — Tjiloo, Zandbaai, BACKER 943 (B) — Pandaglang, BACKER 7411 (B) — Sadjira Lebak, BACKER 2030 (B) — Malingping, Lebak, BACKER 1424 (B); West Java, FORBES s.n. (Br. M.); *Middle Java*: Keboemen, BRINKMAN 36 (B) — Karanganyar, KOORDERS 2620 (L) — Bandjarnegara, KOORDERS 27116 (B) — on the Boroboedoer, KOORDERS 36654 (B), 36688 (B) — Pelemojo, Semarang, KOORDERS 27692 (L) — Tajoe, Ngarengan, Djoewana, KOORDERS 33496 (B), 34931 (B) — Sipakoeng, Ambarawa, KOORDERS 35906 (B) — Poerworedjo, LEEFMANS 92 (B) — Poerwkerto, BACKER 16 (B) — Madjenang, BACKER 18433 (B) — Soebah, Batang, BEUMÉE 4292 (B) — Salatiga, BACKER 30137 (B) — between Slawi and Balapoelang, BACKER 15390 (B) — Garoeng, Wonosobo, BACKER 21983 (B) — Oengaran, DOCTERS VAN LEEUWEN—REIJNVAAN s.n. (B) — between Doro and Bandar, Pekalongan, BACKER 15565 (B) — between Sirangkel and Dieng, BLOKHUIS 60 (B) — south of Blora, BLOKHUIS s.n. (B) — near Pati, BEUMÉE 634 (B) — East Tegal, BEUMÉE 3650 (B) — Dieng-plateau, BACKER 21759 (B) — Margasarie, Brebes, BEUMÉE 195 (B) — Tegal, coll. unknown (B) — Temanggoeng, LÖRZING 343 (B); *Soerakarta*: Bojolali, BEGUIN 65 (B) — Klaten, coll. unknown (B), LEEFMANS 129 (B) — Solo, HEMKEN s.n. (B); *East Java*: G. Tengger, BULJSMAN 2771 (U), VAN HARREVELD—LAKO 88 (B), 23 (B) — Djember, Sempol Kalisat, KOORDERS 43306 (L) — Pantjoer, Sitoebondo, KOORDERS 15437 (B), OTTOLANDER 248 (B) — G. Lawoe, ELBERT 23 (L), BEUMÉE 2228 (B) — G. Willis, LÖRZING 875 (B) — Soemberwaroe, Panaroekan, KOORDERS 43887 (B) — Kalibendo, KOORDERS 43307 (B) — Poeger, KOORDERS 20564 (B) — Southern hills, Malang, KOORDERS 23076 (B) — Malang, HOFSTEE 41 (B), VERHOEF 20 (B) — S.W. of Gondang, Malang, BACKER 3543 (B) — Ngawi, STOUTJESDIJK 3 (B) — Kependjen, Soerabaja, ISMAIL 5 (B) — Toeloengagoeng, BACKER 11684 (B) — South Kediri, KRAMER 58 (B), 143 (B) — Djember, ULTÉE s.n. (B) — Amboeloe, Djember, BACKER 18179 (B) — Sitoebondo, BACKER 24460 (B), G. Idjen, BACKER 24886 (B) — G. Baloeran, BACKER 24784 (B) — Djatiroto, BACKER 7959 (B) — G. Smeroe, BACKER 3783 (B) — Paiton, near Kraksaän, BACKER 12987 (B) — G. Argopoeroe, BACKER 13152 (B) — Pasoeroean, BACKER 7682 (B) — G. Pandan, THORENAAR 8 (B) — Rembang, BEUMÉE 5299 (B), 5211 (B), 937 (B) — Goen, Pasoeroean, WISSE 326 (B) — South Soerabaja, BEUMÉE 2438 (B) —

Gadoengan, Wlingi, Blitar, KOORDERS 22963 (L); Java, ZOLLINGER 23 (L), WATZ s.n. (L).

Madoera: Bangkalan, BACKER 19357 (B) — Sampang, BACKER 19705 (B) — N.W. of Rapa, BACKER 20265 (B).

Karimondjawa Islands: *P. Kamodjan*, KOORDERS 161 (B).

Kangean Arch.: *P. Kangean*, BACKER 27591 — Ardjasa, BACKER 26869 (B) — Kajoewaroe, BACKER 28003 (B); *P. Saoebi*, BACKER 28228 (B); *P. Paliat*, BACKER 29337 (B); *P. Saeboes*, BACKER 29156 (B); *P. Sepandjang*, BACKER 28794 (B); *P. Mamboerit*, BACKER 27302 (B); *P. Saboenten*, BACKER 29692 (B); *P. Sepapan*, BACKER 28542 (B).

Lombok: G. Rindjani, TENGWALL 23 (L, B) — Segare Anak, RENSCH 256 (B) — Narmada, RENSCH 51 (B).

Soembawa: Soembawa besar, RENSCH 481 (B).

Flores: Aboera, DE JONG 9 (B) — Roeteng, KNAAP 21 (B).

Timor: Boerain, S.E. of Koepang, STRAUB G 1 (B).

Christmas Island, south of Java, ANDREWS 48 (K).

Borneo: *Br. N. Borneo*: Sandakan, ELMER 20300 (L, Br. M., K), ZEANO 2360 (K), CREAGH s.n. (Br. M., K) — Tawao, ELMER 20731 (L, K, Br. M.) — G. Kinabaloë, CLEMENS 11239 (K) — Sarawak, BECCARI 824 (K); *N. Borneo*: BURBIDGE s.n. (Br. M.), id. Tikoeng, AMDJAH 777 (L); *West Borneo*: Papar, Ketapang, CLEMENS 11239 (B); *S.E. Borneo*: Banjarmasin, MOTLEY 294 (K) — Pagatan, GRABOWSKY s.n. (Br. M.) — Pembliangan, AMDJAH 833 (L, K); Borneo, HAVILAND 3023 (K).

Celebes: *Manado*: KOORDERS 16418 (B), 16419 (L), 16420 (B) — Koelawi, Paloe, POSTHUMUS 2304 (B) — near Karoewatoë, KOORDERS 16417 (B) — Lindoe lake, DONGGALA 23 (B) — Gorontalo, RIEDEL s.n. (K) — Goeroepahi, KAUDERN 82 (L); *S.W. Celebes*: Makassar, BARCLAY s.n. (Br. M.) — G. Bonthain, BÜNNEMEYER 11609 (L), 12119a (B) — Bonto Parang, BÜNNEMEYER 10557 (L) — Malino, BÜNNEMEYER 10719 (B) — Malakadji, N.W. of Bonthain, BOUMAN—HOUTMAN 56 (B); *S.E. Celebes*: P. Boeton, DE BOER 14 (B).

P. Tanah Djampea, south of Saleier, DOCTERS VAN LEEUWEN 1605 (U).

Talau Islands: P. Karakelang, east of Beo, LAM 2604 (B).

Moluccas: *Amboina*, ROBINSON 428 (L, K); *Ternate*, BEGUIN 895 (B); *Ceram*, Central Ceram, KORNASSI 1394 (B) — near Wai Nalar, RUTTEN 1584a (B) — Roho, RUTTEN 505 (L) — Kilmoeri, RUTTEN 761 (L).

Flowers white (ZWAARDEMAKER a.o.); violet (HALLIER a.o.); dirty pink (KOORDERS); plant smelling badly (KOORDERS), leaves smelling of lemon (BÜNNEMEYER), having a smell of goats (ex MATTF. l.c.).

Vernacular names: *babandotan*, *djoekoet bae*, *rantèn*, *tjemamem*, *bandotan*, *orang aring*, *madoesan*, (*does*) *wedoesan*, *gleton* (all Java); *poeti*, *roempoet sapi*, *salembaranjo*, *wimbe*, *roekoet weroe*, *halibangoe*, *lawet rintek* (all Celebes); *roempoet rangit*, *roempoet weng*, *garang garang djau*, *silamboei*, *siamis*, *toeawa*, *toeloh dagang*, *djoekoehoerang*, *roempoet kambing*, *roempoet amih*, *roempoet njoekoe hoewong*, *roempoet boesoek* (all Sumatra); *lalap-belembang* (Bangka); *djelatang ayam*, *daoen boeloe* (both Lingga Arch); *radioeetoe manaro*, *roempoet manado* (Talaud); *selisip babi* (Brneo), *daoen kambing*, *roekoe bambé*, *roempoet tai babi* (all Mal.).

Hab.: in primeval, teak and other forests, jungles, grassy fields, rice fields, gardens, on banks of rivers, along ditches, lakes and canals, in fields of sugar cane, coffee, Hevea, Cinchona, tea, potatoes, in Coconut-gardens, along waysides, near the beach, on a factory-ground; on clay, on a stony soil, on marly limestone, on a sandy soil, on weathered tuff; on a dry or a moist soil; very common, few to abundant.

Altitude: 0—2100 m.

Flowers during the whole year.

On of the commonest weeds (cf. BACKER l.c.). Often creeping and with rooting stems (LÖRZING); heads often bent down (BLOKHUIS); leaves thin, pale green, dull above, slightly glossy beneath (HALLIER).

Use: Leaves against itch and wounds in P. Sinkep, Lingga Arch., (acc. to BÜNNEMEYER); used by the natives in case of boils, and when bitten by a dog or a crocodile (BORNEO); a medicine against stomach ache.

Distribution: Trop. Asia: Ceylon!, Madras!, Punjab!, Nepal!, Himalaya!, Bengall!, Sikkim!, Assam!, Burma!, Cambodge!, Cochinchina!, Tonking, Laos, Siam!, Annam!, Mal. Penins.!, China (Yunnan!, Hongkong!, Fukien!, Canton!), Formosa, Japan (Kioochool!), Philippines (Luzon!, Leyte!, Culion!), New Guinea!; Polynesia: Marianne Islands!, Samoa Islands!, Hawaiian Islands!, New Caledonia!, Carolines!, Tonga Islands!; Africa: (all over, also Egypt), Madagascar!, Seychelles!, Mauritius!; Trop. South America: Brazil!, Venezuela!, Colombia!, West Indies!, Guyana!, Bolivia!, Nicaragua!; U.S.A.: Georgia!.

A common weed in all hot countries, of American origin.

(2) *Ageratum Houstonianum* MILL. Dict. ed. 8 n. 2 (1768); ROBINSON in Proc. Am. Ac. XLIX (1913) 459; *Ageratum Mexicanum* SIMS. Bot. Mag. (1825) t. 2524; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 137; *Ageratum conyzoides* var. *mexicanum* DC. Prod. V (1836) 108.

Herb, 16—60 cm high, rooting at the lower part. *Stem* subterete, 2—7 mm thick, branches sparsely hirsute, glandular, purplish; very short ones in the axils of the leaves; internodes 2—6 cm long. *Leaves* petiolate (petioles whitish hirsute,  $\frac{1}{2}$ — $6\frac{1}{2}$  cm long), deltoid (upper ones ovate), obtuse or subacute at the top, very shortly acute at the base, serrate, membranous, pinni-nerved (nearly 3-nerved at the base, about 3 pairs of lateral nerves), hirsute at both sides; blades 2—10 cm long,  $1\frac{1}{2}$ — $5\frac{1}{2}$  cm broad. *Heads* in terminal and axillary corymbose panicles, on more or less long peduncles. Heads pedunculate (peduncles 2—6 mm long, campanulate,  $5\frac{1}{2}$ —7 mm long,  $6\frac{1}{2}$ —8 mm wide. *Involucre* cam-

panulate, biseriate,  $3\frac{1}{2}$ —4 mm long; scales lanceolate, long pointed at the top, 2-nerved (nerves prominent), glandular, greyish hirsute (hairs long, flexible, fine),  $\frac{1}{2}$  mm broad. *Corolla* infundibuliform,  $2\frac{1}{2}$ —3 mm long; limb narrowly campanulate, 5-fid at the top, slightly pubescent or subglabrous; lobes deltoid, short, acute at the top, pubescent; tube slender, about as long as the limb, glandularly pubescent. *Anthers* obtuse at the base, subacute at the top. *Style*-branches subglabrous, long exerting the corolla. *Achene* linear-oblong, 5-angular, black, sparingly strigose,  $1\frac{1}{2}$  mm long. *Pappus* consisting of 5 paleaceous setae, deltoid and fringed at the basal part, ending into a long needle at the top, about as long as the corolla. *Receptacle* convex, afterwards conical, alveolate.

Distribution in the Malay Archipelago:

**Sumatra:** *East Coast:* Brastagi, near Medan, LÖRZING 8237 (B).

**Java:** *West Java:* Tjiherang, N.E. of Masing, Buitenzorg, BAKHUIZEN VAN DEN BRINK 5781 (L, K) — Tjipakantjilan, Buitenzorg, BAKHUIZEN VAN DEN BRINK 2006 (B) — Masing, G. Gede, BAKHUIZEN VAN DEN BRINK 2888 (B) — G. Patoeha, Telaga Patengan, Priangan, LEEFMANS s.n. (B), BACKER 12532 (B) — Pengalengan, BACKER 26077 (L) — Tjibodas, KOORDERS 31713 (L), LÖRZING 2408 (B), BACKER 22330 (B) — G. Salak, RAAP 150 (L) — Buitenzorg, BAKHUIZEN VAN DEN BRINK 1024 (B), VAN STEENIS 1801 (B) — G. Gede, BAKHUIZEN VAN DEN BRINK 716 (B) — Soekaboemi, DE VISSER SMITS s.n. (B), BACKER 14620 (B) — G. Kendang, Priangan, KOENS 184 (B) — Sindanglaya, Priangan, BACKER 13500 (B) — G. Tjikorai, Pasir Kolotok, BACKER 8692 (B) — G. Mandalagiri, LAM 132 (B), VAN VUUREN s.n. (B) — Tjiandjoer, BACKER 3139 (B) — Kartamana, Priangan, SMITH 639 (B) — Tjinjirioean, Bandoeng, BACKER 5724 (B), 5712 (B), RANT 3 (B), coll. unknown s.n. (B) — Tjibeureum, near Bandoeng, DOCTERS VAN LEEUWEN s.n. (B), VAN STEENIS 1921 (B); *East Java:* Ploasan, Magetan, WISSE 68 (B) — Nongkodjadjar, WISSE 624 (B) — G. Andjasmoro, Soerabaja, WINCKEL 197 (B).

Flowers purple (LÖRZING, LAM), pale blue (VAN STEENIS).

Vernacular names: *babandottan*, *babadotan woengoe*, *wedoesan* (all Java).

**Hab.:** along waysides, in fields, in tea, coffee and Cinchona gardens, along ditches; in sunny localities; few to numerous, very common.

Altitude: 200—1650 m.

Flowers during the whole year.

**Distribution:** Trop. Asia: Madras!, Assam, Philippines (Luzon!), New Caledonia!; Central and N. South America (Mexico!, Costa Rica, Guatemala, Brazil!, West Indies, Guyana).

Originally from America, introduced into Java and Sumatra.



c. Leaves glabrous at both sides. Heads 6 mm wide, 5 mm long. Involucrum 3-seriate; scales having stalked glands along the margins . . .

(8) *E. adenophorum*.

I. Sectio **Subimbricata** DC. Prod. V (1836) 152; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 140; *Heterolepis* BAKER Fl. Bras. VI 2 (1873—1876) 301.

*Involucrum* 3—4-seriate (according to HOFFM. 2—3-seriate), ovate or campanulate, (often loosely) imbricate. *Receptacle* flat.

(1) *Eupatorium triplinerve* VAHL Symb. III (1794) 97; WILLD. Sp. Pl. III (1804) 1769; BL. ! Bijdr. (1825) 903; BAKER Fl. Bras. VI 2 (1873—1876) 306; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 140; MERRILL in Journ. R. As. Soc. (1921) 587; MERRILL Enum. Phil. III (1923) 598; *Eupatorium ayapana* VENT. Hort. Malm. II (1804) t. 3; WILLD. Sp. Pl. III (1804) 1769; DC. Prod. V (1836) 169; ZOLL. in Nat. Gen. Arch. Neêrl. Ind. II (1845) 228; SCH.-BIP. in ZOLL. Syst. Verz. Ind. Arch. (1854) 120; MIQ. ! Fl. Ind. Bat. II (1856) 26; MIQ. Sumatra (1862) 210; HOOK. Fl. Br. Ind. III (1882) 244; BOERL. Fl. Ned. Ind. II (1899) 236; KOORDERS Exc. Fl. Java III (1912) 318; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 507; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1432; BACKER Handb. Suikerr. Java VII (1932) 758.

Herb, 35—60 cm high; creeping and rooting at the lower part (roots numerous); *stem* terete, ribbed, glabrous, slightly pubescent on the upper part, 1½—3 mm thick; internodes 2—7½ cm long. *Leaves* subpetiolate (petioles 0—1 cm long), narrowly elliptic or lanceolate, more or less long acuminate at the top (tip acute or subobtus), gradually attenuate into the petiole at the base, entire, coriaceous, 3-nerved (nerves diverging at about one third of the length, 3—4 pairs of small lateral nerves), quite glabrous at both sides, minutely glandular beneath, edges recurved, 6—11 cm long, ½—2 cm broad; upper ones gradually smaller, to 5—6 mm broad, 3—3½ cm long; small leafy side-branches in the axils of the leaves; two opposite leaves connected at the base. Leaves of the flowering branches more narrow than those of the sterile branches. Heads broadly paniculate; *inflorescence* thin, terminal and very short ones in the axils of the leaves; side-branches elongated, spreading (making angles of about 45 degrees with the principal axis), pubescent, in the axil of a small, linear, shortly pubescent leaf, heaving few (2—6) heads only at the very superior part and few small, linear, shortly pubescent leaves lower on, or leafless on the lower part; extreme branches dichotomous, slender. *Heads* pedunculate (peduncles slender, pubescent, 6—13 mm long, less than ½ mm thick, having minute bracts at the base and half-

way), campanulate, 20—50-flowered, 6—7 mm high, 5—6 mm wide. *Involucre* campanulate, 3-seriate, nearly as long as the flowers, 5 mm long; scales more or less spreading, gradually shorter to the exterior ones, about 30, linear, 1—2-nerved (nerves prominent), shortly pubescent, sharply acuminate and ciliate at the top. Flowers 6—7 mm long. *Corolla* infundibuliform, narrow, 5-lobed, 4—5 mm long, limb and tube not to be separated; lobes short, subacute. *Anthers* obtuse at both ends. *Style*-branches slender, pubescent, long, shortly exceeding the corolla. *Achene* narrowly oblong, 5-angular, slightly pubescent on the ribs, suddenly narrowed close to the top, 2 mm long. *Pappus* shorter than the corolla, 3 mm long; setae few, ciliate, white. *Receptacle* flat, alveolate, glabrous.

Distribution in the Malay Archipelago:

**Sumatra** (ex MIQUEL l.c., probably cultivated).

**Java**: *West Java*: Tji Handjavar, near Buitenzorg, BACKER 6255 (B) — south of Leuwiliang, Kratjak, BAKHUIZEN VAN DEN BRINK 3388 (L); *Middle Java*: Setro, near Petjangaän, N.W. of Moeriah, DOCTERS VAN LEEUWEN 774 (B, U); Java, BLUME s.n. (L, Br. M.), REINWARDT s.n. (L), ZOLLINGER s.n. (L), det. MIQ. s.n. (U), HORSFIELD 74 (K).

**Borneo**: coll. unknown (L).

**Celebes**: coll. unknown (L).

Flowers pink (DOCTERS VAN LEEUWEN, BAKHUIZEN VAN DEN BRINK); greenish white below, purplish pink at the top (ex BACKER l.c.); whitish (ex BACKER l.c.), violet (ex MIQUEL l.c.); style-branches pink (BAKHUIZEN VAN DEN BRINK). Involucral scales yellowish green (Bakhuizen van den Brink), green and purple at the top (ex BACKER l.c.). Herb creeping or climbing (DOCTERS VAN LEEUWEN), to 1 mm high (ex BACKER l.c.); stem purplish (ex BACKER l.c.).

Achenes never develop in Java (ex BACKER l.c.).

Vernacular names: *tèklam*, *daoen fransman*, *daoen prasman*, *daoen panahan*, *djapono*, *godong prasman*, *djoekoet prasman* (all Java).

Hab.: in second growth forests; in a moist locality, in scattered groups.

Altitude: 300—400 m; 0—1600 m (ex BACKER l.c.).

Flowers: June, Sept., Dec.

Use: leaves (bitter) used to cure fevers, cold and diarrhoea; placed on the fore-head in case of head-ache (HEYNE). Used to heal the sting of poisonous snakes and as a sudorific remedy. In Java cultivated so as to prevent the soil of the tea gardens from being washed away by the rains (VAN HELTEN).

Distribution: Trop. Asia: Philippines (Luzon!); Africa: Mauritius (ex BAKER); South America (Brazil!, Guyana!, West Indies!, Trinidad!).

(2) *Eupatorium sordidum* LESS. in Linnæa VI (1831) 403; STANDLEY in Contr. U.S. Nat. Herb. XXIII (1926) 1453; *Eupatorium ianthinum* HEMSL. in Biol. Centr. Am. Bot. II (1881) 96 (ex STANDLEY l.c.); *Hebeclinum sordidum* SCH.-BIP.! (nomen nudum) in herb.



Shrub; *stem* subterete or subangular, scabridly rusty hirsute or rusty tomentose, 4—10 mm thick; internodes  $2\frac{1}{2}$ —7 cm long. *Leaves* petiolate (petioles 2—9 cm long, 1— $2\frac{1}{2}$  mm thick, inconspicuously grooved, densely scabridly rusty hirsute), elliptic, broadly ovate-elliptic, cordate-ovate or broadly ovate, subacute at the top, acute or truncate at the base, minutely sharply serrate, entire at the basal part, warty, dark coloured and scabrid above, glandular, pale and subglabrous beneath, pinni-nerved (nerves prominent, scabridly hirsute or tomentose above, lateral ones 5—7 pairs, lower ones close together, extreme ones reticulated), chartaceous, occasionally extremely large; blades 9—29 cm long, 4—23 cm broad; upper leaves sometimes deltoid-ovate, acuminate at the top. *Panicles* corymbose, dense, broad (17—30 cm wide), terminal and in the axils of the upper leaves, consisting of many heads; axis of the panicles long, leafless or nearly so, scabridly hirsute or tomentose; branches of the inflorescence more or less elongated, leafless, scabridly hirsute or tomentose, horizontally spreading. *Heads* pedunculate (peduncles long, scabridly hirsute or tomentose, 1— $1\frac{1}{2}$  cm long,  $\frac{1}{2}$  mm thick), campanulate, many-flowered, 7—10 mm high, 8—12 mm wide, having a small linear hirsute bract at base. *Involucre* campanulate, 4-seriate; scales about 20, gradually shorter to the exterior ones, acuminate and subobtusate at top; of the inner rows ovate-oblong, of the innermost row glandular at the inferior part, scabridly hirsute and ciliate at the superior part, 4 mm long,  $\frac{1}{2}$  mm wide; of the second and the third row scabridly hirsute,  $2\frac{1}{2}$ — $3\frac{1}{2}$  mm long, 1 mm wide; of the extreme row linear, scabridly hirsute, 2 mm long,  $\frac{1}{2}$  mm wide. *Flowers* exceeding the pappus. *Corolla* infundibuliform, glabrous, 5-ribbed, 5-lobed, 5 mm long; lobes short, broadly deltoid, acute at the top. *Anthers* obtuse at both ends, thin. *Style*-branches long, filiform, slender, long exserting, acute at the top, 4 mm long. *Achene* linear-oblong, 5-angular, 5-ribbed, glabrous,  $1\frac{1}{2}$  mm long. *Pappus* white, shorter than the corolla; hairs unequal, numerous, hardly ciliate, 4— $4\frac{1}{2}$  mm long. *Receptacle* flat, alveolate.

Distribution in the Malay Archipelago:

J a v a: *West Java*: Tjibodas, SAPIIN 230 (L), KOORDERS 42064 (L), 42169 (B), BACKER 13509 (L), 22214 (B), 13548 (B), CLEMENS s.n. (K), LÖRZING 1840 (B), VAN STEENIS 1820 (B) — Tjibeureum near Bandoeng, DEN BERGER 606 (B) — Sindanglaja, BACKER 32403 (B), DEN BERGER s.n. (B) — Telaga Patenggan, BACKER 12524 (B), 12469 (B).

Flowers blue (CLEMENS); fragrant (ex STANDLEY l.c.); herb 1 m high (KOORDERS).

Hab.: along edges of forests, in a second growth forest, near waterfalls, on a pile of stones; few or many together.

Altitude: 1400—1700 m.

Flowers: March—Sept.

Distribution: Mexico!

(3) *Eupatorium inulifolium* H. B. K. Nov. Gen. Sp. IV (1820) 109; HOCHREUTNER in Candollea V (1931—1934) 299; *Eupatorium pallescens* DC. Prod. V (1836) 154; BAKER! Fl. Bras. VI 2 (1873—1876) 324; KOORDERS Exc. Fl. Java III (1912) 317; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1432; BACKER Handb. Suikerr. Java VII (1932) 758; *Eupatorium javanicum* BOERL.! Fl. Ned. Ind. II (1899) 175, 236.

Large shrub, branched, leafy; *stem* terete, ribbed, shortly densely crispy rusty or fulvously pubescent,  $3\frac{1}{2}$ —9 mm thick; side-branches in the axils of the upper leaves; internodes 5—10 cm long. *Leaves* petiolate (petioles subalate, dilate at the base, shortly felty rusty greyish tomentose,  $\frac{1}{2}$ —3 cm long), ovate-oblong, ovate-lanceolate, deltoid-oblong or rhomboid-oblong, extremely long and sharply acuminate at the top, gradually or suddenly attenuate, acute at the base, sharply or subobtusely sometimes coarsely serrate (of one specimen rarely entire), except the lower part, scabridly pubescent, dark coloured above, densely shortly greyish or fulvously pubescent beneath, membranous or subcoriaceous, pinni-nerved, nearly 3-nerved from the base (3—4 pairs of lateral nerves; reticulations obvious beneath, inconspicuous above); blades 7—16 cm long,  $2\frac{1}{2}$ — $7\frac{1}{2}$  cm broad; upper ones lanceolate or linear, smaller, 1—9 cm long,  $\frac{1}{2}$ — $1\frac{1}{2}$  cm broad. *Heads* crowded, in dense, large, luxurious terminal corymbs; side-branches of the inflorescence in the axils of small leaves; lower ones leafy at the inferior part, felty like the stem. *Heads* pedunculate (peduncles tomentose, 1—2 mm long), campanulate, about 14-flowers, 6 mm long, 4 mm wide. *Involucre* loosely campanulate, 3-seriate; scales gradually shorter to the exterior ones, whitish, shining (when dry), of the inner row lanceolate, obtuse and pubescent at the top, 3-nerved (nerves prominent), 5 mm long, 1 mm broad; of the outer rows ovate-oblong, convex, 3-nerved (nerves prominent), pubescent, obtuse, nearly rounded at the top. *Flowers* 5 mm long. *Corolla* infundibuliform, narrow, 5-lobed, tube and limb not to be separated; lobes deltoid, acute at the top,  $3\frac{1}{2}$  mm long. *Anthers* nearly rounded at the top, acute at the base. *Style*-branches very long, nearly as long as the corolla, obtuse at the top, ciliate. *Achene* oblong, 5-angular, glabrous,  $1\frac{1}{2}$  mm long. Setae of the *pappus* numerous, connate at the base by a ring, shorter than the corolla. *Receptacle* slightly convex, alveolate.

Distribution in the Malay Archipelago:

Sumatra: *East Coast*: Medan, experimental fields D. P. S.,

JOCHEMS 3020 (B); *West Coast*: Fort de Kock, YATES 2478 (B); Sumatra: Tanang Taloe, BÜNNEMEYER 1061 (L).

Java: *West Java*: Tjibodas, KOORDERS 37128 (L), 31786 (B), 31851 (B), LÖRZING 1489 (U), RAAP 668 (L), HALLIER 320 (B) — Tjiandjoer, Takoka, KOORDERS 15022 (L), 33318 (B) — north of Tjiandjoer, BACKER 23552 (B), ZWAARDEMAKER 53 (B) — near Tjiandjoer, G. Gede, BACKER 3077 (B) — Tjidadap, Tjibeber, Tjiandjoer, BAKHUIZEN VAN DEN BRINK 2981 (L), 15a (L), WINCKEL 764 (B) — Bandoeng, Tjinjirean, coll. unknown (L, B) — Soekaboemi, RIDLEY s.n. (K), BACKER 14539 (B) — id. Tjitjoeroeg, BACKER 17264 (B) — Palaboeanratoe, Soekaboemi, KOORDERS 34647 (B) — Pasawahan, Soekaboemi, BACKER 2222 (B) — south of Lampegan, Tjiandjoer, BACKER 14819 (B) — Nanggarang, Soekapoera, BACKER 9094 (B, K) — G. Goentoer, VAN RIJCKEVORSEL s.n. (B), KOENS 230 (B) — G. Gede, Tjibeureum, BACKER 2344 (B), HOCHREUTINER 25 (G) — G. Patoeha, BACKER 12635 (B) — G. Rakoetak, Bandoeng, ROELOFSEN 6250 (B) — G. Papandajan, BACKER 5644 (B) — G. Malabar, DENKER 11 (B) — Garoet, BURCK s.n. (B), coll. unknown (B) — S.W. of Bandoeng, LÖRZING 1127 (B) — Tankoeban Prahoe, VAN DER VEEN s.n. (L) — Radjamandala, Bandoeng, BACKER 13469 (B) — near Leuwiliang, Buitenzorg, BAKHUIZEN VAN DEN BRINK 6550 (L), BACKER 25919 (B) — Buitenzorg, SOEGANDIRENJA 55 (K, B), RAAP 74 (L), HALLIER 162a, b (B), BACKER 31922 (B), 31920 (B), 33513 (B), 5871 (B) — Tjikopo, Buitenzorg, BOERLAGE s.n. (L) — Geger Bintang, Buitenzorg, BOERLAGE s.n. (L), BURCK s.n. (B), SAPIIN s.n. (B) — near Buitenzorg, Telaga Warna, coll. unknown (B) — west of Buitenzorg, Nangoeng, BACKER 10506 (B) — Tjiorek, south of Batoetoelis, Buitenzorg, BACKER 33518 (B) — Djasinga, BACKER 10087 (B) — Plered, Krawang, BACKER 13929 (B) — G. Gede, KRAMER 110 (B) — id. Kandang Badak, BACKER 13596 (B) — G. Salak, KOORDERS 33283 (B), 36702 (B), BACKER 26419 (B) — G. Semboeng, Rongga, Bandoeng, LÖRZING 1179 (B) — Bondjongloping, S.W. of Soekaboemi, BACKER 16935 (B) — Batavia, BACKER 33516 (B), 33514 (B) — Meester Cornelis, BACKER 33515 (B), 35517 (B) — G. Boerangrang near Wanajasa, BACKER 14080 (B) — Nirmala, Batavia, BACKER 10919 (B) — Noesa gede, in the lake of Pendjaloe, Tasikmalaja, KOORDERS 47995 (B) — Tjigoea, Priangan, BACKER 15181 (B) — Depok, BURCK and DE MONCHY s.n. (B) — Bodjongmanik, G. Liman, Lebak, KOORDERS 40931 (B) — between G. Kendeng and Malingping, BACKER 1326 (B) — between Bajah and Langkop, Bantam, BACKER 1701 (B) — Tjikaret Oelik, West Java, RAAP 443 (L); *Middle Java*: G. Gadoeng, Keboemen, BOERLAGE s.n. (L); *East Java*: G. Kawi, WISSE

281 (B) — Nongkodjadjar, S.E. of Lawang, WISSE 548 (B) — G. Smeroe, BACKER 3551 (B).

Moluccas: *Amboina*, ROBINSON 1844 (L, K, B).

Flowers white (KOORDERS a.o.); odoriferous (BACKER a.o.); anthers violet and styles white (BACKER l.c.); shrub, sometimes nearly a tree, 1—5 m high, 8—10 cm thick (KOORDERS).

Vernacular names: *babandjara*, *grinjoe*, *semboeng*, *kirinjoe*, *darismin*, (*ki*) *oengkloek*, *kembang oeroek*, *kidajang* (all Java).

Hab.: in forests and jungles, along edges of ditches, on banks of rivers, in ravines, on slopes, along waysides, in grassy fields, tea-gardens, in an old coffee-garden, on a lava stream; very common, few to abundant; in sunny or not too shady and not too dry localities (ex BACKER l.c.).

Altitude: 5—1800 m.

Flowers during the whole year.

Use: the wood used as firing (ex HEYNE l.c.), the pappus-hairs for stuffing cushions (id.), the leaves for dunging, making good humus and gathering nitrogen (id.).

Distribution: trop. America: Brazil!, Argentine!, Paraguay!, Uruguay!, Ecuador!.

In the Kew Herbarium specimens of this species, identified by ROBINSON and named *Eupatorium inulifolium* H. B. K. forma *suaveolens* (H. B. K.) HERON. (Bolivia) are to be found; specimens with much more woolly tomentose leaves are named *Eupatorium inulifolium* H. B. K. by that author.

II. Sectio *Eximbricata* DC. Prod. V (1836) 164; HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 140.

*Involucrum* 1—3-seriate (acc. to HOFFM. 1—2 seriate), scales few, equal or imbricate. *Receptacle* flat.

(4) *Eupatorium nodiflorum* WALL! Cat. (1828) 3166 comp. 276, DC. Prod. V (1836) 179; CLARKE Comp. Ind. (1876) 31; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 508; KOSTER in Fedde Repert. XXXIV (1933) 6.

Herb, about  $\frac{1}{2}$  m high; *stem* terete, ribbed, scabrid, more or less purplish, black-striped, 2 mm thick; internodes  $5\frac{1}{2}$ — $7\frac{1}{2}$  cm long; side-branches in the axils of the upper leaves. *Leaves* subsessile or very shortly petiolate (petioles subulate, 0—2 mm long), elliptic-lanceolate or elliptic-ovate, acuminate and acute at the top, acute at the base, sharply serrate (lower teeth sometimes much longer and very acute), or subentire, densely glandular, scabrid beneath, glandularly spotted, strigose above, coriaceous, edges recurved, 3-nerved (one pair of lateral nerves, nerves scabrous beneath);  $3$ — $4\frac{1}{2}$  cm long, 7—12 mm broad; upper leaves alternate, smaller, linear, entire, to 2 cm long,  $1\frac{1}{2}$  mm broad. *Heads* in dense terminal corymbs; also small corymbs at the top of the side-branches; ramifications gradually shorter to the upper ones, scabridly greyish

hirsute, having minute bracts at the base and higher on; extreme ones trichotomous. Heads shortly pedunculate (peduncles scabridly hirsute,  $\frac{1}{2}$ —2 mm long) oblong, 5-flowered, 6 mm long, 3 mm wide. *Involucre* oblong, 3-seriate; scales about 8, gradually shorter to the exterior ones, acuminate or mucronate, acute or subacute at the top, oblong or ovate-oblong, 3—5-nerved, glabrous, with shining glands, purplish at the upper part, having membranous edges, inner ones 5 mm long, 1 mm broad, outer ones minute, ciliate at the edges. *Flowers* 6 mm long. *Corolla* subinfundibuliform, 5-lobed, purplish, when dry,  $3\frac{1}{2}$  mm long; limb and tube hardly to be separated; lobes deltoid, broad, acute at the top, with shining glands. *Anthers* obtuse at the base, subacute at the top. *Style*-branches long, obtuse at the top, papillose. *Achene* oblong, ribbed (ribs prominent) 4- or 5-angular, glabrous, with shining glands, black;  $1\frac{1}{2}$ — $2\frac{1}{2}$  mm long,  $\frac{1}{2}$  mm wide. *Pappus*-setae numerous, equal, about as long as the corolla, white, ciliate, connate at the base. *Receptacle* small, flat, alveolate.

Distribution in the Malay Archipelago:

Lombok: G. Rindjani, G. Poesoek, ELBERT 1753 (L).

Hab.: in jungles; on a fairly dry, clayish soil.

Altitude: 1450—1650 m.

Flowers: June.

The anthers of the specimen from Lombok are degenerated, the filaments are broadened and connate along the whole length; only the very upper part of the anthers is fertile.

Distribution: Trop. Asia: Bengal!, Assam! (Khasia!), Himalaya!, Annam!, Tonking, Siam, China, Philippines (Luzon!).

This species is difficult to be distinguished from *Eupatorium Reevesi* WALL., which has smaller heads and broader leaves and *Eupatorium cannabinum* L., which has pinni-nerved, membranous leaves; its outer involucre scales are rounded at the top. From *Eupatorium Toppingianum* ELMER it is to be distinguished by having acute involucre scales and 3-nerved leaves.

CLARKE (Comp. Ind., 1876, 30) records *Eupatorium odoratum* L. to be escaped in Java. In the herbaria examined no specimen from Java has been found.

(5) *Eupatorium Horsfieldii* MIQ.! Fl. Ind. Bat. II (1856) 27.

Herb; *branches* glabrous (extreme ones pubescent, ribbed), 2 mm thick; internodes 2—4 cm long. *Leaves* petiolate or sessile (petioles 0—3 mm long), elliptic, gradually attenuate into the petiole, gradually attenuate and acute at the top, glabrous and glandular above, glabrous or subglabrous (very few short hairs on the nerves), glandular beneath, sharply serrate (some of the upper leaves subentire), submembranous, pinni-nerved (nerves prominent beneath, lateral ones about 5 pairs; extreme ones reticulate), edges recurved, blades 3— $4\frac{1}{2}$  cm long, 1—2 cm broad. Heads corymbosely paniculate; *inflorescence* terminal or in the

axils of the upper leaves; branches often having a very small bract (2 mm long) at the base. *Heads* pedunculate, oblong, 5-flowered, 6 mm long. *Involucre* subcampanulate, oblong, 2—3-seriate, inner scales linear-oblong, obtuse or subacute at the top, 6 mm long, outer ones much smaller, 1—3 mm long; all glabrous, herbaceous, 3-nerved, without glands. *Corolla* 5-lobed,  $4\frac{1}{2}$  mm long, without glands; limb narrowly campanulate, 2 mm long; lobes very short, deltoid, acute at the top. *Anthers* obtuse at both ends, broad. *Style*-branches short, glabrous. *Achene* oblong, 5-angular, ribbed (ribs prominent), pubescent, when young, sparsely pubescent, when ripened, glandular,  $3\frac{1}{2}$  mm long. *Pappus* white, 4 mm long; setae ciliate. *Receptacle* small, alveolate.

Distribution in the Malay Archipelago:

J a v a: herb. HORSFIELD 31 (K, Br. M.).

This species is much allied to *Eupatorium nodiflorum*, but it is to be distinguished by the large pubescent achenes. From *Eupatorium Toppingianum* it is different by the glabrous leaves. It has not been collected again after HORSFIELD.

(6) *Eupatorium Toppingianum* ELMER Leaf. Phil. Bot. I (1906) 101; MERRILL! Enum. Phil. III (1923) 597; *Eupatorium sambucifolium* ELMER! Leaf. Phil. Bot. I (1906) 102; *Eupatorium benguetense* C. B. ROBINSON! in Phil. Journ. Sci. III (1908) 217; MERRILL in Phil. Journ. Sci. V (1910) 393.

Shrub; *stem* terete, striate, rusty crispy pubescent or subglabrous, glandular,  $1\frac{1}{2}$ —3 mm thick; internodes 1—3 cm long. *Leaves* petiolate (petioles pubescent like the stem,  $\frac{1}{2}$ — $1\frac{1}{2}$  cm long), elliptic-oblong, long acuminate at the top, acute at the base, serrate (teeth directed forward) or subglabrous, glandular, very shortly pubescent or subglabrous on both sides, pinni-nerved (nerves prominent and rusty pubescent beneath; lateral ones about 7), paler beneath, edges recurved; blades 4— $7\frac{1}{2}$  cm long,  $1\frac{1}{2}$ — $2\frac{1}{2}$  cm broad. *Corymbs* terminal, dense 6—9 cm wide. *Heads* pedunculate (peduncles thin, rusty pubescent, 2—5 mm long), numerous, 5-flowered,  $6\frac{1}{2}$  mm long, 3 mm thick. *Involucre* campanulate, 3-seriate; scales about 10, gradually shorter to the exterior ones, inner ones glabrous, oblong, obtuse at the top,  $4\frac{1}{2}$  mm long, 1— $1\frac{1}{2}$  mm broad, of the second row subacute at the top, pubescent, 1 mm long, less than 1 mm broad, of the exterior row minute. *Corolla* infundibuliform, 5-lobed, 4 mm long; lobes deltoid, subacute at the top; limb as long as the tube. *Anthers* obtuse at both ends. *Style*-branches gradually broader to the top, subacute at the top, long exserting the corolla. *Achene* narrowly oblong, 5-angular, subglabrous,  $2\frac{1}{2}$  mm long. *Pappus* 3 mm long, consisting of many ebony-coloured hairs. *Receptacle* minute.

## Distribution in the Malay Archipelago:

Moluccas: Central *Ceram*, Hatoe Sosokoetai, Walokone, RUTTEN 2212 (L, B), id., G. Pinaia, STRESEMANN 293 (L); N.W. *Boeroe*, G. Fogha, STRESEMANN 375 (L).

Flowers white (RUTTEN, STRESEMANN); shrub 2 m high (RUTTEN).

Hab.: in a primeval forest, in mountain meadows; fairly common.

Altitude: 1000—3000 m.

Flowers: Febr., May, Aug.

Distribution: Philippines (Luzon!, Negros!).

(7) *Eupatorium riparium* REGEL *Gartenflora* XV (1866) 324 t. 525; STANDLEY in *Contr. U.S. Nat. Herb.* XXIII (1926) 1464; HEYNE *Nutt. Pl. Ned. Ind.* II (1927) 1432; *Eupatorium Harrisii* URBAN! (ex STANDLEY l.c.) *Symb. Antill.* I (1900) 460.

Shrub or herb, much branched, 60—80 cm high, *stem* creeping at the base, having roots at the lower nodes, terete, glabrous and lenticellate on the lower part, shortly pubescent and warty on the superior part,  $1\frac{1}{2}$ —3 mm thick, internodes  $3\frac{1}{2}$ —6 cm long; short leafy branches in the axils of the leaves. *Leaves* petiolate (petioles broadened at the base, 1—2 cm long), small, narrowly elliptic-lanceolate to elliptic, attenuate and acute at both ends, sharply serrate at the upper part, entire at the smaller lower part, edges recurved, 3-nerved at the base (nerves prominent beneath, diverging a little near the base, lateral ones small, about 3 pairs, extreme ones reticulate), glabrous at both sides or subglabrous beneath, membranous or chartaceous; blades 2—10 cm long,  $\frac{1}{2}$ — $2\frac{1}{2}$  cm broad; upper ones slightly smaller. *Corymbs* rather smaller, paniculate, terminal and at the top of the side-branches in the axils of the upper leaves, consisting of 12—25 heads; branches subtrichotomous, slender, having very small leaves at the base. *Heads* pedunculate (peduncles very slender, filiform, 6—7 mm long, having a minute linear bract at the base and 2 more higher on), about 20-flowered, 6 mm long, 4—5 mm wide, having a linear bracteole at the base. *Involucre* campanulate, 1—2-seriate, spreading; scales equal, linear, about 12, subobtusate and ciliate at the top, 2-nerved (nerves prominent), shortly pubescent, 4 mm long, 1 mm broad. *Corolla* 5-lobed, 3 mm long; limb campanulate, clearly to be distinguished from the narrow tube, slightly pubescent at the top; lobes deltoid, acute at the top, subconvex. *Anthers* very shortly sagittate at the base, obtuse at the top. *Style*-branches ciliate at the upper part, subobtusate at the top. *Achene* linear-oblong, 5-ribbed (ribs pubescent) suddenly narrowed close to the top, black,  $1\frac{1}{2}$ —2 mm long. *Pappus* as long as the corolla; setae ciliate, few minute ones mixed among the other ones. *Receptacle* small, nearly flat, alveolate.

## Distribution in the Malay Archipelago:

**J a v a:** *West Java:* Tjibodas, LÖRZING 1931 (L), BACKER 26051 (L), 32420 (B), 13517 (B), KOORDERS 31727 (B), 42195 (B), BRUGGEMAN 270 (B), VAN STEENIS 1810 (B), SAPIIN s.n. (L, B), 2828 (K), VALETON s.n. (L, B); LAM 310 J (B) — between Sindanglaja and Tjibodas, BACKER 21534 (B), ERNST s.n. (B) — near Tjibodas, BACKER 31335 (B) — Sindanglaja, KOORDERS 42052 (L, K) — Tjibeureum near Bandoeng, DEN BERGER 629 (B) — Tjipanas, KAWAKAMI s.n. (B) — Tjisaroea, Buitenzorg, DOCTERS VAN LEEUWEN 8085 (L) — G. Pangerango, VAN SLOOTEN 27 (B), VAN STEENIS 5177 (B) — id. near Kandang, Badak, DOCTERS VAN LEEUWEN 4278 (B) — Tjikopo, Buitenzorg, LAM 3783 (B) — N.W. of the G. Poentjak near Buitenzorg, BACKER 23995 (B).

Flowers white (BACKER a.o.); pappus red (VAN STEENIS); plant more or less reddish (LAM), 40 cm (BRUGGEMAN), up to 3 m high (VAN STEENIS), climbing or procumbent (VAN STEENIS).

Vernacular names: *babanjaran*, *djotang lalakina* (all Java).

Hab.: in primeval forests, along waysides, edges of ravines and brooks, in tea gardens; in wet localities; usually abundant, very common, locally dominating; often in steep localities. Flowering only in sunny localities (LAM).

Altitude: 1000—2400 m.

Flowers: April—Dec.

Used for medical purpose (KOORDERS).

Distribution: Mexico and the West Indies (Jamaica!).

Regarding the shortly sagittate anthers and the pappus, having some minute setae mixed with the other ones, this species is intermediate between *Vernonia* and *Eupatorium*.

(8) *Eupatorium adenophorum* SPRENG. Syst. III (1826) 420; *Eupatorium glandulosum* H. B. K. Nov. Gen. et Sp. IV (1820) 122.

Tall herb, branched; *stem* subterete, densely covered with stalked glands, 2—3½ mm thick; internodes 1—7 cm long. *Leaves* petiolate (petioles 1½—3½ cm long, glandular like the stem, slender) broadly elliptic or rhomboid-elliptic, acute at both ends, acuminate at the top, mucronately angularly dentate, entire at the basal part, glabrous at both sides, paler beneath, pinni-nerved (4 pairs of lateral nerves, nerves glandular beneath; extreme ones obscurely reticulate), chartaceous; blades 6—9 cm long, 3½—6½ cm broad; upper leaves smaller. *Corymbs* small, terminal and at the top of the upper branches; ramifications of the inflorescence glandular like the stem, having small linear bracts at the base. *Heads* pedunculate (peduncles slender 2—5 mm long, glandular, having one or 2 linear bracts), campanulate, small, many-flowered, 5 mm long, 6 mm wide. *Involucre* campanulate, 3-seriate; scales about 20, gradually shorter to the exterior ones, lanceolate-elliptic, acute at the top,



with stalked glands along the margins, 3-nerved, inner ones 4 mm long, outer ones  $1\frac{1}{2}$  mm long. *Flowers* exceeding the involucre. *Corolla*  $2\frac{1}{2}$  mm long, tubularly infundibuliform, 5-lobed (lobes short, deltoid), glabrous. *Anthers* obtuse at both ends. *Style*-branches shortly exceeding the corolla, obtuse at the top, rather thick. *Achene* (immature) linear-oblong, slightly curved, 1 mm long, 5-angular, glabrous. *Pappus* dirty whitish, nearly as long as the pappus, setae about 10, ciliate. *Receptacle* flat, alveolate.

Distribution in the Malay Archipelago:

**J a v a:** *West Java:* Kertamana, Priangan, SPRUIT s.n. (B), det. B. L. ROBINSON — Tjinjireoan, Priangan, VAN SLOOTEN 739 (B) — Pengalengan, Malabar, coll. unknown V E (B).

Vernacular name: *boegang boeroeng* (Soend.).

Hab.: in a grassy field; some specimens together.

Altitude: 1400—1450 m.

Flowers: Sept., Nov., Dec.

Distribution: Mexico!, West Indies, Bermudas, Canaries, Madeiral, Hawaiian Islands, New Zealand.

This *Eupatorium* species is certainly introduced into Java.

BURMAN (Fl. Ind., 1768, 177) mentions *Eupatorium Dalea* L. from Java; he describes its leaves as lanceolate, inconspicuously serrate and glabrous, its heads as 4-flowered. DC. (Prod. V, 1836, 140) states, that this species only in Jamaica has been collected with certainty. MIQUEL (Fl. Ind. Bat. II, 1856, 27) suggested, that the concerning plant from Java might be *Eupatorium Horsfieldii*.

## 11. MIKANIA.

MIKANIA WILLD. Sp. Pl. III (1804) 1742; BL. Bijdr. (1825) 904; LESS. Syn. Comp. (1832) 157; MIQ. Fl. Ind. Bat. II (1856) 27; BENTH. et HOOK. Gen. Pl. II (1873—1876) 246; CLARKE Comp. Ind. (1876) iii; OLIVER Fl. trop. Afr. III (1877) 301; HOOK. Fl. Br. Ind. III (1882) 244; BAILLON Hist. Pl. VIII (1886) 128 (sub *Eupatorium*); HOFFM. in ENGL.-PRANTL Nat. Pfl. IV 5 (1894) 140; BOERL. Fl. Ned. Ind. II (1899) 176; KING et GAMBLE in Journ. As. Soc. Beng. LXXIV (1905) 30; ELMER Leaflet Bot. I (1906) 103; KOORDERS Exc. Fl. Java III (1912) 318; RIDLEY Fl. Mal. Penins. II (1923) 181; GAGNEP. in LEC. Fl. Indo-Chine III (1924) 504; LEMÉE Dict. Genr. IV (1932) 477.

Scandent herbs or shrubs. *Leaves* petiolate. *Heads* spicate, racemose, corymbose or paniculate, small, 4-flowered. *Involucre* oblong, 2-seriate, consisting of 4 subequal scales, sometimes with one or more small outer ones. Limb of the *corolla* campanulate, 5-fid, tube narrow. *Anthers* appendiculate at the top. *Style*-branches slender, long, pubescent, subobtuse at the top, long exserting the corolla. *Achene* oblong, angular,

truncate at the top. *Pappus* setaceous, uniseriate; setae numerous, scabrous.

About 250 species chiefly in trop. America; also in Africa and Asia.

(1) *Mikania cordata* (BURM.) B. L. ROBINSON in Contr. Gray Herb. CIV (1934) 65; *Eupatorium cordatum* BURM. Fl. Ind. (1768) 176 t. 58 fig. 2; *Eupatorium scandens* BURM. Fl. Ind. (1768) 176 (p.p.) non L.; *Eupatorium volubile* VAHL Symb. III (1794) 93; *Mikania volubilis* WILLD. Sp. Pl. III (1804) 1743; BL! Bijdr. (1825) 904; DC. Prod. V. (1836) 199; ZOLL! in Nat. Gen. Arch. Neêrl. Ind. II (1845) 229; SCH.-BIP! in ZOLL. Syst. Verz. Ind. Arch. (1854) 120; MIQ! Pl. Jungh. (1854) 497; MIQ! Fl. Ind. Bat. II (1856) 28; MIQ. Sumatra (1862) 210; MATTFELD! in Engl. Bot. Jahrb. XLII (1929) 405; KOSTER in Fedde Repert. XXXIV (1933) 7; *Mikania scandens* CLARKE Comp. Ind. (1876) 35; KURZ in Journ. As. Soc. Beng. XLVI (1877) 197; HOOK. Fl. Br. Ind. III (1882) 244; FORBES et HEMSLEY in Journ. Linn. Soc. Bot. XXIII (1886—1888) 405; BOERL! Fl. Ned. Ind. II (1899) 176, 236; KING et GAMBLE in Journ. As. Soc. Beng. LXXII 2 (1905) 30; ELMER Leaf. Phil. Bot. I (1906) 104; MATSUMURA et HAYATA in Journ. Sci. Tokyo XXII (1906) 203; LAUTERBACH in Nova Guinea VIII 4 (1912) 863; KOORDERS Exc. Fl. Java III (1912) 318; GIBBS in Journ. Linn. Soc. Bot. XLII (1914) 97; MERRILL Journ. R. As. Soc. (1921) 587; RIDLEY Fl. Mal. Penins. III (1923) 181; MERRILL Enum. Phil. III (1923) 598; GAGNÉP. in LEC. Fl. Indo-Chine III (1924) 504; RENDLE in Journ. Bot. LXIII (1925) suppl. 54; HEYNE Nutt. Pl. Ned. Ind. II (1927) 1433; ALSTON suppl. Fl. Ceylon VI (1931) 160; BACKER Handb. Suikerr. Java VII (1932) 759; HOCHREUTNER in Candollea V (1931—1934) 300, non WILLD.

Scandent herb. *Stem* subterete or irregularly angular, ribbed, slightly pubescent (densely pubescent on the nodes) or subglabrous, 2—3 mm thick; internodes 6—14 cm long, nodes thickened. *Leaves* petiolate (petioles long, slender, pubescent or glabrous, 1—6 cm long, hardly 1 mm or 1 mm broad), deltoid-ovate, cordate-ovate, acuminate and acute at tip, cordate or shortly acute at the base (if cordate, auricles rounded or subacute), entire or more or less coarsely crenate or undulate, slightly mucronulate, warty, subglabrous or slightly pubescent at both sides, glandularly spotted beneath, submembranous, 5-nerved from the base (extreme nerves reticulate; blades 3—10 cm long, 1½—6 cm broad, higher ones smaller, 1—3½ cm long, 7—25 mm broad, subentire; petioles 1—2 cm long. *Heads* in compound corymbs at the top of short side-branches and in the axils of the leaves; corymbs on peduncles of different length, consisting of many heads; branches sparingly pubescent or subglabrous, ½ mm thick, with or without a small linear leaf. Heads

pedunculate or subsessile (peduncles slender, slightly pubescent,  $\frac{1}{2}$ —6 mm long, having a linear bract at the base or at the top; bract pubescent, acute at tip, 2—5 mm long), 4-flowered, cylindric, 6—9 mm long,  $1\frac{1}{2}$ —2 mm thick. *Involucre* consisting of 4 scales; scales oblong, acute or obtuse and mucronate or nearly rounded at the top, slightly attenuate and swollen at the base, convex, glabrous or slightly pubescent, 3-nerved (nerves prominent), edges membranous, 5—7 mm long, 1 mm broad. *Corolla* minutely glandular, 4—5 mm long, limb campanulate, 5—6-lobed,  $1\frac{1}{2}$  mm long, lobes long, acute at the top, tube slender, nearly filiform,  $2\frac{1}{2}$  mm long, apart from the limb, slightly appressed, pubescent. *Anthers* obtuse at the base, subobtuse at the top. *Style*-branches long, subobtuse at the top, papillous at the upper part, grooved at the lower part,  $2\frac{1}{2}$  mm long, nearly half as long as the style. *Achene* linear-oblong, 4-angular (ribs prominent), glabrous, glandular,  $2\frac{1}{2}$ —3 mm long,  $\frac{1}{2}$  mm thick. *Pappus* uniseriate, setaceous, 3—4 mm long; setae numerous, salmon-coloured or whitish, ciliate. *Receptacle* minute (cf. notes on p. 509—510).

Distribution: Br. India, Mal. Penins., Indo-China, Philippines, Mal. Arch., New Guinea, trop. Africa.

Use: Natives use the leaves to cure wounds (HALLIER).

1. forma *typica*; *Eupatorium cordatum* BURM. Fl. Ind. (1768) 176 t. 58 fig. 2.

*Leaves* quite entire, cordate-ovate or cordate; auricles of the leaves rounded.

Distribution in the Malay Archipelago:

J a v a: *West Java*: Tjomas, near Buitenzorg, coll. unkn. (B) — G. Batoe, Priangan, RAAP 560 (L).

B o r n e o: *Br. N. Borneo*: Melalap, GIBBS 2739 (K) — Khota Baloed, Kibayo, CLEMENS 9774 (K); *Sarawak*: Baram district, HOSE 279 (K), 170 (K) — N. Borneo, BURBIDGE s.n. (K).

C e l e b e s: *Manado*, between Soekoer and Soewaan, DE LA SAVINIERRE 285 (K).

M o l u c c a s: *Ceram*: Ninama, between Pasahari and Kaloai, KORNASSI 744 (L) — Kaniki, KORNASSI 553 (L) — between Kaniki and Manoesele, KORNASSI 1405 (L) — near Maneo, RUTTEN 310 (L) — near Melilia, RUTTEN 1642 (L) — between Kabailoe and Kabohari, RUTTEN 237 (B).

Flowers white (BACKER a.o.), dirty greyish white (LÖRZING), dirty yellow or green and white (LÖRZING), odoriferous (KOORDERS a.o.), anthers purplish brown, style white (LAM). *Lianas* to 5 m long (LÖRZING, KOORDERS). *Leaves* pale green (BÜNNEMEYER, VAN STEENIS). Branches winding to the left as well as to the right in the same plant (BACKER).

Vernacular names: *brodjo lego*, *semboeng rambat*, *sientrong*, *areng létah hajam*, *djapoet toehur*, *tjlerem (sapi)*, *kí oki*, *tradjon*, *sobowangi*, *areuj tjapitoeheur* (all Java), *hila hitoe lama* (Ambon), *babaleh telokkoh*, *lamba*, *blajang*, *tambara assoe* (all Celebes), *baimenjangsang*, *sipitoeengoe*, *sape toengoes*, *sapitantoengoe(r)*, *bloekar* (all Sumatra), *hoela* (Tidore), *orang aring*, *brodjo wengi*, *tempoejoeng klerem*, *plopore polo*, *ojot poeti*, *aroi bodas*.

The leaves of the specimens from Ceram are often not cordate at the base, but truncate. BURMAN described the branches as quite glabrous, which certainly is not the case in all the specimens cited.

Hab.: in primeval forests.

Altitude: 0—20 m.

Flowers: June, Sept.—Dec.

Distribution: New Guinea!, von RÖMER 578 (L).

2. forma *undulata* nov. f.

Folia crenata vel undulata, paulo mucronulata.

Distribution in the Malay Archipelago:

**S u m a t r a:** *East Coast:* Sibolangit near Medan, NATIVE COLL. 7218 (K), LÖRZING 3891 (B) — plain of Upper Bila, Sibolangit, LÖRZING 9621 (B) — Boekit Kloeang-valley, coll. unknown 7217 (B) — near G. Batoe Manoempak, LÖRZING 7969 (B) — Perbaoengan, Serdang, LÖRZING 3261 (B); *East Coast*, YATES 972 (B); *West Coast:* LKoto, Bt. Tinggi, BÜNNEMEYER 3025 (L) — id., S. A. Ramboetan, BÜNNEMEYER 3406 (L) — Barong baroe, Tapan, Korintji, ROBINSON and KLOSS s.n. (K) — Scolak dras, Korintji, ROBINSON and KLOSS s.n. (K) — Kp. Baroe, Korintji, BÜNNEMEYER 8085 (B) — G. Talamau, BÜNNEMEYER 433 (B) — Padang, coll. unknown 211 (B) — Anei-cleft, KLEINHOONTE 596 (B); *Bengkoelen:* Soeban Ajam, JACOBSON 331 (B) — Benkoelen, town, JACOBSON 23 (L); *Lampongs:* estate Wai Lima, IBOET 371 (L); Middle Sumatra, KOORDERS 21375 (B); Sumatra, KORTHALS s.n. (L).

**B a n g k a:** near Langgan, coll. unknown (B).

**K r a k a t a u I s l a n d s:** Verlaten Island, BACKER s.n. (B).

**J a v a:** *West Java:* swamp of Danoe, Serang, KOORDERS 40579 (L), type specimen, 40563 (B) — Bantam, FORBES 426 (B) — Rangkasbitong, BACKER 1003 (B) — between Tjitorek and Moentjang, Lebak, BACKER 1813 (B) — G. Kentjana, BACKER 1241 (B) — Depok, KOORDERS 31145 (L), 44163 (B), BEUMÉE 6772 (B), BACKER 31787 (B) — G. Karang near Gloesoer, Bantam, KOORDERS 40667 (B) — Tjadasmalang near Tjibeber, Tjiandjoer, WINCKEL 1400 (L) — Tjidadap, Tjibeber, Tjiandjoer, BAKHUIZEN VAN DEN BRINK 2996 (L) — south of Tjibeber, Tjiandjoer, BACKER 22717 (B), BAKHUIZEN VAN DEN BRINK 2443 (B), 747 (B) — Tasikmalaja, KOORDERS 43342 (L) — G. Galoenggoeng, near Singaparna, BACKER 8571 (L, B) — G. Salak, KURZ 497 (K), RAAP 603 (L), 175 (L), BACKER

9225 (B) — Wanajasa, G. Boerangrang, BAKHUIZEN VAN DEN BRINK 4725 (L), 4705 (B) — Tjisaroea, Tjibodas, RAAP 8 (L) — Tjibodas, BOERLAGE s.n. (L), HALLIER 612 (B), KOORDERS 31616 (L) — Garoet, BURCK 96 (B) — Priangan, PLOEM s.n. (L) — Buitenzorg, BAKHUIZEN VAN DEN BRINK 1918 (L), 7451 (L), BACKER 25853 (B), SCHEFFER s.n. (B) — Geger Bintang, near Buitenzorg, ARSIN 19597 (B) — Tjissalak, Buitenzorg, ARSIN 19473 (B) — Batavia, BLUME s.n. (L) — east of Tandjoeng Priok, VORDERMAN s.n. (B) — Poerwakarta, BACKER 13898 (B) — near Warongloa, Buitenzorg, VAN SLOOTEN 695 (B) — Bandoeng, VALETON s.n. (B), coll. unknown (B) — G. Tiloe, Priangan, SCHEFFER s.n. (B) — G. Patoek, Priangan, BAKHUIZEN VAN DEN BRINK 499 (B) — G. Kendang, Priangan, KOENS 207 (B) — G. Papandajan, BACKER 5645 (B) — Kartamana near Pengalengan, south of Bandoeng, SMITH and RANT 517 (B) — G. Telegabodas, BURCK 123 (B), BACKER 3186 (B) — Tjipanas, BAKHUIZEN VAN DEN BRINK 531 (B) — Lembang, VAN WELSEM 6 (B) — G. Malabar, DENKER 106 (B) — Indihiang, Soekapoera, BACKER 8538 (B) — Segalaherang, Krawang, BACKER 14233 (B) — G. Goentoer, DANSER 6776 (B) — G. Tjeremai, BACKER 4843 (B); *Middle Java*: Soebah, Batang, KOORDERS 36897 (L), ADMIN. RUBBER PLANTATION s.n. (B) — near Doro, Pekalongan, BACKER 15601 (B), 15760 (B), DOCTERS VAN LEEUWEN 501 (B) — Petoeng kriono, Pekalongan, BACKER 15766 (B) — near Tjandiroto, Kedoe, LÖRZING 628 (B) — Pekalongan, SMITH s.n. (B) — Kali Poetjang, Kedoe, BACKER 4394 (B) — G. Merapi, JUNGHUHN 328 (L) — Banjoebiroe, Semarang, KOORDERS 36223 (L) — Salatiga, DOCTERS VAN LEEUWEN 71151 (L); *East Java*: West Toeban, Rembang, BEUMÉE 1107 (B) — Pajaman, Padangan, BEUMÉE 874 (B) — G. Pandan, THORENAAR 173 (B) — G. Kawi, WISSE 267 (B) — near Manggis, Kediri, KOORDERS 22920 (B) — Ngebel, G. Wilis, KOORDERS 23224 (L), 23202 (B), 29186 (B) — Soembersangkil, Bangil, KOORDERS 23583 (L) — Wonokerto, south of Bangil, BACKER 3476 (B) — G. Ardjoeno, Tretes, BREMEKAMP s.n. (B) — Malang, VAN OOSTEN 7 (B), KOORDERS 23470 (B) — south of Bantoer, Malang, BACKER 3982 (B) — Blarong near Lawang, MOUSSET 399 (B) — G. Tengger, near Nongkodjadjar, BULJSMAN 106 (L) — id., near Poespo, KOBUS s.n. (B) — Djatiroto, BACKER 7842 (B) — Tjoeramanis, Djember, KOORDERS 37775 (L), 20559 (B) — G. Idjen, BACKER 25386 (B), 24899 (B), VAN SLOOTEN 2480 (B) — Rahoen-Idjen, Sitoebondo, KOORDERS 19925 (B); Java, near Kapang doengan, KUHL and VAN HASSELT s.n. (L); Java, REINWARDT s.n. (L), HORSFIELD 10 (K), det. Miq. (U), WAITZ s.n. (L), BLUME s.n. (L), ZOLLINGER 417 (L), KORTHALS s.n. (L).

Noesa Kembangan, south of Java: Tjimiring, AMDJAH 217

(B) — Noesa Kembangan, NATIVE COLL. 306 (L), KOORDERS 22059 (B).

Lombok: Rindjani, valley of Sapit, south slope of G. Poessoek, ELBERT 1843 (L), 1907 (L).

Soembawa: Bima, Kenanta, Donggo, ELBERT 3567 (L) — id. Oo, Donggo, ELBERT 3499 (L) — Batoe Doelong, RENSCH 621 (B).

Borneo: *Br. N. Borneo*: K. Kinabaloë, Dallas, CLEMENS 27318 (B, K); *Sarawak*: Sarawak river, HAVILAND s.n. (K) — Sarawak, BECCARI 459 (K); *S.E. Borneo*: Banjarmasin, MOTLEY 309 (K) — Pembliangan, AMDJAH 900 (L); *W. Borneo*: S. Kapoeas, TEYSMANN 8302 (B) — S. Landak, TEYSMANN 21298 (B) — Soekal Santing, Pontianak, HALLIER 109 (B); Borneo, JAHERI s.n. (B), HAVILAND and HOSE s.n. (L).

Celebes: *Manado*: Tondano, FORSTEN s.n. (L), KRUYFF 21 (B) — Minahassa, near Rasahan, LAM 2409 (B) — Manado, KOORDERS 16478 (L), 16480 (L), 16481 (L); *S.W. Celebes*: Bonthain, TEYSMANN 13693 (B), 14082 (B), 14127 (B) — Lombasang, BÜNNEMEYER 11809 (L), 11037 (L), 11705 (L, K) — Pangkadjene, TEYSMANN 11922 (B), 12107 (B); Celebes: Wawotobi, KJELLBERG 866 (B) — Rante Remo, KJELLBERG 1559 (B); P. Boeton S.E. of Celebes, Bau-Bau, ELBERT 6258 (L).

Saleier: DOCTERS VAN LEEUWEN 1771 (U).

Moluccas: *Amboina*, ROBINSON 1838 (L, K), TREUB s.n. (B), BINNENDIJK s.n. (B), coll. unknown 372 (B); *Boeroë*: Nal Besi, TOXOPEUS 196 (L); *Ternate*: Moja, BEGUIN 1015 (B) — Toramadiahi, BEGUIN 1111 (B) — *Halmahera*, Tidore, Boekoe Mala Mala, LAM 3754 (B).

Hab.: in Casuarina and other forests, in jungles, along waysides, on bank of rivers (acc. to BACKER l.c.) and brooks, along the edges of a dry rice field, in hedges of villages, along edges of ravines (acc. to BACKER l.c.), on a dry or a wet soil; on clay and on limestone; in sunny or not too shady localities (acc. to BACKER l.c.); one or numerous specimens together, scattered; common.

Altitude: 0—1900 m.

Flowers during the whole year.

Distribution: Bengall, Assam, Burma!, Siam!, Penins., Penang!, Tonking, Annam, Laos, Cochinchina!, Formosa, Philippines (Luzon!, Mindanao!, Mindoro!, Leyte!, Palawan!, Negros!, Culion!), New Guinea!, Bismarck Arch., trop. Africa (acc. to ROBINSON l.c.).

### 3. forma *dentata* nov. f.

*Folia* angulato-cordata vel hastato-cordata, dentibus paucis, plus minusve deltoideis, acutis, mucronatis, apice decrescentibus, demum evanescentibus, inferioribus magnis, ad 7 mm longis.

Distribution in the Malay Archipelago:

Sumatra: *West Coast*: G. Talang, BÜNNEMEYER 5331 (L) — G. Singgalang, BÜNNEMEYER 2979 (L).

Java: *West Java*: G. Malabar, SOEGANDIREJJA 307 (L), 206 (B)

G. Boekittoengoel, DE MONCHY 74 (B) — G. Geberbintang, near Buitenzorg, KOORDERS 26024 (L); *Middle Java*: G. Telemojo, KOORDERS 27691 (L), 35919 (B); *East Java*: G. Idjen, BACKER 25116 (L, B) — Pantjoer Idjen, Sitoebondo, KOORDERS 32262 (B) — Gendingwaloe, Probolinggo, KOORDERS 43342 (L) — G. Baloeran, along the edges of the crater, CLASON-LAARMAN F. 114 (B) — Sawahan, Kediri, GRUTTERINK 3103 (B).

Bali: G. Kelatakan, exped. MAIER 86 (L).

Borneo: *S.E. Borneo*: Doessoen, KORTHALS s.n. (L) — P. Lanssei, KORTHALS s.n. (L).

Celebes: *Manado*: Goeroepahi, KAUDERN 27 (L), type specimen — Minahassa, KOORDERS 16476 (L), 16479 (L); *S.W. Celebes*: G. Bonthain, BÜNNEMEYER 11603 (L), 11252 (L), 12121 (B), 12005 (B); Celebes, Pasaëran, exped. VAN VUUREN 292 (L).

Hab.: in forests, in a river bed; in not too shady localities.

Altitude: 500—2200 m.

Flowers: March—July, Sept., Oct., Dec.

4. forma *villosa* nov. f.

*Folia* utrinque, petioli et rami extremi dense ferrugineo-villoso-pubescentes, pilis incurvatis, articulatis.

Distribution in the Malay Archipelago:

Sumatra: *West Coast*: G. Sago, BÜNNEMEYER 3702 (L), type specimen — G. Talamau, BÜNNEMEYER 308 (B) — G. Merapi, BÜNNEMEYER 4820 (B); *Palembang*, north of the Ranau lake, VAN STEENIS 334 (B), 3747 (B); *Lampongs*: east of Tandjoeng Karang, AGRICULT. S. SUM. a (B) — G. Rate, Berenong, IBOET 261 (B), 263 (B); Sumatra, FORBES 2680 a (L).

Java: *West Java*: Depok, HALLIER s.n. (B), BURCK and DE MONCHY s.n. (B) — Pagindangan, BAKHUIZEN VAN DEN BRINK 45 E. (L); *East Java*: Djember, ULTÉE 26 (B).

Hab.: along the edges of forests, waysides, edges of a dry rice field, in a young rubber plantation; on a moist soil, on clay.

Altitude: 50—1080 m.

Flowers: April—Dec.

Distribution: Philippines (Mindanao!), New Guinea!

In Sumatra one specimen has been collected (IBOET 263) of this form with extremely small leaves (1—1½ cm long, 1—2 cm broad) and inflorescences existing of very few heads.

BLUME l.c. and MIQUEL l.c. noticed already a densely pubescent variety without naming it.

This only Asiatic *Mikania* species has been considered during a long time to be conspecific with its allies in North and South America. Since ROBINSON (in Contr. Gray Herb. LXIV, 1922, 24 and CIV, 1934, 65) has pointed out, that the Old World species is not conspecific with the North American *Mikania scandens*

(L.) WILLD., nor with the South American *Mikania micrantha* H. B. K., it seems reasonable to use BURMAN's name for the Asiatic *Mikania*. Indeed the three species of *Mikania* are distinct. The heads of *Mikania micrantha* are 4—5 mm long, they have a very small ovate bract at the base, the involucre scales are oblong-elliptic and shortly acute at the top, the limb of the corolla is broadly infundibuliform, the achene is less than 2 mm long. In *Mikania scandens* (L.) WILLD. and *Mikania cordata* the heads are larger, 5—6 mm long (in *Mikania cordata* even up to 9 mm long), the bracts at the base of the heads are lanceolate and about half as long as the involucre in both species. The involucre scales in *Mikania scandens* are lanceolate-oblong, long acuminate and very acute at the top. The involucre scales are elliptic-oblong, shortly acute and mucronate at the top in *Mikania cordata*. The achenes in both species are longer than 2 mm, the limb of the corolla is campanulate. Moreover the colour of the corolla is white in *Mikania micrantha*, dirty white or white in *Mikania cordata* and purple (acc. to ROBINSON) in *Mikania scandens*. So *Mikania cordata* appears to be an originally Asiatic species.

HUMBERT (Comp. Madagasc., 1923, 33) does not separate *Mikania cordata* from *Mikania scandens*. He describes the corolla as white in the *Mikania*, occurring in Madagascar, so it may belong to *Mikania cordata*.

#### Pl. II.

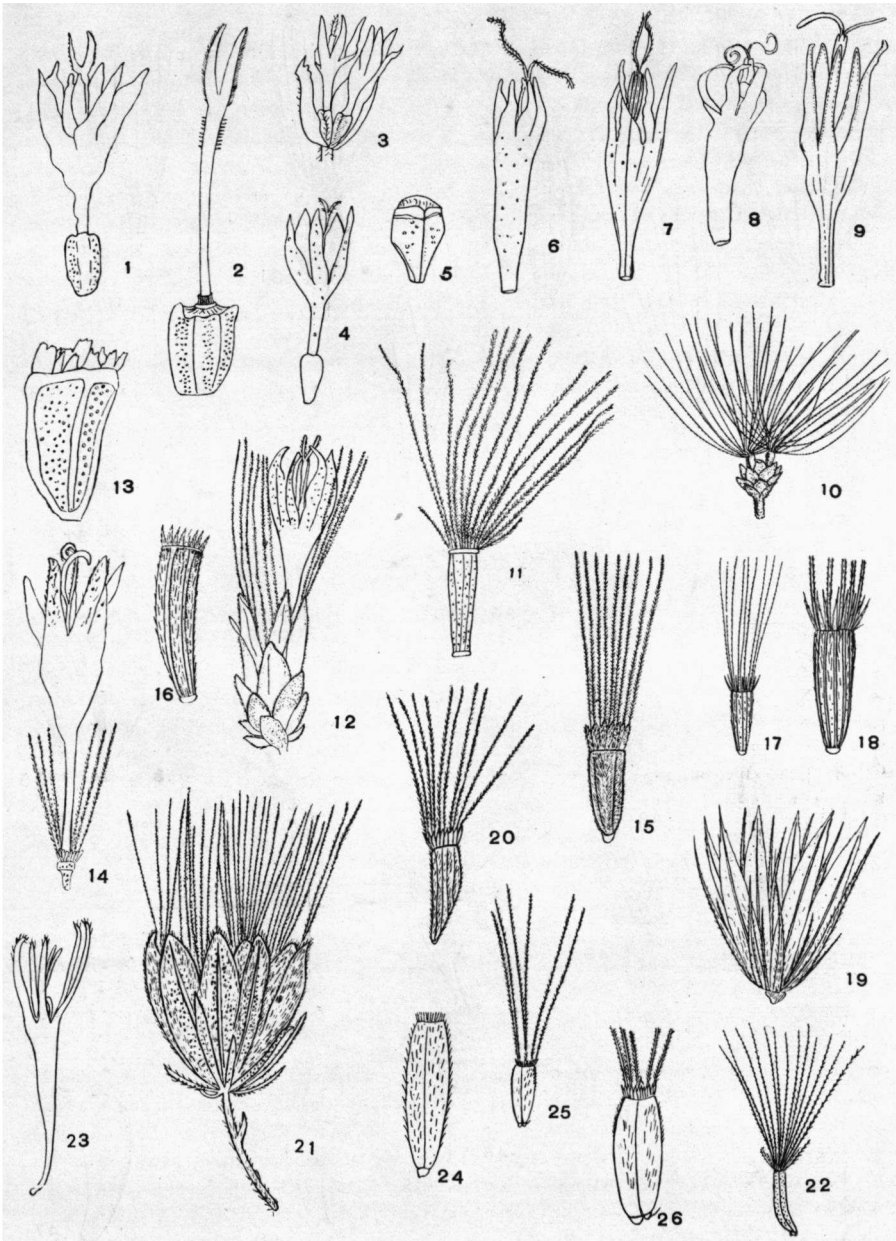
1—2 *Ethulia megacephala* SCH.-BIP.: 1 flower; 2 achene with style; 3—5 *E. triflora* nov. spec.: 3 head, 4 flower, 5 achene; 6 *Vernonia arborea* HAM. var. *typica*: corolla; 7 *V. arborea* HAM. var. *javanica* (BL.) CLARKE: corolla; 8 *V. fimbriolata* nov. spec.: corolla; 9—10 *V. durifolia* nov. spec.: 9 corolla, 10 involucre, achene with pappus; 11—12 *V. kabaënsis* KOSTER: 11 achene with pappus, 12 head; 13—14 *V. albi-folia* KOSTER: 13 achene with outer row of the pappus, 14 flower; 15 *V. Junghuhniana* KOSTER: achene with pappus; 16 *V. subtilis* nov. spec.: achene with outer row of the pappus; 17—19 *V. laxiflora* LESS.: 17 achene with pappus, 18 achene with outer row of the pappus, 19 involucre; 20 *V. Tengwallii* nov. spec.: achene with pappus; 21 *V. coerulea* nov. spec.: head; 22 *V. Reinwardtiana* DE VRIESE et MIQ.: achene with pappus; 23—24 *V. cymosa* BL.: 23 corolla, 24 achene with outer row of the pappus; 25—26 *V. erigeroides* DC.: 25 achene with pappus (only few setae of the inner row left), 26 achene with outer row of the pappus.

#### Pl. III.

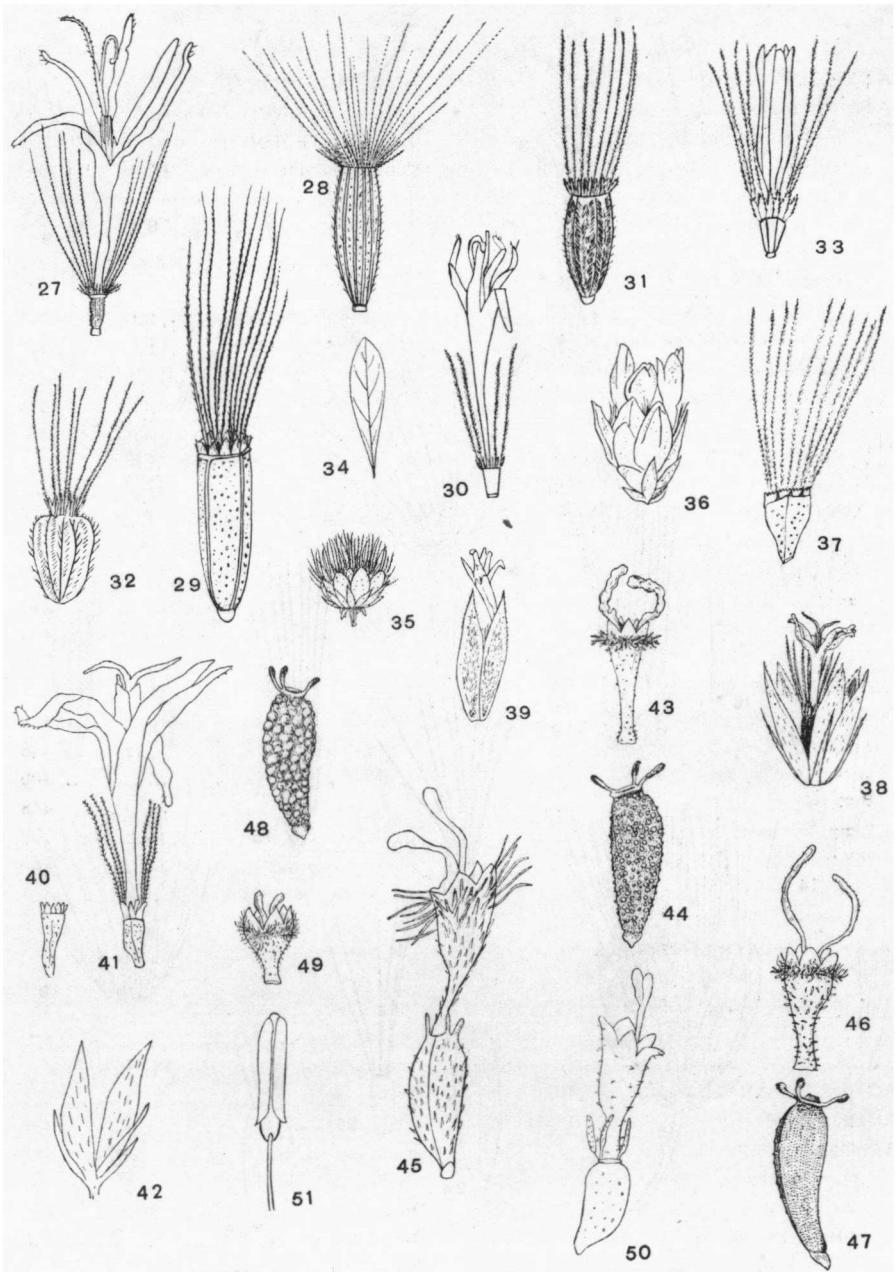
27—28 *Vernonia lanceolata* (WARBG.) MATTF.: 27 flower, 28 achene with pappus; 29 *V. wetarensis* KOSTER: achene with pappus; 30—31 *V. florestiana* nov. spec.: 30 flower, 31 achene with pappus; 32 *V. letiënsis* nov. spec.: achene with pappus; 33—35 *V. Zollingerianoides* SCH.-BIP.: 33 flower, 34 leaf, 35 head; 36—37 *V. actaea* KOSTER: 36 head, 37 achene with pappus; 38 *V. timorensis* nov. spec.: head; 39—42 *V. Walshae* nov. spec.: 39 head without outer row of the involucre, 40 achene with outer row of the pappus, 41 flower, 42 involucre; 43—44 *Adenostemma Lavenia* (L.) O. K.: 43 corolla with style, 44 achene with pappus; 45 *Adenostemma hirsutum* (BL.) DC.: flower; 46—47 *Adenostemma macrophyllum* (BL.) DC.: 46 corolla with style, 47 achene with pappus; 48—49 *Adenostemma parviflorum* (BL.) DC.: 48 achene with pappus, 49 corolla with style; 50—51 *Adenostemma Renschii* nov. spec.: 50 flower, 51 anther.



PL. II.



PL. III.



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indicating the genera, species, varieties and forms by means of their numbers; the first number is that of the genus, that in brackets indicates the species and the third number refers to the variety or the form.

- AARTS: 33 (B) = 9 (1).  
 ABAR BIN ADAN: 2145 (B) = 4 (1) 6.  
 ACHMAD: 17 (L) = 4 (1) 7; 44 (L) = 8 (1) 1; 170 (L) = 4 (1) 7; 250 (L, B, U) = 4 (1) 7; 306 (L) = 9 (1); 307 (L) = 4 (10) 1; 496 (L) = 1 (1); 722 (L) = 4 (1) 7; 731 (L, U) = 4 (18) 1.  
 ADJ. VEEARTS: 5a (B) = 4 (10) 2.  
 ADMIN. GEMAMPOR-ESTATE: 2 (B) = 4 (10) 2; 7 (B) = 5 (1) 2; 58 (B) = 4 (10) 2; s.n. (B) = 4 (10) 1.  
 ADMIN. RUBBER-PLANTATION: s.n. (B) = 11 (1) 2.  
 AGRICULT. S. SUM.: a (B) = 11 (1) 4.  
 AJOEB: 422 (B) = 8 (4).  
 ALTMANN: 116 (B) = 4 (20); 155 (B) = 8 (4); 368 (B) = 4 (20); 370 (B) = 4 (22).  
 AMAND: 38 (U) = 5 (1) 1; s.n. (U) = 9 (1).  
 AMDJAH: 20 (B) = 8 (1) 1; 106 (L) = 8 (1) 2; 138 (B, K) = 4 (1) 5; 217 (B) = 11 (1) 2; 777 (L) = 9 (1); 780 (U) = 4 (10) 1; 825 (L, K) = 1 (1); 833 (L, K) = 9 (1); 900 (L) = 11 (1) 2; s.n. (B) = 4 (1) 8.  
 ANDERSON: 335 (K) = 8 (3) 2; 350 (K) = 4 (17) 1.  
 ANDREWS: 48 (K) = 9 (1).  
 ARENS: s.n. (B) = 2 (1).  
 ARSIN: 19473 (B) = 11 (1) 2; 19597 (B) = 11 (1) 2.  
 BAL: 13 (B) = 4 (1) 2; 25 (B) = 9 (1).  
 BACKER: 4 (B) = 4 (10) 2; 4 (B) = 4 (18) 2; 11 (B) = 4 (10) 2; 16 (B) = 9 (1); 54 (B) = 5 (1) 1; 82 (B) = 8 (1) 1; 107 (B) = 4 (18) 1; 273 (B) = 8 (2); 313 (B) = 8 (4); 801 (B) = 4 (10) 1; 886 (B) = 8 (1) 1; 943 (B) = 9 (1); 1003 (B) = 11 (1) 2; 1008 (B) = 4 (18) 1; 1010 (B) = 5 (1) 2; 1011 (B) = 8 (1); 1096 (B) = 5 (1) 2; 1130 (B) = 4 (1) 2; 1200 (B) = 4 (10) 1; 1241 (B) = 11 (1) 2; 1290 (B) = 5 (1) 2; 1326 (B) = 10 (3); 1424 (B) = 9 (1); 1564 (B) = 5 (1) 2; 1620 (B) = 4 (10) 1; 1686 (B) = 4 (1) 2; 1701 (B) = 10 (3); 1813 (B) = 11 (1) 2; 1855 (B) = 8 (1) 1; 1876 (B) = 5 (1) 2; 2006 (B) = 4 (1) 2; 2030 (B) = 9 (1); 2073 (B) = 4 (10) 1; 2156 (B) = 1 (1); 2211 (B) = 4 (1) 2; 2222 (B) = 10 (3); 2344 (B) = 10 (3); 2583 (B) = 5 (1) 2; 2596 (B) = 4 (10) 1; 2808 (B) = 4 (18) 1; 2810 (B) = 5 (1) 2; 3004 (B) 8 (2); 3019 (B) = 1 (1); 3020 (B) = 5 (1) 2; 3077 (B) = 10 (3); 3082 (B) = 4 (10) 1; 3132 (B) = 4 (18) 1; 3139 (B) = 9 (2); 3186 (B) = 11 (1) 2; 3192 (B) = 8 (3) 1; 3362 (B) = 5 (1) 2; 3363 (B) = 5 (1) 2; 3365 (B) = 5 (1) 2; 3460 (B) = 4 (18) 2; 3476 (B) = 11 (1) 2; 3504 (B) = 8 (1) 1; 3543 (B) = 9 (1); 3551 (B) = 10 (3); 3701 (L) = 8 (3) 2; 3783 (B) = 9 (1); 3799 (B) = 5 (1) 2; 3874 (B) 4 (10) 1; 3982 (B) = 11 (1) 2; 4088 (B) = 8 (1) 1; 4342 (B) = 4 (18) 1; 4394 (B) = 11 (1) 2; 4395 (B) = 8 (1) 1; 4493 (B) = 4 (10) 1; 4513 (B) = 5 (1) 1; 4776 (B) = 4 (17) 1; 4843 (B) = 11 (1) 2; 4870 (B) = 4 (17) 1; 4916 (B) = 4 (17) 1;

4989 (B) = 5 (1) 2; 5132 (B) = 8 (3) 1; 5153 (B) = 1 (1); 5197 (B) = 9 (1);  
 5264 (B) = 4 (10) 1; 5338 (B) = 4 (17) 1; 5644 (B) = 10 (3); 5645 (B) =  
 11 (1) 2; 5712 (B) = 9 (2); 5724 (B) = 9 (2); 5805 (B) = 5 (1) 2; 5871 (B) =  
 10 (3); 5872 (B) = 8 (1) 1; 5943 (B) = 4 (18) 2; 6190 (B) = 8 (1) 1;  
 6244 (B) = 5 (1) 1; 6246 (L, B) = 4 (1) 2; 6255 (B) = 10 (1); 6446 (B) =  
 5 (1) 2; 6600 (B) = 5 (1) 2; 6654 (B) = 4 (18) 2; 6803 (B) = 2 (1);  
 6863 (B) = 4 (18) 2; 6987 (B) = 4 (10) 2; 7080 (B) = 1 (1); 7141 (B) =  
 8 (1) 1; 7259 (B) = 4 (1) 2; 7276 (B) = 4 (18) 1; 7411 (B) = 9 (1);  
 7502 (B) = 4 (10) 2; 7503 (B) = 4 (18) 1; 7505 (B) = 8 (1) 1; 7589 (B) =  
 4 (18) 2; 7682 (B) = 9 (1); 7841 (B) = 1 (1); 7842 (B) = 11 (1) 2;  
 7959 (B) = 9 (1); 7964 (B) = 4 (10) 1; 8062 (B) = 4 (10) 1; 8078 (B) =  
 4 (18) 2; 8176 (B) = 4 (18) 2; 8224 (B) = 4 (20); 8296 (B) = 4 (20);  
 8416 (B) = 5 (1) 2; 8538 (B) = 11 (1) 2; 8571 (L, B) = 11 (1) 2; 8623 (B) =  
 4 (17) 1; 8922 (B) = 8 (2); 9094 (B, K) = 10 (3); 9225 (B) = 11 (1) 2;  
 9325 (B) = 9 (1); 9586 (B) = 4 (17) 4; 9743 (L) 8 (1) 1; 10048 (B) =  
 4 (10) 2; 10058 (B) = 9 (1); 10087 (B) = 10 (3); 10353 (B) = 8 (2);  
 10476 (B) = 4 (1) 2; 10506 (B) = 10 (3); 10510 (B) = 4 (1) 2; 10588 (B) =  
 8 (2); 10657 (B) = 9 (1); 10919 (B) = 10 (3); 11169 (L) = 8 (2); 11264 (B) =  
 4 (18) 2; 11560 (B) = 4 (1) 2; 11684 (B) = 9 (1); 11701 (B) = 5 (1) 2;  
 11758 (B) = 5 (1) 1; 11856 (B) = 4 (18) 2; 11868 (B) = 8 (8) 1; 12129 (B) =  
 4 (10) 2; 12181 (B) = 5 (1) 1; 12219 (B) = 8 (2); 12314 (B) = 4 (1) 2;  
 12469 (B) = 10 (2); 12524 (B) = 10 (2); 12532 (B) = 9 (2); 12635 (B) =  
 10 (3); 12987 (B) = 9 (1); 13152 (B) = 9 (1); 13216 (B) = 5 (1) 2;  
 13296 (B) = 4 (17) 4; 13423 (B) = 1 (1); 13469 (B) = 10 (3); 13478 (B) =  
 4 (18) 1; 13481 (B) = 8 (1) 1; 13500 (B) = 9 (2); 13509 (L) = 10 (2);  
 13517 (B) = 10 (7); 13548 (B) = 10 (2); 13596 (B) = 10 (3); 13760 (B) =  
 5 (1) 2; 13778 (B) = 4 (18) 1; 13779 (B) = 1 (1); 13848 (L) = 8 (1) 1;  
 13898 (B) = 11 (1) 2; 13906 (B) = 9 (1); 13929 (B) = 10 (3); 13959 (B) =  
 4 (10) 1; 14073 (B) = 8 (2); 14080 (B) = 10 (3); 14176 (B) = 4 (17) 1;  
 14233 (B) = 11 (1) 2; 14255 (B) = 9 (1); 14348 (B) = 4 (10) 1; 14362 (B) =  
 4 (18) 1; 14470 (L) = 8 (4); 14539 (B) = 10 (3); 14551 (B) = 5 (1) 2;  
 14580 (B) = 4 (17) 1; 14590 (B) = 9 (1); 14620 (B) = 9 (2); 14627 (B) =  
 4 (18) 1; 14779 (B) = 8 (2); 14819 (B) = 10 (3); 14981 (B) = 8 (4);  
 15055 (B) = 4 (18) 1; 15181 (B) = 10 (3); 15191 (B) = 4 (17) 1; 15235 (B) =  
 5 (1) 2; 15385 (B) = 4 (10) 2; 15390 (B) = 9 (1); 15395 (B) = 5 (1) 2;  
 15423 (B) = 4 (18) 1; 15442 (B) = 4 (10) 2; 15467 (B) = 5 (1) 2; 15487 (B) =  
 1 (1); 15565 (B) = 9 (1); 15568 (B) = 4 (10) 1; 15601 (B) = 11 (1) 2;  
 15614 (B) = 5 (1) 2; 15731 (B) = 8 (2); 15760 (B) = 11 (1) 2; 15766 (B) =  
 11 (1) 2; 15813 (B) = 4 (17) 2; 16122 (B) = 4 (17) 2; 16174 (B) = 8 (4);  
 16196 (B) = 5 (1) 1; 16316 (B) = 4 (10) 2; 16355 (B) = 5 (1) 1; 16702 (B) =  
 4 (10) 2; 16814 (B) = 4 (10) 2; 16934 (B) = 9 (1); 16935 (B) = 10 (3);  
 17148 (B) = 5 (1) 1; 17151 (L) = 8 (2); 17215 (B) = 4 (10) 3; 17264 (B) =  
 10 (3); 17408 (B) = 4 (10) 2; 17408 (B) = 9 (1); 17528 (B) = 8 (1) 1;  
 17722 (B) = 4 (10) 1; 17772 (B) = 4 (18) 2; 17779 (B) = 5 (1) 2; 18061 (B) =  
 4 (10) 1; 18099 (B) = 1 (1); 18179 (B) = 9 (1); 18433 (B) = 9 (1);  
 18474 (B) = 5 (1) 2; 18475 (B) = 4 (1) 2; 18546 (B) = 4 (18) 1; 18550 (B) =  
 8 (1) 1; 18563 (B) = 4 (10) 2; 18721 (B) = 8 (1) 1; 18776 (B) = 4 (10) 1;

19060 (B) = 4 (18) 2; 19069 (B) = 5 (1) 2; 19277 (B) = 4 (10) 2; 19357 (B) = 9 (1); 19369 (B) = 4 (18) 2; 19520 (B) = 4 (18) 2; 19690 (L, B) = 5 (1) 2; 19705 (B) = 9 (1); 19710 (B) = 4 (10) 2; 19856 (L, B) = 5 (1) 2; 20237 (B) = 4 (9); 20265 (B) = 9 (1); 20276 (B) = 4 (18) 2; 20344 (B) = 4 (18) 2; 20486 (L) = 4 (9); 20622 (B) = 4 (18) 2; 20629 (B) = 5 (1) 2; 20798 (B) = 4 (9); 20890 (B) = 5 (1) 1; 21236 (B) = 4 (18) 2; 21337 (B) = 4 (10) 2; 21338 (B) = 4 (10) 2; 21339 (B) = 9 (1); 21340 (B) = 9 (1); 21341 (B) = 9 (1); 21343 (B) = 4 (10) 2; 21347 (B) = 9 (1); 21349 (B) = 9 (1); 21350 (B) = 9 (1); 21355 (B) = 9 (1); 21367 (B) = 4 (10) 1; 21368 (B) = 4 (10) 2; 21374 (B) = 7 (1); 21511 (B) = 5 (1) 1; 21521 (L) = 8 (2); 21534 (B) = 10 (7); 21627 (B) = 4 (17) 2; 21759 (B) = 9 (1); 21768 (B) = 8 (4); 21851 (B) = 4 (17) 2; 21983 (B) = 9 (1); 22204 (B) = 1 (1); 22214 (B) = 10 (2); 22330 (B) = 9 (2); 22378 (B) = 8 (2); 22717 (B) = 11 (1) 2; 22837 (B) = 7 (1); 22841 (L, K) = 6 (1); 22855 (B) = 8 (2); 22914 (B) = 4 (18) 1; 23336 (B) = 1 (1); 23552 (B) = 10 (3); 23556 (B) = 4 (10) 3; 23572 (B) = 9 (1); 23637 (B) = 8 (1) 1; 23913 (B) = 5 (1) 2; 23995 (B) = 10 (7); 24023 (B) = 4 (18) 1; 24028 (B) = 8 (1) 1; 24170 (B) = 4 (18) 2; 24183 (B) = 4 (20); 24310 (B) = 4 (18) 2; 24376 (B) = 4 (10) 2; 24432 (B) = 4 (18) 2; 24437 (B) = 8 (1) 1; 24460 (B) = 9 (1); 24503 (B) = 4 (20); 24529 (B) = 5 (1) 1; 24677 (B) = 4 (20); 24752 (B) = 4 (18) 2; 24784 (B) = 9 (1); 24868 (B) = 5 (1) 1; 24886 (B) = 9 (1); 24899 (B) = 11 (1) 2; 24944 (B) = 4 (18) 2; 24945 (B) = 4 (20); 25116 (L, B) = 11 (1) 3; 25137 (B) = 4 (17) 2; 25267 (B) = 4 (17) 2; 25303 (B) = 2 (1); 25346 (B) = 5 (1) 1; 25386 (B) = 11 (1) 2; 25625 (B) = 5 (1) 2; 25853 (B) = 11 (1) 2; 25871 (L, B) = 4 (1) 2; 25919 (B) = 10 (3); 26051 (L) = 10 (7); 26077 (L) = 9 (1); 26077 (L) = 9 (2); 26401 (B) = 8 (1) 1; 26868 (B) = 4 (10) 2; 26869 (B) = 9 (1); 26984 (B) = 5 (1) 2; 27256 (B) = 4 (18) 2; 27302 (B) = 9 (1); 27499 (B) = 4 (10) 2; 27591 (B) = 9 (1); 28003 (B) = 9 (1); 28034 (B) = 4 (18) 2; 28110 (B) = 4 (9); 28213 (B) = 4 (18) 2; 28228 (B) = 9 (1); 28282 (B) = 5 (1) 2; 28402 (B) = 4 (10) 2; 28462 (B) = 4 (10) 2; 28463 (B) = 4 (9); 28467 (B) = 4 (18) 2; 28490 (B) = 5 (1) 2; 28542 (B) = 9 (1); 28621 (B) = 4 (9); 28708 (B) = 4 (18) 2; 28747 (B) = 4 (9); 28775 (B) = 4 (9); 28785 (B) = 5 (1) 2; 28794 (B) = 9 (1); 28852 (B) = 4 (18) 1; 29092 (B) = 4 (18) 2; 29156 (B) = 9 (1); 29243 (B) = 4 (9); 29284 (B) = 4 (18) 2; 29302 (B) = 4 (9); 29308 (B) = 4 (18) 2; 29328 (B) = 5 (1) 1; 29337 (B) = 9 (1); 29515 (B) = 4 (10) 1; 29644 (B) = 5 (1) 2; 29648 (B) = 4 (9); 29692 (B) = 9 (1); 29731 (B) = 4 (18) 2; 29993 (B) = 4 (10) 3; 30115 (B) = 4 (10) 2; 30137 (B) = 9 (1); 30248 (B) = 4 (17) 2; 30277 (B) = 8 (3) 3; 30347 (B) = 4 (10) 2; 30459 (L) = 4 (1) 4; 31019 (B) = 4 (10) 2; 31335 (B) = 10 (7); 31601 (B) = 4 (10) 2; 31787 (B) = 11 (1) 2; 31920 (B) = 10 (3); 31922 (B) = 10 (3); 32021 (B) = 1 (1); 32026 (B) = 1 (1); 32030 (B) = 1 (1); 32032 (B) = 1 (1); 32403 (B) = 10 (2); 32420 (B) = 10 (7); 32930 (B) = 4 (18) 1; 32933 (B) = 4 (18) 1; 33020 (B) = 8 (1) 1; 33023 (B) = 8 (2); 33513 (B) = 10 (3); 33515 (B) = 10 (3); 33516 (B) = 10 (3); 33517 (B) = 10 (3); 33518 (B) = 10 (3); 35147 (B) = 8 (1) 1; 41338 (B) = 4 (10) 1; 86922 (B) = 9 (2); s.n. (B) = 4 (1) 2; s.n. (B) = 4 (17) 1; s.n. (B) = 4 (18) 2; s.n. (B) = 5 (1) 2; s.n. (L) =

5 (1) 1; s.n. (L, B, U) = 8 (1) 1; s.n. (B) = 8 (2); s.n. (L, U, B) = 8 (2); s.n. (B) = 11 (1) 2.

BACKER and VAN SLOOTEN: 25084 (B) = 4 (10) 2.

BAKHUIZEN VAN DEN BRINK: 15a (L) = 10 (3); 36 (L) = 4 (1) 2; 45 E (L) = 11 (1) 4; 46 (B) = 4 (10) 2; 56 (B) = 4 (18) 1; 75a (L) = 4 (10) 3; 335 (B) = 4 (18) 1; 374 (B) = 7 (1); 433 (B) = 8 (1) 1; 457 (L) = 5 (1) 1; 499 (B) = 11 (1) 2; 531 (B) = 11 (1) 2; 628 (B) = 4 (17) 1; 654 (L) = 1 (1); 716 (B) = 9 (2); 747 (B) = 11 (1) 2; 1016 (B) = 1 (1); 1023 (B) = 9 (1); 1024 (B) = 9 (2); 1121 (B) = 8 (1) 1; 1460 (L, B) = 7 (1); 1629 (B) = 4 (10) 2; 1918 (L) = 11 (1) 2; 1934 (L, K) = 6 (1); 1934 (L, B) = 8 (2); 2006 (B) = 9 (2); 2111 (B) = 1 (1); 2179 (B) = 4 (18) 1; 2443 (B) = 11 (1) 2; 2888 (B) = 9 (2); 2981 (L) = 10 (3); 2983 (L) = 9 (1); 2996 (L) = 11 (1) 2; 3181 (B) = 8 (1) 1; 3194 (B) = 4 (10) 1; 3388 (L) = 10 (1); 3676 (L, U) = 4 (18) 1; 3721 (B) = 4 (10) 3; 3815 (B) = 4 (10) 2; 3816 (B) = 9 (1); 3821 (L) = 7 (1); 3889 (L) = 4 (1) 2; 4320 (L, K) = 4 (17) 1; 4333 (L) = 8 (4); 4652 (B) = 4 (17) 1; 4705 (B) = 11 (1) 2; 4725 (L) = 11 (1) 2; 4781 (L) = 8 (4); 5056 (B) = 5 (1) 1; 5072 (L) = 5 (1) 1; 5561 (B) = 9 (1); 5733 (L, B) = 4 (18) 1; 5781 (L, K) = 9 (2); 5782 (L) = 9 (1); 6030 (L) = 7 (1); 6344 (L) = 7 (1); 6386 (B) = 4 (10) 1; 6550 (L) = 10 (3); 6895 (L) = 4 (10) 3; 6896 (B) = 4 (18) 2; 7160 (B) = 1 (1); 7451 (L) = 11 (1) 2; 7930 (B) = 5 (1) 2.

BARTER: s.n. (K) = 4 (1) 6.

BARTLETT: s.n. (Br. M.) = 4 (1) 6.

BARTLETT and LA RUE: 146 (L) = 8 (2); 150 (K) = 4 (18) 1; 234 (L) = 4 (1) 5; 284 (L) = 9 (1); 332 (L) = 5 (1) 2; 387 (L) = 4 (10) 1; 396 (L) = 9 (1).

BECCARI: 288 (B, K) = 4 (1) 6; 341 (L) = 4 (1) 1; 459 (K) = 11 (1) 2; 824 (K) = 9 (1); s.n. (L, K) = 8 (4).

BEGUIN: 65 (B) = 9 (1); 404 (L, B) = 5 (1) 2; 796 (B) = 5 (1) 2; 821 (B) = 4 (10) 2; 895 (B) = 9 (1); 966 (B) = 8 (1) 1; 1015 (B) = 11 (1) 2; 1111 (B) = 11 (1) 2; 1163 (B) = 4 (1) 6; 1468 (L, B) = 4 (1) 6.

BERCK: s.n. (B) = 8 (1) 1.

DEN BERGER: 94 (B) = 4 (17) 2; 95 (B) = 8 (3) 2; 553 (B) = 4 (1) 3; 606 (B) = 10 (2); 629 (B) = 10 (7); s.n. (B) = 10 (2).

BEUMÉ: 192 (B) = 4 (10) 2; 195 (B) = 9 (1); 378 (B) = 5 (1) 2; A 615 (B) = 8 (1) 1; A 631 (B) = 4 (17) 4; 634 (B) = 9 (1); 637 (B) = 4 (18) 1; 808 (B) = 4 (10) 6; 812 (B) = 4 (10) 1; 874 (B) = 11 (1) 2; 885 (B) = 5 (1) 2; 937 (B) = 9 (1); 1107 (B) = 11 (1) 2; 1164 (B) = 4 (10) 2; 1197 (B) = 8 (1) 1; 1905 (B) = 8 (1) 1; 2228 (B) = 9 (1); 2346 (B) = 8 (1) 1; 2366 (B) = 5 (1) 1; 2432 (B) = 5 (1) 2; 2438 (B) = 9 (1); 2615 (B) = 4 (18) 2; 2780 (B) = 4 (20); 2788 (B) = 5 (1) 2; 2826 (B) = 4 (18) 2; 2848 (B) = 5 (1) 2; 3650 (B) = 9 (1); 3694 (B) = 5 (1) 2; 3697 (B) = 4 (10) 2; 3726 (B) = 1 (1); 3781 (B) = 4 (10) 2; 3945 (B) = 4 (18) 1; 3958 (B) = 5 (1) 2; 4102 (B) = 8 (1) 1; 4292 (B) = 9 (1); 4575 (B) = 4 (10) 2; 4596 (B) = 9 (1); 4854 (B) = 8 (1) 1; 5018 (B) = 4 (10) 2; 5100 (B) = 4 (18) 1; 5211 (B) = 9 (1); 5227 (B) =

5 (1) 2; 5299 (B) = 9 (1); 5350 (B) = 8 (1) 1; 5406 (B) = 4 (18) 1; 5416 (B) = 5 (1) 2; 6772 (B) = 11 (1) 2.

BINNENDIJK: s.n. (B) = 4 (27); s.n. (B) = 11 (1) 2; s.n. (B) = 4 (10) 4.

BLOKHUIS: 60 (B) = 9 (1); s.n. (B) = 4 (17) 2; s.n. (B) = 4 (18) 1; s.n. (B) = 4 (18) 2; s.n. (B) = 4 (18) 3; s.n. (B) = 5 (1) 1; s.n. (B) = 9 (1).

BLUME: 443 (L) = 8 (4); 1436 (L) = 4 (1) 2; 1443 (L) = 4 (17) 2; 1838 (L) = 8 (1) 1; s.n. (L) = 3 (1) 1; s.n. (Br. M.) = 3 (1) 1; s.n. (L) = 4 (1) 1; s.n. (L) = 4 (1) 2; s.n. (L) = 4 (1) 3; s.n. (L) = 4 (1) 9; s.n. (L) = 4 (17) 1; s.n. (L) = 4 (18) 1; s.n. (L) = 4 (18) 2; s.n. (L) = 4 (19); s.n. (L) = 8 (1) 1; s.n. (L) = 8 (2); s.n. (L) = 8 (3) 1; s.n. (L) = 8 (4); s.n. (L) = 9 (1); s.n. (L, Br. M.) = 10 (1); s.n. (L) = 11 (1) 2.

DE BOER: 3 (B) = 5 (1) 2; 14 (B) = 9 (1); 26 (B) = 4 (18) 3.

BOERLAGE: 228 (B) = 4 (10) 1; s.n. (L) = 1 (1); s.n. (L) = 3 (1) 3; s.n. (L, B) = 4 (10) 2; s.n. (L, B) = 4 (17) 1; s.n. (L) = 4 (18) 1; s.n. (L) = 4 (18) 2; s.n. (L) = 8 (1); s.n. (L) = 8 (4); s.n. (L) = 10 (3); s.n. (L) = 11 (1) 2.

BARCLAY: s.n. (Br. M.) = 9 (1).

BOSCHMA: 14 (B) = 4 (10) 2; 66 (B) = 9 (1); 78 (B) = 4 (10) 2.

BOSCHPROEFSTATION: 2 (B) = 4 (1) 2; 7 (B) = 4 (1) 2; 8 (B, U) = 4 (1) 2; 1333 (B) = 4 (1) 2; 1418 (B) = 4 (1) 2; 1798 (B) = 4 (1) 4; 1809 (B) = 4 (1) 2; 1832 (B) = 4 (1) 6; 2154 (B) = 4 (1) 2; 2767 (B) = 4 (1) 13; 3834 (L, B) = 4 (1) 2; 3893 (B) = 4 (1) 6; 4164 (L, B) = 4 (1) 5; 4878 (L, B) = 4 (1) 1; 4888 (L, B) = 4 (1) 5; 5168 (B) = 4 (1) 2; 5258 (B) = 4 (1) 2; 5424 (L, B, K) = 4 (1) 6; 5463 (B) = 4 (1) 9; 5503 (B) = 4 (1) 2; 5519 (B) = 4 (1) 13; 5639 (L, B) = 4 (1) 5; 5825 (B) = 4 (1) 2; 5841 (B) = 4 (1) 13; 6006 (B) = 4 (1) 1; 6091 (B) = 4 (1) 2; 6231 (B) = 4 (1) 13; 6673 (B) = 4 (1) 13; 6908 (B) = 4 (1) 2; 7621 (B) = 4 (1) 2; 8112 (B) = 4 (1) 2; 8134 (B) = 4 (1) 2; 8403 (B) = 4 (1) 2; 8616 (B) = 4 (1) 13; 8681 (B) = 4 (1) 2; 9546 (B) = 4 (1) 6; 10347 (B) = 4 (1) 2; 10455 (B) = 4 (1) 2; 10604 (B) = 4 (1) 6; 12635 (B) = 4 (1) 6; 13917 (B) = 4 (1) 6; 13992 (B) = 4 (1) 2; 14161 (B) = 4 (1) 6; 15413 (B) = 4 (1) 2.

BOUMAN—HOUTMAN: 10 (B) = 4 (19); 56 (B) = 9 (1); 69 (B) = 4 (10) 3; s.n. (B) = 4 (20).

BREMEKAMP: s.n. (B) = 2 (1); s.n. (B) = 4 (1) 2; s.n. (B) = 4 (17) 2; s.n. (B) = 8 (1) 1; s.n. (B) = 11 (1) 2.

BRENKMAN: 8 (B) = 4 (10) 2; 36 (B) = 9 (1); 45 (B) = 1 (1); 181 (B) = 4 (17) 2; 301 (B) = 4 (18) 1.

BROWN: s.n. (L, Br. M.) = 4 (20); s.n. (Br. M.) = 8 (1) 1.

BRUGGEMAN: 189 (B) = 4 (17) 1; 270 (B) = 10 (7).

BRUNIER: 23 (B) = 4 (10) 1; 26 (B) = 9 (1).

BUJSMAN: 106 (L) = 11 (1) 2; 2771 (U) = 9 (1); s.n. (U) = 4 (10) 1; s.n. (U) = 4 (18) 2; s.n. (U) = 5 (1) 1.

BÜNNEMEYER: 60 (B) = 5 (1) 1; 146 (B) = 9 (1); 269 (B) = 4 (10) 1; 270 (B) = 8 (1) 1; 308 (B) = 11 (1) 4; 433 (B) = 11 (1) 2; 592 (B) = 8 (4); 699 (B) = 8 (4); 791 (B) = 8 (4); 793 (B) = 4 (4); 944 (B) = 8 (4); 1017 (L) = 9 (1); 1040 (L) = 9 (1); 1061 (L) = 10 (3); 1223 (B) = 9 (1); 1256 (B) = 4 (17) 1; 1299 (B) = 8 (2); 1301 (B) = 4 (17) 1; 1335 (B) =

9 (1); 1367 (L) = 9 (1); 1422 (L) = 4 (10) 2; 1606 (L) = 9 (1); 1704 (L) = 1 (1); 1975 (B) = 1 (1); 2272 (B) = 4 (10) 1; 2279 (L) = 1 (1); 2343 (B) = 4 (10) 1; 2523 (K) = 4 (10) 1; 2523 (L) = 4 (17) 1; 2578 (L) = 4 (17) 1; 2580 (L) = 8 (4); 2589 (B) = 4 (17) 1; 2590 (B) = 9 (1); 2625 (B) = 8 (4); 2648 (B) = 8 (4); 2843 (B) = 8 (4); 2976 (B) = 4 (17) 1; 2979 (L) = 11 (1) 3; 3024 (L) = 8 (2); 3025 (L) = 11 (1) 2; 3034 (B) = 9 (1); 3216 (B) = 8 (2); 3288 (B) = 4 (17) 1; 3406 (L) = 11 (1) 2; 3408 (L) = 4 (17) 1; 3514 (L) = 4 (17) 1; 3655 (B) = 4 (18) 1; 3702 (L) = 11 (1) 4; 3865 (B) = 8 (4); 3990 (B) = 8 (4); 4062 (L) = 4 (4); 4332 (L) = 4 (1) 2; 4451 (B) = 4 (10) 1; 4521 (L, U) = 4 (17) 1; 4522 (B) = 8 (4); 4570 (L) = 8 (4); 4637 (B) = 4 (1) 2; 4676 (B) = 4 (4); 4754 (B) = 8 (4); 4778 (L) = 4 (17) 1; 4809 (L) = 9 (1); 4820 (B) = 11 (1) 4; 5000 (B) = 4 (4); 5096 (L) = 9 (1); 5176 (L) = 4 (17) 1; 5331 (L) = 11 (1) 3; 5602 (L) = 8 (4); 5987 (B) = 8 (1) 1; 5988 (L) = 4 (10) 1; 6105 (L) = 8 (1) 1; 6107 (L) = 9 (1); 6120 (L) = 4 (10) 1; 6246 (B) = 4 (10) 1; 6251 (L) = 9 (1); 6326 (B) = 5 (1) 2; 6404 (L) = 5 (1) 1; 6443 (B) = 9 (1); 6505 (L, U, K) = 4 (18) 1; 6563 (B) = 9 (1); 6598 (B) = 4 (10) 1; 6641 (L) = 8 (1) 1; 6641 (L, B) = 9 (1); 6754 (L) = 1 (1); 6766 (L, K) = 4 (18) 1; 6771 (L) = 4 (10) 1; 6813 (B) = 5 (1) 2; 6979 (B) = 4 (10) 1; 7039 (L) = 4 (18) 1; 7041 (B) = 9 (1); 7101 (B) = 8 (1) 1; 7102 (B) = 9 (1); 7103 (B) = 4 (10) 1; 7174 (B) = 4 (10) 2; 7295 (L) = 5 (1) 4; 7302 (L) = 1 (1); 7432 (B) = 9 (1); 7434 (L) = 4 (10) 1; 7489 (B) = 9 (1); 7579 (B) = 4 (10) 1; 7711 (L) = 4 (10) 1; 7715 (B) = 9 (1); 7783 (B) = 8 (1) 1; 7784 (L, K) = 1 (1); 7791 (L, B, U) = 4 (1) 8; 7796 (L) = 5 (1) 4; 7817 (B) = 9 (1); 7868 (L) = 5 (1) 1; 7927 (L, K, U) = 4 (18) 1; 7928 (L) = 4 (10) 1; 7933 (U, B) = 9 (1); 7945 (B) = 5 (1) 1; 8066 (B) = 8 (4); 8085 (B) = 11 (1) 2; 8188 (B) = 8 (2); 8260 (B) = 4 (18) 1; 8312 (B) = 4 (1) 2; 8696 (L, U, B) = 4 (1) 2; 8760 (U) = 8 (2); 8848 (B) = 8 (4); 8971 (B) = 4 (1) 2; 8998 (L, B, K) = 4 (1) 10; 9088 (B) = 4 (1) 10; 9125 (B, L) = 8 (4); 9149 (L) = 9 (1); 9160 (B, U) = 4 (1) 10; 9169 (B) = 8 (4); 9438 (L) = 8 (2); 9668 (B) = 8 (4); 9861 (B) = 8 (4); 10255 (L) = 8 (4); 10316 (L) = 8 (4); 10426 (B) = 8 (4); 10550 (B) = 8 (4); 10551 (B) = 8 (4); 10557 (L) = 9 (1); 10570 (B) = 4 (10) 2; 10697 (B) = 5 (1) 1; 10719 (B) = 9 (1); 10723 (B) = 4 (11); 10814 (B) = 4 (10) 3; 10895 (B) = 4 (15); 10957 (B) = 4 (10) 3; 11037 (L) = 11 (1) 2; 11163 (B) = 8 (4); 11243 (L) = 8 (4); 11252 (L) = 11 (1) 3; 11256 (B) = 4 (10) 3; 11349 (B) = 5 (1) 1; 11359 (B) = 4 (10) 3; 11496 (L) = 4 (11); 11530 (L) = 4 (15); 11603 (L) = 11 (1) 3; 11609 (L) = 9 (1); 11618 (B) = 8 (4); 11640 (B) = 4 (10) 3; 11648 (B) = 4 (15); 11678 (L) = 5 (1) 2; 11701 (L, B) = 4 (1) 9; 11705 (L, K) = 11 (1) 2; 11713 (L) = 8 (4); 11783 (B) = 4 (15); 11809 (L) = 11 (1) 2; 11820 (B) = 8 (4); 11821 (B) = 8 (4); 11841 (L) = 8 (4); 11982 (L, B, U, K) = 4 (1) 9; 12005 (B) = 11 (1) 2; 12119a (B) = 9 (1); 12121 (B) = 11 (1) 2; 12401 (B) = 4 (11); 12439 (B) = 5 (1) 2; 12485 (L) = 4 (18) 1; 12515 (B) = 5 (1) 2; 12518 (B) = 4 (10) 3; 12622 (B) = 8 (2).

BURBIDGE: s.n. (Br. M.) = 9 (1); s.n. (K) = 11 (1) 1.

BURCK: 96 (B) = 11 (1) 2; 123 (B) = 11 (1) 2; 147 (B) = 4 (17) 1; 216 (L) = 8 (3) 1; s.n. (B) = 4 (10) 1; s.n. (B) = 4 (18) 1; s.n. (B) = 8 (1) 1; s.n. (B) = 9 (1); s.n. (B) = 10 (3).

BURCK and DE MONCHY: s.n. (B) = 4 (10) 2; s.n. (B) = 5 (1) 2; s.n. (B) = 8 (1) 1; s.n. (B) = 8 (2); s.n. (B) = 10 (3); s.n. (B) = 11 (1) 4.

BURGER: 6677 (B) = 4 (1) 2.

CASTRO and MELEGRETO: 1356 (K) = 4 (29); 1487 (B) = 4 (1) 5; 1508 (B, Br. M.) = 4 (1) 5; 1515 (Br. M.) = 4 (29); 1699 (B) = 8 (1) 1.

CLASON—LAARMAN: F. 29 (B) = 8 (4); G. 30 (B) = 4 (20); F. 49 (B) = 4 (20); D. 89 (B) = 4 (17) 2; F. 114 (B) = 11 (1) 3; F. 117 (B) = 4 (17) 2; 123 (B) = 8 (3) 2.

CLEMENS: 9774 (K) = 11 (1) 1; 11176 (B) = 4 (1) 6; 11207 (B) = 4 (1) 6; 11239 (B, K) = 9 (1); 21433 (B) = 4 (10) 1; 22182 (B, K) = 4 (1) 6; 26873 (L, B, K) = 4 (1) 6; 27318 (K, B) = 11 (1) 2; 28431 (L, B, K) = 4 (1) 1; 28604 (L, B, K) = 4 (29); 28875 (B) = 4 (1) 1; 28993 (L, B, K) = 4 (1) 1; 29263 (L, B, K) = 4 (1) 1; 29951 (L, B, K) = 4 (1) 1; 30537 (L, B) = 4 (1) 6; 30758 (L, B) = 4 (1) 1; 30955 (L, B) = 4 (1) 1; 31495 (L, B) = 4 (1) 1; 32424 (B) = 8 (4); 32512 (L, B) = 4 (1) 1; 32682 (L, B) = 4 (1) 1; 32980 (B) = 4 (1) 1; 34161 (L, B) = 4 (1) 5; 34173 (B) = 4 (1) 1; 34175 (L) = 4 (1) 1; 34234 (B) = 8 (4); 40043 (B) = 4 (1) 1; s.n. (K) = 10 (2).

COOK: s.n. (Br. M.) = 4 (10) 2.

CORDES: s.n. (B) = 8 (1) 1.

CRAMER: 112 (B) = 8 (1) 1.

CREAGH: s.n. (Br. M.) = 4 (10) 2; s.n. (K) = 5 (2); s.n. (K, Br. M.) = 9 (1).

CUMING: 2428 (K) = 5 (1) 2; 2442 (K, Br. M.) = 4 (10) 1.

CURTIS: s.n. (K) = 4 (18) 2.

VAN DAALLEN: 268 (L, B) = 4 (18) 1; 288 (L, B) = 4 (10) 6; s.n. (L) = 9 (1).

DANSER: 6776 (B) = 11 (1) 2.

DECAISNE: s.n. (L) = 4 (20); s.n. (L) = 5 (1) 2.

DELMAAR: 1914 (L, B) = 4 (1) 6.

DENKER: 11 (B) = 10 (3); 106 (B) = 11 (1) 2; 107 (B) = 4 (17) 1; 108 (L) = 3 (1) 2.

DIEPENHORST: s.n. (U, K) = 4 (1) 2.

DOCTERS VAN LEEUWEN: 30 (B, U) = 1 (1); 501 (B) = 1 (2); 771 (B, U) = 4 (18) 1; 774 (B, U) = 10 (1); 1320 (B, U) = 4 (32); 1362 (U, B) = 4 (18) 2; 1423 (B, U) = 4 (32); 1424 (U, B) = 4 (20); 1466 (B, U) = 4 (32); 1491 (U) = 8 (1) 1; 1491 (B) = 8 (1) 2; 1605 (U) = 9 (1); 1701 (B) = 5 (1) 2; 1711 (U) = 11 (1) 2; 1834 (U, B) = 4 (20); 1937 (B, U) = 4 (32); 2540 (B) = 8 (2); 2609 (L) = 4 (1) 2; 3168 (B) = 9 (1); 4278 (B) = 10 (7); 5124 (B) = 8 (1) 1; 5393 (B) = 4 (10) 1; 5420 (B) = 4 (1) 2; 5424 (B) = 1 (1); 8085 (L) = 10 (7); 8730 (B) = 2 (1); 8994 (B) = 4 (18) 2; 12470 (B) = 4 (17) 4; 71151 (L) = 11 (1) 2; s.n. (B) = 4 (10) 2; s.n. (B) = 4 (17) 1; s.n. (B) = 4 (18) 2; s.n. (B) = 9 (2).

DOCTERS VAN LEEUWEN—REYNVAAN 822 (U) = 5 (1) 1; 880 (U) = 5 (1) 1; 71243 (B) = 8 (1) 1; s.n. (U) = 4 (10) 2; s.n. (U) = 4 (17) 1; s.n. (U) = 5 (1) 2; s.n. (B) = 9 (1).

DOMMERS: 139 (B) = 5 (1) 1.



ELBERT: 23 (L) = 9 (1); 552 (L) = 4 (10) 1; 608 (L) = 4 (14); 688 (L) = 4 (14); 748 (L) = 4 (14); 773 (L) = 4 (8); 830 (L) = 4 (8); 1467 (L) = 4 (8); 1587 (L) = 4 (8); 1753 (L) = 10 (4); 1843 (L) = 11 (1) 2; 1907 (L) = 11 (1) 2; 1943 (L) = 4 (20); 2071 (L) = 4 (14); 2503 (L) = 4 (10) 1; 2569 (L) = 4 (32); 3211 (L) = 4 (11); 3499 (L) = 11 (1) 2; 3509 (L) = 4 (20); 3550 (L) = 4 (20); 3567 (L) = 11 (1) 2; 3629 (L) = 4 (20); 4403 (L) = 4 (21); 4511 (L) = 5 (1) 1; 6258 (L) = 11 (1) 2; 44109 (L) = 4 (10) 1; s.n. (L) = 2 (1).

ELMER: 20300 (L, Br. M., K) = 9 (1); 20731 (L, K, Br. M.) = 9 (1); 21030 (B, U, Br. M.) = 4 (1) 6; 21252 (K, U, B) = 8 (1) 1.

ENDERT: 1069 (L, B) = 4 (1) 10.

ERNST: s.n. (B) = 10 (7).

ETTY: s.n. (B) = 5 (1) 2.

EYKEN: s.n. (B) = 4 (18) 1.

FORBES: 49 (Br. M.) = 4 (10) 2; 133 (L) = 8 (2); 308 (B, Br. M.) = 4 (1) 2; 426 (B) = 11 (1) 2; 523 (L) = 4 (1) 6; 653 (L, K) = 4 (1) 6; 791 (Br. M. L, B) = 4 (1) 2; 950 (L) = 3 (1) 1; 950 (Br. M.) = 3 (1) 2; 964 (Br. M.) = 3 (1) 2; 973b (Br. M.) = 3 (1) 2; 990a (L, Br. M.) = 4 (1) 2; 1132c (Br. M.) = 8 (3) 1; 1402 (Br. M.) = 4 (30); 2680a (L) = 11 (1) 4; 2690 (L, Br. M.) = 4 (1) 2; 2900 (L, Br. M.) = 4 (1) 1; 3357 (Br. M.) = 4 (10) 2; 3816 (B) = 4 (14); 4059 (L, K) = 4 (14); s.n. (L) = 4 (11); s.n. (Br. M.) = 9 (1).

FORSTEN: s.n. (L) = 4 (10); s.n. (L) = 4 (18) 1; s.n. (L) = 11 (1) 2.

FREY WYSSLING: 55 (B) = 8 (1) 4.

FRIJLINCK: 5 (B) = 9 (1); 15 (B) = 5 (1) 2.

GALOENGI: 3 (B) = 4 (18) 1; 7 (B) = 9 (1); 441 (B) = 4 (1) 2.

GIBBS: 2739 (K) = 11 (1) 1; 2973 (K, Br. M.) = 4 (1) 6; 4118 (K, Br. M.) = 8 (4).

GJELLERUP: 413 (L, B, K, U) = 4 (1) 6.

GOBLIN: 2498 (K) = 4 (1) 6.

VAN DER GOOT: s.n. (B) = 4 (1) 2.

GRABOWSKY: s.n. (Br. M.) = 4 (10) 1; s.n. (Br. M.) = 9 (1).

GRESHOFF: s.n. (B) = 4 (10) 2.

GRÜNDLER: 3453 (L) = 4 (5); 3843 (L) = 4 (20).

GRUTTERINK: 3047 (B) = 8 (1) 1; 3103 (B) = 11 (1) 3.

GUSDORF: 125 (L) = 4 (1) 2; 125 (L, B) = 4 (1) 5.

HALLIER: 80 (B) = 4 (17) 1; 109 (B) = 11 (1) 2; 154a, b, c, d, (B) = 1 (1); 155a (B) = 4 (18) 1; 156 (L) = 4 (10) 2; 156a (B, L) = 4 (10) 2; 157 (L, B) = 5 (1) 2; 157b (L) = 5 (1) 2; 157c (B) = 5 (1) 1; 157c (L) = 5 (1) 2; 158 (B) = 8 (1) 1; 158 (L) = 8 (2); 158c, g (L) = 8 (2); 158g (B) = 9 (1); 159a, b, c (B) = 9 (1); 162a, b (B) = 10 (3); 194 (L) = 4 (10) 2; 303 (L, B) = 4 (1) 6; 320 (B) = 10 (3); 382 (B) = 8 (1) 1; 382 (L) = 8 (2); 382 (L) = 8 (4); 416 (B) = 4 (1) 3; 442 (B) = 4 (17) 1; 449 (B) = 8 (4); 612 (B) = 11 (1) 2; 636 (B) = 9 (1); 776 (B) = 4 (18) 2; 899 (L, B) = 4 (1) 6; 1297 (L, B) = 4 (1) 6; 1613 (L, B) = 4 (1) 6; 1858 (L, B, K) = 4 (1) 11; 2497 (L, B, K) = 4 (1) 6; 2962 (L, B) = 4 (1) 2; s.n. (B) = 4 (10) 3; s.n. (B) = 4 (17) 1; s.n. (B) = 4 (18) 2; s.n. (B) = 7 (1); s.n. (B) = 11(1) 4.

- HARMSSEN: 10 (B) = 4 (10) 2; 52 (B) = 9 (1); 75 (B) = 5 (1) 2.  
 VAN HARREVELD—LAKO: 88 (B) = 9 (1).  
 HASSKARL: s.n. (L) = 4 (1) 2.  
 HAVILAND: 88 (K) = 4 (1) 6; 3023 (K) = 9 (1); 3024 (K, L) = 4 (10) 20;  
 3608 (K) = 4 (10) 1; s.n. (K) = 11 (1) 2.  
 HAVILAND and HOSE: s.n. (L) = 11 (1) 2.  
 HEERING: s.n. (B) = 9 (1).  
 HEMKEN: s.n. (B) = 4 (10) 2; s.n. (B) = 4 (18) 1; s.n. (B) = 9 (1).  
 HENDERSON: 20483 (B, K) = 1 (1); 20486 (B) = 9 (1).  
 HEYNE: 18 (B) = 4 (1) 8; s.n. (Br. M.) = 9 (1).  
 HOCHREUTNER: 25 (G) = 10 (3); 1199 p.p. (G) = 8 (3) 1; 1199 p.p. (G) = 8 (4); 2738 (G) = 4 (17) 2.  
 HOFSTEE: 4 (B) = 5 (1) 2; 41 (B) = 9 (1).  
 HORSFIELD: 7 (K) = 4 (1) 2; 9 (K) = 3 (1) 2; 10 (K) = 11 (1) 2;  
 12 (K) = 4 (18) 1; 13 (K) = 4 (17) 1; 14 (K) = 4 (18) 2; 16 (K) = 4 (10) 2;  
 17 (K) = 4 (10) 2; 18 (K) = 4 (10) 5; 31 (K, Br. M.) = 10 (5); 64 (Br. M. = 4 (1) 2; 70 (K) = 8 (1) 1; 71 (K) = 8 (4); 74 (B) = 10 (1); s.n. (L, K, U) = 4 (1) 4; s.n. (U) = 4 (10) 2; s.n. (U) = 4 (10) 5; s.n. (U) = 4 (17) 2; s.n. (U) = 4 (18) 1; s.n. (U, K) = 8 (1) 2; s.n. (U) = 8 (4).  
 HORST: 18 (B) = 4 (20).  
 HOSE: 170 (K) = 11 (1) 1; 279 (K) = 11 (1) 1; 797 (K) = 5 (2).  
 HOUTVESTER SUM. WESTKUST: 7 (B) = 4 (1) 13.  
 HUFFEMA: 4 (B) = 9 (1).  
 IBOET: 99 (L) = 9 (1); 159 (L) = 1 (1); 205 (L, B, U) = 4 (16) 2;  
 261 (B) = 11 (1) 4; 263 (B) = 11 (1) 4; 311 (L) = 1 (1); 331 (B) = 4 (18) 1; 356 (B) = 4 (10) 1; 371 (L) = 11 (1) 2; 406 (L, B, K) = 4 (16) 2.  
 IDENBURG: 8 (B) = 9 (1); 37 (B) = 4 (10) 1; 39 (B) = 9 (1).  
 ISMAIL: 5 (B) = 9 (1); 22 (B) = 5 (1) 2; 31 (B) = 4 (18) 2.  
 JACOBSON: 23 (L) = 11 (1) 2; 269 (L, B) = 4 (1) 10; 331 (B) = 11 (1) 2; s.n. (B) = 4 (10) 1; s.n. (B) = 4 (17) 1; s.n. (B) = 9 (1).  
 JAHERI: 44 (B) = 4 (27); s.n. (B) = 4 (1) 6; s.n. (B) = 11 (1) 2.  
 JENSEN: 175 (B) = 4 (10); 350 (B, L) = 4 (10).  
 JESWIET: s.n. (B) = 4 (17) 2.  
 JOCHEMS: 3020 (B) = 10 (3).  
 DE JONG: 9 (B) = 9 (1).  
 JUNGHUHN: 50 (L) = 4 (1) 2; 52 (K) = 4 (17) 1; 52 (L) = 4 (17) 2;  
 52 (L) = 4 (17) 4; 53 (L, K) = 4 (1) 2; 303 (L) = 5 (1) 2; 315 (L, U) = 4 (17) 1; 318 (L) = 4 (17) 2; 322 (L) = 8 (3) 1; 325 (L) = 4 (10) 1;  
 328 (L) = 11 (1) 2; 329 (L) = 4 (10) 2; 334 (L) = 4 (18) 2; 330 (L) = 2 (1); 352 (L) = 3 (1) 2; 361 (L) = 4 (17) 2; 364 (L) = 4 (10) 2;  
 375 (L, U) = 2 (1); 382 (L) = 3 (1) 1; 388 (L) = 8 (1) 1; 389 (L, U) = 4 (9); 391 (L) = 8 (3) 1; s.n. (L) = 3 (1) 2; s.n. (L) = 3 (1) 3; s.n. (L, Br. M.) = 4 (1) 2; s.n. (L) = 4 (1) 3; s.n. (L) = 4 (17) 2; s.n. (L) = 4 (18) 1; s.n. (U) = 8 (1) 2; s.n. (L) = 8 (3) 1; s.n. (L) = 8 (4); s.n. (L) = 9 (1).  
 KAHAR: 2011 (L, B) = 4 (1) 6.  
 KALSHOVEN: XVII (B) = 4 (1) 4.

KARTA: 223 (L, B) = 4 (10) 2.

KAUDERN: 27 (L) = 11 (1) 3; 81 (L) = 8 (2); 82 (L) = 9 (1).

KAWAKAMI: s.n. (B) = 10 (7).

KJELLBERG: 120 (B) = 4 (32); 235 (B) = 4 (11); 354 (L) = 5 (2).  
454a (B) = 4 (10) 3; 466 (B) = 8 (1) 2; 672 (L, B) = 4 (1) 6; 741 (B) =  
4 (1) 6; 866 (B) = 11 (1) 2; 1320 (B) = 4 (10) 2; 1559 (B) = 11 (1) 2;  
1603a (L) = 4 (1) 1; 1704 (L) = 4 (1) 1; 1821a (B) = 4 (1) 9; 2252 (B) =  
5 (2); 2958 (L) = 4 (1) 1; s.n. (B) = 1 (1).

KLEINHOONTE: 1 (B) = 3 (1) 3; 596 (B) = 11 (1) 2.

KLOSS: 19223 (B) = 4 (29).

KNAAP: 21 (B) = 9 (1).

KOBUS: s.n. (L, B) = 4 (1) 2; s.n. (B) = 4 (17) 2; s.n. (B) = 9 (1);  
s.n. (B) = 11 (1) 2.

KOENS: 1 (B) = 9 (1); 33 (B) = 4 (10) 1; 42 (B) = 4 (18) 1;  
45 (B) = 9 (1); 60 (B) = 4 (18) 1; 107 (B) = 5 (1) 1; 155 (B) = 5 (1) 1;  
160 (B) = 4 (18) 1; 184 (B) = 9 (2); 207 (B) = 11 (1) 2; 220 (B) =  
8 (3) 1; 230 (B) = 10 (3); 277 (B) = 5 (1) 1; 281 (B) = 4 (17) 1;  
315 (B) = 4 (18) 1; 379 (B) = 4 (17) 1; 488 (B) = 5 (1) 1; s.n. (B) =  
8 (1) 1.

KOOPAL: s.n. (B) = 2 (1).

KOOPER: 506b (B) = 8 (1) 1.

KOORDERS (the  $\beta$  behind the number has been omitted): 161 (B) = 9 (1);  
245 (B) = 8 (1) 1; 253 (B) = 8 (2); 275 (L, B) = 4 (1) 2; 1896 (L) =  
5 (1) 1; 2347 (B) = 11 (1) 2; 2620 (L) = 9 (1); 2765 (L) = 4 (1) 4;  
2767 (L) = 4 (1) 2; 2768 (B) = 4 (1) 2; 2769 (L, B) = 4 (1) 2; 2770 (L,  
Br. M.) = 4 (1) 4; 2272 (L) = 4 (1) 4; 2774 (B) = 4 (1) 2; 2777 (B) = 4 (1) 2;  
2778 (B) = 4 (1) 2; 2779 (B) = 4 (1) 2; 2780 (B) = 4 (1) 2; 2782 (B) = 4 (1) 1;  
2783 (B) = 4 (1) 2; 2784 (B) = 4 (1) 2; 2785 (B) = 4 (1) 2; 2786 (B) =  
4 (1) 2; 2787 (B) = 4 (1) 2; 2788 (B) = 4 (1) 2; 2789 (B) = 4 (1) 2;  
2790 (B) = 4 (1) 2; 2792 (B) = 4 (1) 2; 2795 (B) = 4 (1) 2; 2797 (B) =  
4 (1) 2; 2798 (B) = 4 (1) 2; 2799 (B) = 4 (1) 2; 2800 (L) = 4 (1) 3;  
2802 (L) = 4 (1) 1; 2803 (L) = 4 (1) 2; 2804 (B) = 4 (1) 2; 2805 (B) =  
4 (1) 2; 2806 (B) = 4 (1) 3; 2807 (L) = 4 (1) 3; 2809 (B) = 4 (1) 4;  
3777 (B) = 8 (3) 2; 9915 (B) = 4 (1) 2; 9979 (B) = 4 (1) 2; 10903 (B) =  
4 (1) 2; 11177 (B) = 4 (1) 2; 11721 (B) = 4 (1) 2; 11862 (B) = 4 (1) 2;  
12480 (L, B) = 4 (1) 3; 12481 (L, K) = 4 (1) 3; 12483 (L) = 4 (1) 3;  
12601 (L) = 4 (1) 3; 13299 (B) = 4 (1) 2; 14401 (B) = 4 (1) 2; 14402  
(U, L) = 4 (1) 2; 14403 (B) = 4 (1) 2; 14962 (B) = 8 (2); 15022  
(L) = 10 (3); 15094 (L) = 9 (1); 15206 (L, B) = 4 (1) 2;  
15245 (B) = 4 (10) 3; 155346 (L, B) = 4 (1) 2; 15347 (L, B) = 4 (1) 2;  
15348 (L, B) = 4 (1) 2; 15437 (B) = 9 (1); 15660 (L, K, B) = 4 (1) 1;  
16415 (B) = 8 (1) 1; 16417 (B) = 9 (1); 16418 (B) = 9 (1); 16419 (L) =  
9 (1); 16420 (B) = 9 (1); 16435 (L) = 5 (2); 16436 (L) = 5 (2);  
16437 (B) = 5 (1) 1; 16438 (L) = 5 (2); 16439 (L) = 5 (2); 16469 (L) =  
4 (11); 16476 (L) = 11 (1) 3; 16478 (L) = 11 (1) 2; 16479 (L) = 11 (1) 3;  
16480 (L) = 11 (1) 2; 16481 (L) = 11 (1) 2; 16494 (L) = 4 (10) 2;  
16495 (L, B) = 4 (1) 6; 16496 (B) = 4 (11); 16497 (L, B) = 4 (24);

16499 (B) = 4 (11); 16500 (B) = 4 (24); I6501 (B) = 4 (10) 1; 16503 (B) = 4 (11); 16504 (L, B) = 4 (1) 6; 16506 (L, B) = 4 (24); 16507 (L) = 4 (1) 1; 16507 (L, B) = 4 (1) 6; 16508 (L) = 4 (1) 1; 16509 (L) = 4 (11); 16510 (L) = 4 (11); 16525 (B) = 4 (11); 19218 (L) = 4 (1) 1; 19218 (L, B) = 4 (1) 6; 19220 (L, B) = 4 (1) 6; 19878 (B) = 8 (3) 2; 19881 (B) = 4 (10) 3; 19925 (B) = 11 (1) 2; 20035 (L) = 4 (1) 1; 20113 (B) = 4 (1) 1; 20549 (L) = 4 (18) 1; 20550 (L) = 4 (18) 1; 20559 (B) = 11 (1) 2; 20564 (B) = 9 (1); 20565 (L) = 5 (1) 1; 20808 (B) = 4 (17) 2; 20836 (B) = 4 (10) 3; 20950 (B) = 4 (1) 2; 21375 (B) = 11 (1) 2; 21386 (B) = 4 (1) 6; 21398 (B) = 4 (1) 2; 22059 (B) = 11 (1) 2; 22212 (B) = 4 (17) 2; 22432 (B) = 4 (1) 2; 22432 (B) = 4 (1) 4; 22656 (L) = 4 (18) 2; 22823 (B) = 8 (1) 1; 22866 (B) = 4 (1) 2; 22872 (B) = 5 (1) 2; 22914 (B) = 4 (18) 2; 22920 (B) = 11 (1) 2; 22938 (L, B) = 8 (2); 22963 (L) = 9 (1); 23022 (B) = 4 (1) 2; 23044 (L, B, U) = 4 (1) 2; 23075 (B) = 8 (2); 23076 (B) = 9 (1); 23091 (L, B) = 4 (1) 4; 23175 (B) = 5 (1) 2; 23202 (B) = 11 (1) 2; 23224 (L) = 11 (1) 2; 23370 (B) = 4 (18) 1; 23583 (L) = 11 (1) 2; 23662 (B) = 4 (1) 2; 23831 (B) = 4 (1) 2; 23901 (L) = 4 (1) 4; 24437 (B) = 8 (1) 1; 24551 (L) = 4 (1) 1; 24926 (L) = 4 (18) 1; 25000 (B) = 4 (10) 2; 25073 (B) = 4 (18) 1; 25136 (B) = 5 (1) 2; 25215 (B) = 4 (18) 1; 25554 (L, B) = 4 (1) 4; 25674 (L, B) = 4 (1); 26064 (L) = 11 (1) 3; 26218 (B, L) = 4 (10) 2; 26224 (B) = 5 (1) 2; 26419 (B) = 10 (3); 26495 (B) = 9 (1); 26640 (L) = 4 (1) 2; 26650 (B) = 4 (17) 1; 26716 (B) = 4 (1) 3; 26868 (L) = 4 (1) 1; 26869 (L) = 4 (1) 1; 27113 (L, B) = 4 (1) 2; 27116 (B) = 9 (1); 27251 (B) = 4 (18) 1; 27345 (L) = 4 (18) 1; 27677 (B) = 8 (2); 27691 (L) = 11 (1) 3; 27692 (L) = 9 (1); 28014 (L) = 5 (1) 2; 28228 (L) = 8 (1) 1; 28229 (B) = 4 (18) 3; 28466 (L) = 5 (1) 1; 28502 (B) = 4 (17) 2; 28532 (L) = 4 (17) 2; 28535 (L) = 4 (17) 2; 28748 (B) = 4 (18) 2; 28750 (B) = 4 (18) 2; 29184 (B) = 4 (17) 2; 29186 (B) = 11 (1) 2; 29236 (B) = 5 (1) 2; 29798 (B, L) = 4 (1) 2; 29799 (L, B) = 4 (1) 2; 29897 (B) = 8 (2); 30328 (B) = 4 (1) 1; 30602 (B) = 4 (1) 2; 30854 (B) = 8 (1) 1; 30946 (B) = 4 (1) 2; 31145 (L) = 11 (1) 2; 31290 (L) = 8 (1) 1; 31291 (B) = 9 (1); 31298 (B) = 5 (1) 1; 31299 (L) = 4 (18) 1; 31323 (B) = 1 (1); 31449 (B) = 1 (1); 31464 (B) = 4 (10) 2; 31473 (L) = 4 (18) 1; 31476 (B) = 9 (1); 31616 (L) = 11 (1) 2; 31713 (L) = 9 (1); 31713 (L) = 9 (2); 31727 (B) = 10 (7); 31786 (B) = 10 (3); 31833 (B) = 4 (17) 1; 31851 (B) = 10 (3); 31887 (B) = 8 (3) 2; 31928 (L) = 8 (2); 32262 (B) = 11 (1) 3; 32398 (B) = 4 (1) 2; 32554 (B) = 4 (17) 2; 32614 (B) = 4 (10) 2; 32615 (L) = 9 (1); 32616 (B) = 5 (1) 2; 32617 (B) = 4 (18) 2; 32627 (L) = 1 (1); 32660 (B) = 4 (10) 2; 32663 (B) = 5 (1) 2; 32664 (B) = 4 (18) 2; 32671 (B) = 4 (1) 2; 32928 (B) = 4 (18) 2; 33047 (L, B) = 4 (1) 2; 33283 (B) = 10 (3); 33318 (B) = 10 (3); 33490 (B) = 8 (1) 1; 33491 (B) = 5 (1) 2; 33496 (B) = 9 (1); 33497 (B) = 4 (18) 2; 33500 (B) = 8 (1) 1; 33501 (B) = 5 (1) 2; 33838 (B) = 4 (1) 2; 33900 (B) = 4 (1) 2; 34190 (B) = 4 (1) 2; 34640 (L) = 8 (1) 1; 34647 (B) = 10 (3); 34649 (B) = 5 (1) 2; 34650 (B) = 9 (1); 34920 (B) = 5 (1) 2; 34928 (B) = 4 (18) 1; 34931 (B) = 9 (1); 35906 (B) = 9 (1); 35907 (B) = 5 (1) 2; 35919 (B) = 11 (1) 3; 36143 (B) = 4 (18) 3; 36144 (B, L) = 5 (1) 2; 36223 (L) = 11 (1) 2; 36654 (B) = 9 (1); 36660 (B) = 4 (1) 2;

36661 (B) = 4 (10) 1; 36665 (B) = 4 (10) 1; 36688 (B) = 9 (1); 36702 (B) = 10 (3); 36728 (B) = 4(10) 1; 36897 (L) = 11 (1) 2; 37128 (L) = 10 (3); 37395 (B) = 4 (17) 2; 37426 (B) = 4 (1) 2; 37427 (L, K) = 4 (17) 2; 37428 (B) = 4 (17) 2; 37770 (K) = 8 (3) 2; 37775 (L) = 11 (1) 2; 37967 (L) = 8 (3) 2; 38571 (B) = 4 (1) 2; 38833 (B) = 4 (1) 2; 39023 (L, B) = 4 (1) 2; 39280 (L, K, B, U) = 4 (1) 1; 40412 (B) = 4 (10) 1; 40508 (B) = 4 (10) 2; 40563 (B) = 11 (1) 2; 40579 (L) = 11 (1) 2; 40655 (B) = 4 (17) 1; 40667 (B) = 11 (1) 2; 40699 (L, B) = 8 (4); 40814 (B) = 8 (1) 1; 40875 (B) = 4 (10) 1; 40931 (B) = 10 (3); 41045 (B) = 8 (2); 41146 (B) = 4 (10) 2; 41149 (B) = 8 (1) 1; 41204 (B) = 9 (1); 41210 (B) = 4 (18) 1; 41338 (B) = 4 (10) 1; 41498 (L) = 4 (18) 2; 41683 (L) = 9 (1); 41703 (L) = 4 (10) 1; 41773 (B) = 4 (1) 2; 41815 (B) = 4 (1) 2; 41956 (B) = 4 (1) 2; 42028 (B) = 4 (1) 2; 420552 (L, K) = 10 (7); 42064 (L) = 10 (2); 42195 (B) = 10 (7); 43306 (L) = 9 (1); 43307 (B) = 9 (1); 43342 (L) = 11 (1) 3; 43353 (B) = 4 (17) 2; 43354 (L) = 4 (17) 2; 43355 (B) = 4 (17) 2; 43356 (L) = 4 (17) 2; 43359 (B) = 2 (1); 43637 (B) = 4 (17) 4; 43723 (B) = 2 (1); 43729 (B) = 2 (1); 43865 (L) = 2 (1); 43887 (B) = 9 (1); 43903 (L) = 4 (18) 2; 43933 (L) = 4 (20); 44004 (B) = 8 (1) 1; 44160 (L) = 9 (1); 44163 (B) = 11 (1) 2; 47985 (L) = 8 (2); 47986 (B) = 8 (2); 47987 (B) = 9 (1); 47988 (B) = 9 (1); 47992 (B) = 5 (1) 1; 47995 (B) = 10 (3); 48002 (B) = 4 (17) 1; 48003 (L) = 4 (18) 1.

KORNASSI: 88 (B) = 4 (12); 479 (B) = 4 (12); 553 (L) = 11 (1) 1; 592 (L) = 8 (4); 744 (L) = 11 (1) 1; 791 (B, U, L) = 4 (10) 2; 1365 (L) = 8 (1) 2; 1394 (B) = 9 (1); 1405 (L) = 11 (1) 1.

KORTHALS: 998 (L) = 4 (1) 5; s.n. (L) = 3 (1) 1; s.n. (L) = 4 (1) 2; s.n. (L) = 4 (1) 3; s.n. (L) = 4 (1) 6; s.n. (L) = 4 (1) 8; s.n. (L) = 4 (1) 9; s.n. (L) = 4 (10) 1; s.n. (L) = 4 (10) 2; s.n. (L) = 4 (17) 1; s.n. (L) = 4 (17) 2; s.n. (L) = 4 (18) 1; s.n. (L) = 8 (1) 1; s.n. (L) = 8 (1) 2; s.n. (L) = 8 (2); s.n. (L) = 8 (4); s.n. (L) = 11 (1) 2; s.n. (L) = 11 (1) 3.

KRAMER: 58 (B) = 9 (1); 106 (B) = 8 (2); 110 (B) = 10 (3); 143 (B) = 9 (1); 153 (B) = 4 (18) 1.

KRUKOFF: 318 (B) = 4 (1) 1.

KRUYFF: 21 (B) = 11 (1) 2; 52 (B) = 8 (1) 1; 64 (B) = 4 (11).

KUHL and VAN HASSELT: s.n. (L) = 11 (1) 2.

KUNTZE: 5512 (K) = 3 (1) 2.

KURZ: 497 (K) = 11 (1) 2.

LAM: 132 (B) = 9 (2); 203 (B) = 4 (17) 1; 220 (B) = 8 (1) 1; 272 (B) = 8 (3) 1; 310 J (B) = 10 (7); 339 (B) = 8 (3) 1; 2241 (L) = 8 (4); 2300 (B) = 7 (1); 2409 (B) = 11 (1) 2; 2414 (B) = 5 (2); 2420 (B) = 4 (11); 2461 (B) = 8 (1) 1; 2589 (B) = 4 (10) 1; 2604 (B) = 9 (1); 2630 (B) = 4 (12); 3088 (B) = 8 (1) 1; 3709 (B) = 4 (12); 3754 (B) = 11 (1) 2; 3774 (B) = 4 (27); 3783 (B) = 10 (7).

LANE POOLE: 429 (K) = 4 (1) 6.

LEEFMANS: 19 (B) = 8 (4); 80 (B) = 4 (10) 1; 92 (B) = 9 (1); 123 (B) = 4 (18) 2; 129 (B) = 9 (1); 131 (B) = 4 (18) 2; s.n. (B) = 4 (10) 2; s.n. (B) = 5 (1) 1; s.n. (B) = 5 (1) 2; s.n. (B) = 9 (2).

LEWANDOWSKY: s.n. (L) = 4 (18) 3.

LEWE: 36 (K) = 4 (1) 6.

LÖRZING: 30a (B) = 2 (1); 30 (B) = 4 (17) 2; 320 (B) = 8 (3) 3; 343 (B) = 9 (1); 356 (B) = 8 (2); 357 (B) = 4 (18) 1; 480 (B) = 4 (17) 2; 628 (B) = 11 (1) 2; 875 (B) = 9 (1); 990 (B) = 4 (10) 1; 1127 (B) = 10 (3); 1134 (B) = 9 (1); 1179 (B) = 10 (3); 1243 (B) = 8 (3) 1; 1256 (B) = 4 (17) 1; 1285 (B) = 8 (3) 2; 1298 (B) = 4 (17) 1; 1300 (B) = 8 (3) 1; 1307 (L, B) = 4 (1) 3; 1327 (L) = 4 (1) 2; 1360 (B) = 8 (4); 1482 (U) = 8 (1) 1; 1489 (U) = 10 (3); 1631 (B) = 8 (1) 1; 1840 (B) = 10 (2); 1931 (L) = 10 (7); 2408 (B) = 9 (2); 3019 (L, B) = 4 (10) 1; 3022 (B) = 9 (1); 3100 (B) = 4 (18) 1; 3126 (B) = 1 (1); 3261 (B) = 11 (1) 2; 3278 (B) = 4 (10) 1; 3311 (B) = 8 (2); 3415 (B) = 4 (10) 2; 3416 (B) = 9 (1); 3429 (B) = 1 (1); 3453 (B) = 1 (1); 3561 (B) = 9 (1); 3646 (B) = 4 (10) 1; 3717 (B) = 1 (1); 3723 (B) = 4 (10) 1; 3729 (B) = 4 (18) 1; 3740 (B) = 9 (1); 3775 (B) = 4 (18) 1; 3884 (B) = 4 (18) 1; 3891 (B) = 11 (1) 2; 3901 (B) = 4 (10) 1; 3903 (B) = 8 (2); 3987 (B) = 4 (18) 1; 4101 (B) = 5 (1) 2; 4126 (B) = 4 (1) 5; 4691 (L, B) = 8 (4); 4872 (B) = 4 (10) 3; 4876 (B) = 9 (1); 5404 (K, L) = 1 (1); 5833 (B) = 8 (1) 1; 5927 (L, U) = 4 (1) 2; 6173 (B) = 8 (2); 6237 (L) = 4 (10) 3; 6292 (B) = 9 (1); 6422 (B) = 5 (1) 2; 6473 (B) = 9 (1); 6491 (L) = 4 (10) 3; 6735 (B) = 8 (2); 7177 (B) = 9 (1); 7230 (B) = 4 (10) 3; 7395 (B) = 9 (1); 7545 (B) = 4 (10) 1; 7643 (B) = 5 (1) 1; 7659 (B) = 4 (18) 1; 7696 (B) = 9 (1); 7696 (B) = 11 (1) 2; 7785 (B) = 4 (10) 3; 8017 (L) = 4 (1) 1; 8048 (B) = 4 (18) 1; 8225 (B) = 8 (4); 8237 (B) = 9 (2); 8540 (B) = 8 (2); 8571 (B) = 4 (10) 3; 8580 (B) = 9 (1); 8805 (B) = 5 (1) 1; 8814 (B) = 4 (18) 1; 9041 (B) = 8 (2); 9254 (B) = 4 (10) 2; 9332 (B) = 4 (10) 3; 9382 (B) = 8 (2); 9621 (B) = 11 (1) 2; 9632 (B) = 4 (10) 2; 9721 (B) = 8 (1) 1; 9772 (B) = 9 (1); 9782 (B) = 4 (10) 6; 10771 (B) = 8 (2); 11076 (B) = 5 (1) 2; 11110 (B) = 9 (1); 11113 (B) = 4 (10) 1; 11114 (B) = 4 (18) 1; s.n. (B) = 9 (1).

MAHLMELSTER: 19 (B) = 4 (10) 2.

MAIER: 86 (L) = 11 (1) 3; 93 (L) = 4 (18) 2.

BUR. SOL. MANILLA: 783 (L) = 5 (2).

MATTHEW: s.n. (K) = 5 (1) 1; s.n. (K) = 8 (4).

VAN DER MEER MOHR: s.n. (B) = 4 (17) 2.

METSelaar: s.n. (B) = 5 (1) 2.

MOH. DACHLAN: 16b (B) = 4 (1) 6.

DE MOL: 144 (B) = 5 (1) 2.

DE MONCHY: 49 (B) = 9 (1); 74 (B) = 11 (1) 3; s.n. (B) = 8 (1) 1; s.n. (B) = 8 (4); s.n. (B) = 9 (1).

MONDI: 198 (L, B) = 4 (10) 1; 202 (L, B) = 4 (1) 6.

MONTÉRIE: 29 (L, B, K) = 4 (1) 3.

MOSELY: s.n. (K) = 5 (1) 2; s.n. (Br. M.) = 8 (1) 1.

MOTLEY: 68 (K) = 4 (1) 6; 291 (B) = 4 (10) 2; 294 (K) = 9 (1); 309 (K) = 11 (1) 2; 312 (K) = 4 (18) 1; 364 (K) = 8 (1) 1; 385 (K) = 4 (1) 6; s.n. (K) = 5 (1) 2.

MOULTON: 6675 (K) = 4 (6).

MOUSSET: 73 (B) = 5 (1) 1; 201 (B) = 4 (18) 2; 227 (B) = 4 (1) 2; 399 (B) = 11 (1) 2; 527a (B) = 4 (10) 2; 855 (L) = 4 (17) 2; s.n. (Br. M.) = 4 (17) 2.

NATIVE COLL.: 306 (L) = 11 (1) 2; 728 (Br. M.) = 4 (1) 6; 7218 (K) = 11 (1) 2; s.n. (L) = 8 (2).

VAN OORT: s.n. (L) = 4 (17) 2.

VAN OOSTEN: 7 (B) = 11 (1) 2; s.n. (B) = 4 (17) 4.

OTTOLANDER: 248 (B) = 9 (1); 325 (B) = 5 (1) 1; 350 (B) = 4 (17) 2; 388 (B) = 4 (10) 1.

OUWELAND: 10 (B) = 9 (1); 42 (B) = 4 (10) 1; 104 (B) = 8 (2); 137 (B) = 4 (18) 1; 267 (B) = 4 (18) 1; 316 (B) = 8 (1) 1.

VAN DER PAARDT: 78 (B) = 4 (18) 2.

PASCUAL: 2380 (B) = 4 (1) 6.

PEEKEL: 85 (L) = 4 (18) 3.

PIEPERS: s.n. (B) = 4 (10) 2; s.n. (B) = 4 (18) 1.

PLOEM: s.n. (L) = 4 (1) 2; s.n. (L) = 8 (4); s.n. (L) = 11 (1) 2.

POSTHUMUS: 459 (L, B) = 9 (1); 509 (B) = 4 (10) 1; 553 (L, B) = 4 (18) 1; 671 (B) = 4 (18) 1; 774 (B) = 1 (1); 805 (L, B) = 5 (1) 1; 880 (B) = 4 (18) 1; 1060 (U, B) = 4 (1) 6; 1078 (L, U, B, K) = 4 (18) 1; 2034 (B) = 9 (1); 3018 (B) = 4 (20); 3098 (B) = 4 (20); 3456 (B) = 4 (10) 3.

PRÆTORIUS: s.n. (L) = 4 (1) 6; s.n. (L, K) = 4 (19).

PARAVICINI: s.n. (B) = 9 (1).

PRINGO ATMODJO: 302 (B) = 9 (1).

PULLE: 2661 (U) = 4 (17) 1; 3118 (U) = 9 (1); 4056 (U) = 8 (1) 1.

VAN DER PIJL: 104a (B) = 2 (1); 291 (B) = 4 (17) 1; 339 (B) = 8 (4).

RAAP: 8 (L) = 9 (1); 8 (L) = 11 (1) 2; 25 (L) = 4 (10) 2; 49 (B) = 8 (1) 1; 74 (L) = 10 (3); 142 (B) = 9 (1); 150 (L) = 9 (2); 175 (L) = 11 (1) 2; 294 (L) = 8 (1) 1; 320 (B) = 10 (3); 331 (L) = 1 (1); 401 (B) = 8 (1) 1; 440 (B) = 8 (1) 1; 443 (L) = 10 (3); 455 (B) = 8 (1) 1; 560 (L) = 11 (1) 1; 566 (L) = 4 (18) 2; 603 (L) = 11 (1) 2; 660 (L) = 4 (17) 1; 661 (L) = 8 (4); 852 (L) = 4 (18) 1; 2424 (L) = 5 (1) 1.

RACHMAD: 956 (B) = 4 (11).

RAMOS: 1338 (B) = 1 (1); 1823 (B) = 5 (1) 1; 1823 (L) = 5 (1) 3.

RANT: 3 (B) = 9 (2); 189 (B) = 4 (18) 1; 263 (B) = 1 (1); 476 (B) = 4 (11); 624 (B) = 4 (10) 1; 791 (B) = 4 (10) 4; 793 (B) = 4 (10) 1; 851 (B) = 8 (1) 1; 1922 (L) = 2 (1); s.n. (L) = 2 (1); s.n. (B) = 4 (1) 2; s.n. (B) = 4 (17) 2; s.n. (L) = 8 (2).

RAYNAUD: s.n. (L) = 4 (18) 1; s.n. (L) = 5 (1) 1.

REINWARDT: 1289 (L) = 4 (19); 1591 (L) = 2 (1); s.n. (L) = 4 (1) 2; s.n. (L) = 4 (10) 2; s.n. (L) = 4 (24); s.n. (L) = 9 (1); s.n. (L) = 10 (1); s.n. (L) = 11 (1) 2.

RENSCH: 51 (B) = 9 (1); 86 (B) = 8 (2); 256 (B) = 9 (1); 388 (B) = 4 (19); 481 (B) = 9 (1); 621 (B) = 11 (1) 2; 829 (B) = 4 (20); 887 (B) = 5 (1) 1; 978 (B) = 4 (20); 1030 (B) = 5 (1) 2; 1032 (B) = 8 (1) 1; 1064 (B) = 4 (25); 1208 (B) = 4 (20); 1298 (B) = 8 (2); 1500 (B) = 8 (4); s.n. (B) = 4 (31).

- BENWARIN:** 2287 (L, K) = 4 (2).  
**RICHARDS:** 1618 (K) = 4 (7); 1734 (K) = 4 (1) 12; 1954 (K) = 4 (1) 2.  
**RIDLEY:** 12362 (K) = 4 (10) 1; s.n. (K, Br. B.) = 4 (1) 2; s.n. (K) = 4 (10) 3; s.n. (K) = 8 (4); s.n. (K) = 10 (3).  
**RIEDEL:** s.n. (K) = 4 (10) 2; s.n. (K) = 4 (18) 3; s.n. (K) = 4 (26); s.n. (K) = 4 (32); s.n. (K) = 8 (1) 1; s.n. (K) = 9 (1).  
**ROBINSON:** 426 (K, L) = 4 (10) 2; 427 (L, B, K) = 8 (1) 1; 428 (L, K) = 9 (1); 1834 (L, K) = 4 (12); 1838 (L, K) = 11 (1) 2; 1842 (B, L) = 5 (1) 2; 1843 (L, K) = 1 (1); 1844 (L, K) = 10 (3); 2522 (B) = 5 (1) 2; 2526 (L) = 4 (14).  
**ROBINSON and KLOSS:** 45 (Br. M.) = 4 (1) 6; 119 (Br. M.) = 9 (1); 2450 (K, Br. M.) = 4 (18) 1; s.n. (Br. M.) = 4 (1) 2; s.n. (K) = 4 (18) 1; s.n. (Br. M.) = 4(28); s.n. (K, Br. M.) = 8 (4); s.n. (K) = 9 (1); s.n. (K) = 11 (1) 2.  
**ROELOFSEN:** 12 (B) = 5 (1) 2; 6250 (B) = 10 (3); 6288 (B) = 4 (1) 2.  
**VAN RÖMER:** s.n. (B) = 4 (10) 1; s.n. (B) = 9 (1).  
**RUTTEN:** 128 (B) = 4 (12); 237 (B) = 11 (1) 1; 310 (L) = 11 (1) 1; 505 (L) = 9 (1); 761 (L) = 9 (1); 970 (L) = 8 (1) 2; 1584 (B) = 4 (12); 1584a (B) = 9 (1); 1638 (L) = 4 (12); 1642 (L) = 11 (1) 1; 1998 (L, B) = 8 (1) 3; 2101 (L) = 4 (27); 2212 (L, B) = 10 (6).  
**RUTTNER:** 45 (B) = 4 (10) 6.  
**VAN RIJCKEVORSEL:** s.n. (B) = 10 (3).  
**SALMOENDI:** 23 (L, B) = 4 (1) 2.  
**SAPIN:** 209 (U) = 4 (1) 3; 230 (L) = 10 (2); 511 (B) = 8 (4); 2567 (U, B) = 4 (17) 1; s.n. (B) = 10 (3); s.n. (L, B) = 10 (7).  
**DE LA SAVINIERRE:** 153 (K) = 4 (11); 285 (K) = 11 (1) 1.  
**SCHIEFFER:** s.n. (B) = 4 (18) 1; s.n. (B) = 11 (1) 2.  
**SCHIMPER:** s.n. (L) = 4 (17) 2.  
**SIHAJA:** s.n. (B) = 8 (2); s.n. (B) = 9 (1).  
**VAN SLOOTEN:** 9 (B) = 8 (3) 1; 27 (B) = 10 (7); 303 (L) = 3 (1) 2; 695 (B) = 11 (1) 2; 739 (B) = 10 (8); 2015 (B) = 4 (10) 2; 2138 (B) = 8 (1) 1; 2391 (B) = 4 (18) 2; 2480 (B) = 11 (1) 2.  
**SMITH:** 639 (B) = 9 (2); s.n. (B) = 11 (1) 2.  
**SMITH and RANT:** 179 (L) = 3 (1) 2; 517 (B) = 11 (1) 2; 548 (B) = 4 (17). 1  
**SORGANDIRENJA:** 28 (B) = 8 (1) 1; 55 (K, B) = 10 (3); 93 (B) = 9 (1); 117 (B) = 4 (18) 2; 118 (B) = 4 (18) 2; 191 (L) = 8 (2); 206 (B) = 11 (1) 3; 257 (B) = 4 (17) 1; 307 (L) = 11 (1) 3; s.n. (B) = 4 (10) 2.  
**SPANOGHE:** s.n. (L) = 8 (1) 1.  
**SPEC. BLANCOANAE:** 235 (L) = 4 (19) 3.  
**SPRÉE:** s.n. (L) = 9 (1).  
**SPRUFT:** s.n. (B) = 10 (8).  
**VAN STEENIS:** 80 (B) = 9 (1); 334 (B) = 11 (1) 4; 420 (B) = 8 (1) 1; 771 (L, B) = 9 (1); 1026 (L) = 1 (1); 1042 (B) = 9 (1); 1071 (B) = 5 (1) 2; 1095 (B) = 4 (1) 2; 1583 (B) = 1 (1); 1697 (B) = 4 (18) 1; 1801 (B) = 9 (2); 1804 (B) = 6 (1); 1810 (B) = 10 (7); 1820 (B) = 10 (2); 1863 (B) = 4 (17) 1; 1869 (B) = 8 (3) 1; 2546 (B) = 4 (1) 2;



3279 (B) = 8 (2); 3747 (B) = 11 (1) 4; 4006 (B) = 4 (1) 2; 4334 (B) = 8 (3) 2; 4368 (L, K) = 3 (1) 1; 4398 (L) = 3 (1) 1; 4427 (L) = 3 (1) 1; 4437 (B) = 4 (18) 1; 4448 (B) = 4 (17) 1; 4478 (B) = 4 (10) 2; 4513 (B) = 4 (17) 2; 4555 (L) = 4 (17) 2; 4751 (B) = (18) 1; 4874 (B) = 3 (1) 1; 5159 (B) = 4 (1) 3; 5177 (B) = 10 (7); 5374 (B) = 1 (1); 5468 (B) = 4 (17) 1; 5951 (B) = 8 (4); 6152 (B) = 4 (18) 1.

STEUP: 53 (B) = 4 (10) 1; 54 (L) = 5 (2).

STOUTJESDIJK: 3 (B) = 9 (1); 60 (B) = 5 (1) 2.

VAN STRAELEN: 37 (B) = 8 (1) 1.

STRAUB: G. 1 (B) = 9 (1).

STRESEMANN: 293 (L) = 10 (6); 375 (L) = 10 (6).

SZEMIAN: 8 (B) = 9 (1); 31 (L, B) = 9 (1).

TENGWALL: 23 (L, B) = 9 (1); 33 (L, B, K) = 4 (13).

TEYSMANN: 98 (L) = 4 (1) 2; 1040 (B, U) = 4 (1) 8; 1042 (B) = 5 (1) 2; 1048 (U) = 4 (1) 2; 1739 (B) = 4 (9); 1739 (B) = 4 (20); 3526 (U) = 4 (1) 2; 5112 (U, B) = 4 (3); 5655 (B) = 4 (18) 2; 8302 (B) = 11 (1) 2; 8304 (B) = 8 (1) 1; 8305 (B) = 4 (1) 6; 8307 (B) = 8 (1) 1; 8780 (L) = 4 (19); 8781 (L, B, K) = 4 (16) 1; 8822 (B) = 4 (10) 2; 11933 (B) = 11 (1) 2; 12107 (B) = 11 (1) 2; 12589 (B) = 4 (11); 13693 (B) = 11 (1) 2; 13878 (B) = 4 (20); 13880 (L) = 4 (20); 14041 (B) = 4 (1) 9; 14082 (B) = 11 (1) 2; 14083 (B) = 8 (4); 14127 (B) = 11 (1) 2; 21298 (B) = 11 (1) 2; s.n. (B) = 3 (1) 3; s.n. (U, B, L) = 4 (1) 2; s.n. (B) = 4 (17) 2; s.n. (U, K, B) = 4 (17) 3; s.n. (B) = 4 (18) 1; s.n. (L, B) = 4 (20); s.n. (B) = 5 (1) 1; s.n. (B) = 8 (1) 1.

THORENAAR: 8 (B) = 9 (1); 173 (B) = 11 (1) 2.

TOXOPEUS: 113 (L) = 8 (4); 190 (L) = 4 (12); 196 (L) = 11 (1) 2; 525 (B) = 4 (10) 1.

TREUB: s.n. (B) = 11 (1) 2; s.n. (B) = 4 (10) 2; s.n. (B) = 4 (12).

ULZÉE: 13 (B) = 4 (10) 2; 26 (B) = 11 (1) 4; s.n. (B) = 4 (1) 2; s.n. (B) = 4 (10) 1; s.n. (B) = 5 (1) 2; s.n. (B) = 8 (1) 1; s.n. (B) = 9 (1).

VALETON: 8 (B) = 8 (2); s.n. (B) = 4 (10) 2; s.n. (B) = 4 (17) 1; s.n. (B) = 4 (18) 1; s.n. (L, B) = 10 (7); s.n. (B) = 11 (1) 2.

VAN DER VECHT: 15 (B) = 4 (10) 2.

VAN DER VEEN: s.n. (L) = 4 (10) 2; s.n. (L) = 4 (17) 1; s.n. (L) = 5 (1) 1; s.n. (L) = 9 (1); s.n. (L) = 10 (3).

VERHOEF: 20 (B) = 9 (1).

VERMEULEN: 5 (B) = 4 (14).

DE VISSER SMITS: s.n. (B) = 8 (1) 1; s.n. (B) = 8 (2); s.n. (B) = 9 (2).

DE VOGEL: 1915 (B) = 1 (1); s.n. (L) = 4 (10) 1.

DE VOOGD: 29 (B) = 8 (1) 2; 50 (L, B) = 4 (1) 10; 170 (B) = 8 (4); 404 (B) = 4 (10) 1; 533 (B) = 8 (2); 1542 (L) = 8 (4); 15422 (B) = 4 (1) 2; s.n. (B) = 5 (1) 1.

VORDERMAN: 150 (B) = 4 (18) 2; 2772 (B) = 4 (18) 1; s.n. (B) = 4 (10) 2; s.n. (B) = 4 (18) 1; s.n. (B) = 5 (1) 2; s.n. (B) = 8 (1) 1; s.n. (B) = 11 (1) 2.

DE VRIES: 39 (B) = 1 (1).

DE VRIESE and TEYSMANN: s.n. (L) = 4 (1) 2; s.n. (L) = 4 (3); s.n. (L) = 4 (1) 4.

VAN VUUREN: 12 (L) = 4 (18) 1; 201 (B) = 4 (18) 1; 292 (L) = 11 (1) 3; 377 (B) = 4 (18) 1; s.n. (B) = 4 (17) 1; s.n. (B) = 9 (2).

WAPZ: s.n. (L) = 2 (1); s.n. (L) = 3 (1) 2; s.n. (L) = 4 (17) 1; s.n. (L) = 9 (1); s.n. (L) = 11 (1) 2.

WALLACE: s.n. (K) = 4 (10) 2.

WALSH: 38 (B) = 4 (10) 7; 101 (B) = 5 (1) 2; 310 (B) = 2 (2); 328 (B) = 4 (33); 331 (B) = 4 (20); 332 (B) = 5 (1) 1; 409 (B) = 4 (34); 481 (B) = 4 (9); s.n. (B) = 5 (1) 2.

WEBB: s.n. (K) = 5 (1) 2; s.n. (K) = 8 (1) 1.

WEBER: s.n. (L) = 4 (10) 1; s.n. (L) = 4 (20).

WEDA: 2985 (B) = 4 (18) 2.

WEEHUIZEN: 1 (B) = 6 (1); 2 (B) = 1 (1).

WEINLAND: s.n. (B) = 4 (18) 3.

VAN WELSEM: 6 (B) = 11 (1) 2; 7 (B) = 4 (17) 1.

WENT: s.n. (L) = 3 (1) 3; s.n. (L) = 4 (17) 2; s.n. (U) = 9 (1).

WENCKEL: 82 (B) = 4 (17) 4; 616 (B) = 4 (10) 2; 764 (B) = 10 (3); 1160 (B) = 4 (1) 2; 1165 (B) = 5 (1) 1; 1221 (B) = 9 (1); 1400 (L) = 11 (1) 2; 1437 (L) = 8 (2); 1475 (B) = 4 (17) 1; 1541 (L, B) = 5 (1) 1; 1865 (L) = 9 (1); 1975 (B) = 4 (18) 1; s.n. (L) = 4 (10) 2.

WIND: 9831 (B) = 4 (10) 6.

WINTERBOTTOM: s.n. (K) = 4 (18) 1; s.n. (K) = 5 (1) 1.

WIROSPOETRO: 41 (L) = 4 (17) 2.

WESSE: 29 (B) = 5 (2); 68 (B) = 9 (2); 157 (B) = 4 (10) 1; 236 (B) = 4 (18) 2; 267 (B) = 11 (1) 2; 281 (B) = 10 (3); 326 (B) = 9 (1); 543 (B) = 8 (3) 2; 548 (B) = 10 (3); 560 (B) = 4 (17) 2; 624 (B) = 9 (2); 734 (B) = 4 (17) 2; 861 (B) = 4 (18) 1; s.n. (B) = 4 (18) 2.

WOLFF VON WÜLFING: W 38 (B) = 4 (10) 2.

WURTH: s.n. (B) = 2 (1).

YATES: 972 (B) = 11 (1) 2; 978 (B) = 4 (1) 1; 1090 (B) = 1 (1); 1294 (L, B) = 4 (1) 5; 1854 (B) = 4 (1) 5; 2115 (L, B) = 4 (1) 5; 2425 (L) = 8 (4); 2478 (B) = 10 (3).

ZEANO: 2360 (K) = 9 (1).

ZEYLSTRA: 3 (B) = 4 (17) 1.

ZIPPELIUS: 244 (L) = 4 (10) 4; s.n. (L) = 4 (10) 1; s.n. (L) = 4 (20); s.n. (L) = 4 (27).

ZOLLINGER: 6 (L, K, Br. M.) = 4 (18) 1; 7 (L, K) = 5 (1) 2; 18 (L) = 4 (19); 23 (L) = 9 (1); 24 (L, K) = 4 (10) 2; 222 (B, K) = 8 (1) 1; 417 (K, L) = 11 (1) 2; 606 (B) = 4 (1) 2; 792 (K, L) = 8 (1) 1; 792 (B) = 8 (2); 792 (B) = 8 (3) 1; 792 (B) = 8 (4); 1039 (L, K) = 4 (1) 2; 1039 (K) = 4 (1) 4; 1096 (Br. M.) = 4 (17) 1; 1486f (L) = 4 (17) 4; 1783 (L) = 8 (1) 1; 2171 (Br. M.) = 4 (17) 2; 2403 = 4 (22), 4 (23); 2634 (B) = 4 (1) 2; 2673 (Br. M.) = 4 (18) 1; 2704 (Br. M.) = 4 (10) 1; 2705 = 4 (22); 2762 (B) = 4 (20); 2772 (Br. M., U) = 4 (10) 1; 2830 (Br. M.) = 2 (1); 3173 (L, Br. M.) = 2 (1); 3220 (L) = 8 (1) 1; s.n. (U) = 4 (9); s.n. (L) = 4 (10) 2; s.n. (L) = 4 (17) 2; s.n. (L) = 4 (18) 1; s.n. (U) = 4 (31); s.n. (U) = 8 (1) 1; s.n. (L) = 8 (4); s.n. (L) = 10 (1).

ZWAARDEMAKER: 8 (B) = 9 (1); 53 (B) = 10 (3).

Key to the symbols of the genera, species, varieties and forms.

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