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The Genus *Lysimachia* in the New World

JAMES DAVIS RAY, JR.

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JAMES DAVIS RAY, JR.

ILLINOIS BIOLOGICAL MONOGRAPHS: *Volume XXIV, Nos. 3-4*

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THE GENUS *LYSIMACHIA* IN THE NEW WORLD

The Genus *Lysimachia* in the New World

JAMES DAVIS RAY, JR.

ILLINOIS BIOLOGICAL MONOGRAPHS: *Volume* XXIV, *Nos.* 3-4

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I. INTRODUCTION

Lysimachia, comprising the plants commonly known as loosestrife, is a large and discontinuously wide-ranging genus of dicotyledonous angiosperms of the family Primulaceae. At present it includes over one hundred and sixty species which occur on all the principal land masses of the world, but are most numerous in central Asia. Although not a genus of economic importance, *Lysimachia* has received considerable attention, especially from European botanists. Jean Duby (1844), F. W. Klatt (1866), and R. Knuth (1905) wrote world monographs. In a revision of the Chinese species, H. Handel-Mazzetti (1926) included an outline of the entire genus. But there has not been a comparative study of the eighty-five species described from the New World since 1753. About thirty species may be accounted for in current American manuals. This investigation is an attempt to interpret the biological problems inherent in such a group and to relate them in terms of contemporary systematics.

Many herbarium specimens, representatives of the total known geographic and morphologic range of each entity, have been critically examined. Field studies and a systematic review of the literature also were made in order that an accurate diagnosis and description of each taxon might result in a more clearly drawn specific concept than was previously possible. The species as interpreted are groups of naturally occurring, apparently interfertile populations with definite morphological characters, geographic ranges, and ecological preferences. With comparative morphology as an indicator of genetic relationship, species appear as well defined groups with a level of variation related to distribution and ecology.

No economic value beyond the occasional use of some of the species of *Lysimachia* as ornamentals or occurrence as weeds is known. Ancient lore attributes to the plants a unique property and perhaps accounts for the origin of their name. When placed about the yokes of discordant oxen, the plant supposedly had the power of conciliation. Tradition has it that King Lysimachus of Thrace, when confronted by an enraged bull, waved a loosestrife before him and quelled the beast. Both the generic and common names may come from the Greek *lysis*, a release, and *mache*, strife.

During the course of this investigation the author has enjoyed the kindness and cooperation of many persons. Sincere appreciation is expressed to Dr. G. Neville Jones, Professor of Botany and Curator of the

Herbarium, University of Illinois, under whose guidance it progressed. The interest and assistance of Mr. Harry E. Ahles is deeply appreciated. Dr. V. H. Chase, of the Peoria Academy of Science, and Mr. C. L. Lee have been very helpful. I am deeply indebted to my wife, Dorothy Burkett Ray, whose conscientious efforts were an inspiration.

Acknowledgment is due the curators of the various herbaria who sent specimens or furnished photographic material. In the citation of specimens the herbarium to which the specimen belongs is indicated by the following abbreviations adopted from Lanjouw (1939):

- BM —British Museum of Natural History
- CAN —National Museum of Canada
- CNC —University of North Carolina
- DUKE—Duke University
- EDIN —Royal Botanic Garden, Edinburgh
- FM —Chicago Natural History Museum
- GH —Gray Herbarium
- ILL —University of Illinois
- INHS —Illinois Natural History Survey
- ISM —Illinois State Museum
- MINN—University of Minnesota
- MISSA—Mississippi State College
- MO —Missouri Botanical Garden
- NY —New York Botanical Garden
- P —Muséum d'Histoire Naturelle
- RNC —North Carolina State College
- US —United States National Herbarium

II. HISTORY OF THE GENUS

Although no bibliographical survey of the literature of this genus before 1753 has been attempted in the present study, a few fragments of history should be noted from earlier writers. Caspar Bauhin (1671) published an account which included eight species later recognized by Linnaeus, but J. P. Tournefort (1700) established the genus. Plukenet (1705) figured *L. terrestris*, an American indigen, in his *Amaltheum Botanicum*. J. F. Gronovious, in *Flora Virginica* (1735), accounted for *L. quadrifolia* and *L. punctata*, and his *Nummularia aquatica Bécagun-gae foliis* probably is *L. radicans*. Linnaeus (1753) included eleven species in *Lysimachia* and one as a mistletoe, in *Viscum*.

The first study of *Lysimachia* within the United States appears to have been made by C. S. Rafinesque. In addition to several proposed new species published with only fragmentary information of description and locality, Rafinesque (1820) undertook a revision of the genus. Based upon floral characters, especially those of the androecium, his work in-

cluded the recognition of *Lysimachia*, *Naumburgia* as described by Moench in 1802, *Lubinina* Ventenat, and three new genera, *Tridynia*, *Steironema*, and *Borissa*. Although species were proposed for *Steironema*, no valid transfers were made. Jacob Bigelow, in *Florula Bostoniensis* (1824), using similar criteria, divided *Lysimachia* into two subgenera: *Seleucia* with intermediate sterile filaments and *Cassandra* without sterile filaments.

Jean Duby's treatment in DeCandolle's *Prodromus* was monographic. Forty-four species were included in four genera, *Lubinina*, *Naumburgia*, *Lysimachia*, and *Apochoris*. Subsequent authors, except Pax (1889), in considering the complete "Lysimachian" cycle of affinity, have treated the group as a single genus. Duby's *Lysimachia* (forty-one species) was separated into two rather amorphous and conglomerate sections, *Ephemerum* with flowers not yellow and inflorescences of terminal spikes or clusters, and *Lysimastrum* with yellow flowers.

F. W. Klatt's well-illustrated monograph in 1866 treated forty-five species in nine well-defined sections. In recognizing Rafinesque's *Steironema* as a section, he relied upon sterile filaments and the peculiar supervolute aestivation of the corolla lobes, characters which Asa Gray (1877) later used in restoring *Steironema* as a genus. Gray (1878) in his *Synoptical Flora* upheld *Lysimachia* and *Steironema* as two genera.

Reinhard Knuth's monograph for Engler's *Pflanzenreich* (1905) included 110 species in sixteen sections. Species of *Steironema* were retained as a distinct section, and *Theopyxis* was expanded to include oriental species with umbellate inflorescences. The remaining North American species were dispersed in several sections. The work is noteworthy for the inclusion of many transcriptions of original descriptions.

Salvator Thenen's phylogenetic study (1911) of the primulaceous flower was based upon the vascular system of the perianth. Conclusions concerning *Lysimachia* based on a study of thirty-two species substantiated Knuth's work to some degree. The staminodia of *Steironema* were regarded as excrescences without phylogenetic significance.

A recent contribution to the systematics of *Lysimachia* is a revision of the Chinese species with an outline of the whole genus by Dr. H. Handel-Mazzetti (1928). In dividing the genus into five subgenera, significance is given floral characters such as flower color, aestivation of perianth, nature of androecium, and form of corolla. Inflorescence and habit also are regarded as significant. Of the 147 species and nine sub-specific taxa considered, nineteen species and four varieties indigenous to the New World are included. His treatment of the American entities consists of a mere listing and a few words of comment concerning their relationship. No diagnostic characters are given.

In the present study, *Lysimachia*, as represented in the New World, is divided into five subgenera. Nineteen species and two putative hybrid populations are recognized. In four of the five subgenera sectional differentiation either does not occur or is not represented in American species. In the larger subgenus *Lysimachia*, sections and subsections have been maintained by several authors, but because of the relatively small number of species represented in the American flora, it has not been necessary herein to maintain these sections. Their characters and affinities, although evident in a more extensive system, are not always perceptible here. In the discussions of taxonomy brief mention is made of them, and for purposes of introduction they are included in the following outline:

- | | |
|--------------------------------|---------------------------------|
| Subgenus I. <i>Seleucia</i> | 11. <i>L. x producta</i> |
| 1. <i>L. ciliata</i> | 12. <i>L. terrestris</i> |
| 2. <i>L. tonsa</i> | 13. <i>L. loomisii</i> |
| 3. <i>L. lanceolata</i> | 14. <i>L. asperulaefolia</i> |
| 4. <i>L. radicans</i> | 15. <i>L. x commixta</i> |
| 5. <i>L. quadriflora</i> | |
| Subgenus II. <i>Lysimachia</i> | Subgenus III. <i>Naumburgia</i> |
| Section <i>Nummularia</i> | 16. <i>L. thyrsiflora</i> |
| 6. <i>L. nummularia</i> | Subgenus IV. <i>Theopyxis</i> |
| 7. <i>L. punctata</i> | 17. <i>L. sertulata</i> |
| Section <i>Lysimastrum</i> | 18. <i>L. mexicana</i> |
| 8. <i>L. vulgaris</i> | 19. <i>L. steyermarkii</i> |
| 9. <i>L. fraseri</i> | 20. <i>L. andina</i> |
| Section <i>Verticillatum</i> | Subgenus V. <i>Palladia</i> |
| 10. <i>L. quadrifolia</i> | 21. <i>L. clethroides</i> |

III. MORPHOLOGY

ROOTS AND UNDERGROUND STEMS

In addition to the primary root, the permanent root system often consists of a diffuse system of slender, adventitious roots usually arising from the nodal regions of rhizomatous structures and bases of aerial stems. All species under consideration are perennial by means of rhizomes, stolons, or basal offshoots. Subgenus *Seleucia* is characterized by slender, cord-like rhizomes with small, opposite scale-like leaves. *Lysimachia lanceolata* ssp. *hybrida*, however, has short rhizomes that are hardly more than slightly elongated lateral buds which develop into sessile basal offshoots. Rhizome development in subgenus *Lysimachia* is more extensive. The ascending tips develop into erect aerial stems bearing scale-like leaves below. Herbarium specimens of species of subgenus *Theopyxis* from Mexico, Central America, and South America

are notably lacking in underground parts. Sheets of *L. sertulata* (see Plate XVIII), however, show short, thick, and jointed rhizomes with many fibrous roots. Aerial shoots develop apically. The holotype of *L. steyermarkii* (see Plate XX) bears a thickened, longitudinally striate, elongated rhizome with lateral as well as apical shoots.

From the lower nodes of *L. terrestris*, slender branches frequently develop and become stoloniferous. A similar tendency is noted in *L. nummularia*. Weak branches, when covered by debris may cease normal leaf development and produce scale-like leaves.

AERIAL STEMS

In *L. ciliata* and other species of subgenus *Seleucia*, aerial stem development begins with the formation of a basal rosette of leaves. When these are formed near the end of the growing season, the plant may persist in the leafy stage until resumption of growth the following spring. At that time an erect stem is formed. Because of the extreme variability of the rosette leaves, they are of little taxonomic value.

A transition from scale leaves to foliar leaves is evident in subgenus *Lysimachia* where, instead of a rosette stage, the ascending rhizome develops into the erect, aerial stem. *Lysimachia thyrsiflora*, the only species of subgenus *Naumburgia*, has a similar development.

With the exception of the repent *L. nummularia*, all American species, native and introduced, produce an erect stem. Well-developed paniculate branching is evident in robust plants of *Seleucia* (see Plates I and V) and in some species of subgenus *Lysimachia*. *L. terrestris* may be rather closely branched, and *L. loomisii*, with many leafy axillary branches, is fastigiate. *Lysimachia quadrifolia*, *L. asperulaefolia*, *L. thyrsiflora*, and species of *Theopyxis* are usually simple.

Stems of *L. tonsa*, *L. lanceolata* ssp. *lanceolata*, and *L. quadrifolia* are terete below with a tendency toward a four-angled condition above. Although the stems of most species are usually glabrous, indument (discussed later), when present, is significant in the classification of *L. vulgaris* and of *L. fraseri*, *L. terrestris*, and *L. loomisii*.

LEAVES

The leaves have alternate, opposite, or verticillate phyllotaxy, with membranous, entire, polymorphic blades. They may be distinctly petiolate, or sessile. Variable leaf-form has been a contributing cause of some taxonomic confusion in the interpretation of *L. lanceolata*. The alternate leaves of *Theopyxis* are broadly elliptic to lanceolate. Species of *Seleucia* show a transition of definitely petiolate and ciliate-margined, ovate leaves of *L. ciliata* to sessile, eciliate-margined, linear leaves of *L. quadriflora*. Stem leaves are opposite. Those of the floriferous branches,

because of shortened alternate internodes, may become subverticillate. Solitary flowers borne in the axils of such leaves are in subverticils. In *L. quadriflora* the lateral veins are reduced and, because of the rather firm texture of the blade, are not evident. With a prominent midrib, the leaf appears one-ribbed. *L. asperulaefolia* is three- to five-ribbed.

In the descriptions of species, medial leaves—those of the middle third of the plant—have been used as the representative or typical leaves. References to size and form, unless otherwise stated, are based upon them.

INFLORESCENCE

All flowers are pedicellate and subtended by a leaf or leaf-like bract. In subgenus *Seleucia* the flowers are solitary in the upper leaf axils. The slender, ascending pedicels vary from one to seven centimeters in length. When the flower bud opens, they bend, and thus the flower is nutant. Among closely related species a transition from solitary and axillary flowers to terminal racemes is apparent. *Lysimachia nummularia* has axillary flowers borne on divergent and weakly ascending pedicels, seldom from distal nodes. The axillary flowers of *L. punctata* have a paniculate appearance because of lateral floriferous branches and reduced upper leaves. *Naumburgia* has very dense, head-like racemes, pedunculate from axils of medial leaves. *Theopyxis* shows a transition from bracted, terminal, and axillary umbels of numerous flowers to flowers solitary in the leaf axils.

CALYX

Except for its indument, the calyx is remarkably constant throughout the group and offers no taxonomic criteria of importance. It is gamosepalous but without an evident tube and usually has five persistent lobes that may become somewhat accrescent in fruit.

COROLLA

The color of the corolla, although significant at the subgeneric level, is of little value for specific delimitation. In subgenera *Seleucia*, *Lysimachia*, and *Naumburgia*, the corolla is yellow. In the first two subgenera, red blotches are evident, especially on *L. quadrifolia* and *L. terrestris*. Dark glandular markings are present in the last two subgenera. The lighter yellow of *Naumburgia*, appearing nearly white in herbarium specimens, is accentuated by the darker yellow anthers in fresh material.

Except for tendencies toward polymery in *L. terrestris* and *L. thyrsiflora*, the corolla is pentamerous. The very short and hardly evident corolla tube forms a shallow crateriform or open-campanulate corolla in

L. nummularia, *L. punctata*, *L. vulgaris*, and *L. fraseri*. In *L. quadri-
folia*, and the other American species of subgenus *Lysimachia*, the
flattened tube with strongly diverging lobes forms, as in *Seleucia*, a
rotate corolla.

Size and form of corolla lobes are not insignificant. *Lysimachia radi-
cans* with corolla lobes 3–5 mm. long has the smallest flowers. Others
have larger lobes—up to 12 mm. in *L. ciliata*. The lobes in *Seleucia* are
of an obovate type, in subgenus *Lysimachia*, lanceolate in *Theopyxis*,
elliptic to obovate, and in *Naumburgia*, linear to oblong-lanceolate.
While in the bud, the corolla lobes of *Seleucia* are rolled lengthwise, the
margins enveloping each other and enclosing an antepetalous stamen.
This peculiar type of aestivation may account for the flatness of the short
tube and may, by enclosing the stamens, be a factor in hindering self-
pollination.

STAMENS

As is typical of the Primulaceae, the stamens are obdiplostemonous,
and with few exceptions pentamerous. In all species the antepetalous
whorl is present and fertile. All subgenera except *Seleucia* have an evi-
dent staminal tube. In this subgenus the antesealous whorl is repre-
sented by a set of sterile filaments or staminodia. These are small,
lanceolate, or subulate structures that are more or less distinct from the
anther-bearing stamens, yet form a single ring with them on the corolla
tube. In the other subgenera the antesealous whorl may be represented
by the occasional occurrence of denticulations in the sinuses of the
staminal tube.

The staminodia of *Seleucia* have been a point of minor controversy in
the systematics of this subgenus. Considered as sterile filaments or
staminodia by earlier taxonomists and as mere non-vascular excrescences
by Thenen (1911) and Handel-Mazzetti (1928), these structures, regard-
less of their true nature, are taxonomically significant. Miss Gertrude
Douglas (1936), in a study of the floral anatomy of Primulaceae, con-
sidered eight of the New World species of *Lysimachia*, two of which
were treated as species of *Steironema*. Regarding the latter she wrote,
“Were it not for the staminodia present species of *Steironema* would
naturally fall into the genus *Lysimachia*.” In staminodia primordia she
found that vascular traces formed but did not continue to develop. This
early dying-out of the vascular tissue may account for Thenen’s failure
to note traces in the mature structures.

Although Miss Douglas included only a small number of species in
her study, some far-reaching inferences may be made. All species were
found to be fundamentally alike in their vascular anatomy. *Lysimachia
nummularia* showed as clearly as any the basic vascular pattern. The

Steironema species, *S. ciliatum* and *S. lanceolatum*, appeared in many respects more closely related to *L. nummularia* than to other species of *Lysimachia*.

PISTIL

The pistil is superior, compound, unilocular, and typically 5-carpellate. The usually numerous ovules are borne on a free-central placenta. At maturity the ovoid or subglobose capsule dehisces, usually by five valves. Minor variations of indument occur. The single style is filiform, unusually so in *Theopyxis*. A somewhat glandular stigma is formed by the slightly enlarged apex of the style.

SEEDS

The few-to-many seeds are oval in outline and trigonal in form. Seeds of *Theopyxis* are characterized by membranous wings; those of other subgenera may occasionally be slightly margined. The testa is shiny-rufescent. *Seleucia* seeds have an outer, finely reticulate covering, while those of *Naumburgia* and some species of *Lysimachia* have a thicker covering, gray or tawny, and are alveolate in texture. It may be removed by scraping to reveal the shiny seed coat. Size of seeds is of little value in the delimitation of species.

INDUMENT

American species show three types of trichomes. Those at nodal regions of the stem, within the inflorescence and floral parts, and rarely on leaves, are sub-sessile capitate glands. On the inner surface of the corolla, on staminal tubes, and on filaments, the glands are bright yellow but upon drying become dull and granular. When they occur elsewhere they are dark red-brown and upon drying become somewhat scurfy. A colorless, glandless, acute or attenuate trichome is found in *Seleucia* as ciliation along the petiole and leaf blade. The third type, evident in subgenera *Theopyxis* and *Lysimachia*, is also colorless and non-glandular. Long, slender, and evidently septate, it forms in *L. punctata* a villous indument. In *L. vulgaris* it is mixed with the sub-sessile, glandular trichomes to form a viscid pubescence.

INTERNAL GLANDS

Glands have been found widely distributed in many species of the genus. According to the Boodle & Fritsch translation of Solereder (1908), secretory cells with reddish-brown crystalline contents are present in root cells of *Lysimachia nummularia*, *L. punctata*, and *L. vulgaris*. Circular spots within the leaves are caused by similar cells. In subgenus *Naumburgia* and in some species of subgenus *Lysimachia*, ovoid secre-

tory cavities are found. Usually red-brown in fresh material and darker in dried specimens and found in any organ of the plant, they are very evident in the corolla, calyx, leaf, and stem. According to H. von Guttenberg (1928), the secretory glands of *L. vulgaris* are at first schizogenous but later become lysigenous. Internal glands have not been observed in *Seleucia*.

IV. GEOGRAPHICAL DISTRIBUTION

As one of the larger genera of the Primulaceae, *Lysimachia* is found in almost all temperate and subtropical parts of the world as well as in some tropical montane regions. Although the total range of the genus is worldwide, the subgenera are all much more restricted. In North America the greatest concentration of species and diversity appears in the Appalachian region of the southeastern United States. This area is not considered as a center of origin for present-day species but may represent a development subsequent to a migration of primitive stock from the supposed Asian center.

According to Handel-Mazzetti (1929), the center of diversity and distribution of the large subgenus *Lysimachia* is in east India, northern Burma, and southern China. Most of its sections are represented there or have become extensions from that center. Section *Apodanthera* has migrated from there into the tropics of Ceylon, Java, Sumatra, and the Philippine Islands and northward into Formosa and Japan. Section *Lerouxia*, well represented in China, is known in western Europe by *L. nemorum*, in Greece by *L. serpyllifolia*, and in Algeria by *L. cousiniana*. Three widely dispersed species compose section *Lysimastrum*. *Lysimachia vulgaris* extends from central and eastern China, eastern Manchuria to Japan, across Siberia to Scandinavia, south to Great Britain and Spain, eastward to the Caspian Sea. *Lysimachia salicifolia* is endemic to southeastern Australia, while *L. fraseri* is restricted to the Appalachian region of northern Alabama to North Carolina.

Species of subgenus *Nummularia* are widely dispersed in the Orient from Japan and northern India southward to Borneo and Ceylon. In Europe this subgenus is represented by *L. nummularia*, and in Asia Minor and southern Europe by *L. punctata*. These species are adventive and naturalized in the eastern United States and Canada, and the former species sparingly so to the Pacific Coast. Indigenous American species of subgenus *Lysimachia* are plants of the eastern United States and Canada north of the Gulf Coastal Plain. *Lysimachia asperulaefolia* and *L. loomisii* are endemic to the Atlantic Coastal Plain of Georgia, South Carolina, and North Carolina. More widely distributed are *L. quadri-*

folia and *L. terrestris*. The former ranges from northern Alabama to southern Ontario, and the latter from South Carolina to James Bay. *Lysimachia* \times *producta* and *L.* \times *commixta* are local in distribution. Their range is that of the putative parents.

Subgenus *Seleucia*, indigenous to the United States and southern Canada, contains two continental-ranging species, *L. ciliata* and *L. lanceolata*. The more restricted species are *L. radicans* of the middle and lower Mississippi Valley, and *L. tonsa*, which is usually found in upland woods and slopes of the southeastern states and northward to Kentucky and Virginia. *Lysimachia quadriflora*, although considered a species of the north central states and southern Canada, is found locally east of the Appalachian Mountains in Massachusetts and southward to Georgia.

Lysimachia thyrsiflora of subgenus *Naumburgia* is the only representative of the genus which occurs naturally on all principal land masses of the Northern Hemisphere. It is, however, apparently absent from Greenland.

The four species of *Theopyxis* are restricted to Mexico, Central America, and South America. Known only from the state of Oaxaca of Mexico, *Lysimachia mexicana* is probably from the vicinity of Zempoaltepetl. In the Sierra Madre of Guatemala, *L. steyermarkii* grows at levels of 2,400 to 3,800 meters. *Lysimachia andina* is a native of the mountains of Ecuador, where it is found at elevations of 3,000 to 3,800 meters. *Lysimachia sertulata*, of central and southern Chile, is sometimes found near sea level.

Subgenus *Palladia* has as its center of diversity and distribution the India-Burma-China region previously mentioned. As considered by Handel-Mazzetti, five of its sections are restricted to northern India, Burma, Indochina, China, Manchuria, eastern Siberia, and Japan. Other sections have become very widespread. Species of section *Lubinina* are found in southern Japan, the Hawaiian Islands, New Caledonia, and Mauritius near Madagascar. *Lysimachia ephemerum* of the monotypic section *Ephemerum* is endemic to Spain. *Lysimachia clethroides* of China, *L. fortunei*, and *L. barystachys* are occasional plants in cultivation in North America. The first occurs as an escape and rarely becomes naturalized.

Although American species show strong tendencies toward hydrophytism, a few species grow under more mesophytic conditions. *Lysimachia tonsa* occurs mainly on dry, rocky bluffs and upland woods. *Lysimachia fraseri* and *L. quadrifolia* may occur along stream banks and occasionally in swamps, but more frequently they are found in moist or dry open woods.

V. GENERIC RELATIONSHIPS

Because of the limitation of this investigation to American species there is no detailed treatment of the intrageneric relationships between *Lysimachia* and the twenty-one other genera recognized by Pax and Knuth (1905) in the Primulaceae. There are, moreover, relationships within the genus which are as yet not clearly evident. The genera, markedly distinct, are mostly in the temperate and colder parts of the northern hemisphere. In the New World twelve are represented, namely, *Primula*, *Douglasia*, *Androsace*, *Hottonia*, *Dodecatheon*, *Lysimachia*, *Trientalis*, *Pelletiera*, *Glaux*, *Anagallis*, *Centunculus*, and *Samolus*. *Lysimachia* is readily distinguished from the first four by its contorted corolla lobes. *Primula* and *Douglasia* are scapose, *Androsace* has a corolla much shorter than the calyx, and *Hottonia* is a true aquatic with pinnatifid leaves and inflated stem. *Dodecatheon* has the corolla lobes strongly reflexed. *Trientalis*, with 6- to 7-merous white flowers, is otherwise similar in floral form to subgenus *Seleucia*. The whorls of its leaves and axillary flowers may be an extreme of the subverticillate condition occurring in *Seleucia*. *Pelletiera* of South America and *Glaux* of the Northern Hemisphere are characterized by reduced flowers. In the former, a reduction of number of parts in each whorl has occurred; in the latter, the entire corolla has been lost. *Anagallis* and *Centunculus* are characterized by the circumscissile dehiscence of the capsule, and *Samolus* has a somewhat perigynous flower. *Lysimachia sertulata* and *L. mexicana* of *Theopyxis* recall to some extent the habit of *Samolus*. *Lysimachia* is apparently one of the more primitive genera of the family. Its shrubby species in characters of floral morphology approach those of the closely related but more primitive family Myrsinaceae.

VI. INTERSPECIFIC RELATIONSHIPS

From the evidence presented by this study, little can be definitely stated concerning the phylogeny of the different species and their aggregates. The subgenera into which the American species are divided seem to fall into well-defined, natural cycles of affinity. The close relation between species of a subgenus is more evident than that between species of different subgenera.

Characterized by white flowers, a short, membranous staminal tube, thread-like filaments and style, small ovoid anthers, winged seeds, a tendency toward an umbellate or fascicled inflorescence, and alternate leaves, the species of Mexico, Central America, and South America appear as a well-defined subgenus. The members of this group are not

closely related to the North American species, and their connection with the Asian species from which the New World entities may perhaps have evolved seems remote. Their affinities with the yellow-flowered subgenus *Lysimachia* seem greater than with the white-flowered subgenera. Divergence between *Lysimachia sertulata* and *L. mexicana* is very slight. *Lysimachia steyermarkii* and *L. andina* are derivatives.

In North America, *Lysimachia ciliata*, *L. tonsa*, *L. lanceolata*, *L. radicans*, and *L. quadriflora* form a distinct aggregate. Continental-ranging *L. ciliata* approaches what may have been a progenitor of the entire series. *Lysimachia tonsa* is closely related to *L. ciliata*, and *L. radicans* more nearly approaches subspecies *hybrida* of *L. lanceolata*. *Lysimachia quadrifolia* and *L. terrestris* form another aggregate. Included are *L. asperulaefolia* and *L. loomisii*. The former species is more closely related to *L. quadrifolia*; the latter to *L. terrestris*. An apparently fertile hybrid of *L. quadrifolia* and *L. terrestris* indicates close genetical relationship. *Lysimachia thyrsoflora*, which according to Douglas (1936), has a very reduced floral anatomy, is near *L. terrestris* with which it supposedly hybridizes.

Of the introduced species, *Lysimachia nummularia* and *L. punctata* are not closely related; yet they form part of an otherwise unrepresented European and Asian series. An endemic of the southern Appalachian region, *Lysimachia fraseri*, and the introduced *L. vulgaris*, show strong affinities.

VII. ARTIFICIAL KEY TO THE SPECIES

- A. Flowers solitary in leaf axils, plants often appearing paniculate because of short floriferous branches and reduced leaves above.....B.
- B. Flowers white..... 20. *L. andina*
- BB. Flowers yellow.....C.
- C. Plants evergreen.....6. *L. nummularia*
- CC. Plants not evergreen.....D.
- D. Stems weakly erect or becoming decumbent and reclining, often rooting at distal nodes; flowers small, calyx lobes 3–4 mm. long, corolla lobes 3–5 mm. long.....4. *L. radicans*
- DD. Stems erect, not decumbent, reclining, nor rooting at nodes; flowers large, calyx lobes 3–8 mm. long, corolla lobes 4–12 mm. long.....E.
- E. Leaves punctate.....7. *L. punctata*
- EE. Leaves not punctate.....F.
- F. Leaves rather firm, lateral veins not evident, margins revolute
5. *L. quadriflora*
- FF. Leaves thin, lateral veins evident, margins not revolute.....G.
- G. Medial leaves verticillate.....10. *L. quadrifolia*
- GG. Medial leaves opposite.....H.
- H. Medial leaves ovate to ovate-lanceolate.....I.
- I. Petioles ciliate to the blade.....1. *L. ciliata*

- II. Petioles ciliate at base. 2. *L. tonsa*
- HH. Medial leaves narrow-lanceolate, elliptic, or linear. J.
- J. Stem slender, usually less than 4 mm. in diameter at base, often 4-angled above; underground stem elongate; lower leaves usually persistent; medial leaves sessile or subsessile, blades bristly ciliate at base
- 3a. *L. lanceolata* ssp. *lanceolata*
- JJ. Stem stout, usually more than 4 mm. in diameter at base, not 4-angled above, underground stems short, abruptly ascending and forming basal offshoots; lower leaves not persistent; petioles of medial leaves ciliate at base, sparingly so to the blade. 3b. *L. lanceolata* ssp. *hybrida*
- AA. Flowers in racemes, panicles, or umbels (transitions from inflorescences above to single axillary flowers below may be noted in several species included here) K.
- K. Leaves 3-ribbed. 14. *L. asperulaefolia*
- KK. Leaves 1-ribbed L.
- L. Margins of leaves rufescent-glandular. 9. *L. fraseri*
- LL. Margins of leaves not rufescent-glandular. M.
- M. Calyx lobes rufescent-glandular margined. 8. *L. vulgaris*
- MM. Calyx lobes not rufescent-glandular margined. N.
- N. Flowers bright yellow to cream-yellow. O.
- O. Inflorescence of lateral, pedunculate, spike-like racemes
16. *L. thyrsoflora*
- OO. Inflorescence of terminal racemes, often with subtending solitary and axillary flowers (terminal spike-like racemes with similar, lateral, subtending racemes. 15. *L. x commixta*) P.
- P. Plants exhibiting a transition from that of solitary and axillary flowers below to an extended terminal raceme above. 11. *L. x producta*
- PP. Plants bearing a terminal raceme. Q.
- Q. Leaves linear to narrowly elliptic, inflorescence glandular-pubescent
13. *L. loomisii*
- QQ. Leaves lanceolate to elliptic, inflorescence glabrate. 12. *L. terrestris*
- NN. Flowers white R.
- R. Plants with a terminal spike-like raceme. 21. *L. clethroides*
- RR. Plants with axillary or terminal umbellate clusters; transitions to solitary and axillary flowers may be present. S.
- S. Inflorescences sessile or subsessile; medial leaves 3-6 cm. long, 1.5-2.5 cm. wide. 19. *L. steyermarkii*
- SS. Inflorescences pedunculate; medial leaves 6-12 cm. long, 2-4 cm. wide T.
- T. Leaves elliptic to elliptic-lanceolate, umbels usually many-flowered (10-15), stem puberulent above. 17. *L. sertulata*
- TT. Leaves oblanceolate, umbels few-flowered (2-5), stems glabrous above
18. *L. mexicana*

VIII. TAXONOMY

LYSIMACHIA [Tournefort] Linnaeus

Lysimachia [Tournefort, Inst. 1:141., 2:tab.59. 1700]; Linnaeus, Sp. Pl. 146. 1753; Walter, Fl. Carol. 92. 1788; Lamarck, Encycl. 3:569. 1791;

Tabl. Encycl. 1:438. 1792; Michaux, Fl. Bor. Am. 1:126. 1803; Muhlenberg, Cat. Pl. Am. Sept. 20. 1813; Pursh, Fl. Am. Sept. 1:135. 1814; Poirlet in Lamarck, Encycl. Suppl. 3:475. 1814; Elliott, Sketch Bot. S.C. & Ga. 1:232. 1817; Nuttall, Gen. N. Am. Pl. 1:121. 1818; Roemer & Schultes, Syst. Veg. 4:120. 1819; Steudel, Nom. Bot. 501. 1821; Torrey, Fl. N. & M. U.S. 1:209. 1824; Bigelow, Fl. Bost. ed. 2, 74. 1824; Sprengel, Syst. Veg. ed. 16, 1:571. 1825; Endlicher, Gen. Pl. 2:732. 1839; Eaton & Wright, N. Am. Bot. ed. 8, 310. 1840; Steudel, Nom. Bot. ed. 2, pt.2:84. 1841; Baudo in Ann. Sci. Nat. II. 22:347. 1843; Duby in DeCandolle, Prodr. 8:60. 1844; A. Gray, Man. Bot. 282. 1848; Wood, Class-book 386. 1853; A. Gray, Man. Bot. ed. 2, 272. 1856; Chapman, Fl. S. U.S. 280. 1860; Provancher, Fl. Can. 1:383. 1862; Klatt in Abh. Naturw. Ver. Hamburg. 4. pt.4. 1866; A. Gray, Man. Bot. ed. 5, 315. 1868; Bentham & Hooker, Gen. Pl. 2:635. 1876; A. Gray in Proc. Am. Acad. Arts Sci. 12:63. 1877; Syn. Fl. 2. pt.1:62. 1878; Macoun, Cat. Can. Pl. 2:314. 1884; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 330. 1889; Pax in Engler & Prantl, Pflanzenf. 4. pt.1:112. 1889; Britton & Brown, Illustr. Fl. N. U.S. 2:587. 1897; Chapman, Fl. S. U.S. ed. 3, 298. 1897; Small, Fl. Se. U.S. 902. 1903; Knuth in Engler, Pflanzenr. pt.237: 256. 1905; Dalla Torre & Harms, Gen. Siphon. 390. 1907; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 645. 1908; Reiche, Fl. Chile 5:98. 1910; Britton & Brown, Illustr. Fl. N. U.S. ed. 2, 2:710. 1913; Thenen, Phyl. Prim. 97. 1911; Henry, Fl. S. Brit. Col. & Vancouver I. 239. 1915; Piper & Beattie, Fl. Nw. Coast 286. 1915; Rydberg, Fl. Rocky Mts. 651. 1917; Hegi, Illustr. Fl. Mittel-Eur. 5. pt.3:1850. 1927; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:51. 1928; in Hannig & Winkler, Pflanzenareale 2. pt.5:39. maps 44-49. 1929; Rydberg, Fl. Pr. & Pl. 623. 1932; Small, Man. Se. Fl. 1023. 1933; Marie-Victorin, Fl. Laurent. 430. 1935; Douglas in Am. Jour. Bot. 23:204. 1936; Jepson, Fl. Calif. 3. pt.1:73. 1939; Deam, Fl. Indiana 746. 1940; Peck, Man. Pl. Oregon 550. 1941; Roland in Proc. Nova Scotia Inst. Sci. 21. pt.3:407. 1945; Bailey, Hortus Sec. 450. 1947; Man. Cult. Pl. rev. ed. 784. 1949; Fernald in A. Gray, Man. Bot. ed. 8, 1139. 1950; Abrams, Illustr. Fl. Pac. States 3:331. 1951.

Lisimachia Necker, Delic. Gallo-Belg. 1:108. 1768.

Nummularia Rev. ex Rupp. Gilibert, Fl. Lithuan. 29. 1781.—non Gron. Kuntze 1891.

Lisima Medikus, Phil. Bot. 2:59, 107. 1791.

Palladia Moench, Meth. Pl. Marb. 429. 1794.

Lubinina Commerson ex Ventenat, Descr. Pl. Jardin Cels tab.96. 1800; Rafinesque in Ann. Gén. Sci. Phy. 7:193. 1820; Endlicher, Gen. Pl. 2:733. 1839; Duby in DeCandolle, Prodr. 8:60. 1844; Pax in Engler & Prantl, Pflanzenf. 4. pt.1:112. 1889.

Naumburgia Moench, Meth. Suppl. 23. 1802; Rafinesque in Ann. Gén. Sci. Phy. 7:193. 1820; Steudel, Nom. Bot. 550. 1821, — pro syn.; Endlicher, Gen. Pl. 2:732. 1839; Duby in DeCandolle, Prodr. 8:60. 1844; A. Gray, Man. Bot. 283. 1848; Wood, Class-book 386. 1853; A. Gray, Man. Bot. 273. 1856; Provancher, Fl. Can. 1:384. 1862; Macoun, Cat. Can. Pl. 2:314. 1884; Pax in Engler & Prantl in Pflanzenf. 4. pt.1:113. 1889; Britton & Brown, Illustr. Fl. N. U.S. 2:591. 1897; Dalla Torre & Harms, Gen. Siphon. 390. 1907; Henry, Fl. S. Brit. Col. & Vancouver I. 239. 1915; Piper & Beattie, Fl. Nw. Coast 286. 1915; Rydberg, Fl. Rocky Mts. 651. 1917; Allen in Rhodora 22:193. 1920; Rydberg, Fl. Pr. & Pl. 625. 1932; Abrams, Illustr. Fl. Pac. States 3:332. 1951.

Lysimachusa Pohl, Tent. Fl. Bohem. 1:163, 194. 1810.

Lerouxia Mérat, Nouv. Fl. Paris 77. 1812.

Thyrsanthus Schrank in Denkschr. Akad. Muench. 75. 1813-14; Baudo in Ann. Sci. Nat. II. 22:346. 1843.

Tridynia Rafinesque in l.c.

Steironema Rafinesque in Ann. Gén. Sci. Phy. 7:193. 1820; Steudel, Nom. Bot. ed. 2, pt.2:635. 1841; — pro syn.; Baudo in Ann. Sci. Nat. II. 22:346. 1843; A. Gray in Proc. Am. Acad. Arts Sci. 12:63. 1877; Syn. Fl. 2. pt.1:61. 1878; Macoun, Cat. Can. Pl. 2:313. 1884; Coulter, Man. Rocky Mt. Bot. 235. 1885; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 330. 1889; Britton & Brown, Illustr. Fl. N. U.S. 2:589. 1897; Chapman, Fl. S. U.S. ed. 3, 298. 1897; Pax in Engler & Prantl. Pflanzenf. 4. pt.1:113. 1889; Howell, Fl. Nw. Am. 1:436. 1903; Small, Fl. Se. U.S. 903. 1903; Piper in Contr. U.S. Nat. Herb. 11:448. 1906; Dalla Torre & Harms, Gen. Siphon. 390. 1907; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 646. 1908; Britton & Brown, Illustr. Fl. N. U.S. ed. 2, 2:712. 1913; Rydberg in Fl. Rocky Mts. 651. 1917; Fl. Pr. & Pl. 623. 1932; Small, Man. Se. U.S. 1024. 1933; Marie-Victorin, Fl. Laurent. 429. 1935; Douglas, Am. Jour. Bot. 23:207. 1936; Peck, Man. Pl. Oregon 551. 1941; Tidestrom & Kittell, Fl. Ariz. & N. Mex. 513. 1941; Bailey, Hortus sec. 706. 1947; Man. Cult. Pl. rev. ed. 785. 1949; Abrams, Illustr. Fl. Pac. States 3:332. 1951.

Borissa Rafinesque in l.c.

Ephemerum Reichenbach, Consp. 127. 1821; Fl. Germ. Exc. 409. 1831. —Non [Tourn.] Moench 1794, nec Hampe 1837.

Godinella Lestiboudois, Bot. Belg. 2:194. 1827.

Coxia Endlicher, Gen. Pl. 2:739. 1839.

Tridyra Rafinesque ex Steudel, Nom. Bot. ed. 2, pt.2:84. 1841, — pro syn., sphalm.

Lysimandra Reichenbach, Nom. 124. 1841.

Anagzanthe Baudo in op. cit. 347, — nom. nud.

Bernadina Baudo in op. cit. 348, — nom. nud.

Apochoris Duby in op. cit. 67; Bentham & Hooker, Gen. Pl. 2:635. 1876; Pax in l.c. Kuntze, Rev. Gen. pt.2. 397. 1891; Dalla Torre & Harms, l.c.

Theopyxis Grisebach in Goett. Abh. 6:126. 1856.

Lysis (Baudo) Kuntze in l.c.

Nummularia [Gron.] Kuntze in op. cit. 398, — non Rev. ex Rupp. Gilibert 1781.

Lysimachiopsis Heller in Minn. Bot. Studies 1:874. 1897.

Dugezia Montrouzier ex Beauvisage in Ann. Soc. Bot. Lyons 26:83. 1901, — nom. nud.

Woody or herbaceous, rhizomatous, often punctate perennials; stems erect, decumbent or repent, simple or branched; leaves simple, entire, alternate, opposite or verticillate; flowers solitary, verticillate, racemose or in axillary umbels, terminal racemes, spikes, or clusters; flowers hypogynous, actinomorphic, pentamerous, hexamerous, or rarely polymerous; calyx imbricate or valvate, generally herbaceous, persistent, somewhat accrescent, deeply parted; corolla rotate or crateriform-campanulate, deeply parted, tube very short, the lobes convolute or individually supervolute; stamens obdiplostemonous, adnate to the corolla, antese-palous staminodia sometimes present, filaments almost distinct or monodelphous, equal or unequal; anthers cordate-oblong or ovoid, basifixed or semi-versatile; placentation free-central; ovules few to many; style slender, stigma slightly enlarged at apex; capsule ovoid to globose, dehiscent usually by five valves, rarely indehiscent; seeds few to many, oblong, orbiculate or angular, sometimes margined or winged; embryo in evident endosperm.

About 160 species, the greatest number (about 90) in China. Also represented in other Asian regions, as well as Australia, Africa, Europe, North America, and South America.

Type species: *Lysimachia vulgaris* L.

KEY TO THE SUBGENERA REPRESENTED IN AMERICA

- A. Corolla yellow B.
- AA. Corolla white D.
- B. Flowers with evident staminodia; corolla lobes supervolute, each enclosing a stamen, erose and apiculate; leaves epunctate. Indigenous in North America north of Mexico. Subgenus I. *Seleucia*
- BB. Flowers without evident staminodia (occasional vestiges on staminal tube sinus); corolla lobes imbricate, entire, rarely glandular ciliate; leaves punctate. Indigenous and introduced plants. C.
- C. Flowers axillary or in terminal racemes or panicles; flowers 5- to 7-merous, usually pentamerous; corolla lobes lanceolate to orbicular. (*L. x commixta*, an intersubgeneric hybrid, may be sought here). Subgenus II. *Lysimachia*
- CC. Flowers in pedunculate, dense, axillary racemes; flowers 4- to 9-merous, corolla lobes linear to lanceolate. Subgenus III. *Naumburgia*

D. Inflorescence umbellate or flowers solitary in leaf axils, calyx valvate, staminal tube short, almost distinct, membranous, filaments long-filiform, anthers elliptical; style filiform, seeds membranous winged. Indigenous in the montane regions of Mexico, Central America, and South America

Subgenus IV. *Theopyxis*

DD. Inflorescence dense, terminal, spike-like racemes, calyx intricate, staminal tube adnate to corolla tube, not membranous, filaments short, anthers linear, style short, thick. Plants of cultivation, rarely becoming naturalized

Subgenus V. *Palladia*

A. Subgenus I. SELEUCIA Bigelow

Steironema Rafinesque in Ann. Gén. Sci. Phy. 7:193. 1820, — as a genus.

Seleucia Bigelow in Fl. Bost. ed. 2, 74. 1824, — as a subgenus.

Lysimandra Endlicher, Gen. Pl. 2:732. 1839, — as a section.

Lysimastrum sensu Duby in DeCandolle, Prodr. 8:63. 1844, — non Endlicher 1839, as a section, p.p.

Steironema (Raf.) A. Gray, Man. Bot. 283. 1848; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:24. 1866; A. Gray, Man. Bot. ed. 5, 315. 1868. — As a section.

Steironema (Raf.) Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:80. 1928; in Hannig & Winkler, Pflanzenareale 2. pt.5:39, map 45. 1929. — As a subsection.

Erect or decumbent, glabrous or glandular-puberulent perennial herbs; stems simple, or in more vigorous individuals branched above with a transition from medial opposite leaves to upper subverticillate and bractiform ones; flowers axillary, nutant, pentamerous; calyx valvate; corolla lobes supervolute, each enclosing one stamen, deeply parted; corolla rotate or nearly so, yellow, the base of lobes, tube, and filaments with yellow gland-tipped trichomes, the lobes erose and apiculate; stamens almost distinct, anther-bearing filaments linear, alternate with lanceolate to somewhat ovate staminodia on a common line of adnation with the corolla tube, filaments subequal; anthers becoming arcuate; ovary sparingly pubescent with gland-tipped trichomes, ovules numerous, style slender, capsule subglobose to ovoid, seeds several to many, trigonal, rufescent with a finely reticulate covering. Five species native of temperate North America north of Mexico.

Type species: *Lysimachia ciliata* L.

KEY TO THE SPECIES OF SUBGENUS SELEUCIA

- A. Lateral nerves of the leaves evident; blades thin, petiolate or sessile, the form and ciliation various. B.
 B. Plants erect (rarely reclined in 3b), flowers, fruit, and seed large (calyx lobes 3–8 mm. long, corolla lobes 4–12 mm. long, capsules 3–5.5 mm. long, seed 1.2–2.4 mm. long). C.

- C. Leaf blades ovate to ovate-lanceolate, bases rounded to subcordate rarely obtuse, petioles always distinct. D.
- D. Petioles conspicuously ciliate to the blade, leaf margins ciliate, blades not glandular-puberulent. 1. *L. ciliata*
- DD. Petioles ciliate at base, rarely sparingly so to the blade, leaf margins papillate, blades glandular-puberulent, especially beneath along midrib and veins. 2. *L. tonsa*
- CC. Leaf blades narrow-lanceolate, elliptic or linear, sessile or if petiolate the bases attenuate to somewhat rounded (3. *L. lanceolata*) E.
- E. Basal rosettes from slender, smooth rhizomes; stems erect, slender, usually less than 4 mm. in diameter at base, and 4-angled above; leaves heteromorphous, usually persistent to base of stem, medial ones sessile to subsessile, linear to elliptic, rarely lanceolate to oblanceolate, green above, pale beneath. Plants usually of drier habitats. 3a. ssp. *lanceolata*
- EE. Basal rosettes sessile or subsessile, not usually from slender rhizomes; stems erect (rarely reclined), usually robust, more than 4 mm. at base, not evidently 4-angled above; leaves not heteromorphous, not usually persistent below, medial ones petiolate, linear to lanceolate, green above and beneath. Plants usually of moist habitats. 3b. ssp. *hybrida*
- BB. Plants weakly erect, becoming decumbent or reclining, rooting at nodes; flowers, fruit, and seed small (calyx lobes 3-4 mm. long, corolla lobes 3-5 mm. long, capsules 3 mm. long, seeds 1-1.5 mm. long) 4. *L. radicans*
- AA. Lateral nerves of the leaves obscure; blades sessile, firm, linear, sparsely ciliate at base. 5. *L. quadriflora*

1. *LYSIMACHIA CILIATA* Linnaeus

(Plate I)

Lysimachia ciliata Linnaeus, Sp. Pl. 147. 1753; Walter, Fl. Carol. 92. 1788; Lamarck, Encycl. 3:571. 1791; Tabl. Encycl. 1:440. 1792; Michaux, Fl. Bor. Am. 1:126. 1803; Muhlenberg, Cat. Pl. Am. Sept. 20. 1813; Pursh, Fl. Am. Sept. 1:136. 1814; Nuttall, Gen. N. Am. Pl. 1:121. 1818; Rafinesque in Ann. Gén. Sci. Phy. 7:193. 1820; Steudel, Nom. Bot. 501. 1821; Elliott, Sketch Bot. S. C. & Ga. 1:233. 1821; Torrey, Fl. N. & M. U.S. 1:210. 1824; DUBY in DeCandolle, Prodr. 8:64. 1844; A. Gray, Man. Bot. 283. 1848; Wood, Class-book 386. 1853; Chapman, Fl. S. U.S. 280. 1860, — exclud. var.; Provancher, Fl. Can. 1:384. 1862; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:25. tab. 13. 1866; Knuth in Engler, Pflanzenr. pt.237:276. 1905; Thenen, Phyl. Prim. 98. 1911; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:80. 1928; Fernald in A. Gray, Man. Bot. ed. 8, 1142. 1950.

Steironema ciliatum (L.) Baudo in Ann. Sci. Nat. II. 22:346. 1843; A. Gray in Proc. Am. Acad. Arts Sci. 12:62. 1877; Syn. Fl. 2. pt.1:61. 1878; Macoun, Cat. Can. Pl. 2:313. 1884; Chapman, Fl. S. U.S. ed. 3, 298. 1897; Small, Fl. Se. U.S. 904. 1903; Piper in Contr. U.S. Nat. Herb. 11:448. 1906; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 646. 1908; Coulter & Nelson, New Man. Rocky Mt. Bot. 377. 1909; Britton &

Brown, *Illustr. Fl. N. U.S.* ed. 2, 2:713. fig. 3292. 1913; Rydberg, *Fl. Rocky Mts.* 651. 1917; House, *Mem. No. 15. N.Y. State Mus.* 2:tab. 162. 1918; Tidestrom in *Contr. U.S. Nat. Herb.* 25:411. 1925; Rydberg, *Fl. Pr. & Pl.* 624. 1932; Small, *Man. Se. Fl.* 1025. 1933; Marie-Victorin, *Fl. Laurent.* 429. fig. 144. 1935; Douglas in *Am. Jour. Bot.* 23:207. 1936; Tidestrom & Kittell, *Fl. Ariz. & N.Mex.* 513. 1941; Bailey, *Hortus sec.* 706. 1947; *Man. Cult. Pl. rev. ed.* 784. 1949; Abrams, *Illustr. Fl. Pac. States* 3:332. fig. 3748. 1951.

Nummularia ciliata (L.) Kuntze, *Rev. Gen.* 1:398. 1891.

Lysimachia grandiflora Nuttall in sched. ex Knuth in l.c., — pro syn.

Steironema ciliatum var. *occidentale* Suskendorf in *Allg. Bot. Zeitschr.* 12:26. 1906; Piper, op. cit. 614.

Steironema pumilum Greene, *Leaflets Bot. Obs. & Crit.* 2:111. 1910; Rydberg, *Fl. Pr. & Pl.* 624. 1932; Bailey, *Hortus sec.* 706. 1947. — Non Franch. 1895.

Steironema membranaceum Greene, l.c.

Steironema pumilum var. *longipedicellatum* Lunell in *Am. Midl. Nat.* 2:157. 1912; Rydberg, l.c.

Steironema longipedicellatum (Lunell) Lunell in *Am. Midl. Nat.* 4:504. 1916.

Lysimachia membranacea (Greene) Handel-Mazzetti in l.c.

Lysimachia greeneana Handel-Mazzetti in l.c.

Lysimachia longipedicellata (Lunell) Handel-Mazzetti in l.c.

Simple, erect plants, sometimes branched above 5(1)–10 dm. tall; rhizomes few, slender, rather elongate; stem apparently glabrous but upper part, especially the nodal regions and pedicels, glandular-puberulent; petioles 0.5–5 cm. long, canaliculate, winged and conspicuously ciliate to the blade; medial leaves opposite, thin, glabrous, lighter beneath, ovate to ovate-lanceolate (rarely lanceolate), 5–15 cm. long, 2.5–6.5 cm. wide, reduced above, base rounded to obtuse, sometimes subcordate, apex acute to acuminate, rarely obtuse, margin evidently ciliate near base to finely ciliate toward apex because of 1–2 irregular rows of short, blunt trichomes, veins arcuate, connecting at the margin; flowers solitary in upper leaf axils; pedicels ascending to erect, 1.5–4.5(7) cm. long, glandular-puberulent; calyx tube short, about 1 mm. long, lobes lanceolate, entire, 3.5–8 mm. long, 1.5–3 mm. wide, with 3(5) branched, reddish-brown nerves, apex acuminate, glandular-puberulent with scattered stalked glands, persistent, usually longer than the capsule; corolla yellow, rotate to saucer-shaped, densely yellow glandular within, tube short, flat, 1–2 mm. long, sometimes with red blotches at base of lobes, lobes obovate, glabrous beneath, 8(5)–12 mm. long, 5–9 mm. wide, erose near the apex, apiculate; stamens almost distinct, filaments 1.9–2.5 mm.

long; anthers linear, 2–2.8 mm. long; staminodia 1–2 mm. long, triangular to subulate, glandular, almost hyaline; ovary globose to ovoid, 1–1.2 mm. in diameter, minutely glandular-puberulent at style base, style 3.5–5 mm. long, persistent, tip slightly swollen, stigmatic surface with minute hyaline trichomes; ovules numerous, minutely papillate; capsule subglobose to ovoid, glabrous, 3.5–5.5 mm. in diameter; usually exceeding calyx; seeds many, 1.9–2.2 mm. long, trigonal, rufescent, finely reticulate, outer surface flattened to convex, adjacent surfaces concave.

Type locality: "Habitat in Virginia, Canada." Linnaeus (1753).

Distribution: Damp woods, bottomlands, thickets, stream banks, open meadows, and occasionally along roadsides; Nova Scotia and Quebec to southern British Columbia, southward to Oregon, New Mexico, and Florida. Flowering period: June–August. Map 1.

Nova Scotia. Queens-Lunenburg: damp thickets near Lahave River, Bridge-water, *Fernald & Long* 24337 (CAN). Shelbourne-Yarmouth: alder thicket, Yarmouth, *Fernald, Long & Linder* 22247 (CAN, NY).

New Brunswick. Charlotte: damp thicket, near Grand Harbor, *Weatherby & Weatherby* 57735 (CAN). Restigouche-Madawaska: damp thickets, Campbellton, *Chalmers* July 1878 (CAN). St. John-Albert: cemetery, St. John, *Edwards* July 1886 (NY). York-Sunbury: roadside, sandy-loam, 1 mi. e. of N.F.P. Camp, beside Richibucto Road, near Fredericton, *McKenney* 5 June 1931 (NY).

Quebec. Bellechasse: sur les rivages estuariens, Berthier-en-bas, *Marie-Victorin, Rolland-Germain, & Meilleur* 44134 (FM). Charlevoix-Saguenay: Ste. Anne de Beaupré *Macoun* 30 August 1905 (CAN). Hull: Gatineau Bridge, *Macoun* 30 June 1911 (CAN). Jacques Cartier: marécage à *Scirpus cyperinus*, Senneville, *Marie-Victorin & Rolland-Germain* 33911 (NY). Lake St. John: Lake St. John, *Allen* 1890 (NY). Laval-Two Mountains: damp thickets, Ste. Rose, *St. Cyr* 5 July 1889 (CAN). Quebec-Montmorency: zone intercotidale des rivages estuariens, St. John, *Marie-Victorin et al* 60024 (CAN). Shefford: marécage, Granby, *Fabius* 290 (NY).

Maine. Cumberland: Westbrook, *Ricker* 684 (US). Kennebec: wet ground, along Kennebec River, *Fassett* 3764 (DUKE). Oxford: Buckfield, *Allen* 11 August 1893 (DUKE). Penobscot: low grassland, Orono, *Harvey & Harvey* 649 (US). Piscataquis: gravelly thicket, Dover-Foxcroft, *Fernald* 289 (MINN, NY, US). York: gorge, South Berwick, *Neal* 397. (MINN).

New Hampshire. Cheshire: roadside, Jaffrey, *Deane* September 1890 (US). Coos: low ground by river, Shelbourne, *Deane* 3 October 1915 (US). Grafton: Pine Park, Hanover, *Stewart* 4409 (NY) East Hebron, *Wilson* 18 July 1917 (NY).

Vermont. Addison: damp soil, Leicester, *Dutton* 8 July 1923 (DUKE, FM). Bennington: Manchester, *Day* 123 (US). Caledonia: West Barnet, *Blanchard* 25 July 1892 (FM, NY). Chittenden: moist thickets, Burlington, *Charette* 442 (NY); Shelbourne, *Deane* 3 August 1883 (NY). Orange: Newberry, *Onslow* 31 July 1923 (NY). Rutland: swamp, Proctor, *H.J.B.* 269 (NY). Windham: Newfane, *Howe* 9 July 1891 (NY); in open meadow, Jamaica, *Moldenke & Moldenke* 9932 (ILL, MINN, NY). Windsor: shore of river, Woodstock, *Kittredge* 1 August 1936 (NY).

Massachusetts. Berkshire: meadow, near Ward's Pond, Becket, *Jones & Jones 16108* (ILL); vic. of Tyringham, *Vail 10 July 1897* (NY); vic. of Great Barrington, *Pollard 1 August 1894* (US). Essex: Danvers, *Chamberlain* (NY). Franklin: moist thicket, Leverett, *Smith 12* (ILL,NY). Hampden: Holyoke, *Earle 2 July 1877* (NY); swampy woods, Southwick, *Seymour 235* (DUKE, NY). Hampshire: Chesterfield, *Goodale & Markert 59383* (DUKE). Plymouth: shady spot, Manomet, *Seymour 5242* (DUKE). Worcester: Worcester, *Edmondson 1465* (NY).

Connecticut. Fairfield: Hawleyville, *Morong 23 July 1883* (NY); vic. of Green's Farms, *Pollard 159* (US). Hartford: vic. of Kensington, *Waterman 1874* (US). Litchfield: marshy bank, Washington, *Clarke July 1892* (NY); Roxbury, *Denslow 3* (NY). New London: Lebanon, *Denslow 18 July 1932* (NY). Tolland: Ellington, *Pease July 1875* (NY). Windham: South Woodstock, *Denslow 19 July 1937* (NY).

New York. Bronx: Bronx Park, *Nash 27 June 1896* (NY); McLean Woods, Bronx, *Holtzoff 5 August 1920* (NY). Broome: upper Susquehanna, Binghamton, *Clute 1895* (NY). Cattaraugus: Quaker Run, Allegany Park, *Johnson 3244* (NY). Chenango: Oxford, *Coville 10 July 1884* (US). Delaware: vic. of North Harpersfield, *Topping 218* (ILL,US); Arkville, *Wilson 4 July 1915* (NY). Dutchess: low pasture, vic. of Clove, *Standley & Bollman 12339* (US). Erie: Ebenezer, *Johnson 9 July 1921* (NY). Greene: Hotaling Island, Hudson River, New Baltimore, *Taylor 1353* (NY); New Baltimore, *Taylor 1241* (NY). Genesee: low grounds, *Pavilion* (ILL). Hamilton: wet slope, Indian Lake, *Lambert 98* (CAN). Monroe: low sandy soil bordering marsh, Mendon Ponds Park, *Matthews 3191* (CNC). New York: Kingsbridge, *Leggett 15 August 1862* (NY); Mosholu Parkway, New York, *Edmondson 1487* (NY). Niagara: Niagara Falls, *Schneck 7 July 1898* (ILL). Oneida: wet thicket along edge of swamp, Oneida, *Maxon 13 August 1895* (NY). Orange: wet ground, Middlehope, *Barnhart 140* (NY); Mambasha Lake, *Denslow 19 July 1922* (NY). Oswego: Salmon River, *Britton 8 September 1900* (NY). Otsego: Middlefield, *Gilman 1867* (NY). Queens: Kew Gardens, *Ferguson A-1* (NY); Jamaica, *Ferguson 7731* (NY); Woodside, *Ferguson 1677* (NY). Rensselaer: Schaghticoke, *Banker August 1899* (NY). Richmond: *Hollick 15 July 1879* (NY). St. Lawrence: low moist ground, Norfolk, *Phelps 773* (US). Suffolk: Greenport, *Ferguson 29 August 1920* (NY). Tompkins: McLean Bog, Ithaca, *Drushel 5329* (ILL). Ulster: roadside, Mt. Zion, near Marlboro, *Barnhart 156* (NY); Ulsterville, *Rusby 28 August 1896* (NY). Warren: Lake George, *Matrons 1894* (NY). Westchester: Pelham Park, *Clute 12 July 1899* (NY); wet woods, Yonkers, *Gleason 1388* (NY).

New Jersey. Bergen: thickets, Fairview, *VanSickle 26 June 1893* (US); Harrington Park, *Pollard 4 July 1893* (US). Burlington: Kinkora, *Taylor 2547* (NY). Camden: Woods, Gibbsboro, *Whitte 12 July 1930* (NY). Middlesex: Milltown, *Vail 18 June 1887* (NY); Houghtonville, near Woodbridge, *Light-hipe 16 June 1891* (NY). Monmouth: Farmingdale, *Taylor 2166* (NY). Morris: open woods, Chatham, *Mackenzie 233* (NY). Somerset: Glenside Avenue above Surprise Lake, Watchung Reservation, *Kezer 30 June 1936* (NY); swampy thickets, Rocky Hill, *Mackenzie 8383* (NY); moist rich woods, "Second Mountain," Watchung, *Moldenke 1317a* (ILL,NY). Sussex: Stockholm, *VanSickle June 1893* (US); hills, nw. of Lake Hopatcong and Bear Pond, *Rydberg 4 July 1917* (NY). Warren: near Delaware River, Phillipsburg, *Small 15 August 1890* (FM).

Pennsylvania. Allegheny: border of stream, Hurts Run, *Shafer* 716 (FM). Berks: rich woods, e. slope, Gibraltar Hill, *Meredith* 14 June 1922 (NY). Butler: thicket, Thom Creek, near McBride, *Bright* 6888 (MINN). Centre: *Buckhart* June 1892 (FM). Lackawanna: wet woods, se. of Milwaukee, *Glowneke* 8177 (MINN). Chester: woods, Westtown, *Pennell* 11259 (NY). Lancaster: at mouth of Tucquan, *Heller & Halbach* 1041 (FM,NY,US). Montgomery: banks of Schuylkill, *Parker* 17 July 1864 (NY). Northampton: near Bethelam, *Moser* August 1832 (NY); Easton, *Tyler* 16 July 1896 (NY). Perry: vic. of Marysville, *Small* 4 July 1888 (US). Westmoreland: edge of lake, 3 mi. e. of New Alexandria, off Route 22, *Henry* 615 (FM,US). Wyoming: Factoryville, *Granger* 6 July 1894 (NY). York: vic. of McCalls Ferry, *Rose & Painter* 8199 (US).

Delaware. Sussex: near Georgetown, *Schott* 25 June 1889 (FM).

Maryland. Allegany: Wills Creek, *Shreve & Jones* 992 (US); Cumberland, *Shriver* 7 August 1891 (NY). Garrett: low grounds, Oakland, *Smith* 870 (US); *Smith* 2 August 1878 (US). Harford: shore of Chesapeake Bay, ½ mi. sw. of Havre de Grace, *Shull* 59 (NY). Howard: Ellicott City, *Arsen* 623 (NY). Montgomery: muddy shore, Plummer's Island, in Potomac River, near Cabin John, *Standley* 13116 (NY).

District of Columbia. vic. of Washington, *Kearney* 9 August 1897 (CNC).

West Virginia. Jackson: near fairgrounds, *WVU Bot. Exp.* 27 June 1930 (DUKE). Mercer: low moist ground, Lake Shawnee, *Boggess* 241 (DUKE). Randolph: Dry Fork River, near Harman, *Greenman* 237 (FM). Sommers: along Blue Stone River, *Berkley* 1108 (MO). Upshur: near Bucklin, *Pollock* 16 July 1894 (US); *Pollock* 6 July 1897 (US). Wirt: Lake Kananha River, *Millsbaugh* 350 (NY).

Virginia. Campbell: vic. of Lynchburg, *Britton, Britton, & Vail* 1 July 1892 (NY). Fauquier: moist woods, 2 mi. n. of Hopewell Gap, w. slope of Bull Run Mts., *Allard* 1768 (NY); low ground in second-growth locust woods below High Point, w. slope of Bull Run Mts., *Allard* 7798 (NY). Giles: wet banks, flood plains, Glenlyn, *Core* 3003 (NY). James City: Williamsburg, *Grimes* 3664 (MINN). Madison: Big Meadows Swamp, Shenandoah National Park, *Walker* 2558 (US). Nansemond: wet woods, Suffolk, *Gleason* 8597 (NY). Prince George: swampy woods, bottomland of Powell's Creek, Garysville, *Fernald & Long* 8409 (DUKE). Roanoke: moist meadow, Bottom Creek, *Wood* 3274 (MINN). Smyth: Middle Fork of Holston River, Marion, *Small* 6 July 1892 (FM,MINN,NY). Southampton: wooded bottomland, Meherrin River, se. of Branchville, *Fernald & Long* 10383 (NY,US). Washington: stream bank, 1 mi. e. of Damascus, *Radford & Radford* 2626 (CNC).

North Carolina. Alexander: meadow near Blue Ridge Parkway, *Radford & Stewart* 1665 (CNC). Buncombe: low grounds, Biltmore, *Biltmore* 3477b (CNC,MINN,MO,NY). Durham: moist soil, along streams, Durham, *Blomquist* 4566 (DUKE). Haywood: Lake Junaluska, *Blomquist* 4570 (DUKE). Henderson: bog, 5 mi. e. of Hendersonville, *Caughey* 671 (DUKE). Madison: stream banks, 1½ mi. n. of Democrat, *Radford* 1 July 1946 (CNC). Mitchell: Roan Mt., 1800 m., *Merriam* 14 August 1892 (US); flank of Roan Mt., *Smith* 16 July 1880 (US). Orange: opposite entrance to Forest Theater, Battle Park, Chapel Hill, *Setzer* 23 May 1938 (NY); Upper New Hope, *Blomquist & Oosting* 4567 (DUKE). Randolph: bank of Bush Creek, *Correll* 737 (DUKE). Surry: Mt. Airy, *Rusby* 20 June 1909 (NY). Watauga: shady road bank, s. of

Ashe-Watauga line, *Fox & Godfrey 3379* (MINN). Wilkes: along road near Alexander Co. line, *Radford & Stewart 1624* (CNC).

South Carolina. Berkeley: margin of woods, near Pinopolis, *Martin 1806* (DUKE). Darlington: rich woods, near Darlington, *Smith 580* (CNC). Pickens: low woods, Calhoun, *House 3490* (NY). Williamsburg: rich woods, 10 mi. se. of Gourdin, *Godfrey & Tryon 431* (DUKE,FM,NY,US).

Georgia. Clarke: wet woods, *Harper 28 May 1897* (NY); bank of Bobbin Mill Creek, Athens, *Perry 993* (NY). Fannin: Blue Ridge Mts., *Smith 2467* (FM). Gwinnett: Yellow River, near McGuire's Mill, *Small 1 July 1893* (FM). Haralson: near Tallapoosa, *Way 1* (US).

Florida. "West Florida," *Collector not determined* (NY).

Ontario. Bruce: banks of creek, Stokes Bay, *Krotkov 9319* (NY). Carleton: open grassy area near Rideau River, Junction Gore, *Minshall 266* (NY). Cochrane: buisson humide, Natabiska Point, James Bay, *Dutilly & Lepage 15390* (CAN). Elgin: open woods, Aylmer, *Harrington 1443* (CAN). Hastings: swamp border, near Belleville, *Macoun 12 July 1871* (CAN). Huron North: stream banks, Wingham, *Morton 20 July 1890* (CAN). Lanark: Almonte, *Fowler 11 July 1898* (FM,US). Ottawa: *Rolland 127* (US). Parry Sound: grassy plot off bay, Georgian Bay Islands, opposite Shawanaga twp., *McDonald 447* (CAN,US). Prescott: sandy shore, Longueuil twp., Ottawa River, 4 mi. w. of L'Original, *Senn 1611* (NY). Port Arthur-Thunder Bay: low ground, Jackfish, *Hosie, Losee, & Bannan 1853* (CAN).

Michigan. Allegan: low ground, *Herron 3 July 1891* (Minn). Alpena: moist rocky beach of Lake Huron and adjacent beach thickets, Alpena, *Gleason 9899* (NY). Berrien: low swampy woods, Harbert, *Johnson 1171* (FM). Cheboygan: Douglas Lake, *Swallen July 1924* (US); grassy part of *Thuja* bog, Douglas Lake, *Gates & Gates 9791* (ILL). Ingham: Lansing, *Toumey 26 July 1890* (US). Jackson: *Camp & Camp 15 July 1897* (FM, MINN). Keweenaw: swamps, *Farwell August 1904* (NY). Presque Isle: mouth of Rainy River, Black Lake, *Gleason 31 July 1933* (DUKE). Tuscola: wet meadow, near shore of Lake Huron 9 mi. e. of Bay City, *Gleason 9927* (NY). Wayne: low grounds, *Farwell July 1892* (NY).

Wisconsin. Brown: *Schuetz 1886* (FM,NY). Buffalo: Fountain City, *White 11 July 1889* (MINN). Dane: Stewarts Woods, *Bakker 202* (ILL). Door: Egg Harbor, *Schuetz 6 July 1882* (FM). Douglas: Wisconsin Point, *Horton 13 August 1936* (MINN). Milwaukee: Milwaukee, *Hasse* (NY). Polk: 5 mi. n. of St. Croix Falls, *Benner & Benner 140* (MINN). Racine: Ives, *Wadmond 2816* (MINN). Walworth: marsh, Williamsbay, *Umbach 16 July 1898* (FM, US). Wood: Pittsville, *Colby 4524* (FM,US).

Minnesota. Big Stone: low lakeside meadow, 3 mi. n. of Ortonville, *Johnson 386* (NY). Brown: Sleepy Eye, *Sheldon 726* (MINN). Carlton: slate crevice, Jay Cook Park, *Lakela 3732* (MINN). Cass: wet woods, 6 mi. s. of Cass Lake, *Gleason 9496* (NY). Chippewa: Montevideo, *Moyer July 1885* (MINN). Chisago: *Taylor 1426* (MINN). Clearwater: headwaters of the Mississippi, Itasca Park, *Grant 2822* (MINN,US). Dakota: Minnesota River bottom, *Campbell July 1895* (MINN). Douglass: rr. prairie strip, n. of Garfield, *Moore & Jacobs 14718* (MINN). Goodhue: copses, Red Wing, *Sandberg July 1885* (MINN). Hearn's Waite Park, *Campbell July 1895* (MINN). Hennepin: Fort Snelling, *Mearns 457* (US). Houston: Spring Grove, *Rosendahl 630* (MINN). Hubbard: Benedict, *Bergman 3118* (MINN). Kanabee: Mora, *Shelton 2285* (MINN). Kandiyohi: Wilmar, *Frost 277* (MINN). Koochiching: Tilson Bay,

Rainy Lake, *Moore & Moore 11852* (MINN). Lake: wet meadow, Gooseberry Falls State Park, 15 mi. ne. of Two Harbors, *Gleason 9553* (NY). Lake of the Woods: poplar forest near Pine Creek, *Moore & Moore 10970* (MINN). Marshall: Warren, *Ballard 2776* (MINN). Mille Lacs: Milaca, *Shelton* July 1892 (MINN,US). Nicollet: Courtland, *Ballard 1057* (MINN). Olmstead: Rochester, *Ainslie 2816* (MINN). Pennington: along Thiel River, *Moyle 1315* (MINN). Pope: Glenwood, *Taylor 848* (MINN). Roseau: Creek bank near Dieter, *Moore & Moore 11948* (MINN). St. Louis: moist ground in open woods, Armstrong Lake, near Ely, *Jones 18137* (ILL); roadside, Duluth, *Lakela 2058* (NY). Scott: Prices Lake, *Ballard 569* (MINN). Stearns: St. Cloud, *Campbell* July 1896 (FM,MINN). Wabasha: moist thicket, Brooks Lodge, *Roberts 16* July 1904 (MINN). Winona: *Holzinger* July-October 1897 (MINN,NY).

Ohio. Columbiana: waste places, Salem, *Wilkinson 313* (US). Cuyahoga: ditches, etc., Berea, *Watson 4* July 1894 (ILL). Erie: Cedar Point, *Moseley 23* June 1894 (FM). Franklin: Columbus, *Hine 9* July 1890 (FM). Highland: *Roads 20* July 1941 (NY). Lorain: Pittsfield, *Ricksecker 10* July 1894 (US). Meigs: Salem twp., *Jones 1* July 1935 (NY). Pickaway: roadside ditches, *Dreisbach 16* August 1912 (FM). Portage: roadside ditch, nw. of Ravenna, *Bentley 18* (DUKE). Richland: Mansfield, *Wilkinson 27* June 1896 (DUKE, FM,MINN). Wayne: Killbuck Creek bottom, s. of Wooster, *Drushel 11648* (ILL).

Indiana. Carroll: Delphi, *Rose* July 1892 (US). De Kalb: banks of Cedar Creek, 3 mi. w. of Auburn, *Shoop 11* July 1933 (FM). Gibson: low rich bottomlands, near Gordon Hills, *Schneck 4* July 1900 (ILL); near mouth of White River, *Schneck 10* June 1890 (ILL). Howard: rr. 4 mi. nw. of Kokomo, *Ek 21* (US); Park Road, *Ek 5* July 1940 (NY). Jasper: roadside ditch, Carpenter twp., about 3 mi. ne. of Goodland, *Welch 87* (ILL). Jennings: sandy branch bank in woods, Hendricks' farm, *Hendricks 19* July 1941 (CNC). La Porte: low moist ground, Michigan City, *Mell 115* (US). Lawrence: low ground, along Mill Creek, near Mill Creek State Park, *Kriebel 849* (DUKE). Marion: rr. 4 mi. sw. of Maywood, *Friesner 9691* (FM,ILL,NY). Marshall: Lake Maxinkuckee, *Evermann 734* (US). Monroe: Bloomington, *Evermann 30* June 1888 (US). Montgomery: roadside, 9 mi. sw. of Crawfordsville, *Dean 17613* (NY). Parke: stream bank, Porter Dune Creek, *Peattie 2060* (FM). Turkey Run State Park, *Duncan 119* (DUKE). St. Joseph: Mishawaka, *Williamson* June 1891 (FM). Union: Liberty, *Rose* June 1886 (FM). Wells: woods in Lancaster twp., *Dean 20* July 1902 (US); woods, ½ mi. s. of Bluffton, *Dean 28* June 1903 (US).

Illinois. Adams: moist ground, 5 mi. s. of Camp Point, *Evers 5983* (INHS). Boone: C. & N. W. R. R., 1 mi. w. of Belvidere, *Fell & Fell 46471* (ILL,ISM). Calhoun: Miss. River bottoms, *Davis 2650* (MINN). Cass: along B. & O. R. R. w. of Ashland, *Fell & Fell f46683* (ILL,ISM); wet roadside, 4 mi. w. of Ashland, *Fuller 11822* (ILL). Champaign: Busey Woods, s. of Woodlawn Cemetery, Urbana, *Winterringer 443* (ILL); Sangamon River, near Mahomet, *Jones 12281* (ILL); *Seymour 16895* (ILL). Christian: Taylorville, *Andrews 30* June 1899 (ILL). Clark: woods along Rocky Branch, near Dolson, *Jones 12618* (ILL). Cook: low thickets, near Grand Crossing, *Hill 44* (ILL); thicket, Evanston, *Chase 6* July 1897 (ILL); alluvial soil, bottomland of Thorn Creek, Thornton, *Lansing 1364* (ILL). Coles: wet woods 3 mi. s. of Charleston, *Fuller 10662* (ISM). Cumberland: along road, ½ mi. of Neoga, *Rippey 12* July 1941

(ILL.) De Kalb: low open woods, Hopkins Park, De Kalb, *Whitford* 15 June 1946 (ILL). Douglas: woods along Kaskaskia River, 4 mi. w. of Arcola, *Winterringer* 615 (ILL). Du Page: rr. w. of Wheaton, *Moffatt* 490 (ILL). Edgar: wet woods 5 mi. s. of Kansas, *Fuller* 10583 (ISM). Effingham: prairie strip, 9 mi. s. of Effingham, *Ahles* 2635 (ILL). Fayette: along Dismal Creek, ne. of Farina, *Odell* 306 (ILL). Franklin: wet woods, near Christopher, *Jones* 12163 (ILL). Fulton: moist original prairie, Canton, *Chase* 10590 (ILL). Hamilton: swampy area, 2 mi. s. of Dale, *Evers* 5070 (INHS,ISM). Iroquois: along I. C. R. R., 3 mi. s. of Onarga, *Franklin* 4 July 1949 (ILL). Jackson: dry low rich soil, oak thicket, near Sandridge, *McCree* 863 (ILL). Jersey: low ground, Pere Marquette State Park, *Link & Fuller* 237 (ISM). Kankakee: shore, Kankakee River, 8½ mi. nw. of Kankakee, *Boewe* 2 July 1942 (ISM). Lake: thickets, near Chicago, *Moffatt* 212 (MINN). La Salle: Starved Rock State Park, *Thone* 16 (ILL). Livingston: moist woods near river, Pontiac, *Fuller* 9133 (ILL). Logan: along rr. 3 mi. w. of Lincoln, *Winterringer* 324 (ILL). McDonough: low ground, Spring Lake, *Myers* 837 (ISM). McHenry: Algonquin, *Nason* 13 July 1878 (ILL). Macon: Decatur, *Mills* 4 July 1940 (ILL). Macoupin: Carlinville, *Andrews* 26 June 1889 (ILL). Mason: edge of woodland, s. of Wolf Lake, *Ahles* 2982 (ILL). Menard: Athens, *Hall* 30528 (ILL). Ogle: wet woodland, White Pines Forest State Park, *Hills* 3372-0 (ISM). Peoria: damp woodlands, Peoria, *McDonald* July 1889 (ILL). Piatt: Lodge Park, *Winterringer* 442 (ILL). Pike: Mississippi Bottoms, Shepherd, *Davis* 3028 (ILL). Putnam: moist original prairie, Putnam, *Chase* 11261 (ILL). Richland: wet ditch, 3½ mi. n. of Olney, *Scherer* 242 (ILL). St. Clair: edge of thicket, vic. of Falling Springs, *Neill* 1264 (ISM). Sangamon: wet fields, Springfield, *Fuller* 5319 (ILL). Schuyler: bottomland roadside, Fredrick, *Chase* 11335 (ILL). Stark: moist bank, Valley twp., *Chase* 9 July 1894 (ILL). Stephenson: swampy woodland, wet prairies, near Freeport, *Serf* 9856 (ISM). Tazewell: flood plain, along Illinois River, 4 mi. n. of East Peoria, *Ray* 1299 (ILL); Spring Mill Bog, *Chase* 8870 (ILL,INHS,MINN). Union: wet bottomlands of the Mississippi River, near Wolf Lake, *Gleason* 9019 (NY); wet fields, Wolf Lake, *Fuller* 698 (ILL). Vermilion: along Middle Fork of Vermilion River between Oakwood and Collision, *Jones* 14352 (ILL). Wabash: Mt. Carmel, *Schneck* 1 October 1875 (ILL); along Zimmerman's Bluff, *Shearer* 4 July 1901 (ILL). Washington: Irvington, *French* 1876 (US). Winnebago: low prairie, 2½ mi. ne. of Shirland, *Fell & Fell* f46509 (ILL).

Kentucky. Carter: muddy stream bank, e. of Tygarts River, near Cascade Caverns, *Smith, Hodgdon, Gilbert, & McCoy* 3519 (US). Fayette: damp places, Lexington, *Peter* June 1833 (NY). Union: near McCotrey School, *Schaclette* 383 (NY). Warren: moist thickets, along Route 31-E, near Barren River, *Gleason* 8865 (NY); along stream, Bowling Green, *Price* 10 July 1895 (NY). County not determined: *Short* 1840 (NY).

Tennessee. Carter: summit of Roan Mt., *Britton* 10 September 1885 (NY). Cocke: French Broad River, between Paint Rock and Del Rio, *Kearney* 830 (CNC,MINN,MO,NY,US). Knox: banks of stream, Knoxville, *Ruth* 784 (NY).

Alabama. Clay: near Idaho mine, *Mohr* 31 July 1896 (MO). Coosa: *Earle* 924 (NY). Lauderdale: low damp banks, rivulets, Barrens, *Mohr* June 1892 (US). Lee: Auburn, *Earle* 31 May 1896 (NY); Auburn, *Earle & Baker* 8 June 1897 (NY,US).

Iowa. Allamakee: wet soil, *Fitzpatrick & Fitzpatrick* 7 July 1895 (NY). Black Hawk: moist soil, river flat, Cedar Falls, *Burk* 790 (ILL). Boone: wet

meadow, sw. of Luther, *Hayden* 7209 (MINN). Clay: seasonally inundated moist soil, near bridge, Lost Island Lake, Freeman twp., *Hayden* 11418 (US). Clayton: McGregor, *Pammel* 10 Aug. 1927 (MINN). Decatur: near streams, *Ames* 4 June 1855 (ILL). Emmet: *Cratty* 2 August 1882 & 10 September 1882 (US); low prairie n. of Four-Mile Lake, 3 mi. w. of Estherville, Emmet twp., *Hayden* 10159 (NY). Fayette: *Fink* 254a (US). Lyon: Ruck Rapid, *Pammel* 1 Sept. 1920 (MINN).

Missouri. Barry: banks of Kings River, 4½ mi. sw. of Viola, *Steyermark* 22507 (FM). Calloway: low woods along slopes, 3½ mi. w. of Reform, *Steyermark* 26180 (FM). Carter: Big Spring State Park, near Van Buren, *Steyermark* 1924 (FM). Crawford: *Woodson* 10 July 1926 (MO). DeKalb: prairie swales, 3 mi. w. of Santa Rosa, *Palmer & Steyermark* 41375 (NY). Gasconade: low slopes, along Gasconade River, 3 mi. nw. of Bay, *Steyermark* 27899 (FM). Greene: prairie, ne. of Springfield, *Standley* 9153 (US). Harrison: upland prairie, 6 mi. n. of Blythedale, *Steyermark* 40351 (FM). Jackson: low ground, Atherton, *Bush* 18 (NY); prairies, Lee's Summit, *Mackenzie* 6 July 1900 (NY). Jasper: wet open ground near Carthage, *Palmer* 21754 (NY). Laclède: *Moore* 13 July 1937 (FM). Lincoln: King's Lake, *Steyermark* 8957 (MINN). Linn: low grounds, 4 mi. sw. of Laclède, *Steyermark* 40437 (FM). Maries: base of limestone slopes, along Gasconade River, 7 mi. sw. of Vienna, *Steyermark* 27611 (FM). Miller: alluvial banks, along Osage River, w. of Capps, *Steyermark* 6842 (FM). Ozark: rocky woods, slopes of "Bald Jesse," near Gainesville, *Palmer* 34740 (US). Polk: damp sandy soil, vic. of Graydon Springs, *Standley* 9903 (US). St. Clair: meadow around lake, 3 mi. n. of Taberville, *Steyermark* 7588 (FM). Ste. Genevieve: base of slopes in thickets, 6 mi. ne. of Coffman, *Steyermark* 63579 (FM). Taney: alluvial woods, 4 mi. sw. of Protém, *Steyermark* 66389 (FM). Wright: wooded hillside, 1 mi. se. of Cedar Gap, *Lansing* 3088 (FM,ILL).

Arkansas. Benton: Decatur, *Plank* 1899 (NY). Crittenden: old drainage ditch, West Memphis, *Demaree* 11367 (MINN,MO,NY,US). Washington: wet open ground, Westfork, *Palmer* 8288 (US).

Manitoba. Brandon: Brandon, *Macoun* 17 July 1876 (CAN,NY). Macdonald: Aweme, *Criddle* 10 July 1926 (CAN). Neepawa: thickets, Oak Island, Reeve, *Morong* 1 September 1878 (NY).

North Dakota. Benson: wet meadows, Leeds, *Lunell* 17 July & 7 August 1911 (NY, TOPOTYPE of *Steironema pumilum* Greene); wet meadows, Leeds, *Lunell* 8 August 1911 (NY). Bottineau: Turtle Mts., *Wright* 20 August 1891 (NY). Burleigh: thicket, along Missouri River, near Bismarck, *Lunell* 23 August 1913 (FM,ILL). McHenry: Towner, *Lunell* 21 July 1908 (NY, ISO-TYPE of *Steironema membranaceum* Greene). McLean: Butte, *Lunell*, 26 June & 18 September 1911 (MINN). Morton: along streams, Glen Ullin, *Bergman* 2434 (MINN). Ramsey: copses, Devils Lake, *Lunell* 16 July 1902 (MINN). Rolette: wooded ravine, Dunsietta, *Lunell* 3 September 1911 (MINN). Ward: rich moist soil, Minot, *Lakela* 239 (MINN).

South Dakota. Brookings: riverside, Brookings, *Williams* 28 June 1894 (US); Brookings, *Carter* 17 July 1896 (NY). Custer: along stream, Custer, *Degener & Peiler* 16074 (NY); along French Creek, 15 mi. below Custer, 1200 meters, *Rydberg* 22 July 1892 (NY). Harding: thicket, *Over* 21 July 1920 (US); Lawrence: damp locations, Deadwood, *Rydberg* 48 (CAN,FM,MINN,NY,US); head of Blacktail Gulch, 1100 meters, *Murdoch* 3544 (NY). Meade: Black Hills, near Ft. Meade, *Forward* 251 (CAN,US). Minnehaha: riverbank,

Dell Rapids, near Big Stone Lake, *Johnson 51* (ILL,NY). Pennington: Rochford, 1700-1850 m., *Rydberg 11* July 1892 (NY,US). Washabaugh: moist thickets, Beer Creek, *Visher 2047* (FM).

Nebraska. Cass: low areas with willow on island, Platte River, 2 mi. ne. of Louisville, *Morrison 1208* (MO). Cedar: Aten, *Clements 2660* (MINN,US). Custer: Anselmo, *Webber 6* July 1889 (MO). Knox: Fort Niobrara, *Wilcox 25* June 1888 (NY). Saline: Crete, *Seigerest*, July 1889 (MINN).

Kansas. Douglas: roadside ditch, wet loam, 4 mi. n. of Lawrence, *Horr & Franklin E264* (DUKE,ILL,MINN); Lawrence, *Stevens* (US). Miami: along road, between Olathe and Pleasanton, *Rydberg & Inler 33* (NY). Riley: wet places, *Norton 322* (NY,US); Manhattan, *Norton 19* August 1892 (US).

Saskatchewan. Maple Creek: thickets, Cypress Hill, *Macoun 23* June 1894 (CAN). Melfort: open woodland, 7 mi. sw. of Tisdale, *Breitung 1753* (CAN). Prince Albert: ditches, low woods, Duck Lake, *Johnson 1457* (NY). Yorkton: Springside, *VanBlaricon 24* (FM). District not determined: *Paine 12760* (US).

Alberta. Calgary West: moist thickets, Elbow River Valley, Calgary, *Moodie 24* July 1913 (US); moist ground, thickets, Elbow River Valley, vic. of Calgary, *Moodie 88* (FM,NY). Macleod: east-facing slope of draw, near Pincher Creek, *Moss 12* (US); along Crows Nest Pass, *Macoun 27* July 1897 (CAN). Medicine Hat: Belly River, *Malte 30* July 1911 (CAN). Red Deer: moist ground, thickets, Red Deer Valley, 670-750 m., vic. of Rosedale, *Moodie 1093* (FM,MO,NY,US). Vegreville: shaded creek bank, e. of Fort Saskatchewan, *Turner 7320* (CAN).

Montana. Cascade: Great Falls, *Williams 216* (NY); Sand Coulee, *Anderson* September 1888 (US). Flathead: Bog Fork, *Butler 2105* (NY); Winiger Slough, 8 mi. sw. of Columbia Falls, *Rogers & Rogers 1112* (MO,NY); Flathead Valley, 1000 m., *MacDougal 770* (NY). Gallatin: low ground, Gallatin River, Bozeman, *Blankinship 345* (CAN,FM,US); Gallatin Valley, near Bozeman, 1650 m., *Rydberg 719* (NY). Jefferson: along stream, n. of Boulder, *Hitchcock & Muhlick 13681* (CAN). Lewis & Clarke: Helena, Ten Mile Creek, *Butler 23* July 1909 (NY); Augusta, *Wilcox 340* (US). Meagher(?): Sixteen Mile Creek, *Scribner 9* July 1893 (CAN). Missoula: Seeley Lake, *Marsh 336* (FM). Sweet Grass: McLeod, *Pope 38* (NY); Melville, *Wootton 17* August 1921 (US).

Idaho. Benewah: Chacolet Lake, *Stillinger 14* (US). Bingham: Snake Plains of Idaho, Pocatello, *Palmer 449* (US). Bonner: stream margin, MacAbee's Ranch, Priest River Valley, 600 meters, *MacDougal 74* (CAN,NY); Priest Lake, *Piper 3782* (US). Canyon: moist thickets, Falk's Store, *Macbride 317* (FM,ILL,MINN,MO,NY,US). Kootenai: Lake Coeur d'Alene, Farmington Landing, *Sandberg 580* (NY,US). Shoshone: slackwater, St. Joe River, 650 meters, *Leiberg 1285* (NY,US).

Wyoming. Albany: wet banks, Halleck Cañon, *Nelson 7392* (ILL,MINN,MO,NY,US); Laramie Peak, *Nelson 1582* (ILL,MINN,MO,NY,US). Crook: Devils Tower, *Williams 15* August 1897 (NY). Sheridan: Big Horn, 1850 meters, *Meed 2582* (NY); Bald Mt., *Nelson 18* (US); rolling plains between Sheridan and Buffalo, 1100 to 1700 meters, *Tweedy 3489* (NY). Weston: moist swales, Boyd, *Nelson 9438* (MINN,US).

Colorado. Alamosa: Alamosa, *Clements 120* (NY). Boulder: Boulder, 1700 meters, *Penard 513* (NY); plains & foothills, near Boulder, 1700 to 1850 meters, *Tweedy 4972* (NY). El Paso: Palmer Lake, *Dougan 28* August 1915 (ILL,MO); Black Forest, *Livingston 645* (DUKE). Huerfano: LaVeta, *Shear 3557*

(NY,US). La Plata: river bottomlands, Bayfield, *Payson* & *Bethel* 10 August 1917 (MO). Larimer: Fort Collins, 1700 m., *Cowen* 17 July 1893 (NY). Weld: New Windsor, *Osterhout 2294* (MINN,NY).

Utah. Cache: Logan, *Mulford 176* (ILL). Utah: ditchbank, Provo, 1500 meters, *Galway 2191* (MINN). Weber: Huntsville-Ogden Valley, *Smith 1938* (FM).

New Mexico. Colfax: wet thicket, vic. of Ute Park, 2200 to 2900 meters, *Standley 13858* (NY,US); 12 mi. ne. of Vermo Park, 2600 meters, *Wooton 30 August 1913* (US). San Miguel: near Pecos, 2100 meters, *Standley 5122* (MO,NY,US). Taos: moist open places, Penesco, *Casimir 1958* (FM). County not determined: *Vasey July 1881* (US).

British Columbia. Fraser Valley: Agassiz, *Malte 18 August 1911* (CAN). Kamloops: damp thickets, Kamloops, *Macoun 20 June 1889* (CAN). West Kootenay: Sproat, *Macoun 18 July 1890* (CAN).

Washington. Chelan: Wenatchee, *Whited 177* (US); damp thicket, Wenatchee River, *Whited 1424* (US). Clark: moist places, along Lacamas Creek, *English 7 July 1925* (US). Cowlitz: river bottom thicket, Kelso, *Benson 2278* (MO). Klickitat: bank of Columbia River, White Salmon, *Lloyd 23 August 1894* (NY); shady places on wet high bottomland, Bingen, *Suksdorf 1530* (MINN,MO,NY,US, TYPE of *Steironema ciliatum* var. *occidentale* Suksd.); Falcon Valley *Suksdorf July 1908* (NY). Okanogan: swampy border of Mud Lake, near Conconully, *St. John 7745* (FM). Pend Oreille: 6 mi. n. of Newport, *Jones 5600* (ILL,MINN). Spokane: Spokane, *Kreager 546* (MINN,NY,US); Clarks Springs, 10 mi. n. of Spokane, *Kreager 131* (MINN,NY,US). Stevens: wet meadow, near Colville River's junction with Columbia River, *Boner & Welder 222* (NY). Whitman: grassy margins of ponds, Pullman, *Elmer 137* (NY,US); edge of ponds, Pullman, *Piper 1729* (FM,MINN,NY). Yakima: dry gravelly shores, Wapato Point, *Gorman 811* (US).

Oregon. Marion: Salem, *Hall 1871* (FM). Multnomah: Portland, *Harford & Dunn 2 July 1869* (NY); Multnomah Falls, *Sheldon 10992* (MINN,MO,NY,US); Bridal Veil, *Smith 3134* (FM,NY). Wallows: near mouth of Minam River, *Sheldon 8708* (NY,US).

Lysimachia ciliata is the most widely distributed and apparently the commonest species in the subgenus *Seleucia*. Constant in characters over its entire range, it is readily distinguished by its conspicuous petiole ciliation and broadly lanceolate to ovate blades which are rounded to obtuse at the base. The blade margins are also ciliate. Lateral veins are very evident on the paler, lower surface of the blades. Generally, its flowers, capsules, and seeds are larger than those of related species.

Several variants, mainly described by Greene and Lunell and given specific or varietal status, are not confined to any particular part of the range and appear within any large population or series of herbarium specimens. Without exception they have been found to be conspecific.

Authors frequently have placed *L. ciliata* of Walter in synonymy with various segregates of *L. lanceolata*. The reason for this confusion is not apparent, for the description is clear and the photographs of the two specimens from the Walter herbarium in the British Museum are clearly *L. ciliata* L.

2. *LYSIMACHIA TONSA* (Wood) Knuth

(Plate II)

Lysimachia ciliata var. *tonsa* Wood, Class-book 505. 1861.*Steironema intermedium* Kearney in Bull. Torr. Bot. Club. 21:264. tab. 209. 1894; Mohr in Bull. Torr. Bot. Club. 24:25. 1897; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 646. 1908; Britton & Brown, Illustr. Fl. N. U.S. ed. 2, 2:713. fig. 3293. 1913.—Non Janka 1878-82.*Steironema tonsum* (Wood) Bicknell in Britton & Brown, Illustr. Fl. N. U.S. 2:590. fig. 2817. 1897; Harper in Bull. Torr. Bot. Club. 28:477. 1901; Small, Fl. Se. U.S. 904. 1903; Man. Se. Fl. 1025. 1933.*Steironema tonsum* var. *simplex* Kearney in Bull. Torr. Bot. Club. 24:571. 1897; Harper in l.c.*Lysimachia tonsa* (Wood) Knuth in Engler, Pflanzenr. pt.237:277. 1905; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:80. 1928; Fernald in A. Gray, Man. Bot. ed. 8, 1141. 1950.*Lysimachia tonsa* var. *typica* Knuth in l.c.*Lysimachia tonsa* var. *simplex* (Kearney) Knuth in l.c.; Handel-Mazzetti in l.c.

Perennial herbs, usually 3–6 dm. tall; rhizomes several, slender and elongated; stems erect, slender, simple or branched above, glabrous below, glandular-puberulent above, obtusely 4-angled; leaves opposite, pale beneath and sparingly glandular-puberulent, ovate to ovate-lanceolate, rarely somewhat elliptic, medial ones 3–7 cm. long, 2–4 cm. wide, the apex acute to acuminate, the base cuneate, rounded, or subcordate; leaf margin entire or somewhat sinuate, papilate with minute tooth-like trichomes; petioles 1–4 cm. long, slightly winged, ciliate only at the base or very rarely sparingly ciliate to the blade; flowers deep yellow, in axils of reduced upper foliage-leaves, pedicels 1–2.5(4) cm. long, glandular-puberulent; calyx likewise puberulent, tube short, about 0.5 mm. long, lobes lanceolate, 4–5 mm. in flower, 5–6 mm. in fruit, acute to acuminate, entire, corolla tube about 1 mm. with a dull red blotch at base of lobes, lobes obovate to suborbicular, 6–10 mm. long, 6–10 mm. wide, erose near apex, apiculate, stalked yellow glandular hairs within; stamens almost distinct at base, glandular, filaments 1.7–2 mm. long, subequal; anthers linear 2–3 mm. long, staminodia triangular to lance-subulate, 0.6–1 mm. long; capsule subglobose, 3–4 mm. in diameter, equal to or shorter than the calyx; seeds several, about 2 mm. long trigonal, rufescent, finely reticulate, outer surface somewhat convex, adjacent ones concave.

Type locality: "Mts. E. Tennessee, near the Cumberland Gap." Wood (1861).

Distribution: Dry rocky hills, bluffs, slopes, open woods; rarely in

disturbed soil; Virginia and Kentucky southward to Alabama and Georgia. Flowering period: May-August. Map 2.

Virginia. County not determined: *Aiken* 1843 (NY).

North Carolina. Durham: edge of road cut, Duke Forest *Blomquist* 150 (US); dry field, Duke Forest, *Oosting* 33123 (DUKE). Forsyth: woods, *Schallert* 25 June 1940 (DUKE,MO,NY). Orange: country club road, Chapel Hill, *Womack* 9 May 1939 (NY); edge of road cut, *Blomquist* 4574 (DUKE). Polk: near Columbus, *Townsend* 18 June 1897 (US). Surry: Pilot Mt., *Alexander* 21 June 1939 (NY).

Georgia. Cobb: dry soil, s. of Kennesaw Mt., *Harper* 208 (MO,NY,US). Walker: along C. & D. R. R., Lookout Mt., *Ruth* 455 (NY,US); in rocky (sandstone) oak-hickory woods on e. edge of top of Lookout Mt., between Lafayette and Trenton, 600 meters, *Cronquist* 5275 (MO,US). Whitfield: summit of Rocky Face Mt., *Harper* 284 (NY,US).

Kentucky. Bell: dry hills and open woods, Middlesborough, *Gleason* 8811 (NY); mountains around Pineville, *Mackenzie* 960 (MO,NY). Harlan: Pine Mt., *Kearney* August 1893 (FM,MINN,NY,US). Henderson: *Kearney* July 1893 (MO).

Tennessee. Cocke: 3 mi. of Wolf Creek Station, *Kearney* 6 September 1897 (NY,TYPE of *Steironema tonsum* (Wood) Bicknell var. *simplex* Kearney). Davidson: White Creek, *Alexander*, *Everett*, & *Pearson* 22 September 1933 (NY). Hamilton: near Chattanooga, *Alexander*, *Everett*, & *Pearson* 22 September 1933 (NY); dry rocks, Lookout Mt., *Biltmore* 5426 (NY,US). Knox: borders of woods, Knoxville, *Kearney* 14 June 1893 (NY); *Kearney* 9 July 1894 (FM,MINN,MO,NY,US); open woods, bluffs of Tennessee River, Knoxville, *Ruth* June 1895 (ILL,MINN,US); rich shaded grounds, Knoxville, 3002 (NY). Rhea: *Biltmore* 5426d (MINN).

Alabama. Clay: *Earle* 1022 (NY); Cheawha Mt., 750 meters, *Mohr* 19 August 1896 (NY); rocky summit, Cheawha Mt., *Mohr* 1 August 1896 (US). Etowah: Lookout Mt., near Collierville, *Mohr* August 1881 (MO). Jackson: roadsides on Sand Mt., near Long Island, *Graves* 718a (MO). Talladega: sandstone cliffs, near summit of Flagstaff Mt., near Alpine, *Mohr* 22 September 1892 (NY,US). Tallapoosa: *Earle* 23 June 1897 (MINN,NY).

Plants of this species were first described by Alphonso Wood (1861) as *Lysimachia ciliata* var. *tonsa* "with smaller leaves and petioles destitute of ciliae." Later Kearney (1894) described conspecific material from Virginia, Kentucky, Tennessee, and Alabama as *Steironmea intermedium*. Knuth (1905), apparently unaware of Wood's variety as the basonym, based his epithet on an herbarium label "*L. tonsa* Wood" and therefore published it without evidence of previous rank. Kearney's name would have been valid had it not been for an earlier homonym of Janka.

Lysimachia tonsa is distinguished from *L. ciliata* by its more slender habit, shorter and broader leaves which are glandular-puberulent beneath, especially along the veins, and smaller flowers. It differs from *L. radicans* in its erect habit, shorter and broader leaves, and larger flowers. Restricted to the southeastern United States, it is found in open

woods and on bluffs, in contrast to the widely dispersed, continental *L. ciliata* and *L. radicans* of the lower Mississippi River Valley and Virginia, both of which grow in low, wet ground.

3. *LYSIMACHIA LANCEOLATA* Walter

Lysimachia lanceolata Walter, Fl. Carol. 92. 1788.

Plants erect or rarely reclined, 1.5(0.5)–10 dm. tall, stems simple or paniculately branched above, glabrous to sparingly glandular-puberulent; rosulate leaves oval, oblong to lanceolate, petiolate, medial leaves opposite, becoming subverticillate and bracteate above, linear, lanceolate, or elliptic, 5–18 cm. long, 1(0.5)–4 cm. wide, petiolate to tapering at the base, obtuse to acuminate at the apex, entire, ciliolate to papillate, glabrous, pinnate veins arcuate, connecting along the margin; petioles when present to 3.5 cm. long, ciliate at the base; flowers axillary in upper leaf axils or paniculate, pedicels 2(1)–4.5(6) cm. long, straight or flexed; calyx glabrous or scurfy-glandular puberulent, tube about 0.5 mm. long, lobes lanceolate 3–8(10) mm. long, 1–2 mm. wide, corolla yellow, with yellow stalked glandular hairs within, dull red blotch at base of lobes often present, lobes obovate to suborbicular 4(3)–8(10) mm. long, 4(2)–7 mm. wide, apiculate, erose near the apex; stamens almost distinct, glandular, filaments 1.5–3 mm. long, subequal, anthers 1.5–2.5 mm. long, linear, staminodia ovate to subulate, 0.7–1.4 mm. long, ovary subglobose, glabrous, style 3.5–4.5 mm. long, stigma obtuse, ovules numerous, capsule subglobose to turbinate, 3(2.5)–4.5 mm. in diameter, seeds several, trigonal, 1.2–2 mm. long, rufescent, with a somewhat scarious covering finely reticulate, outer surface flattened or slightly convex, oval or somewhat angular in outline, adjacent surfaces concave.

Type locality: South Carolina. Type specimen in Walter's herbarium, British Museum. Phototype in the herbarium of the University of Illinois.

Botanists have given various interpretations of the extremely variable *L. lanceolata*. In delimiting two or more species with attendant subcategories, significance was given to leaf form by Gray (1848, 1877, 1878), Chapman (1860), Klatt (1866), Small (1903), and Knuth (1905). Fernald (1937) discounted this significance and developed dichotomy based upon stem thickness, rhizomes, calyx venation, and certain leaf characters. Deam (1940), following him in recognition of two species, *L. lanceolata* Walt. and *L. hybrida* Michx., noted, in addition, habit, habitat, and relative length of lower and upper leaves. The treatment herein included, based upon examination of types and phototypes, morphological and distributional studies of herbarium material, and field observations, recognizes but one species with two subspecies: *L. lanceolata* ssp. *lanceolata* and *L. lanceolata* ssp. *hybrida*.

A basis for this recognition may be seen by comparing phototypes of *L. lanceolata* of Walter, *L. heterophylla* of Michaux, and *L. angustifolia* of Lamarck, with *L. hybrida* of Michaux. The former show a rather slender stem with rhizomes, short internodes, a poor branching habit, short, broad, petiolate leaves below and longer tapering, linear-lanceolate, sessile leaves above. The latter shows a more robust habit with a thick stem, long internodes, well-developed branches above and lanceolate leaves, petiolate to the upper third of the plant. Lobes of the same corolla may vary from obovate to suborbicular. The thin stem of ssp. *lanceolata* is characteristic of much of *hybrida* populations in the northeastern United States and adjacent Canada. Long slender rhizomes were found by the writer on plants of ssp. *hybrida* from a margin of an Illinois prairie pond. Much of the Coastal Plain material (and sometimes specimens from inland regions) of either aggregate shows well-developed branches and a tendency toward linear leaves and smaller flowers. Form of staminodia is not consistent within either population. In eastern North America the petioles of ssp. *hybrida* except for the base are very sparsely, if at all, ciliate, while the more western ones are more or less sparsely ciliate to the leaf blades as is the case in ssp. *lanceolata*.

Subspecies should show distinct ecological niches or allopatric ranges. In *L. lanceolata* there is ecological preference; however, ssp. *lanceolata* normally of open woods and hillsides does invade moist places, locations tolerated by ssp. *hybrida*, a plant usually of swamps and thickets. Sympatric in most of its range in eastern United States, ssp. *hybrida* extends farther northward and westward. Although both are present on the Coastal Plain, ssp. *lanceolata* is commoner there. Intergradation appears greatest along the periphery of the common range.

Lysimachia lanceolata is not always readily distinguished from other taxa of subgenus *Seleucia*, but from *L. ciliata* it may be distinguished by the degree of ciliation on the petiole and leaf margin, form of the medial leaves, and relative size of flowers and seed; and from *L. radicans* by its erect habit; and from *L. tonsa* by its narrower, glabrous leaves, and smaller seed.

3a. *LYSIMACHIA LANCEOLATA* ssp. *LANCEOLATA*

(Plates IV and VI)

Lysimachia lanceolata Walter, Fl. Carol. 92. 1788; A. Gray, Man. Bot. 283. 1848; Klatt in Abh. Naturw. Ver. Hamburg 4 pt.4:25. tab. 13. 1866; A. Gray, Man. Bot. ed. 5, 316. 1868; Knuth in Engler, Pflanzenr. pt.237:278. 1905; Thenen, Phyl. Prim. 98. tab. 8. 1911; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:80. 1928; Fernald in Rhodora 39:438-442. tab. 482. 1937; Deam, Fl. Indiana 748. 1940; Fernald in A. Gray, Man. Bot. ed. 8, 1142. 1950. — Non Pursh 1814.

Lysimachia angustifolia Lamarck, Tabl. Encycl. 1:440. 1792; Muhlenberg, Cat. Pl. Am. Sept. 20. 1813. — Non Michaux 1803.

Lysimachia heterophylla Michaux, Fl. Bor. Am. 1:127. 1803; Muhlenberg, l.c.; Poiret in Lamarck, Encycl. Suppl. 3:477. 1814; Pursh, Fl. Am. 1:136. 1814; Elliott, Sketch Bot. S.C. & Ga. 1:235. 1817; Nuttall, Gen. N. Am. Pl. 1:121. 1818; Rafinesque in Ann. Gén. Sci. Phys. 7:193. 1820; Sprengel, Syst. Veg. ed. 16, 572. 1825; Duby in DeCandolle, Prodr. 8:63. 1844; Wood, Class-book 387. 1853. — Non D. Don 1825.

Steironema heterophyllum (Michx.) Raf. First Cat. Bot. Gard. Transylv. Univ. 15. 1824; Small, Fl. Se. U.S. 904. 1903; Man. Se. Fl. 1025. 1933.

Steironema floridum Baudo in Ann. Sci. Nat. II. 22:347. 1843. — p.p.

Lysimachia lanceolata var. *heterophylla* A. Gray, Man. Bot. 283. 1848.

Lysimachia lanceolata var. *angustifolia* (Lam.) A. Gray, Man. Bot. ed. 2, 273. 1856; Knuth in Engler, Pflanzenr. pt.237:278. 1905; Handel-Mazzetti in l.c.

Lysimachia ciliata var. *heterophylla* (Michx.) Chapman, Fl. S. U.S. 280. 1860.

Lysimachia ciliata var. *angustifolia* (Lam.) Chapman, l.c.

Steironema lanceolatum (Walt.) A. Gray in Proc. Am. Acad. Arts Sci. 12:63. 1877; Syn. Fl. 2. pt.1:62. 1878; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 330. 1889; Britton & Brown, Illustr. Fl. N. U.S. 2:590. (not fig. 2819) 1897, — p.p.; Small, Fl. Se. U.S. 904. 1903; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 646. 1908; Britton & Brown, Fl. N. U.S. ed. 2, 2:714. (not fig. 3295) 1913, — p.p.; Small, Man. Se. Fl. 1025. 1933; Bailey, Hortus Sec. 706. 1947. — p.p.

Steironema lanceolatum var. *angustifolium* (Lam.) A. Gray in Proc. Am. Acad. Arts Sci. 12:63. 1877; Syn. Fl. 2. pt.1:62. 1878.

Nummularia lanceolata (Walt.) Kuntze Rev. Gen. 1:398. 1891.

Steironema ciliatum var. *heterophyllum* (Michx.) Chapman, Fl. S. U.S. ed. 3, 298. 1897.

Steironema ciliatum var. *angustifolium* (Lam.) Chapman, l.c.

Steironema gramineum Greene, Leaflets Bot. Obs. & Crit. 2:109. 1910.

Lysimachia graminea (Greene) Handel-Mazzetti in l.c.

Slender erect perennials 2.5(1.0)–7.5 dm. tall; stem usually less than 4 mm. in diameter at base, often 4-angled above, simple but sometimes paniculately branched; rosettes developing from long slender, smooth rhizomes, rosette leaves opposite, ovate or broadly elliptic, rarely narrowly elliptic and tapering, rounded or cordate at the base, petioles longer than the lamina, ciliate or glabrate; medial and upper leaves sessile or subsessile, linear or elliptic, sometimes lanceolate or oblanceo-

late, 5–18 cm. long, 0.6(0.3)–3.5 cm. wide, acute to attenuate or petiolate at the base, apex rounded, or acute to tapering, margin papillate toward the apex, bristly ciliate toward the base, green above, pale beneath; lower leaves usually persistent; flowers solitary in the upper leaf axils or sometimes close-paniculate, pedicels filiform 2–5 cm. long, calyx lobes lanceolate 5–8 mm. long, 1–1.7 mm. wide, acute, entire, midrib evident, laterals sometimes obscure; corolla obovate to suborbicular, 4–8 mm. long, 3.5–6 mm. wide, weakly erose, apiculate, filaments equal to or longer than the anthers, staminodia triangular ovate to subulate; capsule 3(2.5)–4 mm. in diameter, seed several, 1.7–2.0 mm. long.

Type locality: South Carolina. Holotype in Walter's herbarium, British Museum. Phototype in the herbarium of the University of Illinois.

Distribution: Stream banks, ditches, dry and moist open woods, slopes and bluffs, occasionally along roadsides; Pennsylvania to Wisconsin and Iowa, southward to eastern Oklahoma, Texas, and Florida. Flowering period: June–August. Map 3.

Pennsylvania. Allegheny: Moon twp., *Shafer* 1534 (GH). Cambria: Sheridan, *Seal* 25 July 1886 (GH). Dauphin: near Harrisburg, *Small* 1885 (FM). Huntington: barrens, *Lowrie* (FM). Lancaster: York Furnace, *Carter* 16 July 1909 (NY); mouth of Tucquan River, *Heller* 24 July 1901 (FM,GH,US); banks of Susquehanna River, *Porter* 11 September 1861 (GH). Mifflin: *Rothrock* (FM). Perry: 1 mi. n. of Marysville, *Small* 4 July 1888 (FM).

Maryland. Cecil: island in Susquehanna River, Conowingo, *Crawford* 29 July 1924 (GH); Garrett: borders of glades, *Smith* 13 July 1883 (GH,US); Mountain Lake Park & vic., *Steele* 126 (US).

District of Columbia. vic. of Washington, *Ward* 4 July 1879 (FM).

West Virginia. Fayette: Gauley Mt., *Kellerman* 27 July 1901 (NY). Greenbriar: White Sulphur Springs, *Brown* 23 July 1872 (NY); dry roadside, dry wooded ravine, 2 mi. e. of White Sulphur Springs, *Leonard & Leonard* 16906 (US). Mercer: roadside, Brush Creek Falls, *Core* 3077 (GH). Monogalia: near mouth of Cheat River, Bayard, *Millsbaugh* 1011 (NY); along trail in woods, about ½ mi. e. of Cheat Neck, *Bartholomew* 3 July 1942 (US). Pocahontas: moist dense woods, Green Bank, *Wherry & Pennell* 13435 (MO). Raleigh: along clay road on Glade Creek, exposed to sunlight and grazed upon by stock, *Tosh* 833 (US). Randolph: Slaty Fork, *Hutton* 344 (GH,MO). Wayne: swale, near Buffalo Creek, *Plymale* 720 (DUKE,FM,GH,MO,NY,US). Wood: damp meadow, Kanawha Station, *Millsbaugh* 281 (FM,NY).

Virginia. Augusta: partly wooded, grassy ground, foot of Great North Mt., vic. of Augusta Springs, *Steele* 29 August 1908 (NY,US); clearing on west slope of cold spring, summit of Elliott Knob, 1360 meters, *Allard* 3159 (FM, NY,US). Bedford: *Curtiss* 15 September 1871 (GH). Brunswick: border of rich woods, Seward Forest, near Triplett, *Fernald* 14652 (GH). Greensville: oak-hickory woods and clearings e. of Skipper's, *Fernald & Long* 10385 (FM, GH); rich deciduous woods by Metcalf Branch, e. of Emporia, *Fernald & Long* 8411 (GH). Henrico: argillaceous swale, Libbie Avenue, Westhampton, *Fernald, Long & Smart* 5888 (GH,NY,US). Lee: limestone glades, The Cedars, *Carr* 879 (GH). Pittsylvania: Fall Creek, *Heller* 1106 (FM,GH,MINN,MO,

NY,US). Pulaski: along Peak Creek, on Peak Mt., 700 meters, *Small* 16 July 1892 (FM,GH,MO,NY,US). Southampton: dry mixed woods by Applewhite Church, *Fernald & Long* 10387 (GH); rich sandy-loamy woods, along Three Creek, n. of Carey Bridge, *Fernald & Long* 15332 (GH). Sussex: rich oak woods, near Moore's Mill, *Fernald & Long* 7139 (GH,NY,US); rich woods and bush clearing, e. of "fall-line" along Nottoway River, Double Bridge, about 6 mi. nw. of Jarratt, *Fernald & Long* 1108 (GH,NY,US). Warwick, Newport News, *Wherry & Pennell* 12459 (MO). Wythe: Sayer's fields, Wytheville, *Shriver* 10 July 1878 (NY).

North Carolina. Alexander: dry southern exposure, Rocky Face Mt., *Radford & Stewart* 1616 (CNC,MINN). Buncombe: low grounds, Biltmore, *Biltmore* 3478b (CNC,GH,MINN,MO,US). Catawba: swamp, n. of Hickory, *Small & Heller* 271 (NY,US). Cherokee: wooded bottom, 2 mi. e. of Andrews, *Oosting* 34610 (DUKE). Clay: near Hayesville, *Huger* 29 (NY). Cleveland: n. bank of Broad River, s. of Boiling Springs, *Fox* 4815 (RNC). Guilford: damp open woods, Arden Place, Greensboro, *Wiegand & Manning* 2484 (GH). Halifax: Weldon, *Williamson* July (FM). Haywood: Richland's Creek, 5 mi. s. of Waynesville, *Fox* 5033 (RNC); Waynesville, *Harbison* 1 July 1897 (GH). Henderson: Hendersonville, *Blomquist* 4572 (DUKE). Jackson: dry road bank, near Webster, *Totten* 28 June 1939 (CNC); Cullowhee, *Thaxter* June-July 1887 (GH,US). McDowell: Old Fort, *Faxon* 25 June 1872 (GH). Macon: Horse Cove, Highlands, *Alexander, Everett, & Pearson* 15 September 1933 (NY); Horse Cove Bog, *Fox & Godfrey* 3099 (RNC); Highlands, *Harbison* August 1906 (GH). Transylvania: Sapphire, *Sherwood* 20 July 1901 (NY); Pisgah Forest, Looking-glass Mt., *House* 3677 (GH). Wilkes: boggy pasture, 3 mi. nw. of Traphill, *Radford & Stewart* 1860 (CNC). County not determined: in paludosis ad fluvium, Broad River Mts., *Rugel* July 1841 (CAN).

South Carolina. Anderson: damp banks, McKinney Springs, near Anderson, *Davis* 7990 (US); damp soil, Anderson, *Davis* 8380 (US); damp levels, Whitner Park, Anderson, *Davis* 15 May 1919 (ILL,MO). Beaufort: Beaufort District, *Mellichamp* July 1887 (US). Berkeley: along Santee River, *Walter* (ILL, photograph of TYPE from BM). Pickens: *Anderson* 1256 (RNC,US); dry oak woods, Calhoun, *House* 3489 (NY).

Georgia. Calhoun: swampy thicket, 4 mi. n. of Morgan, *Thorne* 4134 (US). Clarke: dry woods, Athens, *Harper* 116 (GH,MO,NY,US). Clay: Fort Gaines, *Chapman* (NY). De Kalb: moist soil over granite, Lithonia, *Pennell* 4068 (NY). Early: bank of Chattahoochee River, near Hilton, *Thorne* 5336 (FM). Fannin: Blue Ridge Mts., *Smith* 2447, 2556 (FM). Floyd: Rome, *Chapman* (MO). Gwinnett: Thompsons Mills and vic., *Allard* 189 (NY,US). Jefferson: vic. of Louisville, *Hopkins* (NY); between Alcovy River and No Business Creek in Oconee and Gwinnett counties, *Small* 14 July 1893 (FM,GH,NY,US). Rabun: dry soil in clearing, near summit of Rabun Bald, *Pyron & McVaugh* 883 (US). Richmond: low pine barrens, Augusta, *Cuthbert* 355 (NY). Union: hardwoods slope, *Jester* 7 July 1938 (DUKE). Walker: dry soil, Lookout Mt., *Ruth* 454 (US). County not determined: *Wright* 1875 (GH).

Florida. County not determined: near Ochusa, "West Florida," *Collector not determined* (NY); *Chapman* (NY); *Croom* (GH).

Michigan. Berrien: dryish oak woods near Benton Harbor, *Dodge* 519 (NY). Cass: Magician Beach, *Gates* 6 August 1906 (ILL). Ingham: Michigan State College, East Lansing, *Gray* (GH). Jackson: *Camp & Camp* 5 July 1897 (FM, MINN). Kalamazoo: moist sandy shore, Eagle Lake, *Hermann* 9041 (GH,

NY). Kent: Grand Rapids, *Crozier* 4 July 1886 (US). Montcalm: Greenville, *Barlow* 29 September 1900 (CAN).

Wisconsin. Adams: Wisconsin dells, *Wadmond* 3536 (MINN). Eau Claire: sand terraces, along Chippewa River, *Rosendahl & Butters* 3123 (MINN). Dane: Madison, *Chevey* 23 July 1888 (GH). Juneau: Camp Douglas, *Mearns* 456 (FM,US). Sauk: thicket, Baraboo, *True* 7 July 1891 (ILL). Waushara: damp woods, Poy Sippi, *Hill* 8 August 1883 (ILL).

Ohio. Butler: moist woods, Oxford, *Overholts* 29 July 1910 (MO). Franklin: Columbus, *Lea* 1837 (GH). Hamilton: near Cincinnati, *Lloyd* (GH,NY); Cincinnati, *Lea* 1839 (GH). Jackson: wet meadow, near Pyro, *Bartley & Pontius* 317 (NY); Liberty twp., *Pontius & Bartley* June 1924 (US). Lucas: Swanton twp., *Moseley* 25 July 1926 (US). Ross: *Crowl* 27 June 1938 (NY).

Indiana. Brown: Nashville, *Wright* 9 July 1892 (MINN). Crawford: Indian Hollow, wooded ravine about ½ mi. w. of Leavenworth, *Deam* 16489 (NY). Dubois: roadside, nw. of Birdseye, *Deam* 16524 (MINN). Franklin: white oak woods, about 5 mi. se. of Oldenburg, *Deam* 58092 (DUKE,FM,NY); old log road in woods, 3.4 mi. w. of Metamora, *Friesner* 20678 (GH,MO). Gibson: hard white clay soil in low fallow corn field, about 8 mi. w. of Princeton, *Deam* 56133 (GH); grassy clay field, 8 mi. w. of Princeton, *Hermann* 6619 (NY,US). Harrison: rocky wooded slopes, 3 mi. e. of Elizabeth, *Deam* 58324 (FM). Jasper: lane leading to falls, Carpenter twp., 2 mi. e. of Goodland, G. Welch farm, *Welch* 629 (ILL). Jefferson: beech woods, 2 mi. ne. of Hanover *Deam* 65220 (RNC). Lake: swales, *Umbach* 20 July 1898 (FM). La Porte: Michigan City, *Mell* 84 (MO,NY,US). Lawrence: old field, along Road 37, 1 mi. n. of Bedford, *Friesner* 11573 (FM,MINN,NY). Marshall: Lake Maxinkuckee, *Evermann* 700 (US). Miami: dry soil along rr. 2 mi. w. of Bunker Hill, *Ek* 30 (US). Montgomery: vic. of Crawfordsville, *Seaton* June 1890 (FM). Morgan: woods, n. of Martinsville, *Deam* 2263 (MINN). Owen: wooded bluff of Raccoon Creek, about 5½ mi. sw. of Spencer, *Deam* 23952 (NY). Parke: open woods, s. of Hemlock Point, Turkey Run State Park, *Duncan* 104 (DUKE). Porter: damp sandy thicket, Dune Park, *Chase* 1922 (ILL,US); dune swales, Mineral Springs, *Peattie* 27 July 1920 (GH). Putnam: woods soil, Spring Trail, Hoosier Highlands, about 20 mi. sw. of Greencastle, *Welch* 5945 (GH). Ripley: low, pin oak-sweet gum woods, e. side of Road 29, about 7 mi. s. of Versailles, *Friesner* 20711 (GH,MO). St. Joseph: Mishawaka, *Williamson* July 1891 (FM). Steuben: e. side of Clear Lake, *Deam* 3 July 1904 (US). Union: Liberty, *Rose* June 1886 (FM). Wells: lakes, Jackson twp., *Deam* 19 June 1898 (FM). White: *Rhoades* 6 July 1940 (GH).

Illinois. Adams: Camp Point, *Seymour* 27 June 1876 (DUKE); bluff top, Burton Cave, *Evers, Jones & Jones* 1171 (ILL,ISM). Champaign: Urbana, *Seymour* 16896 (ILL); grassy bank, along rr. near Urbana, *Jones* 17845 (ILL). Cook: meadow near 119th Street, West Pullman, Chicago, *Greenman* 1922 (GH); damp places, Thornton, *Hill* 2 July 1864 (ILL). Cumberland: along I. C. R. R., 1 mi. s. of Neoga, *Winterringer* 252 (ILL). De Kalb: woods and thickets, *Whitford* 251 (ISM); Douglas: Arcola, *Mohr* 3 July 1939 (INHS); along I. C. R. R., 2 mi. s. of Tuscola, *Winterringer* 655 (ILL). Du Page: meadows, Naperville, *Umbach* 23 July 1897 (US). Effingham: prairie strip along rr. between Edgewood and Mason, *Ahles* 2892 (ILL). Fayette: fence row, 3½ mi. nw. of Farina, *O'Dell* 305 (ILL). Hancock: Augusta, *Mead* (NY). Hardin: rich wooded hillsides, Peters Creek, *Palmer* 15462 (MO). Jackson: moist rocky places, Makanda, *Gleason* June 1903

(GH). Kankakee: 3 mi. nw. of Bonfield, *Jones 15939* (ILL); low sandy swamps, near Wichert, *Tehon & Creager 25 June 1942* (INHS,ISM). Lawrence: wooded roadside, 5 mi. sw. of Sumner, *Sivert 8 August 1946* (ILL, ISM). Macon: wet prairie soil, near Decatur, *Gleason 9147* (NY). McDonough: prairie, along rr. w. of Macomb, *Myers 292* (ISM). Macoupin: Carlinville, *Robertson 10 July 1882* (INHS). Menard: *Hall 1861* (GH,ILL, US). Moultrie: along rr. near Gays, *Winterringer 4826* (ISM). Ogle: low grounds, Oregon, Gales Hill, *Waite 16 July 1883* (ILL). Piatt: Monticello, *Seymour 18 August 1881* (DUKE). Pulaski: in timber along road, e. of Karnak, *Boewe 6 August 1946* (INHS). Randolph: Coulterville, *Emig August 1912* (MO). Richland: roadside ditch, 3 mi. s. of Noble, *Scherer 267* (ILL, ISM). St. Clair: edge of thicket, vic. of French Village, *Neill 298* (ISM). Saline: wet soil, rocky woods, Cave Hill, 5½ mi. sw. of Equality, *Winterringer 1369* (ILL). Sangamon: Woodside twp., *Fuller 8190* (ISM). Shelby: moist soil along roadside, Williamsburg Hill, *Fuller 13066* (ISM). Union: woods, Bald Knob, Alto Pass, *Stout 13 June 1927* (INHS). Vermilion: along Vermilion River between Oakwood and Collision, *Jones 12380* (ILL); along rr., *Muncie, McDougall 4* (ILL). Wabash: dry sandy soil, Old Palmyra, *Schneck 1 July 1877* (ILL); waste land, *Shearer 20 May 1924* (ILL). Wayne: along Route 15, ne. of Sims, *Boewe 12 June 1946* (ISM). Will: forest of Arden, Joliet, *Skeels 20 July & 2 October 1904* (US). Williamson: wet river bottom soil, Bush, *Fuller & Welch 212* (ISM). Winnebago: sandy woods, 1 mi. w. of Shirland, *Fell 45369* (ILL,ISM); wet woods, Rockford, *Fuller 2471-H* (ILL).

Kentucky. Logan: thickets, limestone hills, near Russellville, *Palmer 17754* (GH,MO). McCreary: moist sandy flat on ridge, *Braun 15 June 1935* (GH). Marshall: Calvert City, *Eggleston 4788* (MINN,NY); wet prairies, sandy soil, near Iola, *Palmer 17901* (GH,MO). Mercer: swampy land, Burgin, *King 279* (FM). Rockcastle: low meadow, between Berea and Mt. Vernon, *Smith & Hodgdon 3701* (FM,GH,NY,US); wooded gully, s. of Livingston, *Smith & Hodgdon 3753* (FM,FG,NY,US). Warren: moist soil, Bowling Green, *Price July 1897* (MO).

Tennessee. Chester: low fields, Henderson, *Bain 335* (NY,US). Davidson: dry gravel hillside, Joelton, *Svenson 90* (GH). Hamilton: Lookout Mt., *Allen June 1870* (NY). Knox: woods, Knoxville, *Ruth 779* (NY). Lewis: open woods, Natchez Trace Parkway, Meriwether Lewis National Monument, *King 380* (US). Morgan: sandbars along stream, Rugby, *Svenson 4088* (GH). Sevier: Gatlinburg, *Trelease August 1924* (ILL). Stewart: pine bluffs, just across Tennessee River from Kentucky, *Gleason 9993* (NY).

Alabama. Cullman: low damp places, Cullman, *Mohr June 1884* (US). De Kalb: shaded sandy banks of Town Creek, near Sand Mt., *Harper 4002* (US). Jackson: thin pine woods, sandy soil, Bryant, e. of Porter's Pond, *Porter 15 June 1934* (GH). Lee: Auburn, *Earle 10 June 1897* (US); Auburn, *Earle & Baker 973* (ILL,NY,US). Tuscaloosa: shaded bottoms of Warrior River about 5 mi. w. sw. of Tuscaloosa, *Harper 3665* (GH,MO,US). County not determined: "Northern Alabama," *Vasey 1878* (GH, US, TYPE of *Steironema gramineum* Greene; FM, NY, PHOTOTYPE); *Buckley* (GH).

Mississippi. Benton: Holly Springs, *Tracy 6 September 1890* (MISSA). Oktibbeha: Starkville, *Tracy 26 June 1888* (MISSA); Starkville, *Phares May 1883* (MISSA). Scott: Lake, *Tracy 4 August 1896* (MISSA). Wilkinson: Centerville, *Tracy 3467* (NY).

Iowa. Clarke: moist copses and banks, *Mohr June 1854* (US).

Missouri. Audrain: moist open ground about lake, near Mexico, *Steyermark* 40834 (MO). Bollinger: low rich woods, along Grassy Creek, 5 mi. w. of Grassy, *Steyermark* 14153 (MO). Boone: Rock Bridge, *Rickett* 9 July 1927 (DUKE). Butler: low woods, along Mud Creek, 2 mi. nw. of Rombauer, *Steyermark* 11315 (MO). Carter: low gravelly woods, along Big Barren Creek, 10 mi. nw. of Bennett, *Steyermark* 5337 (FM,MO). Dent: pine woods, 5 mi. nw. of Bunker, *Steyermark* 12359 (MO). Douglas: upper sandstone slopes, along North Fork of White River, 3½ mi. s. of Topaz, *Steyermark* 23591 (FM, MO). Greene: prairie ne. of town, vic. of Springfield, *Standley* 9139 (US). Howell: open sandstone slopes along Little Indian Creek 7 mi. nw. of Willow Springs, *Steyermark* 23454 (MO). Iron: Des Arc, *Smith* 1075 (FM). Jefferson: dry woods, n. of Plattin, *Eggert* 28 June 1891 (MO). Knox: low open ground, near Novelty and Plevna, *Palmer* & *Steyermark* 40946 (MO). Laclede: swampy meadow pond along road, 8 mi. sw. of Lebanon, *Steyermark* 64712 (FM). Maries: along wash in ravine, 4 mi. sw. of Belle, *Steyermark* 27601 (FM). Mississippi: moist open ground, sandy prairies, 4 mi. w. of Charleston, *Palmer* & *Steyermark* 41482 (GH,MO). Oregon: terraces with residual soil, dolomite glades above Eleven Point River, "Irish Wilderness", w. of Turners Mill Spring, *Palmer* & *Steyermark* 41739 (GH). Osage: limestone bluffs along Big Maries River, 5 mi. nw. of Freeburg, *Steyermark* 27688 (FM). Ozark: rocky banks, open woods, near Tecumseh, *Palmer* 32919 (NY); wooded slopes along base of "Bald Jesse," near Gainesville, *Palmer* 34741 (US). Ripley: sandy woods, Pleasant Grove, *Mackenzie* 324 (MINN,MO). Ste. Genevieve: creek bank, Weingarten, *Reecher* 269 (FM). St. Francois: Bloomsdale, *Kellogg* 1099 (MO). St. Louis: Forest Park, St. Louis, *Eggert* 9-12 June 1875 (FM, NY,US); forests, *Riehl* 132 (MO). Shelby: moist sandy banks above river, near Bethel, *Palmer* & *Steyermark* 40890 (GH,NY). Sullivan: prairie along rr., 1 mi. w. of Humphreys, *Gleason* 9258 (NY). Texas: wooded sandstone slopes, 5 mi. sw. of Slabtown, *Steyermark* 25303 (FM). Washington: swampy meadow, Last Creek Valley, 2 mi. e. of Berryman, *Steyermark* 41275 (FM). Wayne: low flat woods, near Lost Creek, 2½ mi. e. of Shook, *Steyermark* 6565 (FM). Webster: chert slopes, on ridge bordering Niangua River, 2 mi. sw. of Forkner's Hill, *Steyermark* 23817 (FM,MO). Wright: *Bush* 25 June 1888 (MO).

Arkansas. Benton: *Plank* 1899 (MO,NY). Drew: ditchbanks in woods, Monticello, *Demaree* 17367 (GH,MO,NY). Faulkner: *Demaree* (MO,US); roadside, near Conway, *Haas* 1607 (US). Garland: Ouachita Mt., near Hot Springs, *Chase* 9818 (ILL). Jefferson: sandy pineland, Jefferson Springs, *Penel* 10660 (NY). Miller: low open ground, Doddridge, *Palmer* 10534 (MO, US). Polk: moist, rocky low areas, Rich Mountains, *Demaree* 23191 (MO).

Louisiana. East Feliciana: Jackson, *Carpenter* (GH). Rapides: moist open woodland slope, n. of Pineville, *Correll* & *Correll* 9880 (DUKE). West Feliciana: rich wet woods, *Cocks* 3630 (NY). Parish not determined: *Carpenter* 1811-48 (GH); Red River, *Hale* (NY).

Oklahoma. Le Flore: sandstone rubble along creek, near Page, *Palmer* 21601 (NY); woods, near Page, *Blakley* 1439 (ILL,MINN,MO,NY,US); Kiamichi River, *Ortenburger* June 1927 (US).

Texas. Gregg: damp woods, Gladewater, *Reverchon* 2562 (MO). Wood: Mineola, *Reverchon* 7 May 1902 (MO).

Lysimachia lanceolata ssp. *lanceolata* was originally described by

Walter (1788) as *L. lanceolata*, "foliis lanceolatis subsessilibus, petalis acumine terminatis," and later from conspecific material by Lamarck (1792) from "East Carolina" as *L. angustifolia* ". . . folius linearibus, sessilibus; pedunculis unifloris; corollis calyce brevioribus," and by Michaux (1803) as *L. heterophylla*, "*L. gracilis*, glabra: foliis oppositis; imis suborbiculatis et brevipetiolatis; superioribus linearibus, sessilibus, basiciliolatis: floribus cernuis." Michaux's description is more accurate in designating the typical material, and the name is more appropriate, for it is the variation of the leaves as well as the slender stems and rhizomes which characterize the subspecies throughout its range. Variations in leaf shape and length, internode length, and branching are noted in collections from every part of the range. The most significant of these variations, though not worthy of nomenclatural consideration, are elliptic leaf forms with tapering or rounded apices, which seem more common in Illinois, Iowa, and Missouri; very attenuated linear leaf forms with long internodes commonly found in Indiana; the short internode plants with stems hardly 10 cm. tall from exposed slopes in the eastern states; and the narrowly linear, paniculately branched forms common in the southeastern part of its range. These ecological variants are more marked here than in other taxa under consideration.

Lysimachia gramineum Greene, known only from specimens from the type locality, "Northern Alabama," is included here as an extreme of ssp. *lanceolata*. Collected in 1878 by G. R. Vasey, probably near Gadsden, the type material, represented by two sheets in the U.S. National Herbarium and a fragmentary specimen in the Gray Herbarium, is perhaps not even typical of its kind. The stem, either cut or grazed near its base, consists of several attenuated lateral shoots. Narrowly linear leaves, small flowers, and capsules all range in size below those of ssp. *lanceolata*, yet there is not sufficient evidence for a distinct taxon. E. L. Greene emphasized the long filiform filaments which greatly exceed the short oblong-oval anthers. However, these are not unlike others of the southeastern populations.

3b. *LYSIMACHIA LANCEOLATA* ssp.
HYBRIDA (Michx.) J. D. Ray, grad. nov.

(Plates V and VII)

Lysimachia hybrida Michaux, Fl. Bor. Am. 1:126. 1803; Poirlet in Lamarck, Encycl. Suppl. 3:477. 1814; Pursh, Fl. Am. Sept. 1:136. 1814; Nuttall, Gen. N. Am. Pl. 1:121. 1818; Rafinesque in Ann. Gén. Sci. Phy. 7:193. 1820; Steudel, Nom. Bot. 501. 1821; Torrey, Fl. N. & M. U.S. 1:211. 1824; Sprengel, Syst. Veg. ed. 16, 572. 1825; Duby in DeCandolle, Prodr. 8:64. 1844; Provancher, Fl. Can. 1:384. 1862; Fernald in A. Gray, Man. Bot. ed. 8, 1143. 1950.

Lysimachia lanceolata var. *hybrida* (Michx.) A. Gray, Man. Bot. 283. 1848; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:25. 1866; A. Gray, Syn. Fl. 2. pt.1:62. 1878, — pro syn.; Knuth in Engler, Pflanzenr. pt.237:-278. 1905; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:80. 1928.

Lysimachia ciliata var. *hybrida* (Michx.) Chapman, Fl. S. U.S. 280. 1860.

Steironema lanceolata var. *hybridum* (Michx.) A. Gray in Proc. Am. Acad. Arts Sci. 12:63. 1877; Coulter, Man. Rocky Mt. Bot. 235. 1885; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 330. 1889; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 646. 1908.

Steironema lanceolatum sensu Macoun, Cat. Can. Pl. 2:313. 1884; Marie-Victorin, Fl. Laurent. 430. fig. 144. 1935. — Non Walter 1788.

Steironema hybridum (Michx.) Raf. ex Jackson, Ind. Kew. 2:985. 1895; Small, Fl. Se. U.S. 904. 1903; Rydberg, Fl. Pr. & Pl. 624. 1932,—p.p.; Small, Man. Se. Fl. 1025. 1933.

Steironema ciliatum var. *hybridum* (Michx.) Chapman, Fl. S. U.S. ed. 3, 298. 1897.

Steironema laevigatum Howell, Fl. Nw. Am. 1:436. 1901.

Steironema verticillatum Green, Leaflets Bot. Obs. & Crit. 2:110. 1910; Rydberg, l.c.; Stevens, N.Dak. Pl. 223. 1950.

Steironema lunellii Greene, l.c.

Steironema validulum Greene ex Wooton & Standley in Contrib. U.S. Nat. Herb. 16:158. 1913; Contrib. U.S. Nat. Herb. 19:491. 1915; Tidestrom & Kittell, Fl. Ariz. & N.Mex. 513. 1941.

Steironema verticillatum var. *monstrosum* Lunell in Am. Midl. Nat. 4:505. 1916.

Nummularia hybrida (Michx.) Farwell in Am. Midl. Nat. 11:67. 1928.

Lysimachia validula (Greene ex Wooton & Standl.) Handel-Mazzetti in l.c.

Lysimachia lunellii (Greene) Handel-Mazzetti in l.c., — non Bieberstein 1808.

Lysimachia ciliata var. *validula* (Greene ex Wooton & Standl.) Kearney & Peebles in Jour. Wash. Acad. Sci. 29:487. 1939; U.S.D.A. Misc. Publ. 423, 668, 1942.

Usually stout, or rarely reclined perennial herbs, 3–10 dm. tall; stems simple or often branched from below the middle, base 4 mm. or larger in diameter; basal rosettes developing as sessile offshoots from a thick ascending rhizome up to about 5 cm. long; leaves of the rosette ovate to oblong, rounded or obtuse at base, petioles longer than the lamina, ciliate at base; medial leaves petiolate, linear to lanceolate, sometimes oblong or elliptic, 5(3)–10 cm. long, 0.8–3 cm. wide, rounded

to tapering at the base, acute to acuminate, minutely papillate along the margin, green above and beneath, petioles 0.8(0.3)–3.5 cm. long, ciliate at base, sometimes sparingly so to the blade; upper and rameal leaves smaller, somewhat elliptic, petiolate or subsessile, becoming subverticillate; lower leaves usually not persistent due to inundation, etc.; flowers axillary, or in branched individuals open panicate due to reduction of rameal leaves to leaf-like bracts; pedicels slender, 1–4 cm. long, scurfy glandular-puberulent; calyx lobes lanceolate, 4–7(9) mm. long, 1–1.3 mm. wide, acute to attenuate, usually 3(5)-nerved; corolla lobes obovate to suborbicular, 6–9 mm. long, 5–7 mm. wide, weakly erose, apiculate; filaments and anthers subequal in length; staminodia triangular ovate to subulate, 1.2–1.7 mm. long; capsule 3.5–4.5 mm. in diameter, subequal to or shorter than the calyx; seed several, trigonal, 1.2–1.8 mm. long.

Type locality: "Hab. in Carolina." Michaux (1803). Holotype in the Michaux herbarium of the Muséum d'Histoire Naturelle, Paris. Phototype in the herbarium of the University of Illinois.

Distribution: Swamps, thickets, ditchbanks, meadows, and pond margins; Maine and southwestern Quebec to North Dakota, Saskatchewan, Alberta, and Washington, southward to Arizona, Missouri, and west Florida. Flowering period: July, August. Map 4.

Quebec. Brome-Missisquoi: wet shore of Lake Champlain, Phillipsburg, *Knowlton* 10-11 August 1923 (GH,MO). Laval-Two Mountains: sur les rivages de la rivière des Mille-Isles, Sainte-Rose, *Marie-Victorin & Rolland-Germain* 43561 (GH). Nicolet-Yamaska: s. shore of St. Lawrence River at Ste. Angèle De Laval, *Chamberlain & Knowlton* 31 July 1923 (GH). Portneuf: rivages estuariens, *Marie-Victorin* 28165 (US). St. Jean-Iberville-Napierville: sur les rivages du Richelieu, Vallée du Richelieu, Sabrevois, *Marie-Victorin & Rolland-Germain* 45516 (GH,MO); rivages humides du Richelieu, Vallée Du Richelieu, Ile Ste.-Therese, *Marie-Victorin & Rolland-Germain* 49145 (GH). Trois Rivières: n. shore of Lake St. Peter, St. Lawrence River, at Pointe Du Lac, *Chamberlain & Knowlton* 2 August 1923 (GH,MO).

Maine. Kennebec: Gardiner, *Fassett* 16027 (MO). Lincoln: Bristol, *Drummond* 1896 (ILL). Oxford: sandy soil along ditches, Lovell, *Johnson* 109 (NY); beach, Lovewell Pond, Frysburg, *Pease* 25644 (GH). Penobscot: river intervalle, Orono, *Fernald* 255 (FM,GH,MINN,MO,NY,RNC,US); gravelly thicket, Orono, *Fernald* 328 (GH,MINN,MO,US). Sagadahoc: swales along Catherance River, submersed at high tide, *Fassett* 133 (FM,NY). Washington: among stones, edge of Lake Hadley, East Machias, *Barber* 21 August 1898 (GH). York: sandy plains, Limington, *Pillsbury* 28 July 1875 (US); North Berwick, *Parlin* 28 July 1891 (GH).

New Hampshire. Coos: meadow, Randolph, *Pease* 16755 (ILL). Rockingham: Raymond, *Hall* 61 (RNC); open moist roadside, Derry, *Batchelder* 19 July 1919 (NY,US).

Vermont. Chittenden: mouth of Winooski River, *Grout* (FM).

Massachusetts. Bristol: meadow, East Taunton, *Seymour* 4186 (DUKE).

Essex: sandy-peaty margin, Walden Pond, Saugus, *Fernald & Svenson* 1016 (US,GH); low wet bank, Sudbury River, Concord, *Worthen* 21 August 1904 (US). Middlesex: between South Sudbury and Framingham, *Greeman* 2084 (GH); meadows, along Concord River, Billerica, *Weatherby* 12 August 1911 (US). Norfolk: boggy meadow, Sharon, *Williams* 12 July 1896 (GH); open swamp, near Dedham, *Forbes* 2819 (GH); Canton, *Kennedy* 15 July 1887 (GH). Plymouth: swale, Robinson Creek, Pembroke, *Fernald & Svenson* 1015 (GH); West Wareham, *Kennedy* 28 August 1863 (GH). Suffolk: near Boston, *Boot* 1816 (US). Worcester: pond margin, Upton, *Seymour* 5865 (DUKE).

Rhode Island. Providence: Providence, *Olney* (GH); wet meadows, Providence, *Thurber* July 1844 (GH). Washington: damp sandy or peaty shore of Beach Pond, Exeter, *Collins & Fernald* 11410 (US); Lake Worden, *Faxon & Faxon* 24 August 1881 (GH).

Connecticut. Fairfield: moist bank of pond, Bridgeport, *Eames* 5 August 1901 (GH,NY). New Haven: Milford, *Eaton* 1858 (GH); New Haven, *Dana* (GH). New London: wet border of ponds, Groton, *Bissell* 23 July 1901 (GH); swale in sandy plain, Groton, *Woodward* 14 August 1906 (GH). Windham: shore of Quaddick Reservoir, *Weatherby* 3521 (RNC).

New York. Clinton: swamp, n. end of Point au Roche, Lake Champlain Watershed, *Muenschler, Manning, Maguire* 486 (GH). Nassau: Albertson, *Ferguson* 24 August 1918 (NY); Glenhead, *Ferguson* 7928 (NY); Jericho, *Ferguson* 7738 (NY); Roslyn, *Bicknell* 7023 (NY). Orange: Goshen, *Denslow* 11 July 1922 (NY). Queens: *Ferguson* 932 (NY). Richmond: New Dorp, *Britton* 12 July 1890 (NY); *Leggett* 14 July 1864 (NY). Suffolk: Montauk, *Ferguson* 28 July 1920 (NY); Riverhead, *Ferguson* 3985 (NY). Washington: cold spring, Furnace Creek, South Bay, Lake Champlain, *Burnham* 21 October 1903 (GH).

New Jersey. Bergen: thickets, Fairview, *VanSickle* 28 June 1894 (US); Ridgefield, *Walker* 27 July 1897 (NY). Cape May: clay-bottom bog, Bennett, *Gershoy* 564 (GH); open swamp edges, Bennett, *Mackenzie* 26 September 1920 (DUKE,NY). Essex: West Orange, *Wilson* 24 September 1916 (NY). Hudson: Arlington, *Hunter* 1506 (NY). Hunterdon: Stockton, *Fisher* 24 July 1897 (MO). Mercer: shores of Delaware, near Bordentown, *Mackenzie* 7240 (NY). Middlesex: Monmouth Junction, *Taylor* 2580 (NY). Morris: shores of Denmark Pond, *Mackenzie* 4754 (NY); moist places, Pequannock, *Mackenzie* 3819 (MO,NY). Somerset: marshy field along brook, Watchung, *Moldenke* 3372 (NY); moist grassy meadow along brook, Watchung, *Moldenke* 1344a (ILL,NY). Sussex: Morris Pond, *Britton* 11 September 1890 (NY); swampy soil, Decker Pond, *Mackenzie* 7280 (NY). Warren: swampy places, Phillipsburg, *Mackenzie* 4343 (NY). County not determined: *Torrey* 1832 (GH).

Pennsylvania. Bucks: along wet ditch, Rockhill, *Benner* 4 August 1917 (GH); Pennsylvania Valley, *Crawford* 11 August 1895 (NY,US); near Quakertown, *Fretz* 4 August 1917 (GH). Pike: gravel river shore, Bushkill, *Bartram* 18 August 1918 (NY).

Delaware. Kent: Kenton, *Thompson* (FM). New Castle: tidal shores of Delaware River, Hollyoak, *Commons* 17 August 1896 (GH,MO); margin of exsiccating pond-hole in clayey field, se. of Harmony, *Long* 28254 (GH); desiccated pond, Fieldsboro, *Pennell* 12314 (GH,NY); pondhole in field, ½ mi. se. of Harmony, *Tatnall* 1940 (GH); marshy field, Delaware River bottom, *Holmes* 332 (US).

Maryland. Cecil: sandy muddy tidal shore of Elk River, about 1½ mi. s. of

Elkton, *Long 57057* (GH); sandy tidal shore of Northeast River fronting village, Charlestown, *Long 57102* (GH). Charles: roadside pool, Lothair, *Leonard & Killip 871* (GH,US). Harford: 1½ mi. s.sw. of Havre De Grace, *Shull 90* (GH,MO,NY). Wicomico: margin of tidal flat, Salisbury, *Wherry & Pennell 12854* (MO). Worcester: Stockton, *Rusby* August 1889 (NY).

District of Columbia. Along ditch, near Marshall Hall, *Holm 7* August 1897 (ILL); *Kearney 8* August 1897 (NY); Bennings, *Pollard 15* August 1897 (NY); vic. of Washington, *Ward 7* July 1878 (GH).

West Virginia. Hardy: Baker, *Core 18* August 1931 (NY). Mineral: Burlington, *Core 31* July 1931 (NY). Wayne: water seep near edge of woods, Buffalo Creek, *Plymale 608* (DUKE,FM,GH,MINN,MO,NY,US).

Virginia. Augusta: cranberry bog, Spring Pond, *Carr 134* (GH). Fairfax: wet meadows, New Alexandria, *House 403* (NY); along Hunting Creek, ½ mi. s.sw. of Alexandria, *Shull 210* (GH,MO,NY). Roanoke: growing in several inches of water, shallow acid pond, base Fort Lewis Mt., about 2 mi. nw. of Salem, *Wood 5090* (GH). Warwick: sandy woods, Newport News, *Wherry & Pennell 12459* (MO).

North Carolina. Cherokee: low meadows, Murphy, *Sargent 84* (US). Henderson: near Bridges, *Gray* September 1843 (NY); Mud Creek, Naples, *Rydberg 9552* (NY). Jackson: Balsam Mt., *Gray 1843* (NY). Orange: wet stream bank, New Hope Division of Duke Forest, *Hood 85* (MO). Rockingham: grassy swale, near Benaja, *Wherry & Pennell 14359* (DUKE,MO).

South Carolina. Berkeley: floodplain forest, Santee River, 3 mi. ne. of Pineville, *Godfrey & Tryon 657* (MO,NY,US); Santee Canal, *Ravenel* (GH).

Florida. Wakulla: ad rivulos prope St. Marks, *Rugel* August 1843 (NY).

Ontario. Carleton: open sandy area, Wright's Grove, Prescott Highway, Napean twp., *Minshall 1894* (NY,US).

Wisconsin. Buffalo: swale, near Beef Slough, Alma, *Fassett & Hotchkiss 3453* (FM,MINN,NY). Columbia: along Wisconsin River road, Portage, *Allen 18* August 1945 (ILL). Douglas: Solon Springs, *Goessl 8358* (FM). Dunn: low wet ground, near Wheeler, *Palmer 28570* (MO). Grant: low places, Wisconsin island of Mississippi River opposite McGregor, Iowa, *Pammel 880* (GH). La Crosse: La Crosse, *Pammel* July 1887 (MO). Polk: Osceola, *Sheldon 3954* (MINN). Walworth: woodland ponds, vic. of Delavan, *Hollister 46* (US).

Minnesota. Chisago: Lindstrom, *Anderson* July 1894 (GH,ILL), Center City, *Taylor* July 1892 (GH,US). Clay: prairie pothole, Buffalo State Park, *Stevens 1025* (MINN). Goodhue: wet places, Red Wing, *Sandberg* July 1886 (MINN). Hennepin: low ground, *Sandberg* July 1889 (CAN,FM,MINN). Lake: rocky bank of South Kawishwi River, *Huff 151* (MINN). Mahnomen: Mahnomen, *Chandonnet 15* July 1912 (MINN,US). Marshall: damp meadow, 6 mi. sw. of Middle River, *Johnson 515* (NY). Polk: Crookston, *Macmillan & Skinner*, August 1900 (MINN,NY,US). Ramsey: Long Lake, St. Paul, *Churchill 646* (MO). St. Louis: border of temporary pond, Trinity Road, Duluth, *Lakela 5073* (MINN,NY). Washington: Hugo, *Wilcox* July 1899 (MINN). Winona: *Holzinger 18* July 1888 (FM,MINN).

Indiana. Jasper: moist bank, Kankakee River, about ½ mi. w. of Taft Bridge, *Deam 42243* (GH,MINN). Knox: dried-up swamp on w. side of rr., about ¾ mi. ne. of Oaktown, *Deam 54346* (RNC,MINN,US). Newton: deep roadside ditch, s. of Schneider, *Deam 39447* (GH,US). Sullivan: wet places near

open pond and in woods, about 4 mi. nw. of Grayville, *Deam 51010* (MINN, GH).

Illinois. Cass: dry swamps, Beardstown, *Geyer* July 1842 (MO). Champain: moist thicket, Urbana, *Clinton 29991* (ILL). De Kalb: *Whitford* 5 July 1946 (ILL). Hancock: Augusta, *Mead* August 1844 (NY). Henry: low mucky margin of field pondhole, Atkinson, *Dobbs* 20 July 1944 (INHS). Kankakee: pond margin, *Pepon* 8 August 1933 (INHS). McDonough: old lake site, 1 mi. s. of Colmar, *Myers 794* (ISM). Macoupin: Macoupin, *Robertson* 19 July 1883 (INHS). Menard: Athens, *Hall 30529* (ILL). Peoria: small colony of plants with slender rhizomes in heavy wet soil near prairie pond, 1 mi. s. of South Rome, *Ray 1297* (ILL). St. Clair: highway embankment, vic. of Casseyville, *Neill 485* (ISM). Stark: swamp, Valley twp., *Chase* 15 July 1896 (ILL); moist prairie, n. of Wady Petra, *Chase 101* (ILL). Tazewell: marsh between sand hills, s. of Pekin, *Chase 11427* (ISM). Union: Bluff Lake, *Collector not determined* 3 October 1887 (MO). Wabash: pond on Hoffman farm, *Schneck* 15 July 1879 (ILL); in wasteland, *Shearer* 20 July (ILL). Whiteside: prairie, 2 mi. w. of Erie, *Fell & Fell 47214* (ISM). Winnebago: Sugar River slough, w. of Shirland, *Fell & Fell 46544* (ILL,ISM). County not determined: lake margins, American Bottom, *Engelmann* August 1846 (MO).

Kentucky. Fayette: moist meadows, Lexington, *Short* (GH). Mercer: calcareous soil, woods border, Burgin, *King 79* (ILL,ISM). County not determined: *Short* (NY).

Tennessee. Franklin: marsh at Cowan, Cumberland Mts., *Ruth* August 1893 (NY), 453 (US). Lewis: Meriwether Lewis National Monument, *King 379* (US).

Iowa. Black Hawk: swamp, *Burk 530* (ILL,MO). Buchanan: low prairie, n. of Independence, *Shimek* (MINN). Clayton: Mississippi Bottoms, near Marquette, *Tolstead* 31 July 1933 (MO). Decatur: moist soil, *Anderson* 23 July 1903 (MO). Dubuque: Dubuque, *Benke 3758* (FM). Emmet: Armstrong, *Cratty* 1883 (GH). Fayette: wet ground, Fayette, *Fink* July 1894 (GH,US). Johnson: Iowa City, *Somes 3496* (US). Louisa: Columbus Junction, *Pammel 1710* (MO). Muscatine: low ground nw. of Bayfield, *Shimek* 21 August 1915 (MINN). Ringgold: swamps, *Fitzpatrick & Fitzpatrick* 26 July 1898 (FM, NY). Story: Ames, *Pammel & Ball 220* (FM,GH,MO,US).

Missouri. Dent: mud-shallow water, sink-hole pond, between Gladden and Timber, *Palmer & Steyermark 41415* (GH,MO). Greene: open field, near Frisco Shops, vic. of Springfield, *Standley 9026* (US); *Blankinship* 29 July 1895 (GH). Henry: Wood Lake, Hartwell, *Metcalf 893* (US). Jackson: low grounds, Adams, *Mackenzie* 8 August 1897 (MINN,US); Atherton, *Bush 359* (MO,NY); Lake City, *Bush 236* (US). Jasper: margins of sloughs and pools, low woods, near Galesburg, *Palmer 18632* (ILL). Laclede: swampy meadow along road, 8 mi. sw. of Lebanon, *Steyermark 64702* (FM). Linn: low woods, 4 mi. sw. of Laclede, *Steyermark 40438* (FM). McDonald: *Bush* 2 August 1892 (MO). Oregon: base of wooded slopes around tupelo gum pond, *Steyermark 12273* (MO). St. Charles: Belleau Swamps, St. Peter, *Pring & Jensen* 1920 (MO). St. Clair: wet places, *Eggert* 23 July 1877 (MO). St. Louis: *Riehl* 133 (MO). Shannon: in ponds, Montier, *Bush* 27 October 1908 (MO). Webster: *Bush* 10 August 1892 (MO).

Arkansas. Benton: *Plank* 1899 (MO,NY).

North Dakota. Benson: in slough, Leeds, *Lunell* 6 July & 14 August 1910

(MINN,NY,ISOTYPE of *Steironema lunellii* Greene); Butte, *Lunell* 22 July 1906 (FM,ILL,MINN,NY,US,TOPOTYPE of *Steironema verticillatum* Greene); Butte, *Lunell* 5 August 1906 (NY,US). Ramsey: near Cheyenne River and Devils Lake, *Geyer* July-August 1839 (MO). Ransom: wet places in Fargo loam, *Bell* 478 (FM). Rolette: low spot in pasture with willows, St. John, *Stevens* 467 (MO). Ward: Minot, *Rider* 376 (FM).

South Dakota. Day: high grass in dry slough, *Over* 14315 (US).

Nebraska. Brown: Long Pine, *Conklin* 85 (NY). Cherry: wet meadow along lake, North Dewey Lake, near Valentine, *Tolstead* 458 (GH). Hooker: Niobrara River, *Winter* 132 (US).

Kansas. Miami: *Oyster* 20 August 1883 (US); Paola, *Oyster* 5226 (NY).

Saskatchewan. The Battlefords: Scott, *Malte* 19 June 1913 (CAN). District not determined: Long Lake, *Macoun* 7 July 1879 (CAN).

Alberta. Acadia: small dry slough, Craigmyle, *Brinkman* 706 (NY).

New Mexico. Catron: Mogollon Mts., on or near West Fork of Gila River, McKinney's Park, *Metcalfe* 394 (MO,NY,US); Middle Fork of Gila River, *Wooton* 5 August 1900 (US).

Arizona. Apache: under willows, head of White River, White Mts., *Goodding* 668 (NY,US); swampy situations along creek, McNary, 2300 meters, *Peebles* 12476 (US); dampish places, White Mts., *Whitehead* 1553 (US). Coconino: Mormon Lake, 2100 meters, *Collom* 652 (MO,US); Buck Springs Ranger Station, Mogollon Mts., 2300 meters, *Collom* 782 (US); Oak Creek, near Flagstaff, *Lemmon & Lemmon* July 1884 (US,TYPE *Steironema validulum* Greene); Oak Creek, s. of Flagstaff, *McDougal* 451 (US); Canyon of Clear Creek, *Mearns* 25 July 1887 (NY); Mormon Lake, *Toumey* 198 (MINN,US). Gila: Baker's Butte, Mogollon Mts., *Mearns* 70 (NY). Yavapai: *Rusby* 715 (FM,NY).

Washington. Kittitas: Ellensburg, *Whited* 586 (US). Yakima: moist overflow ground of river, near Mabton, *Cotton* 751 (US); along Yakima River, near Selah, *Jones* 2220 (ILL); Yakima, *Jones* 13 July 1927 (ILL).

Subspecies *hybrida* usually differs from ssp. *lanceolata* in having thicker, more robust stems with longer internodes, no persistent cord-like rhizomes and hence sessile basal offshoots. The usually petiolate leaves are green beneath rather than somewhat glaucous and the open-paniculate inflorescence is more evident.

In favorable habitats such as swamps and wet alluvial soils it becomes a robust plant with thick stems and well-developed, floriferous branches. It is this ecological form, not unusual in any part of range, that Greene described as *S. verticillatum*. Although offering a strong contrast to smaller and simple plants of less favorable habitats, it cannot be treated as a distinct taxon. As seen from the phototype, diffuse branching is not present, but all the flowers are borne in the axils of subverticillate leaves. Another effect of habitat is the loss of lower leaves, leaving either a naked lower stem or one with smaller "second growth," lanceolate leaves. This loss of lower leaves may frequently be contrasted with lower leaf retention by subspecies *lanceolata* of drier habitats. *S. lunellii* Greene and *S. verticillatum* var. *monstrosum* Lunell are robust but

stunted forms. The latter is probably a persistent vegetative stage of the basal offshoots.

Westward extensions of *ssp. hybrida* in the Dakotas, Alberta, and Saskatchewan, in Washington east of the Cascade Mountains, and in Arizona and New Mexico are populations that have been considered by some botanists to be conspecific with *L. ciliata* or a segregate of it. Wootton and Standley (1913) retained Greene's *S. validulum* as a distinct species, but it was later reduced by Kearney and Peebles (1939) to a variety of *L. ciliata*. The type *Lemmon & Lemmon* July 1884 (US), from Oak Creek near Flagstaff, Arizona, has a very robust stem; is branched from below the middle; and the numerous floriferous branches bear reduced lanceolate leaves in subverticils of three or more. Stem leaves are lanceolate with sparingly ciliate petioles and minutely papillate leaf margins. Lower leaf surfaces are green, not glaucous; and upon drying, the midrib and lateral veins are darker, not lighter, than the blade tissue. Fruiting calyx lobes are lanceolate and acute, nerved and longer than the capsule. Seed size ranges from 1.4 mm. to 1.7 mm. Later collections by MacDougal from the type locality have the smaller flowers and shorter anthers of *ssp. hybrida*; however, flower size is not a reliable criterion by which the taxa may be separated. The leaves of the latter collection are longer-lanceolate with less ciliation on the petioles, otherwise like the type. No collections of *L. ciliata* from Arizona have been seen. The above characters are either typical of *ssp. hybrida* or within its range of variation. The minutely papillate leaf margin is one of the most consistent characters of the entire species. *Lysimachia ciliata* has invariably conspicuously ciliate petioles and leaf margins with ciliation or evident papillae.

Material from the Upper Sonoran life-zone of Washington, *Cotton* 785 (US), is characterized by stems about 4 mm. in diameter below, weakly branched above, leaves lanceolate with obtuse bases, sparingly ciliate petioles, blades green above and beneath, the veins not lighter than the blade and the margins minutely ciliate. This same variant is seen in Catron County, New Mexico, in material collected by Wootton. A second sheet of *Cotton* 785 (US) (US No. 525256) is of a more vigorous plant with longer-lanceolate leaves and a more vigorous branching habit. The greatly reduced leaf-like bracts of the subverticils recall those on the type collection of Greene's *S. verticillatum*. In habit it is similar to *Whited* 583 (US) and *Jones* 1603 (ILL). These variants are not peculiar to the western population but can likewise be found in various ecological niches occupied by the eastern populations. Conspecificity of these western plants with *L. ciliata* cannot be admitted unless all the

taxa of subgenus *Seleucia*, except *L. quadriflora*, be considered a coenospecies. Evidence to support this supposition is not at hand.

As yet neither type nor other authentic material of Thomas Howell's *S. laevigatum* has been located, but from the original description and later notes by Peck (1941), that binomial seems to belong here.

4. LYSIMACHIA RADICANS Hooker

(Plate VIII)

Lysimachia radicans Hooker, Comp. Bot. Mag. 1:177. 1836; Duby in DeCandolle, Prodr. 8:64. 1844; Chapman, Fl. S. U.S. 280. 1860; Klatt in Abh. Naturw. Ver. Hamburg 4 pt.4:25. 1866; Knuth in Engler, Pflanzenr. pt.237:278. 1905; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:80. 1928; Fernald in Rhodora 39:438. 1937; 42:366. 1940; in A. Gray, Man. Bot. ed. 8, 1141. 1950.

Steironema radicans (Hooker) A. Gray in Proc. Am. Acad. Arts Sci. 12:63. 1877; Syn. Fl. 2. pt.1:61. 1878; Chapman, Fl. S. U.S. ed. 3, 298. 1897; Britton & Brown, Illustr. Fl. N. U.S. 2:590. fig. 2818. 1897; Small, Fl. Se. U.S. 904. 1903; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 646. 1908; Small, Man. Se. Fl. 1025. 1933.

Nummularia radicans (Hooker) Kuntze, Rev. Gen. 1:398. 1891.

Weakly erect, branched herbaceous perennials with long arching stems becoming decumbent or reclining, 4–10 dm. long, glabrous to sparingly glandular-puberulent; basal rosettes or those developing from distal, rooting nodes sessile; rosette leaves ovate or lanceolate, glandular, petioles to 3 cm. long, winged, eciliate; medial leaves opposite, ovate or lanceolate, 5–9 cm. long, 1–3 cm. wide, rounded or obtuse at the base, not attenuate, acuminate, membranous, glabrous, entire margin finely papillate; petiole 2(1)–4 cm. long, winged, ciliate at base and sparingly so above; flowers solitary, in axils of reduced leaves; slender pedicels 1(0.5)–2.5 cm., calyx tube glabrous, 0.5 mm. long, lobes lanceolate, 3–4 mm. long, attenuate, 3-nerved, entire; corolla light yellow, rotate, tube 0.5 mm. long, glandular, sinuses rounded, lobes obovate to sub-orbicular, 3–5 mm. long, 2–3 mm. wide, erose, apiculate, dull red blotch at base of lobes sometimes evident; stamens and staminodia apparently distinct but connected by a membranous connecting ridge, filaments subequal, 1.5–2 mm. long, anthers linear 1.5 mm. long, notched below, staminodia triangular-subulate, obtuse, glandular, 0.5–0.7 mm. long; ovary subglobose, style 3.5 mm. long, slightly expanded at the tip; capsule subglobose or ovoid, 3 mm. in diameter, barely exceeding the calyx, seeds several, 1–1.5 mm. long, rufescent, trigonal and somewhat umbonate, minutely reticulate, outer surface with a thin margin.

Type locality: "Jacksonville." [Washington Parish, Louisiana] Hooker

(1836). Type at Kew. Phototype in the herbarium of the University of Illinois.

Distribution: Swamps, moist woods, and stream banks; southern Illinois and northwestern Missouri, to eastern Texas and southeastern Mississippi; also locally in Virginia. Flowering period: June–August. Map 2.

Virginia. Augusta: moist sandy soil, near Outlet, Green Pond, vic. of Stewart's Draft, *Carr 360* (GH). New Kent: bottomland woods, Chickahominy River n. of Long Bridge, se. of Quinton, *Fernald & Long 11402* (GH). Southampton: spring-heads bordering alluvial wooded bottomland, Nottoway River, Cypress Bridge, *Fernald & Long 10778, 10779, 11109, 11401* (GH); siliceous and argillaceous alluvium bordering cypress swamp, bottomland of Nottoway River, above Cypress Bridge, *Fernald & Long 6332* (GH).

Illinois. Pulaski: low swampy woods, Karnak, *Palmer 16545* (MO); woods, 1 mi. e. of Karnak, *Winterringer 3209* (ISM). County not determined: damp woods, American Bottom, *Collector not determined* 11 August 1860 (MO).

Tennessee. Chester: bottoms, *Bain 112* (US). Shelby: creek bank, Memphis, *Fendler* (GH).

Mississippi. Jackson: Nyssa-Mayaca swamp, Black Creek of Pascagoula River, *Ray 3041* (MISSA). County not determined: *Hilgard* 1858 (MO).

Missouri. Butler: swamps, *Eggert* 30 August 1892 (FM,GH,MINN); Neelyville, *Eggert* 8 August 1893 (ILL,NY,RNC). Cape Girardeau: moist places, about 3 mi. sw. of Orleor, *Steyermark 22685* (FM). Cass: bottoms, *Broadhead* (MO). Dunklin: swamps, Campbell, *Kellogg 25700* (NY). Jackson: Blue Springs, *Eggert* 19 August 1892 (NY,US). New Madrid: *Bush 86* (GH,NY). Pemiscot: low woods, 3 mi. sw. of Deering, *Steyermark* 26 August 1938 (FM). Ripley: low swampy woods, e. of Naylor, *Palmer & Steyermark 41544* (GH, NY). Stoddard: Idalia, *Bush 460* (MO,NY). Wayne: Wappapelo, *Steyermark 6230* (FM).

Arkansas. Clay: low wet woods, Corning, *Palmer 6088* (FM,MO). Craighead: wet woods, *Demaree 7062* (GH,US). Drew: mud flats, Selina, *Demaree 22283* (MINN,NY). Pulaski: Little Rock, *Hasse* 1885 (US).

Louisiana. Calcasieu: low woods, Lake Charles, *Mackenzie 530* (CNC, MO, NY). Catahoula: bottomland, near Jonesville, *Brown 6532* (GH). Livingston: in water of woodland ditch, along Amite River, near Denham Springs, *Correll & Correll 9136* (DUKE,GH). Orleans: New Orleans, *Drummond* (GH). Ouachita: low woods, Monroe, *Palmer 8945* (MO,US). Richland: Holly Ridge, *Collector not determined* 1901 (FM). Union: low pine woods, Marion, *Ridell* 1859 (US). Washington: Jacksonville, *Drummond* (GH,ISOTYPE;ILL, Photo of TYPE from KEW). West Carroll: *Moseley* 16 July 1903 (US); low and damp grounds, Bayou Cane, *Carpenter* 5 July (NY). Parish not determined: *Hale* (GH,NY); *Torrey* 1834 (GH); *Thurber* (GH).

Texas. Gregg: *York* 14 June 1942 (GH). Hardin: low woods, Fletcher, *Palmer 12734* (MO); *Tharp* 10 September 1937 (GH). Harris: Cypress City, near Houston, *Ball 838* (GH).

Plants collected by Thomas Drummond near Jacksonville, Washington Parish, Louisiana, were the basis of *L. radicans* described by W. J. Hooker (1836). Hooker said: ". . . that though in some respects allied

to the preceding species [ssp. *hybrida*] it is abundantly distinct. The stems and branches are long and straggling, rooting at the extremities, the leaves of all of them rather long and slender stalks, ovate (not attenuate) at the base. . . . Fruit and seed exactly as in *hybrida*."

The erect and more robust habit of ssp. *hybrida* usually makes it distinctive unless, as under conditions conducive for attenuated growth, it assumes the habit of *L. radicans*. Then relative ranges of floral structures may be used to separate the closely related taxa. Hooker's statement concerning fruit and seed is misleading, for, although similar in form, ssp. *hybrida* is usually larger. Capsules of *L. radicans* are about 3 mm. in diameter; those of ssp. *hybrida*, 3.5–4.5 mm.; seed of the former are 1–1.5 mm. long; the latter, 1.2–1.8 mm. long. A similar norm of variation occurs with floral parts. For example, corolla lobes of ssp. *hybrida* are 6–9 mm. long; those of *L. radicans*, 3–5 mm. long.

Fernald (1937), when first observing *L. radicans* in Virginia, believed the plants to be ssp. *hybrida* but after repeated field observations accepted it as *L. radicans*. Material observed in Virginia does not branch as extensively as the inland material and consequently bears more flowers in the axils of stem leaves.

The distribution of *L. radicans* in the lower Mississippi River Valley and apparent isolation in Virginia is not particularly significant. Attention of the reader is called to a discussion by Fernald (1937) on Coastal Plain phytogeography.

5. LYSIMACHIA QUADRIFLORA Sims

(Plate X)

Lysimachia quadriflora Sims in Curtis, Bot. Mag. 17:tab. 660. 1803; Elliott, Sketch Bot. S.C. & Ga. 1:234. 1817; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:80. 1928; Fernald in A. Gray, Man. Bot. ed. 8, 1142. 1950.

Lysimachia longifolia Pursh, Fl. Am. Sept. 1:135. 1814; Nuttall, Gen. N. Am. Pl. 1:122. 1818; Torrey, Fl. N. & M. U.S. 211. 1824; DUBY in DeCandolle, Prodr. 8:63. 1844; Chapman, Fl. S. U.S. 281. 1860; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:26. tab. 14. 1866; Knuth in Engler, Pflanzenr. pt.237:279. 1905; Thenen, Phyl. Prim. 98. tab. 8. 1911.

Lysimachia revoluta Nuttall, Gen. N. Am. Pl. 1:122. 1818; Torrey, Fl. N. & M. U.S. 1:211. 1824.

Steironema revolutum (Nutt.) Raf. ex Steudel, Nom. Bot. ed. 2, pt.2:85. 1841; Baudo in Ann. Sci. Nat. II. 22:347. 1843; A. Gray in Proc. Am. Acad. Arts Sci. 12:63. 1877. — Pro syn.

Lysimachia angustifolia sensu A. Gray 1848, — non Lamarck 1792.

Lysimachia angustifolia var. *revoluta* (Nutt.) A. Gray, Man. Bot. 283. 1848.

Steironema longifolium (Pursh) Raf. ex A. Gray in Proc. Am. Acad. Arts Sci. 12:63. 1877; Syn. Fl. 2. pt.1:62. 1878; Macoun, Cat. Can. Pl. 2:314. 1884; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 330. 1889.

Nummularia longifolia (Pursh) Kuntze, Rev. Gen. pt.2:398. 1891.

Steironema quadriflorum (Sims) Hitchcock in Trans. St. Louis Acad. 5:506. 1892; Britton & Brown, Illustr. Fl. N. U.S. 2:591. fig. 2820. 1897; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 646. 1908; Rydberg, Fl. Pr. & Pl. 624. 1932.

Lysimachia loomisii Torrey in sched. herb. Kew ex Knuth in l.c.

Lysimachia quadrifolia Curtis, Bot. Mag. ex Knuth in l.c., — sphalm.

Nummularia quadriflora (Sims) Farwell in Report Mich. Acad. Sci. 15:183. 1913.

Slender herbaceous perennials 2–8.5 dm. tall; rhizomes few, slender, forming subsessile offshoots; rosette leaves long petioled, elliptical to obovate, 2–3 cm. long, 0.5–1 cm. wide, tapering at base; stem simple or branched, glabrous, 4-angled above; medial leaves opposite linear, 3.5–9 cm. long, 3–6 mm. wide, rigid, grooved along the midrib, tapering to a ciliate base, apex acute to obtuse, midrib prominent, lateral nerves obscure, shiny above, dull below, margins revolute, flowers in upper leaf axils; pedicels 2–3 cm. long; calyx tube short, lobes lanceolate, attenuate, entire, 4–6 mm. long, 1.5–2 mm. wide; rotate corolla yellow, glandular tipped hairs within, tube about 1.2 mm. long, rounded to obtuse, lobes oval to obovate, 7–12 mm. long, 5–9 mm. wide, erose or entire, apiculate; stamens weakly joined with alternate triangular to subulate staminodia by a membranous line at base of corolla tube; filaments glandular, about 2 mm. long, subequal, anthers linear, notched below, about 2 mm. long; ovary subglobose, glabrous or with a few glandular tipped hairs at summit; style 4.5–5 mm. long, ovules numerous, capsules short ovate to subglobose 3.5–4 mm. in diameter; seeds trigonal, about 1.2 mm. long, outer surface flat, somewhat angular in outline, adjacent surfaces concave, shiny rufescent coat with thin scarious covering.

Type locality: Plants described by John Sims were grown from seed sent from North America to Mr. Salisbury of the Botanical Garden at Brompton [England]. Sims (1803).

Distribution: Moist riverbanks, slopes, prairies, swamps, and roadside ditches; Massachusetts and western New York to Manitoba, southward to Arkansas and Georgia. Flowering period: July–September. Map. 5.

Massachusetts. Hampshire: dry woods, Amherst, *Morong* 13 July 1875 (NY). Middlesex: Lowell, *Ordway* (MO).

New York. Erie: Buffalo, *Clinton* (NY). Niagara: Niagara Falls, *Gray* (NY). Pennsylvania. Berks: Kenneys, *Eby* July 1889 (MO).

District of Columbia: rocky riverbanks, vic. of Washington, *Steele* 4 July 1896 (MINN,MO).

Virginia. Augusta: Staunton, *Murrill* August 1894 (NY). Montgomery: Blacksburg, *Murrill* (NY).

Georgia. Douglas: acid bog, along highway 2 mi. e. of Villa Rica, *Cronquist* 5422 (US). Murray: near Chatsworth, *Alexander*, *Everett*, & *Pearson* 4 October 1933 (NY).

Ontario. Bruce: marsh, Stokes Bay, Bruce Peninsula, *Krotkov* 9320 (NY, US); low ground, Pike Bay, Bruce Peninsula, *Pease* & *Ogden* 24817 (GH,US). Essex West: Sandwich, *Macoun* 6 September 1892 (CAN,NY,US). Huron: stream banks, Wingham, *Morton* 20 July 1890 (CAN). Lambton-West: Pt. Edward, Lake Huron, *Macoun* 12 August 1901 (CAN,GH,US). Middlesex East: low river flat, London, *Milliman* 30 July 1883 & 31 August 1883 (US). Simcoe North: rivages calcaires de la baie Georgienne, *Marie-Victorin*, *Rolland-Germain*, & *Meilleur* 45083 (GH). Welland: Point Abino, *Coville* 23 August 1886 (US).

Michigan. Bay: abundant in marshy meadows about 9 mi. e. of Bay City, *McVaugh* 11053 (CAN). Cass: Magician Beach, *Gates* 4 August 1906 (ILL). Cheboygan: lake shore, Cheboygan, *Kofoed* 15 August 1890 (GH). Genesee: Flint, *Clarke* 187? (US). Hillsdale: Hillsdale, *Sloop* 23 July 1933 (FM). Ingham: Michigan State College, East Lansing, *Gray* (GH); moist soil, Haslett, *Yuncker* 730 (ILL). Muskegon: vic. of Muskegon Marsh, *McLouth* 17 September 1898 (CAN). Oakland: wet marshy margins, Lake Orion, *Chandler* 3 August 1913 (US). Saint Clair: Port Huron, *Dodge* 8 July 1894 (MINN). Washtenaw: low swale, sandy soil, ne. of Cedar Lake, 3 mi. w. of Chelsea, *McVaugh* 7572 (GH); swampy edge of woods, s. shore, Portage Lake, *Hermann* 6917 (FM,GH,NY,US).

Wisconsin. Dane: Madison, *Churchill* 23 August 1893 (GH); Lake Mendota, Madison, *Sudworth* 24 August 1893 (US). Door: Idle Wild, *Schuetz* 23 August 1902 (FM). Jefferson: edge of Faville Prairie near Lake Mills, *Jones* 17747 (ILL). Milwaukee: wet grounds, Milwaukee, *Lapham* July (NY). Racine: Racine, *Davis* 15 July 1879 (FM). Walworth: Delavan, *Milligan* September 1867 (US); vic. of Delavan, *Hollister* 10 (US). Waukesha: open bog, w. of Big Bend, *Wadmond* 19834 (MINN).

Minnesota. Clay: Glyndon, Red River Valley, *Ballard* 2995 (GH). Dakota: Nicola, *Moore*, *Butters* & *Jenkins* 15117 (MINN). Hennepin: Minneapolis, Aiton August 1891 (US); prairie, St. Anthony Falls, *Schuetz* 18 July 1888 (GH). Kittson: virgin prairie, 4 mi. e. of Lake Bronson, *Johnson* 494 (NY). Lincoln: Lake Benton, *Sheldon* 51328 (MINN). Mahanomen: Wauburn, *Chandonnet* 28 July 1911 (US). Marshall: Holt, *Rosendahl*, *Butters* & *Mayle* 7061 (MINN). Mower: moist meadow, Rose Creek, *Rosendahl*, *Butters* & *Phillips* 7271 (MINN). Nicollet: *Ballard* July 1892 (GH, MINN, US). Ramsey: edge of dry pond, Fort Snelling, *Rosendahl* 2245 (MINN). Scott: bottomlands, Savage, *Rosendahl* 6777 (MINN). Stearns: Rockville, *Campbell* 199 (MINN). Swift: slough, *Moyer* 2820 (NY).

Ohio. Clark: open bog, northern part of Cedar Swamp, vic. of Tremont City, *Leonard* 16055 (US). Erie: Castalia, *Moseley* 27 July 1894 (FM). Montgomery: Dayton, *Morgan* & *Morgan* 17 July 1879 (NY). Ottawa: East Harbor, *Moseley* 15 August 1896 (US). Pickaway: Kibler's bog, ½ mi. s. of Circleville,

Bartley & Pontius 36 (NY). Rose: *Crowl* 14 August 1937 (NY). Stark: swamp, Canton, *Case* August 1912 (US).

Indiana. De Kalb: Diamond Lake, 2 mi. n. of Auburn, *Sloop* 30 August 1933 (FM). Jasper: *Ek* 13 July 1940 (NY); roadside, Marion twp., 1 mi. w. of Rensselaer, *Welch* 88 (ILL). Knox: Sandborn, *Rhodes* July 1927 (NY). La-grange: margin of Lake Eve, *Yunker & Welch* 10764 (GH,US). Lake: moist swales, East Chicago, *Peattie* 21 July 1920 (GH). La Porte: bog, 1 mi. n. of Mill Creek, *Friesner* 13836 (DUKE,NY). Marshall: Lake Maxinkuckee, *Bardsley* July 1889 (US); Lake Maxinkuckee, *Evermann* 718 (US). Newton: Rose-lawn, *Hahn* 1905 (US). Parke: wet rocks, Turkey Run State Park, *Duncan* 224 (DUKE). St. Joseph: Notre Dame, *Nieuwland* 16 September 1911 (US). Steuben: marsh, near Lake Gage, *Deam* 11 August 1903 (NY). Wayne: Ear-lham, *Pennell* 9482 (MINN). Wells: sec. 32, along Salimonie River, *Deam* 105 (US).

Illinois. Boone: marsh, 2 mi. se. of Irene, *Fell & Fell* f46492 (ILL); spring-fed boggy swamp, 2 mi. n. of Irene, *Fuller* 11875 (ILL). Cass: wet prairies, Beardstown, *Geyer* July 1842 (GH,NY). Champaign: low sandy soil, Cham-paign, *Gleason* 903 (GH); low ground, Champaign, *Seymour* 16897 (ILL). Coles: along I. C. R. R. between Doran and Humboldt, *Winterringer* 702 (DUKE,ILL). Cook: prairie, Constance, Chicago, *Chase* 1618 (ILL,US); moist grounds, Englewood, *Hill* 126 (ILL); wet prairie, Riverside, *Lansing* 1450 (ILL). Du Page: edge of marsh, Lisle, *Martinek* 137 (US); low ground e. of Wheaton, *Moffatt* 491 (ILL). Hancock: Augusta, *Mead* August 1844 (NY). Henderson: near Oquawka, *Patterson* 187 (NY). Iroquois: along rr., Gilman, *McDougall* 118 (ILL); moist prairie, 5 mi. ne. of Beverville, *Winter-ringer* 1412 (ILL). Kane: cold wet soil, Elgin, *Sherff* 1988 (ILL). Kankakee: low moist ground near island, Kankakee River, 7 mi. nw. of Kankakee, *Sherff* 1621 (ILL,MO); moist prairies, Kankakee, *Hill* 35 (ILL). Lake: dry sand ridge along lake shore, Waukegan, *Gleason & Shobe* 344 (GH,ILL); meadow, along Lake Michigan, near Waukegan, *Jones* 17226 (ILL). McHenry: Algon-quin, *Nason* 12 August 1878 (ILL). McLean: prairie, Bloomington, *Robinson* June 1886 (GH). Macoupin: Carlinville, *Robertson* 23 August 1882 (INHS); Carlinville, *Andreus* 1 July 1889 (ILL). Mason: wet ground, Havana, *Gates* 8 July 1910 (DUKE). Menard: Athens, *Hall* 1861 (GH,ILL). Ogle: near Byron, *Goddard* 9 July 1879 (NY); Byron, *Waite* 7 August 1885 (US). Piatt: *Seymour & Seymour* 1881 (DUKE). Stark: wet prairie, near Wady Petra, *Chase* 13 July 1898 (ILL). Stevenson: Freeport, *Johnson* 27 July 1899 (MINN). Tazewell: Spring Mill Bog, near East Peoria, *Chase* 3194 (DUKE, ILL,MINN,NY,US); Sawmill River Bog, *Ray* 1300 (ILL). Vermilion: along Middle Fork of Vermilion River between Oakwood and Collison, *Jones* 14384 (ILL,MO). Wabash: low wet quagmire, near Patonk, *Schneck* 11 August 1881 (ILL); Mt. Carmel, *Waite* 30533 (ILL). Will: White Prairie, Joliet, *Skeels* 393 (US). Winnebago: Fountaindale, *Bebb* 1867 (GH,NY,US); sandy swamp, near Shirland, *Fuller* 10882 (ILL). Woodford: cold bog, Illinois River bottom beyond Upper Ferry, *McDonald* June 1889 (GH,ILL).

Iowa. Black Hawk: low prairie, Bennington twp., *Burk* 504 (ILL). Cerro Gordo: along Buffalo Slough, Mason City, *Shimek* 6 July 1920 (MINN). Dick-inson: kettle hole on prairie, 1½ mi. n. of Miller's Bay, West Okoboji, *Shimek* 27 July 1916 (GH). Emmet: prairies, Armstrong, *Cratty* 13 August 1855 (US); wet meadow, n. of Four-Mile Lake, 3 mi. w. of Estherville, Emmet twp., *Hayden* 10158 (GH,NY). Fayette: river bottoms, Fayette, *Fink* July

1894 (GH). Greene: Jefferson, *Allen* 25 July 1867 (GH). Guthrie: *Allen* August 1867 (GH). Palo Alto: marshy area around hilltop bog, 5 mi. e. of Ruthven, Highland twp., *Hayden* 10157 (MINN,US). Polk: bogs, Johnson, *Fitzpatrick & Fitzpatrick* 31 July 1897 (NY). Story: Ames, *Arthur* 18 July 1877 (NY); Story City, *Pammel & Stewart* 976 (GH). Webster: Fort Dodge, *Somes* 3434 (US). Winneshiek: lowlands of tallgrass prairie, near Ridgeway, *Tolstead* 11 July 1933 (MO).

Missouri. Benton: swampy meadow along creek, 3 mi. w. of Zora, *Steiermark* 7304 (FM). Camden: swampy meadow in creek valley, 2½ mi. sw. of Barnumton, *Steiermark* 6944 (FM). Crawford: along Crooked Creek, 4 mi. nw. of Sligo, *Steiermark* 1806 (FM). Dallas: base of moist limestone ledges, along Niangua River, 5 mi. sw. of Long Lane, *Steiermark* 24229 (FM). Douglas: moist limestone ledges, along Spring Creek, near Roosevelt, *Steiermark* 23320 (FM). Greene: *Shepard* 1880 (GH); low ground ne. of Springfield, *Standley* 9121 (US). Howell: meadow, along Little Indian Creek, 7 mi. nw. of Willow Springs, *Steiermark* 23411 (FM). Iron: open bog, foot of rock hills, near Lopez switch, *Palmer* 31537 (GH). Jefferson: *Eggert* (US). Miller: swampy meadow, 4 mi. w. of Iberia, *Steiermark* 6773 (FM,MO). Ozark: crevices in limestone boulder-bed of Turkey Creek, 2 mi. ne. of Hammond, *Steiermark* 22838 (FM). Polk: limestone boulders along river, 5 mi. ne. of Pleasant Hope, *Steiermark* 24120 (FM). Pulaski: seepage slope along Big Piney River, 3½ mi. e. of Tribune, *Steiermark* 25496 (FM). Ripley: bogs and rocks, Bay Mills, *Mackenzie* 388 (MINN,US). St. Francois: Koester, *Bauer* 20 (FM). Shannon: wet places, Montier, *Bush* 5324 (GH,US); *Tracy* 2 July 1886 (NY). Taney: limestone ledges near river, 11½ mi. se. of Mincy, *Steiermark* 20058 (FM). Washington: gravel bar in Big River, near Bliss, *Steiermark* 1842 (FM). Wayne: cattail and alder swamp along Stanley Creek, 7 mi. ne. of Wappapelo, *Steiermark* 67005 (FM). Webster: meadow, along Osage Fork, 1 mi. n. of Roder, *Steiermark* 23789 (FM).

Arkansas. Baxter: spring, near Cotter, *Palmer* 8421 (MO). Iazard: rocky creek bank, Calico Rock, *Demaree* 23515 (MO). Marion: moist rocky banks near Cotter, *Palmer* 10560 (MO,US). Pulaski: near Little Rock, *Merrill* 2121 (ILL).

Manitoba. Winnipeg Valley, *Bourgeau* 1859 (GH).

North Dakota. Cass: swamp edge, Kindred, *Stevens* 86 (FM). Clay: low prairie, Buffalo State Park, *Stevens* 18 July 1947 (MINN). Ransom: low meadow on sandy loam, McLeod, *Bell* 225 (MINN). Richland: sandy prairie, Walcott, *Stevens* 7 Aug. 1919 (MINN).

In the attempted revival of Rafinesque's *Steironema*, Asa Gray (1877) declared Sims' epithet a source of confusion because of its similarity to *L. quadrifolia*, and he therefore adopted the later epithet of Pursh, *L. longifolia*. Only a few botanists followed him. Desirable as such a change may be, it is of course not permissible under the International Code.

Lysimachia quadriflora may be distinguished from the "ciliata-lanceolata" complex by the linear and rather firm leaves that are ciliate only at the base, shiny and grooved along the midrib above, dull below with evident midrib and revolute margin and obscure lateral veins, and by

the large flowers with apiculate lobes to 12 mm. long usually borne in subverticils of four.

B. Subgenus II. *LYSIMACHIA* (L.) J. D. Ray, grad. nov.

Ephemerum Reichenbach, Consp. 127. 1821; Fl. Germ. Exc. 409. 1831, — non [Tourn.] Moench 1794, as a genus, p.p.

Cassandra Bigelow, Fl. Bost. ed. 2, 74. 1824, — as a subgenus.

Godinella Lestiboudois, Bot. Belg. 2:194. 1827, — as a genus, p.p.

Lysimastrum Endlicher, Gen. Pl. 2:732. 1839; Duby in DeCandolle, Prodr. 8:60. 1844; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:19. 1866; Knuth in Engler, Pflanzenr. pt.237:303. 1905; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 645. 1908; Fernald in A. Gray, Man. Bot. ed. 8, 1140. 1950, — as a section, p.p.

Lerouxia (Mérat) Endlicher, l.c.; Klatt in op. cit. 40; Bentham & Hooker, Gen. Pl. 2:635. 1876; Knuth in op. cit. 261,—as a section.

Tridynia (Raf.) A. Gray, Man. Bot. 283. 1848, — as a section.

Nummularia (Gilib.) Klatt in op. cit. 27; Knuth in op. cit. 275; Fernald in A. Gray, Man. Bot. ed. 8, 1141. 1950, — as a section, p.p.

Lubinia Klatt in op. cit. 29, — as a section, p.p.

Cilicina Klatt in op. cit. 34, — as a section, p.p.

Asterolinum Klatt in op. cit. 37, — as a section, p.p.

Lysimachia (L.) A. Gray, Syn. Fl. 2. pt.1:62. 1878; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 330. 1889, — as a section.

Pteranthae Knuth in op. cit. 260, — as a section.

Hypericoideae Knuth in op. cit. 264, — as a section.

Verticillatae Knuth in op. cit. 266, — as a section.

Alternifoliae Knuth in op. cit. 268, — as a section.

Cephalanthae Knuth in op. cit. 279, — as a section.

Eulysimachia Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:69. 1928; in Hannig & Winkler, Pflanzenareale 2. pt.5:39. Map 45. 1929, — as a section, p.p. max., exclud. section *Theopyxis* and subsection *Steironema*.

American plants of subgenus *Lysimachia* are erect or repent perennials with simple or branched stems, glabrous or with septate trichomes; leaves usually opposite or verticillate, glandular-punctate, entire or nearly so; flowers solitary and axillary or in racemes or panicles; flowers usually 5-merous (rarely more); perianth deeply parted, calyx valvate, imbricate, or contorted in the bud; corolla contorted in the bud, rotate, or crateriform, yellow, the lobes entire or glandular-ciliate, usually dark glandular-streaked or dotted; stamens monadelphous; filaments unequal; anthers ovoid to ellipsoid; ovary glandular-punctate; style slender; capsule glandular-streaked or dotted, dehiscent usually by 5 valves; seeds

several, trigonal or somewhat flattened, the dark coat with a finely reticulate or alveolate covering. In North America north of Mexico this subgenus includes eight species and two putative hybrids.

Type species: *Lysimachia vulgaris* L.

According to the International Code (1950), the subgenus containing the type species of the genus shall have the same name as the genus. Thus *Cassandra* of Bigelow (1824), the earliest name in the category, and *Eulysimachia*, a later synonym proposed by Handel-Mazzetti (1928) are to be discarded. *Lysimachia* as a subgeneric category was first used in 1878 by Gray.

KEY TO THE SPECIES OF SUBGENUS LYSIMACHIA

- A. Corollas crateriform to open campanulate.....B
- B. Flowers in the axils of opposite or verticillate leaves, calyx not dark glandular-margined; corolla lobes glandular-ciliate.....C
- C. Stems repent or becoming so: plants evergreen, glandular punctations of leaf equally distributed, calyx valvate and reduplicate
 - 6. *L. nummularia*
- CC. Stems erect, plants not evergreen, glandular-punctations of leaf mostly toward margin and apex; calyx imbricate.....7. *L. punctata*
- BB. Flowers in terminal and axillary panicles, calyx dark glandular-margined, corolla lobes not glandular-ciliate.....D
- D. Plants viscid-pilose above; leaves villous below, not glandular-margined. Introduced from Europe.....8. *L. vulgaris*
- DD. Plants glandular-puberulent above; leaves glabrous below, rufescent-glandular margined. Indigenous to the southern United States
 - 9. *L. fraseri*
- AA. Corollas rotate to saucer-shaped.....E
- E. Leaf arrangement various, leaves 1-ribbed.....F
- F. Flowers solitary in the axils of verticillate leaves.....10. *L. quadrifolia*
- FF. Flowers exhibiting a transition from that of solitary and axillary to an extended terminal raceme, leaves opposite to verticillate
 - 11. *L. x producta*
- FFF. Flowers in a terminal raceme (raceme spike-like and usually subtended by two lateral racemes, sometimes additional ones near the stem middle, flowers rotate to funnel-formed, 5- to 9-merous, stamens ascending
 - 15. *L. x commixta*)....G
- G. Leaves lanceolate to elliptic, inflorescence glabrate, branches when present not fasciculate.....12. *L. terrestris*
- GG. Leaves linear to narrowly elliptic, inflorescence glandular-puberulent, branches fasciculate.....13. *L. loomisii*
- EE. Leaves verticillate, 3-ribbed.....14. *L. asperulaefolia*

6. LYSIMACHIA NUMMULARIA Linnaeus¹

Lysimachia nummularia Linnaeus, Sp. Pl. 148. 1753; Lamarck, Encycl. 3:572. 1791; Tabl. Encycl. 1:440. 1792; Nuttall, Gen. N. Am. Pl. 122. 1818; Rafinesque in Ann. Gén. Sci. Phys. 7:194. 1820; Steudel, Nom. Bot. 501. 1821; Duby in DeCandolle, Prodr. 8:66. 1844; Klatt in Abh.

¹ For additional synonymy of this European species, see Knuth in l.c.

Naturw. Ver. Hamburg 4. pt.4:21. tab. 15. 1866; A. Gray, Syn. Fl. 2. pt.1:63. 1878; Macoun, Cat. Can. Pl. 2:314. 1884; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 331. 1889; Small, Fl. Se. U.S. 902. 1903; Knuth in Engler, Pflanzenr. pt.237:258. 1905; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 645. 1908; Thenen, Phyl. Prim. 98. tab. 8. 1911; Britton & Brown, Illustr. Fl. N. U.S. ed. 2, 2:712. fig. 3291. 1913; Piper & Beattie, Fl. Nw. Coast 286. 1915; Gagnepain in Mem. Hort. Soc. N.Y. 3:373. 1927; Hegi, Illustr. Fl. Mittel-Eur. 5. pt.3:1852. tab. 212, fig. 3; fig. 2857, 2719. 1927; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:101. 1928; Rydberg, Fl. Pr. & Pl. 623. 1932; Small, Man. Se. Fl. 1123. 1933; Marie-Victorin, Fl. Laurent. 431. fig. 145. 1935; Douglas in Am. Jour. Bot. 23:204. 1936; Beijerinck, Zaden Atlas tab. 65, fig. 644. 1947; Bailey, Hortus Sec. 450. 1947; Man. Cult. Pl. rev. ed. 784. 1949; Fernald in A. Gray, Man. Bot. ed. 8, 1141. 1950; Abrams, Illustr. Fl. Pac. States 3:331. fig. 3747. 1951.

Nummularia repens Gilibert, Fl. Lithuan. 1:29. 1781.

Lysimachia rotundifolia F. W. Schmidt, Fl. Boem. 2:29. 1781.

Lysimachusa nummularia (L.) Pohl, Tent. Fl. Bohem. 1:196. 1810.

Lysimachia repens (Gilib.) Stokes, Bot. Mat. Med. 1:304. 1812.

Lysimachia nemorum Genersich, Elench. Scepus. ex Roemer & Schultes, Syst. Veg. 4:128. 1819, — non Linnaeus 1753.

Perennial herbs, evergreen, the stems repent or becoming so, branched; leaves opposite, suborbicular, entire, 1.5–3.5 cm. wide, dark green, red glandular punctate; petioles 1.5–4 mm. long, narrow wings weakly decurrent, flowers solitary from medial axils, pedicels 1–5 cm.; calyx valvate and reduplicate in bud, lobes ovate, 5–8 mm. long, 3.5–5 mm. wide, weakly keeled with cordate base and acuminate apex, entire; corolla crateriform, yellow, lobes obovate to oblanceolate 1–1.5 cm. long, 5–8 mm. wide, sparingly glandular-streaked or dotted, ciliate, rounded to acute, somewhat erose; staminal tube about 1 mm. long, densely glandular, sinuses rounded often with a small dentation, filaments 4–5 mm. unequal, glandular, anthers linear, about 1.5 mm. long, notched below; ovary subglobose, style 4–5 mm.; ovules usually more than 10; capsules not seen by the writer.

Type locality: "Habitat in Europa juxta agros & scrobes." Linnaeus (1753).

Distribution: River flats, stream banks, woodlands, moist roadsides, and persistent as an escape, often becoming an aggressive weed about gardens and fields; Newfoundland, according to authors, and Nova Scotia to Wisconsin, southward to North Carolina, and Georgia according to Harper (1900). Flowering period: June–August. Map 6.

Nova Scotia. Digby-Annapolis-Kings: Digby, *Macoun* 25 August 1910 (CAN,FM). Shelburne-Yarmouth: outskirts of Yarmouth, *Edmondson* 6506 (NY); moist roadside, Yarmouth, *Long & Linder* 22245 (NY,US).

New Brunswick. Charlotte: St. Andrew's, *Fowler* 27 July 1900 (US).

Quebec. Chambly-Rouville: Environs de Longueuil, Vallee du Saint Laurent, *Marie-Victorin* 9728 (US,NY,ILL). Shefford: fosse humide, Granby, *Fabius* 298 (NY).

Maine. Cumberland: Westbrook, *Ricker* 661 (US). Knox: Matinicus Island, *McAtee* 2 November 1915 (US). Penobscot: waste places, lawns, Orono and vic., *Harvey & Harvey* 652 (US). Washington: Damarosecytta Lake, *Steyermark* 2190 (FM).

New Hampshire. Grafton: an escape, Hanover, *Brown* 20 July 1939 (DUKE). Hillsboro: near farmhouse, Sharon, *Blake* 27 July 1909 (ILL).

Vermont. Addison: Middlebury, *Lathrop* 3 June 1848 (NY). Caledonia: Peacham, *Blanchard* 25 July 1885 (FM,NY). Chittenden: moist shaded places, Burlington, *Charette* 303 (NY). Rutland: naturalized, lawns and damp grounds, Middletown Springs, *Carpenter* 23 June 1911 (MINN). Windham: on rocks beside a small stream, Townshend, *Moldenke & Moldenke* 9898 (ILL,NY).

Massachusetts. Berkshire: Stockbridge, *Shear* 28 June 1891 (ILL). Franklin: riverbank, Greenfield, *Murdock* 5207 (FM). Hampden: sterile rocky brookside, Granville, *Seymour* 212 (NY). Hampshire: dooryard weed, Amherst, *H.G.J.* July 1869 (ILL). Middlesex: Medford, *Perkins* 21 June 1878 (NY). Nantucket: roadside pond, *Fort* 141 (US). Suffolk: Cambridge, *Briggs* June 1900 (MINN).

Connecticut. Fairfield: grassy banks, Bridgeport, *Eames* 19 June 1896 (US). Litchfield: muddy bank of Bantam River, next to clearing leading to White Mansion, Litchfield-Morris Wildlife Sanctuary, Litchfield, *Dwyer* 2408 (NY). Middlesex: lawn, Wesleyan University Campus, Middletown, *Barnhart* 305 (NY).

New York. Bronx: McLean Woods, *Holtzoff* 24 June 1920 (NY). Cayuga: dooryard, Meridian, *Banker* June 1899 (US). Chemung: escape, Elmira, *Lucy* 9569 (FM). Delaware: Arkville, *Wilson* 17 July 1915 (NY). Dutchess: Hyde Park, *Taylor* 563 (NY). Jefferson: escape often in remote fields, Pierrepont Manor, *Phelps* 770 (NY). Nassau: Great Neck, *Ferguson* 23 May 1920 (NY). New York: Van Cartlandt, *Pollard* June 1893 (US). Onondago: vic. of Syracuse, *Underwood* 1891 (NY). Ontario: Canandaigua, *Durand* July 1890 (MINN). Rensselaer: along bank of Jomhannock Creek, Banker farm, Schaghticoke, *Banker* 3788 (NY). Richmond: Richmond Valley, *Britton* 24 June 1894 (NY); Richmond Valley, *Leggett* 12 July 1869 (NY). Saratoga: Saratoga Springs, *Gillman* 1867 (NY). Suffolk: in shady dooryard, Cold Spring Harbor, *Banker* 2941 (NY); Northport, *Ferguson* 10 July 1920 (NY). Tioga: an escape, *Millsbaugh* 20 July 1885 (FM). Tompkins: lower Enfield Gorge, Ithaca, *Dyal & Nielson* 1492 (MINN). Washington: Truthville, *Drushel* 9133 (NY).

New Jersey. Bergen: low woods, Oradell, *Mackenzie* 750 (NY). Burlington: Moorestown, *Stokes* 13 June 1885 (MINN). Essex: East Orange, *Lighthipe* June 1914 (NY). Hunterdon: along creek, Frenchtown, *Mackenzie* 5912 (NY). Mercer: Princeton Cemetery, *Macloskie* June 1876 (NY); Hightstown, *Birdsall* 4 June 1889 (NY). Middlesex: New Brunswick, *Halsted* 157 (ILL,NY). Monmouth: Farmingdale, *Taylor* 2252 (NY). Somerset: Rocky Hill, *Lighthipe* 10 August 1914 (NY); near riding stables, Watchung Reservation, *Kezer* 14 June 1936 (NY).

Pennsylvania. Bucks: Sellersville, *Fretz* 20 (US). Chester: West Chester, *Jefferes* 1836-79 (NY). Dauphin: cemetery swamps, Harrisburg, *Small* 13 August 1888 (FM). Lancaster: banks of Conestogo Creek, South Lancaster, *Small* 23 June 1890 (FM,MINN,NY,US). Montgomery: W. Conshohocken, *MacElwee* 26 June 1892 (US). Northampton: Easton, *Tyler* 22 June 1896 (NY). Philadelphia: lower Wissahickon Valley, Philadelphia, *Edmondson* 2438 (NY); Ger. R. R. & Broad St. Philadelphia, *Martindale* (NY). York: McCalls Ferry, *Small* September 1893 (NY).

Delaware. New Castle: moist ground, near B. & O. R. R. depot, Newark, *Commons* 2 June 1896 (NY).

West Virginia. Marshall: on bank of Fish Creek, near mouth of lower Bowman Run, *Bartholomew* 1940-166 (NY). Wirt: bank of pond, above mouth of Reedy Creek, *Bartholomew* 423 (US).

Virginia. Grayson: cool brookside along road, Independence, *Gleason* 8747 (NY). Montgomery: Blacksburg, *Murrill* (NY).

North Carolina. Avery: 2 mi. s. of Minneapolis, *Radford* 11 July 1946 (CNC). Durham: abundant in flood plain woodland between Lowe's Grove and Chapel Hill *Godfrey* 49530 (DUKE,RNC). Haywood: bank of Plott Creek, *Hendrix* 26 June 1935. Iredell: escaped cultivation, Statesville, *Hyams* July 1881 (NY). Macon: highway ditch, Highlands, *Keever* 842 (DUKE). Madison: Marshall, *Gahagen* 16 June 1947 (RNC). Moore: *Fox & Godfrey* 2436 (RNC). Northampton: Roanoke, *Fox & Godfrey* 1609 (RNC). Wake: low ground near pond, Crabtree Creek Park, *Fox & Whitford* 1437 (DUKE, RNC).

Ontario. Carleton: sandy woodland, Constance Bay, Ottawa River, *Senn* 827 (NY). Huron: garden escape, Wingham, *Morton* 15883 (CAN). Ottawa: by old green house, Beechwood, *Macoun* 17 June 1911 (CAN). Waterloo: riverbank, Galt, *Herriott* 63066 (CAN). Welland: Chippewa, *Macoun* 11 July 1901 (US).

Michigan. Cheboygan: wet ground, e. end of Cerp Lake, *Gleason* 10 July 1935 (DUKE,FM,US). Jackson: escaped, Jackson, *Camp & Camp* 9 July 1897 (DUKE,FM,MINN,US). Kalamazoo: Kalamazoo, *Tuthill* 16 (NY). St. Clair: near Port Huron, *Dodge* 11 July 1895 (FM,ILL,MINN).

Wisconsin. Brown: yard, Green Bay, *Schuette* 8 June 1886 (FM,NY,US).

Iowa: bank of stream in field, 3 mi. e. of Arena, *Herman* 8956 (FM,MO,NY). Jefferson: Ft. Atkinson, *Wadmond* 3521 (MINN). Walworth: cemetery, Delavan, *Wadmond* 30 June 1907 (MINN).

Minnesota. Olmstead: grassy terrace, Rochester, *Ainslie* 2815 (MINN).

Ohio. Cuyahoga: Euclid, *Stan* 30 May 1896 (NY). Delaware: Center Village, *Drushel* 22 June 1927 (ILL). Erie: Castalia, *Moseley* 16 June 1895 (FM). Greene: very wet, partly shaded habitats, John Bryan State Park, Yellow Springs, *Demaree* 11432 (US). Lorain: Oberlin, *Ricksecker* June 1895 (US). Meigs: Salem twp., *Jones* 3 July 1936 (NY). Miami: Fletcher, *Clevenger* (US). Richland: lawns and gardens, Mansfield, *Wilkinson* 6762 (FM, MINN,US).

Indiana. Jasper: creek bank, Carpenter twp, nw. of Remington, *Welch* 195 (ILL). Marion: wet site along Newcastle Div. of Big Four R. R., w. of Emerson Ave., Indianapolis, *Friesner* 16801 (NY). Parke: low wet ground, Turkey Run State Park, *Duncan* 92 (DUKE). Wells: low places along riverbank, ¼ mi. e. of Bluffton, *Deam* 21 June 1905 (US); along Wabash River, Harrison twp., *Deam* 16 June 1903 (NY).

Illinois. Adams: *Brinker 3621* (ILL); low ground, Quincy, *McDougall 175* (ILL). Boone: bank of river slough, 3 mi. w. of Belvidere, *Fell & Fell f46356* (ILL). Champaign: Mahomet, *Rapp & Rapp 30 May 1945* (ILL); cemetery near Brownfield Woods, e. of Urbana, *Winterringer 342* (ILL). Cook: w. of Desplaines River, near Fairview, *Chase 283* (ILL). De Kalb: open low woods n. of Sycamore, *Whitford 9 June 1946* (ILL). Du Page: escape into streets, Wheaton, *Moffatt 196* (ILL); riverbanks, Naperville, *Umbach 11 June 1896* (US). Fayette: woods sw. of Loogootee, *Odell 501* (ILL); wet soil along the I. C. R. R. 1 mi. s. of Farina, *Winterringer 1164* (ILL). Gallatin: dry bottomland, Shawneetown, *Trelease July 1916* (ILL). Jackson: low black soil, Big Muddy River, *McCree 28 May 1941* (ILL). Kane: low bank of Fox River, East Dundee, *Chase 9632* (ILL). Kankakee: moist wooded lowland, vic. of Kankakee, *Crampton 231* (US); near Saint Anne, *Jones 11485* (ILL). Lee: river bottomland, 2 mi. n. of Dixon, *Keithley 26 June 1943* (ILL). Livingston: wet woods, 3 mi. w. of Rowe, *Fuller 8556* (ILL). Peoria: wet grounds, Peoria, *McDonald July 1903* (NY); waste ground, near Springdale Cemetery, Peoria, *Chase 3271* (CNC,ILL,NY). Tazewell: Spring Mill Bog, near East Peoria, *Chase 8869* (ILL,MINN). Vermilion: grassy field along Vermilion River between Oakwood and Collison, *Jones 12998* (ILL,NY). Winnebago: escape, Rockford, *Pammel 23 June 1930* (MINN).

Kentucky. Scott: pond margin, Georgetown cemetery, Georgetown, *Singer 169* (US).

Iowa. Black Hawk: river flat in shade, *Buck 789* (MO). Clayton: wet place, above McGregor, *Shimek* (MINN). Muscatine: low wooded bottoms, w. of Moscow, *Shimek 26 April 1930* (MO).

Missouri. Barry: banks of Kings River, se. of Allen Ford, *Steyermark 22579* (FM). Cass: shaded portion of alluvial woods, 4 mi. nw. of Archie, *Steyermark 66789* (FM). Crawford: alluvial slopes, 3 mi. ne. of Steelville, *Steyermark 41379* (FM). Gasconade: alluvial banks, Gasconade River, 3 mi. nw. of Bay, *Steyermark 27878* (FM). Howell: moist mud banks along stream, 2 mi. sw. of Moody, *Steyermark 5242* (FM). Jackson: Sugar Creek, near Barretts, *Drushel 21 April 1923* (ILL). Johnson: swampy ground, near Warrensburg, *Steyermark 24657* (FM). Marion: damp soil, Riverview Park bluffs, Hannibal, *Davis 4546* (ILL). Pike: slough margin, Salt River Valley, 2½ mi. s. of Ashburn, *Steyermark 22353* (FM). Putnam: common along creek, 2 mi. ne. of Hartford, *Steyermark 64594* (FM). Ralls: muddy roadside ditches, w. of Spalding, *Steyermark 25701* (FM). Reynolds: along spring in alluvial valley, 3½ mi. w. of Piedmont, *Steyermark 22027* (FM). Stone: muddy banks of Indian Creek, n. of Coombs Ferry, *Steyermark 22721* (FM). Vernon: bottom woods, near Stultz Lake, 4 mi. nw. of Nevada, *Steyermark 9792* (FM). Wayne: alluvial sandy ground, 2½ mi. ne. of Patterson, *Steyermark 26834* (FM).

Colorado. Boulder: in mountains above Boulder, *Graves 1925* (MO).

Washington. Thurston: Black Lake, near Olympia, *Meyer 983* (DUKE,MO, NY,US).

Oregon. Multnomah: edge of *Carex* bog, Sauvies Island, *Constance & Beetle 2678* (CAN,DUKE,ILL,NY,US).

California. Plumas: moist meadow, Quincy, *Keck 1627* (FM,MO,US).

With a repent habit, persistent, suborbicular leaves, and a broadly-ovate and more or less keeled calyx which is valvate and reduplicate in the bud, *L. nummularia* seems not closely related to our plants of sub-

genus *Lysimachia*. However, the solitary axillary flower, round, clear, red glandular-punctations of the leaf, densely glandular staminal tube, and linear, almost erect anthers relate it to the European and west Asian *L. punctata* with which it was included by Handel-Mazzetti (1928) in his treatment of section *Nummularia* (Gilib.) Klatt. This large and admittedly difficult section contains thirty-eight species with its center of diversity and distribution in India and southeastern Asia. *Lysimachia nummularia*, with its natural distribution in middle Europe, and *L. punctata* of Europe and western Asia, represent two disjunct extensions from the Asian epicenter. The natural distribution is somewhat obscured by the tendency of the species to become completely naturalized in moist situations in many other localities. This is true not only in Europe but also in North America, where it may occur in extensive colonies in isolated places, leading some botanists to regard it as native. On the other hand, as a low, evergreen mat-former, it sometimes becomes an undesirable weed at the expense of garden plantings, pasture grasses, and native vegetation. Some practical use is being made of it as a ground cover.

Specimens of this species are characteristically sterile, and apparently there is no evidence of North American plants developing capsules with viable seeds. Although the plants are usually floriferous and the flowers have normally developed stamens and pistils, capsules are rarely produced under natural conditions and therefore propagation is entirely vegetative. Gagnepain (1927) reports production of fruits in France under controlled conditions, and concludes that extreme dryness of soil favors fructification and production of viable seeds.

7. *LYSIMACHIA PUNCTATA* Linnaeus¹

Lysimachia punctata Linnaeus, Sp. Pl. 147. 1753; Lamarck, Encycl. 3:572. 1791; Tabl. Encycl. 1:440. 1792; Rafinesque in Ann. Gén. Sci. Phy. 7:194. 1820; Steudel, Nom. Bot. 501. 1821; Baudo in Ann. Sci. Nat. II. 22. 347. 1843; Duby in DeCandolle, Prodr. 8:65. 1844; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:22. tab. 11. 1866; Macoun, Cat. Can. Pl. 2:314. 1884; Britton & Brown, Illustr. Fl. N. U.S. 2:588. fig. 2812. 1897, and edition 2; Knuth in Engler, Pflanzenr. pt.237:267. 1905; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 645. 1908; Thenen, Phyl. Prim. 98. tab. 8. 1911; Hegi, Illustr. Fl. Mittel-Eur. 5 pt.3:1857. fig. 2861. 1927; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:103. 1928; Marie-Victorin, Fl. Laurent. 430. fig. 145. 1935; Bailey, Hortus Sec. 450. 1941; Man. Cult. Pl. rev. ed. 785. 1949; Fernald in A. Gray, Man. Bot. ed. 8, 1140. 1950.

¹ For further synonymy, see Knuth in l.c.

Lysimachia quadrifolia Miller, Gard. Dict. ed. 8, no. 10, 1768, — non Linnaeus 1753.

Lysimachia villosa F. W. Schmidt, Fl. Boëm 2:57. 1793.

Lysimachia verticillata Bieb. Fl. Taut. Cauc. 1:141. 1808.

Lysimachia punctata var. *racemosa* K. Koch in Linnaea 19:18. 1808.

Lysimachusa punctata (L.) Pohl. Tent. Fl. Bohem. 1:195. 1810.

Lysimachia punctata var. *villosa* (F. W. Schmidt) Klatt in l.c.; Knuth in l.c.

Lysimachia punctata var. *verticillata* (Bieb.) Klatt in l.c.; Knuth in op. cit. 268.

Lysimachia punctata ssp. *verticillata* (Bieb.) Handel-Mazzetti in l.c.

Plants erect, 3.5–12 dm. tall; rhizomes few, slender and cord-like; stem simple or branched, glabrescent below, villous above; lower leaves scale-like; medials verticillate or opposite, 5–10 cm. long, 4–6 cm. wide, ovate to lanceolate, villous, glandular-punctate or punctulate especially near the acute apex; the base rounded to obtuse; margins entire and ciliate; petioles 5–16 mm. long; flowers axillary in upper leaf verticils, calyx imbricate, tube short, lobes lanceolate, 5–8 mm. long; corolla crateriform, yellow, tube about 1.5 mm. long, yellow glandular within; lobes lanceolate to ovate, 12–18 mm. long, 6–8 mm. wide acute, glandular-ciliate, staminal tube 2–2.5 mm. long, sinuses acute, densely yellow glandular, filaments unequal, 2–3 mm. long, anthers linear, 2 mm. long, subversatile, ovary subglobose, dark glandular, style 0.5 cm. ovules numerous, capsules globose about 4 mm. in diameter; seeds few, trigonal 1–1.3 mm. long, with a thin, rufescent, reticulate layer which when removed reveals a memnonius shiny coat.

Type locality: "Habitat in Holland inter arundines." Linnaeus (1753).

Distribution: Introduced or adventive, and now naturalized, from Europe. Roadsides, pastures, and waste places; Newfoundland (according to Fernald), Nova Scotia and Quebec, southward to Ohio and Pennsylvania. Europe and Asia minor. Flowering period: June–September. Map 7.

Nova Scotia. Cape Breton North-Victoria: garden escape, Baddeck, *Macoun* 25 July 1898 (CAN). Annapolis: naturalized, Annapolis, *Macoun* 26 June 1883 (CAN).

Quebec. Chambly-Rouville: on waste ground, vic. of Longueuil, *Marie-Victorin* 8224 (MO,NY). Dorchester: au bord du chemin, St. Anseleme, *Marie-Victorin*, *Rolland-Germain*, & *Meilleur* 43607 (CAN,FM). Témiscouata: pastures, Rivière du Loup, *Marie-Victorin* 88 (NY,US).

Maine. Lincoln: near old house, Ocean Point, *Fassett* 3824 (DUKE). Oxford: Norway Village, vic. of Oxford, *Fellows* 4342 (US).

Massachusetts. Dukes: Edgartown, Martha's Vineyard, *Bicknell* 7001 (NY). Franklin: old cellar hole, Shutesburg, *Seymour* 8 September 1929 (DUKE).

Hampshire: roadside, Amherst, *Woolson* 16889 (ILL); Amherst, *Bernhardt* 1881 (US).

Connecticut. Fairfield: roadside, near pond, Greenwich, *Weatherly* 3055 (RNC). New Haven: cultivated land, Waterbury, *Ray* 1 (NY).

New York. Queens: Prince's Garden, Flushing, *Britton* 14 June 1879 (NY). St. Lawrence: escaped from cultivation, found in several towns in waste, Gouverneur, *Phelps* 1613 (CAN,NY,US); along roadside, s. of Ogdensburg, *Muenschler & Maguire* 2466 (US). Suffolk: Flatlands Road, *Ruger* 9 June 1871 (NY). Tompkins: near Ithaca, *Coville* 1884-87 (US). Ulster: Highland, *Granger* 2 July 1897 (NY). Westchester: Lake Mohegan, *Leggett* 30 June 1870 & 21 August 1870 (NY).

New Jersey. Bergen: West Englewood, *Wilson & Boynton* 18 June 1915 (ILL). Cape May: escape, swampy meadows, Dennisville, *Mackenzie* 7018 (NY). Ocean: naturalized along roadsides, Forked River, *McElwee* 22 June 1895 (NY). Sussex: persistent after cultivation, Cranberry Lake, *Mackenzie* 787 (MINN). County not determined: barrens, *Britton & Wilson* 30 June—4 July 1900 (NY).

Pennsylvania. Northampton: roadside, Easton, *Tyler & Porter* 10 July 1894 (NY).

Ontario. Lanark: Perth, *Matheson*, 5 July 1902 (CAN).

Ohio. Hamilton: Cincinnati, *Felter* 14 July 1904 (MO).

Lysimachia nummularia, *L. punctata*, and *L. vulgaris* have in varying degrees become a part of the American flora. The first, most successful, has become extensively naturalized in eastern North America, and in certain locations appearing as a native. The other species, although occasionally in cultivation, are chiefly weeds of waste places. *Lysimachia vulgaris* usually grows in more moist and protected places and *L. punctata* in drier and usually disturbed soil.

The date of introduction of *L. punctata* along the Atlantic Coast of North America is not known. John Gronovius (1739) in his *Flora Virginica* included *Lysimachia foliis lanceolatis floribus solitariis*, which was considered by Linnaeus to be synonymous with *L. punctata*. No modern collection is known from Virginia. According to John Macoun (1884), it was "quite common along roadsides and in fields near Annapolis, N. S.; also in some old gardens at Belleville, Ontario. Very likely introduced from France." Britton & Brown in the *Illustrated Flora* of 1897 gave its range as "waste places, Nova Scotia to southern New Jersey."

Lysimachia punctata and *L. vulgaris* were placed in separate sections by Knuth (1905), and by Handel-Mazzetti (1928). In the latter treatment, *L. punctata* is placed close to *L. coreana*, from which it differs only in the indument, and in the larger corollas with broader lobes. The larger, axillary flowers with thin glandular-ciliate corolla lobes, non-margined calyx, and dark-coated seeds readily separate *L. punctata* from *L. vulgaris*.

Glandular-punctations of the leaves are most evident near the margin and the apex. All leaf material examined is punctate.

8. *LYSIMACHIA VULGARIS* Linnaeus¹

Lysimachia vulgaris Linnaeus Sp. Pl. 146. 1753; Lamarck, Encycl. 3:570. 1791; Tabl. Encycl. 1:439. tab. 101, fig. 1. 1792; Rafinesque in Ann. Gén. Sci. Phy. 7:194. 1820; Duby in DeCandolle, Prodr. 8:65. 1844; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:21. tab. 9. fig. 1, 2. 1866; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 330. 1889; Britton & Brown, Illustr. Fl. N. U.S. 2:587. fig. 2811. 1897; Knuth in Engler, Pflanzenr. pt.237:303. 1905; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 645. 1908; Thenen, Phyl. Prim. 98. tab. 8. 1911; Hegi, Illustr. Fl. Mittel-Eur. 5. pt.3:1859. tab. 212, fig. 2, fig. 2862-2864. 1927; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:81. 1928; Bailey, Hortus Sec. 450. 1941; Beijerinck, Zaden Atlas tab. 65, fig. 643. 1947; Bailey, Man. Cult. Pl. rev. ed. 785. 1949; Fernald in A. Gray, Man. Bot. ed. 8, 1140. 1950. — Non Walter 1788.

Lysimachusa vulgaris (L.) Pohl, Tent. Fl. Bohem. 1:194. 1810.

Lysimachia vulgaris var. *typica* Knuth in op. cit. 304; Thenen, Phyl. Prim. 98. 1911.

Lysimachia fauriei Léveille in sched. ex Handel-Mazzetti in Notes Bot. Gard. Edinb. 41:81. 1921, — pro syn.

Coarse herbaceous perennials usually 4–12 dm. tall, simple or paniculately branched; rhizomes few, elongate; stems glabrate below to viscid-pilose above; leaves opposite or verticillate, scale-like below, medial ones elliptic to lanceolate 6–12 cm. long, 1.5–4 cm. wide, entire, somewhat sinuate and revolute, glandular-puberulent above, villous and pale beneath; the base rounded acute or tapering; the apex acute to acuminate; petioles 1–6 mm. long; flowers in terminal and axillary panicles; pedicels 2–7 mm. long, villous; bracts lanceolate to subulate, 2–8 mm. long; calyx imbricate to contorted in the bud; calyx-tube very short, lobes lanceolate 2.5–4.5 mm. long, about 1.5 mm. wide, margin entire, dark glandular; corolla yellow, crateriform, yellow glandular-stalked hairs within; lobes obovate to elliptic 6–10 mm. long, 3.5–6 mm. wide, entire, rounded; staminal tube likewise glandular, 1.5 mm. long, sinuses obtuse or acute, filaments 2–4 mm. long, unequal, anthers oblong, 2 mm. long, ovary about 2 mm. in diameter, with style glandular-puberulent; style 4–5 mm. long, ovules numerous; capsule sometimes reddened above, subglobose, 3.5–4 mm. in diameter, seeds usually 15 to 25, trigonal, 1 mm. long, shiny rufescent coat with a tawny alveolate "bloom."

Type locality: "Habitat in Europa ripas & paludes." Linnaeus (1753).

Distribution: Naturalized from Europe. Roadsides, waste ground, thickets, salt marshes; Nova Scotia and Quebec to Ontario and Michigan.

¹ For a more extensive synonymy, see Knuth in l.c.

southward to Illinois and Pennsylvania. Europe and Asia. Flowering period: June–September. Map 7.

Prince Edward Island. Queens: rubbish heap, Charlottetown, *Fernald & St. John 11156* (CAN,NY,US).

Quebec. Charlevoix-Saguenay: salt marshes, Ste. Anne de Beaupré, *Macoun 68634* (NY,US). Quebec-Montmorency: salt marshes, *Macoun 30 August 1905* (CAN).

Maine. Cumberland: persistent around old houses, Cumberland, *Chamberlain 657* (US).

New Hampshire. Hillsboro: roadside, Manchester, *Provost & Sheehan 9 July 1935* (NY).

Massachusetts. Middlesex: woodland near Winter Street, Lexington, *Seymour 2 August 1913* (DUKE). Nantucket: Nantucket Island, *Bicknell 20 September 1899* (NY); Nantucket Island, *Faxon & Faxon 18 August 1875* (FM,NY). Plymouth: naturalized, Hingham, *Morong 12 July 1875* (NY). Suffolk: Boston, *Young 1878* (NY).

Connecticut. Fairfield: Wilton, *Bishop 1897* (NY).

New York. Bronx: Kingsbridge, *Bicknell 9 July 1897* (NY). Herkimer: gravelly flats along West Canada Creek, East Herkimer, *Haberer 2868* (US).

New Jersey. Hunterdon: edge of thicket, Annadale, *Fisher 20 July 1917* (ILL).

Pennsylvania. Philadelphia: Darby Creek, *Stewart 8 July 1902* (NY). York: York Furnace, *Brinton 6 September 1892* (NY). Venango: Franklin, *Bell 10 July 1893* (NY).

Ontario. Lincoln: Grimsby, *Armstrong 17 July 1892* (US). Toronto: established on Toronto Island, *Scott 8 July 1899* (CAN).

Michigan. Ingham: along roadside, East Lansing, *Yuncker 707* (ILL,US).

Illinois. Cook: escape, Midlothian Golf Links, *Worthington 5 August 1935* (FM). Kane: moist field along Fox River, s. of Batavia, *Pearsall 7281* (ISM). Lake: wet fields near road, 3 mi. e. of Antioch, *Fuller 9243* (ILL); weed in waste ground near Antioch, *Jones 16509* (ILL). Pope: edge of rocky stream bed near Herod, *Winterringer 7215* (ILL,ISM). Winnebago: banks of Rock River, Rockford, *Fell & Fell 47-312* (ILL).

Three closely related but widely dispersed species, *L. fraseri* of southeastern United States, *L. salicifolia* of Australia, and *L. vulgaris* of Eurasia, comprise the much restricted section *Lysimastrum* Endl. as treated by Knuth (1905) and Handel-Mazzetti (1928). The section is characterized by opposite or verticillate, dark-punctate leaves, paniced inflorescence, dark, glandular-margined calyx, and crateriform corollas. Its relationship to the other North American species is not close.

The stem of *L. vulgaris* is viscid-pilose above, while that of *L. fraseri* is glandular-puberulent above. The leaves of the latter have dark-glandular margins.

9. *LYSIMACHIA FRASERI* Duby

(Plate XI)

Lysimachia lanceolata Pursh, Fl. Am. Sept. 2:729. 1814; Elliott,

Sketch Bot. S.C. & Ga. 1:233. 1817; Sprengel, Syst. Veg. ed. 16, 571. 1825; Duby in DeCandolle, Prodr. 8:64. 1844. — Non Walter 1788.

Lysimachia fraseri Duby in DeCandolle, op. cit. 65; Chapman, Fl. S. U.S. 280. 1860, and subsequent edition; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:21. tab. 8. 1866; A. Gray, Syn. Fl. 2. pt.1:62. 1878; Small, Fl. Se. U.S. 903. 1903; Knuth in Engler, Pflanzenr. pt.237:305. 1905; Thenen, Phyl. Prim. 98. tab. 8. 1911; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:81. 1928; Small, Man. Se. Fl. 1024. 1933; Bailey, Hortus Sec. 450. 1947.

Herbaceous perennial with slender rhizomes; stem stout, erect, 0.7–2 m. tall, simple or sparingly branched above, glabrescent below, glandular-puberulent at upper nodes and inflorescence; lower leaves scale-like, medial ones verticillate to opposite or alternate above, elliptic to lanceolate, sometimes ovate or oblanceolate, glandular-punctate and puberulent; margins rufescent-glandular and entire, obtuse to tapering to a short petiole 3–15 mm. long; bracts linear-subulate, rufescent-margined; calyx aestivation contorted, tube short, about 0.5 mm. long; lobes dark glandular-margined, lance-attenuate, 3–5 mm. long, 0.7–1 mm. wide, minutely glandular, ciliate; corolla yellow, crateriform, tube 0.7–1 mm. wide, lobes broadly elliptical, entire, obtuse, with fine glandular-stalked trichomes; staminal tube 1–3 mm. long, glandular, sinuses obtuse or acute; filaments glandular, unequal, 1–2 mm. long; anthers ovate, deeply notched below, somewhat versatile; style slender 3–4 mm. long, stigma truncate, ovules numerous; capsule globose, 3–4 mm. in diameter, seeds several, usually about 10–15, trigonal, weakly margined, 1.7–3 mm. long, with a thin, reticulate, rust-colored layer which upon drying may be removed to reveal a memnonius splendent coat.

Type locality: "Collected in Carolina by Catesby." Pursh (1814).

Distribution: Open woods and slopes, river flats, stream banks, moist pastures, occasionally in disturbed soil; Blue Ridge and Appalachian Valley regions of North Carolina to Georgia, Tennessee, and Alabama. Flowering period: June–August. Map 5.

North Carolina. Buncombe: flats of the French Broad River near Biltmore, *Biltmore 6573* (ILL,MINN,NY,US); *Biltmore 4120* (CNC,ILL,FM,MINN,NY,US). Catawba: Highland, *Boynton 1888* (US). Macon: Horse Cove, near Highland, *Alexander, Everett, & Pearson 15 September 1933* (NY); Horse Cove, *Boynton 69* (US); edge of road cut through hardwood forest, Whiteside Cove Road to Cashiers Valley, *Blomquist 13916* (DUKE). Transylvania: Sapphire, *Sherwood 20 July 1890* (NY); moist pasture, near Brevard, *Harbison 25 June 1930* (CNC).

South Carolina. County not determined: *Boynton 1888* (US).

Georgia. Rabun: Mountain City, *Reade 14 August 1911* (DUKE). Stephens: clay soil, steep slope of road cut, 7 mi. e. of Toccoa, *Duncan 9856* (RNC). Walker: Lookout Mt., *Allen June 1870* (NY); gullies in old fields, Lookout

Mt., *Smith* 28 August 1883 (FM,US); near summit of Pigeon Mt., *Wilson* 185 (US,NY). County not determined: *Boykin* (NY).

Tennessee. Cocks: Wolf Creek, *Kearney* 30 July 1894 (NY,US); along French Board River between Paint Rock and Del Rio, *Kearney* 829 (CNC, MINN,NY,US); banks of French Broad River, above bridge Bingham Heights, *Mohr* 7 July 1900 (US). Hamilton: Lookout Mt., *Allen* June 1870 (NY); Lookout Mt., *Vasey* 1878 (FM,NY,US). Sevier: near Gatlinburg, *Freeman* 1 (DUKE).

Alabama. Calhoun: Anniston, *Howell* 806 (US). Talladega: on sandstone road, summit of Alpine Mt., *Mohr* 1892 (US).

Lysimachia fraseri, described by Pursh (1814) as *L. lanceolata*, was based upon material in Sherard's herbarium collected in Carolina by Catesby. DUBY (1844) either did not see this collection or else believed material collected in South Carolina by Fraser to represent a distinct species, for he included *L. fraseri*, as well as *L. lanceolata* Pursh, in his monograph. Klatt later (1866) treated Pursh's plant as identical with *L. asperulaefolia*.

Endemic to the Blue Ridge and Appalachian Valley regions of southeastern United States, *L. fraseri* appears to be more closely related to the Eurasian *L. vulgaris* than to any of the native American species. It is the largest of the indigenous species, very robust, sometimes 2 meters tall (according to J. K. Small) with axillary and terminal panicles of rather large, crateriform flowers. The dark glandular-margined calyx lobes and leaves, and large, dark seeds, 1.7–3 mm. long, render it very distinctive.

10. *LYSIMACHIA QUADRIFOLIA* Linnaeus

(Plate XII)

Lysimachia quadrifolia Linnaeus, Sp. Pl. 147. 1753; Lamarck, Encycl. 3:571. 1791; Tabl. Encycl. 1:440. tab. 101, fig. 2. 1792; Muhlenberg, Cat. Pl. Am. Sept. 20. 1813; Pursh, Fl. Am. Sept. 1:135. 1814; Elliott, Sketch Bot. S.C. & Ga. 1:233. 1817; Nuttall, Gen. N. Am. Pl. 1:121. 1818; Torrey, Fl. N. & M. U.S. 1:210. 1824; DUBY in DeCandolle, Prodr. 8:64. 1844; A. Gray, Man. Bot. 283. 1848; Chapman, Fl. S. U.S. 280. 1860; Provancher, Fl. Can. 1:384. 1862; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:22. tab. 22. 1866; A. Gray, Syn. Fl. 2. pt.1:62. 1878; Macoun, Cat. Can. Pl. 2:314. 1884; Watson & Coulter in A. Gray, New Man. Bot. ed. 6, 331. 1889; Britton & Brown, Illustr. Fl. N. U.S. 2:588. fig. 2813. 1897; Small, Fl. Se. U.S. 903. 1903; Knuth in Engler, Pflanzenr. pt.237:266. 1905; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 645. 1908; Thenen, Phyl. Prim. 98. tab. 8. 1911; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:81. 1928; Rydberg, Fl. Pr. & Pl. 623. 1932; Small, Man. Se. Fl. 1024. 1933; Marie-Victorin, Fl. Laurent. 430. fig. 145. 1935; Douglas in Am. Jour. Bot. 23:204. 1936; Bailey, Hortus Sec. 450. 1941; Fernald in A. Gray, Man. Bot. ed. 8, 1141. 1950.—Non Linnaeus 1767.

Lysimachia punctata Walter, Fl. Carol. 92. 1788,—non Linnaeus 1753.

Lysimachia hirsuta Michaux, Fl. Bor. Am. 1:127. 1803.

Tridynia quadrifolia Raf. ex Steudel, Nom. Bot. ed. 2, pt.2:85. 1841,—

pro syn.

Lysimachia quadrifolia var. *variegata* Peck in Report N.Y. State Mus. 47: 157. 1894.

Lysimachia quadrifolia f. *variegata* (Peck) House in Bull. N.Y. State Mus. 254:559. 1924.

Erect plants 2–6 dm. tall; rhizomes elongated; stems usually simple, glabrous or villous-pubescent with septate hairs; leaves in verticels of 3 to 7 (usually 4) lower scale-like, medials elliptic to lanceolate, 4–12 cm. long, 1(0.6)–3.5 cm. wide, sessile or short petiolate; the base acute to tapering, apex obtuse to acute; lower surface sparingly villous, the upper, glabrous; margins entire, ciliate or glabrous, pinnate veins arcuate; flowers axillary, upper two-thirds of plant generally floriferous; pedicels filiform, 1.5–4 cm. long; calyx imbricate in the bud, dark glandular-streaked and ciliate; tube about 0.3 mm. long, lobes lanceolate, 2–5 mm. long, 0.8–1.2 mm. wide, acute to acuminate; rotate to saucer-shaped, yellow; dark streaked or dotted, glandular-tipped hairs within, dull red blotch at base of lobes; corolla-tube about 1 mm. long, lobes elliptic to ovate-oblong, 5–6 mm. long, 3–4 mm. wide, rounded, entire; staminal tube about 1.7 mm. long, densely yellow glandular, sinuses rounded or obtuse, rarely with a small dentation; filaments 1.6–2.3 mm. long, unequal; anthers oblong, notched below; ovary subglobose, style 3–3.5 mm. long, ovules numerous; capsules 2.5–3.5 mm. in diameter, with few dark punctations near the summit; seeds few, 1.5–2 mm. long, trigonal, shiny rufescent coat with a dry, finely reticulate covering.

Type locality: "Habitat in Virginia." Linnaeus (1753).

Distribution: Woods, slopes, roadsides, and fields; occasionally in swamps; Maine to southern Ontario and Wisconsin, southward to northern Alabama. Flowering period: May–August. Map 8.

Maine: Androscoggin: low ground, Auburn, *Merrill* July 1898 (NY). Cumberland: Cape Elizabeth, *Gayle* 771 (US); Westbrook, *Ricker* 585 (US). Hancock: Upper Hadlock Pond, Mt. Desert Island, *Rand* 14 July 1897 (GH); summit of Green Mt., Mt. Desert, *Williams* 18 July 1889 (GH). Knox: Jones Mt., Hope, *Cole* 934 (US). Penobscot: low grasslands, woodside, Orono and vic., *Harvey & Harvey* 653 (US). Waldo: Patrick Mt., 5 mi. w. of South Liberty, *Steyermark* 9 July 1930 (FM). York: Fletcher's Woods, Biddleford, *Kennedy* 20 September 1901 (GH); Kennebunkport, *Morong* 8 August 1878 (NY).

New Hampshire. Belknap: damp soil near shore, Lake Opechu, Laconia, *Carter* 114 (ILL). Carroll: light soil, Ossipee Park, *Tucker* 4 July 1887 (FM). Cheshire: open woods, Fall Mt., Walpole, *Hayes & Fernald* 346 (GH). Grafton: dry woods near Lower Baker Pond, Wentworth, *Williams* 29 July 1908 (GH); moist soil, Pine Park, Hanover, *Stewart* 4318 (GH,NY). Hillsboro:

sandy woods, Nashua, *Robinson 715* (GH). Merrimack: woods, Henniker, *Robinson 842* (GH).

Vermont. Addison: Ferrisburgh, *Horsford 7* June 1878 (FM). Bennington: woods, mountain side, Manchester, *Day 3* (US). Rutland: Twin Mts., W. Rutland, *Eggleston 1493* (GH). Windham: Bellows Falls, *Blanchard 14* July 1902 (GH); Haystack Mt., near Dover, *Drushel 4446* (ILL); woods, Westminster, *Robinson 78* (GH).

Massachusetts. Barnstable: dryish grazed wooded slope, Spring Hill, Sandwich, *Fernald & Long 18979* (GH). Berkshire: woods, Mt. Washington, *Meredith 25* July 1927 (NY); vic. of Tyringham, *Vail 8* July 1897 (NY). Bristol: North Easton, *Leavitt 10* July 1900 (US). Dukes: woods near Jerry's Pond, West Tisbury, Martha's Vineyard, *Seymour 1762* (GH). Essex: fields and low grounds, Ipswich, *Morong 20* June 1870 (NY). Falmouth: hills, Woods Hole, *Pepoon 10* July 1897 (MINN). Franklin: borders of woods, Bernardston, *Robinson 2* August 1898 (GH). Hampden: dry pastures, Monson, *Morris 7* July 1898 (FM,US); Granville, *Seymour* August 1889 (ILL); dry open woods, Granville, *Seymour 112* (GH). Hampshire: Amherst, *Woolson 16883* (ILL). Middlesex: Lincoln, *Williams 17* June 1899 (GH); riverside, Newton, *Gilbert 19* June 1892 (GH); Pine Grove, Newton, *Gilbert 29* June 1893 (GH). Nantucket: Sauls Hills, Nantucket Island, *Bicknell 7005* (NY). Norfolk: Holbrook, *Greenman 703* (GH); Dry Millock, Holbrook, *Williams 18* June 1899 (GH). Plymouth: Middleboro, *Murdock 615* (FM). Suffolk: woods, near Muddy Pond, Boston, *Faxon & Faxon 27* September 1886 (GH); Oak Island, Revere, *Kennedy 8* July 1907 (GH). Worcester: Westminster, *Minott 13* July 1880.

Rhode Island. Kent: low ground near rr., Barrington, Nayatt Point, *Reynolds 0613* (GH,ILL). Newport: Block Island, *Trelease 59* (ILL); peaty pond margins e. of Dickens Point, Block Island, *Fernald, Long, & Torrey 10200* (GH). Providence: dry soil, Providence, *Thurber 6* June 1844 (GH); near Providence, *Staples 7* July 1874 (NY).

Connecticut. Fairfield: vic. of Green's Farms, *Pollard 62* (US); dry copses, Bridgeport, *Eames 18* June 1895 (NY). Hartford: low ground, Southington, *Bissell 22* June 1899 (GH). Middlesex: Chatham, *Beals & Chamberlain 5* July 1924 (NY). New Haven: woods, near Prospect Street, New Haven, *Safford 136* (US). Windham: dry woods, Thompson, *Knoulton 1* July 1903 (GH).

New York. Albany: woods, Wolf Hill, *House 22718* (NY). Allegany: dry woods, near Andover, *Watson 20* July 1946 (NYS). Broome: sandy waste, w. of cemetery, Binghamton, *Millspaugh 1885* (FM). Bronx: Bronx Park, *Nash 12* June 1896 (NY); Pelham Bay Park, *Ahles 344* (NYS). Chatteraugus: open woods, near Salamanca, *Keller 5* July 1926 (NYS). Chenango: open woods, Chenango Park, *Crockett 13* June 1937 (NYS). Columbia: woods, Austerlitz, *McVaugh 1350* (NYS). Dutchess: Hyde Park, *Taylor 517* (NY); edge of swamp, vic. of Clove, *Standley & Bollman 12252* (US). Erie: Buffalo, *Clinton* (FM). Essex: Mt. Defiance, Ticonderoga, *Whitney 4297* (NYS). Greene: woods on Kaatskill Mt., vic. of Tannersville, *Vail 31* July 1891 (NY). Jefferson: sandy soil, n. of Great Bend, *House 17679* (NYS). Madison: moist open field, near Nelson, *House 32548* (NYS). Nassau: Valley Stream, *Hanks 6* June 1903 (NY); Sea Cliff, *Wilson 14* August 1915 (NY). New York: Ft. Washington Park, New York, *Stewart 24* June 1916 (NY); Mosholu Parkway, New York, *Edmondson 1407* (NY). Oneida: sand plains, 2 mi. n. of New London, *Crockett 24* June-7 July 1937 (NYS). Ontario: *Hall 1828-34* (FM). Orange: n.

slope of Mt. Misery, Black Rock Forest, *Raup* 7348 (NY,GH); Tuxedo Park, *Lewis* 28 June 1890 (NY). Oswego: Pleasant Lake, *Schroepel*, *House* 27 June 1916 (NYS). Otsego: open wooded slope, 2 mi. e. of Colliersville *Smith & Weaver* 7356 (NYS). Queens: hilly rich woods, n. of Kew Gardens, *Ferguson* 5015 (NY). Rensselaer: Sand Lake, *Whitney* 1697 (NYS). Richmond: Staten Island, *Crooke* June 1868 (NY); Staten Island, *Hollick* 3 June 1879 (NY). Spring Valley, *Wilson* 27 June 1915 (NY). Saratoga: rich hillside, Saratoga, *Schneck* 9 June 1902 (ILL). Schenectady: open woods, near Schenectady, *House* 23537 (NYS). Steuben: Bath, *Warne* June 1866 (NYS). Suffolk: hilly open dry oak woods, Big Long Pond, Sag Harbor, *Ferguson* 4921 (NY); in dry mixed woods, Cold Spring Harbor, *Banker* 2927 (NY). Sullivan: Highland Lake, *Peck* July (NYS,TYPE of *L. quadrifolia* var. *variegata* Peck). Tioga: Apalachin, Upper Susquehanna, *Fenno* 279 (NY); dry field, top of hill, North Spencer, *Eames & McDaniels* 4805 (GH). Tompkins: n. side of Beebe Lake, Fall Creek Ravine, and vic., Ithaca, *Palmer* 948 (GH); Ithaca, *Rowlee* 25 June 1891 (US). Ulster: Highland, *Granger* 2 July 1897 (NY). Warren: moist soil along roadside, Cotton Point, Lake George, *House* 31051 (NYS). Washington: roadside bog, nw. of Tripoli, near Fort Ann, *Burnham* 7 July 1897 (GH). Westchester: swamp, near Central Ave., *Bicknell* 6988 (NY); woods, North Tarrytown, *Barnhart* 1001 (NY). Wyoming: open woods, Portage, *Johnson* 8 July 1923 (NYS).

New Jersey. Bergen: West Englewood, *Wilson* 19 June 1915 (NY); thickets, Oradell, *Mackenzie* 748 (NY). Burlington: New Egypt, *Taylor* 2623 (NY); thicket, Maple Crossway, Atsion, *Benner*, *Long & Bassett* 10 August 1926 (GH). Cumberland: thickets, *Holmes* 8 September 1890 (US). Essex: West Orange, *Wilson* 24 September 1916 (NY). Gloucester: open woods, Westville, *Bassett* 10 June 1923 (MINN,NY). Hudson: Granton, *VanSickle* 25 June 1895 (US). Mercer: Princeton Junction, *Macloskie* 19 June 1875 (NY). Middlesex: Spotswood, *Taylor* 2407 (NY); Milltown, *Vail* July 1887 (NY). Monmouth: Farmingdale, *Taylor* 2174 (NY). Morris: dry woods ne. shore of Budds Lake, *Fogg* 12454 (NYS). Passaic: borders of woods, Haskell, *Mackenzie* 2707 (NY,US); Clifton, *Nash* 1014 (NY). Salem: in humidis, Elmer, *Redfield* 4795 (MO). Somerset: dark evergreen woods, Watchung, *Moldenke* 1278a (ILL, NY). Sussex: woods, Montague twp., *Nash* 24 July 1909 (NY). Union: Westfield, *Drushel* 27 June 1926 (ILL); sunny roadside, Watchung Reservation, *Drushel* 11168 (ILL).

Pennsylvania. Berks: road bank, $\frac{3}{4}$ mi. sw. of McKnights Gap, *Berkheimer* 2554 (GH). Blair: dry slope, low ridge of Allegheny Mts., about 5 mi. n. of Bellwood, *Yuncker* 10548 (GH). Bradford: edge of woods, Sayre, *Barbour* 1465 (ILL). Bucks: Rockhill, *Benner* 26 June 1908 (GH). Butler: woodland, Plains Church, *Bright* 9322 (MINN). Carbon: wooded slope, Blue Mts., *Fogg* 11902 (MINN). Centre: old field, 4 mi. nw. of State College, Payton twp., *Westerfield* 465 (ILL). Chester: *Sharples* 178 (GH). Columbia: dry oak scrub, hilltop, $\frac{1}{2}$ mi. n. of Centralia, *Fogg* 14268 (GH). Delaware: swamps, Tinicum, *McElwee* 533 (FM,MINN,NY). Elk: wooded alluvial bottom, 1 mi. e. of Portland Mills, *Wahl* 683 (GH). Huntingdon: damp grounds, Mill Creek, *Suter* 9 June 1899 (ILL); laurel woods, hilltop, Warriors Mark, *Wiegand* 27 June 1924 (GH). Lackawanna: wet rocky woods, Moosic, *Glowneke* 7059 (MINN). Lancaster: near Mt. Hope, *Heller* 24 June 1901 (FM,GH,US). Lawrence: wooded ridge, (Rose Point), $4\frac{1}{2}$ mi. nw. Portersville, *Hermann* 9514 (GH,US). Luzerne: Nescopeck, *Heller* 2 July 1889 (FM,GH). Mercer:

swamp, 1 mi. s. of Swamp Root, on road to Grove City, *Henry 515* (FM,US). Northampton: Bethlehem, *Moser* July 1852 (NY). Perry: above Marysville, *Small* 18 June 1888 (FM). Philadelphia: near Philadelphia, *Greenman 1430* (GH). Pike: wooded road, Digman's Ferry, *DePue 185* (MINN). Snyder: rocky wooded hillslope along Susquehanna River, 1 mi. ne. of Shamokin Dam, *Fender 1455* (GH). Warren: Warren, *Ricksecker 141* (MINN). York: vic. of McCalls Ferry, *Rose 8157* (US).

Delaware. New Castle: open ground along rr., ½ mi. s. of Townsend, *Tatnall 4869* (GH); in woods, region w. of Wilmington, *Tidestrom 11520* (GH). Sussex: edge of dry abandoned field and adjacent dry thicket, Ellendale, *Gleason 8473* (NY).

Maryland. Allegany: Cumberland, *Shriver 1894* (NY). Baltimore: 1 mi. w. of Reisterstown, *Jones 15 June 1910* (FM). Cecil: border of dry woods along Octoraro Creek, Porters Bridge, *Long 28575* (GH); alluvial wash in woods, 1 mi. e. of Porters Bridge, *Pennell 14590* (NY). Garrett: between Oakland and Thayerville, *Tidestrom 6479* (US); copses bordering glades, *Smith 429a* (US); dry thicket, Wilson, *Core 2752* (NY). Prince Georges: Laurel, *Knowlton 30 May 1894* (GH). Talbot: flat woods, 1¼ mi. w.sw. of Unionville, *Earle 3693* (GH). Worcester: swampy ground, vic. of Snow Hill, *Gleason 6 June 1934* (DUKE).

District of Columbia. Anacostia, *Boettcher 190* (GH,NY); dry woods, Takoma Park, *Chase 2283* (FM,ILL,MINN).

West Virginia. Barbour: Tygart Junction, *Greenman 228* (GH). Braxton: rocky open ground, near Frametown, *Palmer 39547* (GH). Cabell: with pine, 1 mi. s. of Culloden, *Williams 456* (DUKE,FM,GH,MINN). Mineral: Elk Garden, *Frye* (MINN). Monogalia: fields, Route 56, near Halleck, 650 m., *Core 2964* (GH); banks, Uffington, *Millspaugh 185* (NY). Ohio: Wheeling, *Mertz 1801* (FM). Pendleton: Snowy Mt., 1250-1400 meters, *Rydberg 9114* (NY). Ritchie: dry soil, waste ground 3 mi. w. of Auburn, *Randolph & Randolph 1343* (GH). Upshur: near Bucklin, *Pollock 18 June 1895* (US). Wayne: open woods near road, Cabwaylingo State Park, *Gilbert 3 June 1939* (GH,NY,US). Webster: Hacker Valley, *Smith 1474* (FM).

Virginia. Accomac: dry roadside on Chincoteague Road, 1 mi. w. of bay, *Gleason 8556* (NY). Arlington: field near Arlington, *Brenckle 40-025* (NY). Allegheny: Falling Spring, 4 mi. s. Covington, *Woods & Woods 1349* (RNC). Bedford: peaks of Otter, *Rydberg 9280* (NY). Botetourt: Blue Ridge Parkway, station 134K between Mons and Powell's Gap, *Freer 1504* (GH). Charles City: moist rich soil in woodland, Wallers Pond, n. of Williamsburg, *Grimes 3616* (NY). Fairfax: dry woods, Fairfax, *Sargent 12 June 1949* (MINN). Fauquier: broomsedge field, s. of Hopewell Gap, w. slope of Bull Run Mts., *Allard 5033* (GH,NY). Giles: dry open, mixed woods border and underbrush, *Iltis 1778* (US). Gloucester: dry field, near Ark, *Leonard & Killip 508* (US). Henrico: wood and borders, *Walton 2254* (GH). Highland: open rocky land, Shenandoah Mt., *Killip 32457* (US). Norfolk: near Norfolk, *Kearney 1305* (US). Patrick: oak forest, 850 meters, 5 mi. nw. of Stuart, *Gleason 8711* (NY). Princess Anne: dry woods, Virginia Beach, *Fernald & Long 4125* (GH). Prince Williams: wooded slope, High Knob, 1½ mi. n. of Hopewell Gap, e. slope of Bull Mts., *Allard 2960* (GH). Shenandoah: woods, Powell's Fort, *Artz 559* (US). Smyth: vic. of Marion, 650 meters, *Britton, Britton & Vail 13 June 1892* (FM,NY). Stafford: sandy oak woods, 3 mi. n. of Falmouth, *Wiegand &*

Manning 2479 (GH). Westmoreland: sandy-clay thicket, 1½ mi. e. of Oak Grove, *Hermann* 10531 (NY).

North Carolina. Alexander: woods, 10 mi. n. of Taylorsville, *Keever* 55 (DUKE). Ashe: cliff, near Nigger Mt., *Fox & Godfrey* 3343 (RNC). Buncombe: open woods, Ridgecrest, *Davis* 1474 (NY); sandy soil, Biltmore, *Biltmore* 619 (MINN,US); *Biltmore* 619a (CNC,GH,NY,US); woods, vic. of Montreat, *Standley & Pollman* 10033 (US); damp banks, Black Mts., *Davis* 1419 (ILL). Burke: Table Rock Mt., *Biltmore* 619f in part (US). Catawba: Highlands, *Magee* 30 June 1901 (GH); Highlands, *Magee* 20 June 1901 (GH). Davidson: edge of woods, 1 mi. n. of Yadkin College, *Totten* 6 June 1915 (CNC). Durham: marshy swamp, East Club Blvd. Durham, *Bloomquist* 11099 (DUKE). Edgecombe: pine woods near N.C. Route 44, 2 mi. s. Martin County line, *Fox & Godfrey* 1473 (RNC). Guilford: Greensboro, *Biltmore* 519b (US). Haywood: edge of woods near Fincher Mt., Lake Junaluska, *Price* 189 (NY); meadow, vic. of Eagles Nest, near Waynesville, 900 to 1500 meters, *Standley* 5473 (US); woods, Sunburst, *House* 4474 (US). Henderson: road to Stony Mt., Hendersonville, *Blomquist* 4561 (DUKE). Hoke: ditch along highway 6 mi. s. of Aberdeen, *Radford & Stewart* 451 (CNC). Iredell: Statesville, *Hyams* (MINN). Jackson: open woods, Tuckasegee Falls, *Caughbey* 608 (DUKE). Johnston: near Princeton, *Mitchell* 1936 (DUKE). McDowell: rocky bank, n. fork of Catawba River, *Fox & Beaman* 4730 (RNC). Macon: near Highlands, *Huger* 1895 (NY). Madison: Hot Springs, *Drushel* 7577 (ILL). Mitchell: rocky meadow, Frank, *Ashe* July 1927 (CNC). Montgomery: Route 109, se. Troy, *Fox & O'Connell* 4710 (RNC). Pamlico: shrub bog, 2 mi. s. Arapahoe, *Godfrey* 48247 (RNC). Polk: dry slopes, Saluda, *Davis* 28 June 1920 (US); Tryon, *Peattie* 4 June 1919 (GH). Rutherford: vic. of Chimney Rock, 615 meters, *Barksdale* 1932 (CNC). Stokes: earthen dam, Hanging Rock Park Lake, 4 mi. w. of Danbury, *Radford & Stewart* 479 (CNC). Swain: open wooded slope, Blowing Springs, *Oosting* 35265 (DUKE). Transylvania: open woods, Galloway, *Caughy* 374 (DUKE). Washington: pineland, near Roper, *Kerr & Godfrey* 3908 (US). Watauga: Blowing Rock Mt., *Small & Heller* 7 July 1891 (FM). Wilkes: near Mart Branch, Brusy Mts., *Stewart* 13 June 1938 (CNC). Wilson: woods near Wilson, *Williamson* 8 May 1938. Yancey: maple-birch-magnolia (cove) association, 3 mi. n. of Burnsville, *Radford* 9 July 1946 (CNC).

South Carolina. Aiken: damp places in pine woods, Aiken, *Ravenel* 1 June 1867 (GH). Berkeley: along Santee River, *Walter* (ILL photograph from BM). Darlington: along Crowley's Branch, Hartsville, *Norton* 12 May 1921. Oconee: wet places along streams, *Anderson* 1166 (NY). Pickens: Estatoce Creek, w. of Rocky Bottom, *Wilbur* 199b (DUKE). County not determined: Santee Canal, *Ravenel* (GH).

Georgia. Dade: open deciduous woods at base of sw. facing cliffs in Cloudland Canyon, e. of Trenton, Cumberland, *Cronquist* 5149 (US). Dawson: moist places along small stream, below Amicolola Falls, Blue Ridge, *Cronquist* 4543 (GH,US). De Kalb: near base of Stone Mt., *Miller, Perry, Boyd, & Myers* 569 (GH). Haralson: near Tallapoosa, *Way* 3 (US). Meriwether: Warm Springs, *Tracy* 9433 (FM,GH,MINN,NY,US). Rabun: Rabun Bald, *House* 2317 (NY,US). White: McAfee place, near Cleveland, *Lovett* 6 June 1938 (DUKE). Whitfield: ravine near Gordon Springs, *Wilson* 154

(NY,US); rich shady woods, Oostanaula Sahle, e. of Dalton, *Harper 1288* (FM,NY,US).

Ontario. Bruce: sandy beach, Stokes Bay, *Krotkov 9322* (DUKE). Essex West: Sandwich, *Macoun 15 July 1901* (CAN,GH,US). Norfolk: dry grassy oak woods, near Port Ryerse, *Soper 2088* (GH). Renfrew North: Petawawa, bords de l'Ottawa, *Marie-Victorin, Rolland-Germain, & Meilleur 45365* (GH). Toronto: shady hillsides, Toronto, *White 16 July 1890* (CAN). Waterloo: woods, Orr's Landing, near Galt, *Montgomery 1044* (GH); woods, Galt, *Umbach 18 August 1899* (FM,US).

Michigan. Calhoun: s. of Albion, *Sherff 19 July 1906* (FM). Cass: swampy woods, Diamond Lake, *Richards 25 June 1939* (FM). Dickinson: pine woods, upper Quinnesee Falls, Quinnesee, *Hill 63* (ILL). Ingham: Michigan State College, East Lansing, *Gray* (GH); damp situation along rr., Haslett, *Yuncker 338* (ILL). Ionia: sandy roadside, Orleans, *Collector not determined 25 June 1887* (NY). Jackson: dry open woods, *Camp & Camp 12 June 1896* (FM, MINN,US). Muskegon: moist sands, Fruitport, *Hill 141* (FM,ILL). Oakland: near Lake Angelus, *Chandler 18 June 1916* (US). St. Clair: Port Huron, *Dodge 23 July 1893* (FM,MINN,US). Wayne: Woodmere, Detroit, *Gillman 25 June 1871*. County not determined: *Gray 1840* (NY).

Wisconsin. Adams: sandstone bluffs, Cold Water canyon, Wisconsin River Dells, 3 mi. s. of Plainville, *Hermann 8726* (NY). Chippewa: near river, Chippewa Falls, *Rosendahl & Butters 3098* (MINN). Columbia: Poynette, *Russell 1 July 1887* (ILL). Dane: Stewart's Woods, *Bakker* (ILL); near Sauk City, *Orport 16 June 1949* (ILL); Madison, *Cheney 2 July 1892* (GH). Douglas: wooded bank, Eau Claire Lake, e. of Gordon, *Wadmond 20 July 1935* (MINN). Iowa: woods, near Blue Mounds, *Heddle 2723* (FM). Juneau: Camp Douglas, *Mearns 454* (US). Marinette: Peshligo, *Schuette, 31 Aug. 1883* (MINN). Milwaukee: Milwaukee, *Lapham* (NY). Sauk: woods, Devils Lake, *True 30 June 1892* (GH); bluffs, Devils Lake, *Umbach 5 August 1897* (US). Shawano: Ant Hill Pond, Maple Grove twp., *Keefe 21 July 1938* (NY).

Ohio. Cuyahoga: Lakewood, *Stair 12 June 1896* (NY). Erie: Florence twp., *Moseley 20 June 1895* (US). Greene: Cedarville, *Clevenger June 1905* (US). Hamilton: near Cincinnati, *Lloyd 10 June 1890* (ILL). Holmes: Hochstetler's Woods, Saltcreek twp., *Drushel 1615* (ILL). Jackson: dry soil, Rock Run, Liberty twp., *Bartley & Pontius 220* (NY). Lake: Painesville, *Werner 14 July 1884* (MINN). Licking Gorge, *Moseley 2 June 1894* (FM). Richland: low grounds, Mansfield, *Wilkinson 6763* (FM,MINN,RNC,US). Scioto: partly wooded bottoms, Camp Gordon, Shawnee State Forest, *Demaree 10702* (GH). Trumbull: Braceville twp., *Webb & Ruud 7 June 1908* (GH); clearing in woods, Phalanz, *Ruud 3 July 1904* (ILL). Wayne: West Salem, *Wilkinson 26 June 1887* (DUKE). Wood: Plain twp., *Shanks 1087* (NY).

Indiana. Brown: open wooded hillside, near junction of Road 45 and Bean Blossom Creek near Trevlac, *Friesner 10574* (NY). Crawford: wooded slope of ravine, about 4 mi. sw. of Milltown, *Deam 20394* (FM,GH,MINN,NY). Harrison: clay soil in open oak woods along Road 337, 7.3 mi. nw. of Corydon, *Friesner 14410* (NY). Marshall: Lake Maxinkuckee, *Evermann 901* (US). Steuben: dry hill, near Lake Gage, *Deam 17 June 1903* (GH,NY,US); bank, e. side of Clear Lake, *Deam 4 July 1904* (US).

Illinois. Jo Daviess: moist woods, Apple River Canyon State Park, *Fuller 10497* (ISM). Ogle: Table Rock, *Waite 11 July 1885* (US). Wabash: chiefly

about Mt. Carmel, *Schneck* (ILL). Winnebago: moist woods, Shirland, *Gleason* 26 June 1908 (GH).

Kentucky. Bath: dry woodland, Salt Lick, *Biltmore* 619d (US); Salt Lick, *Eggleston* 5508 (NY). Bell: dry hills, open woods, Middlesboro, *Gleason* 8833 (NY). Harlan: Pine Mt., *Kearney* 189 (GH,NY). Lawrence: woodland, Louisa, *Biltmore* 619c (US). Lyon: Kuttawa, *Eggleston* 4753 (NY). Powell: dry soil, Clay City, *Biltmore* 619e (US).

Tennessee. Blount: low grounds along streams, Chilhowee Mt., *Curtiss* 1801 (FM,GH,NY); dry woods, Montvale Springs, *Anderson & Hesler* 1290 (GH). Carter: Roan Mt., *Britton* 9 September 1885 (NY). Cocke: near Wolf Creek Station, *Kearney* 828 (MINN,NY,US); low wet ground, Wolf Creek, *Ruth* 2998 (NY); mts., Wolf Creek, *Ruth* 541 (US). Franklin: woods, *Eggert* 8 June 1897 (NY). Johnson: Iron Mt., near Mountain City, *Sharp & Underwood* 1560 (NY). Knox: woods, Knoxville, *Kearney* May (MINN). Sevier: Gatlinburg, *Trelease* 443 (ILL). Unicoi: open woods, near state line, Rocky Fork, *Price* 865 (DUKE).

Alabama. Cullman: damp woods, Cullman, *Mohr* 1892 (US). Jackson: rich woods on sandstone, nw. slope of Sand Mt., below Moore's Gap, *Harper* 3423 (GH,NY); Cargile Swamp, Sand Mt., Bryant, *Porter* 13 June 1934 (GH). Talladega: *Earle* 988 (NY); *Earle* 26 August 1897 (NY). County not determined: "Northern Alabama," *Stewart* 1865 (ILL); *Vasey* 1878 (FM,US).

Lysimachia quadrifolia was described by Linnaeus (1753) from Virginia, and subsequently by Walter (1788) as *L. punctata*, and later by Michaux (1803) as *L. hirsuta*. Ranging beyond the Coastal Plain into the interior regions to southern Canada and the Mississippi River, it is relatively stable in its characteristics. Variations in the degree of pubescence, number of leaves per whorl, tendencies toward a terminal inflorescence, and an occasional red tinge on the corolla lobes and stamens are of sporadic occurrence throughout the range of the species, and are of no diagnostic importance.

Considered a species of section *Lysimastrum* Endl. by the earlier monographers, *L. quadrifolia*, because of its whorled leaves and flowers, was included with *L. x producta* (*L. foliosa* Small) and *L. punctata* by Knuth (1905) in his section *Verticillatae*. The related *L. terrestris*, *L. x producta*, and *L. loomisii*, the last two considered as varieties of the first, were placed along with other taxa of different affinities in his subsection *Racemosae* under section *Ephemerum*. In a more natural arrangement Handel-Mazzetti (1928), although without presenting any evidence, modified Knuth's *Verticillatae* and included *L. terrestris*, *L. quadrifolia*, *L. x producta*, and *L. asperulaefolia*. *Lysimachia loomisii* was included as a variety of *L. terrestris*.

Although quite distinct with the usually simple erect stem, whorled, elliptic to lanceolate leaves, and axillary flowers with slightly saucer-shaped corollas, *L. quadrifolia* shows a tendency toward the terminal inflorescence of *L. terrestris* and *L. loomisii*. In areas where it shares the

same ecological niches as *L. terrestris*, populations frequently exist which form complete intra-specific series of variants. These populations considered as hybrids are discussed later.

11. *LYSIMACHIA* × *PRODUCTA* (A. Gray) Fernald

(Plate III)

Lysimachia racemosa Michaux, Fl. Bor. Am. 1:128. 1803,—p.p., non Lamarck 1791.

Lysimachia stricta var. *producta* A. Gray, Man. Bot. ed. 2, 272. 1856; Syn. Fl. 2. pt.1:63. 1878; Kuntze, Rev. Gen. 1:397. 1891; Peck in Report N.Y. State Mus. 47:157. 1894; Knuth in Engler, Pflanzenr. pt.237:299. 1905.

Lysimachia quadrifolia L. var., Gray, op. cit. 273.

Lysimachia producta (A. Gray) Fernald in Rhodora 1:134. tab. 6, fig. 1-3. 1899; Britton, Man. Fl. N. States & Can. ed. 3, 716. 1907; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 645. 1908, as *x* *L. producta* (A. Gray) Fernald; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:81. 1928; Small, Man. Se. Fl. 1024. 1933; Fernald in Rhodora 42:364. 1940; in A. Gray, Man. Bot. ed. 8, 1141. 1950, as in edition 7.

Lysimachia polyantha Fernald in Rhodora 1:134. tab. 6, fig. 4-6. 1899.

Lysimachia foliosa Small, Fl. Se. U.S. 903. 1903; Knuth in op. cit. 267.

Plants erect, 4–10 dm. tall; rhizomes slender, rather smooth; stems simple to branched above, glabrous, rarely glandular-puberulent at nodes, dark streaked; leaves opposite or verticillate, scale-like below; medial leaves elliptic to lanceolate to ovate, 4–8 cm. long, 1.5–2.5 cm. wide, glabrous above, pale beneath, lateral nerves not too evident; margins entire, somewhat revolute; the base tapering to a short winged petiole, the apex acute-acuminate; inflorescence an extended terminal raceme, pedicels ascending, 1.5–3 cm. subtended by normal leaves with axillary flowers below to gradually reduced foliar bracts above, in some forms the transition from leaf to bract may be abrupt and the raceme may be terminated by several whorls of sterile bracts; calyx imbricate in the bud, lobes lanceolate, 3–7 mm. long, 1–1.5 mm. wide, acute to acuminate, glandular-puberulent, streaked and ciliate; corolla rotate to saucer-shaped, yellow with dark streaks, tube short, lobes elliptic to ovate, rounded to obtuse, entire, yellow short-stalked glandular hairs on the tube and base of lobes; staminal tube and filaments likewise yellow glandular, tube 1.7–3 mm. long, sinuses rounded; filaments 1.7–3 mm. long, unequal, anthers oblong, about 1 mm. long, ovary subglobose, style 4 mm. long, the tip slightly expanded; capsule globose, 3.5 mm. in diameter; seeds few, 1–1.2 mm., trigonal, thin, dark splendent, the coat covered by a grayish or tawny alveolate “bloom”; outer surface oval, convex, often slightly margined, adjacent surfaces concave.

Type locality: "New York and Michigan." Gray (1878).

Distribution: Open woods, damp thickets, swamp margins, and sandy fields; Maine and southwestern Quebec to Wisconsin, southward to North Carolina. Abundant locally. Flowering period: June–August. Map 9.

Quebec. St. Jean-Iberville-Napierville: Saint Grégoire, *Adrien* 1857 (GH).

Maine. Hancock: Upper Hadlock Pond, Mt. Desert Island, *Rand* 9 July 1898 (GH); low ground in dense woods, Near Harbor trail to Jordan Pond, Mt. Desert Island, *Williams* 19 July 1899 (GH). Piscataquis: sandy shore of Pleasant River, Brownville, *Parlin* 1887 (GH). York: damp thicket back of Wells Beach, *Fernald* 23 July 1898 (FM,GH); York Harbor, *Bicknell* 16 August 1896 (NY); alluvial woods, Limington, *Fernald & Long* 14360 (NY).

New Hampshire. Cheshire: near pond, Dublin, *Elliot* August 1902 (GH); alluvial thicket by Connecticut River, Walpole, *Fernald* 28 (GH). Grafton: river gravel, North Woodstock, Woodstock, *Fernald* 11860 (GH).

Vermont. Chittenden: Burlington, *Eggleston & Jones* 1492 (GH,NY).

Massachusetts. Barnstable: edge of swamp, Wianno, Cape Cod, *Purdie* 10 July 1899 (GH). Essex: Ipswich, *Morong* 14 July 1868 (NY). Franklin: swamp, Leverett, *Smith* 14 (CAN,ILL,NY). Middlesex: dry soil, borders of woods, *Morong* 22 June 1877 (MO). Norfolk: Walpole, *Greenman* 883 (MO); damp shrubby ground, Stoughton, *Blake* 1705 (US); Holbrook, *Greenman* 760 (GH,NY,US); edge of Big Swamp, near Shingle Mill, Walpole, *Kennedy* 20 July 1899 (GH). Suffolk: open woods, e. part of Oak Island, Revere, *Rich* 9 July 1899 (GH).

Rhode Island. Kent: boggy meadow, Warwick, *Fernald* 25 June 1910 (GH). Newport: low thicket, sw. of Harbor Pond, Block Island, *Fernald, Hunnewell, & Long* 10199 (GH).

Connecticut. Fairfield: dry field bordering salt meadow, with *L. quadrifolia* and intermediate forms, Stratford, *Eames* 5323,5324 (GH); dry field, Darien, *L. quadrifolia* borders this field, *Eames & Hoyt* 5308 (GH,NY). Hartford: low meadow, Glastonbury, *Wilson* 10 July 1890 (GH). County not determined: meadow, Killingworth, *Weatherby* 3738 (RNC).

New York. Delaware: Arkville, *Wilson* 16 July 1915 (NY). Essex: Elizabethtown, *Peck* July (NY,NYS). Nassau: low thicket, Lawrence, *Bicknell* 16 June 1903 (NY). New York: meadow in Van Cortlandt Park & vic. with *L. terrestris*, *Bicknell* 28 June 1896 (NY,NYS). Oneida: sandy barrens near Oneida Lake, Verona twp., *Haberer* 575 (GH). Oswego: grassland edge of North Pond, with *L. terrestris*, Sandy Creek twp., *Hotchkiss* 2979 (NYS). Queens: Flushing, *Ferguson* 7609 (NY). Rensselaer: along Little Hoosick River, Petersburg, *House* 31691 (NYS). Suffolk: Babylon, *Ferguson* 5717 (NY); dry thicket, Fishers Island, *St. John* 2870 (GH). Sullivan: Narrowsburg, *Peck* July (NYS). Tompkins: swampy elder thicket, vic. of Cortland, *Eames & McDaniels* 4807 (GH); McLean Bogs, *Muenschler & Bechtel* 405 (ILL). Warren: low sandy woods, near road, n. of Glen Lake, *Dobbin & Burnham* 22 August 1906 (GH). Westchester: Pocantico Hills, *Taylor* 830 (NY).

New Jersey. Essex: meadows, near Little Falls, *Mackenzie* 2955 (NY). Middlesex: Spotswood, *Taylor* 2424 (NY). Morris: Budd Lake, *Miller* 406 (NY). Ocean: sandy bog, Forked River, *Moldenke* 10984 (NY). Passaic: meadows, Haskell, *Mackenzie* 2709 (GH,NY,US). Sussex: field, above Dingman's Ferry, thousands of plants in a large patch—neither supposed parent in

the vicinity, *Mackenzie 11224* (GH). Union: Great Island, Elizabethport, *Vail 17 July 1890* (NY).

Pennsylvania. Bucks: near Quakertown, *Fretz 1882* (NYS). Lackawanna: sandy woods along Lackawanna River, 1 mi. n. of Moosic, *Glowenke 7490* (GH). Lancaster: island, Peach Bottom, *Carter 6 July 1894* (FM). Monroe: swamp along edge of lake, Buck Hill Falls, *Moldenke 2982* (NY). Perry: above Marysville, *Small 25 June 1888* (FM). Pike: riverbank, below Indian Rock, Bushkill, *Bartram 29 June 1918* (NY). York: muddy riverbank, McCalls Ferry, *Britton 2-6 July 1904* (NY).

Maryland. Prince Georges: roadside among brush, e. of Riverdale, *Chase 2383* (FM, ILL); low woods, between Riverdale and College Park, *Maxon & Norton 22* (FM).

District of Columbia. *Crandell July 1835* (NY). "High Island Flats," *Steele 9 June 1897* (NY).

West Virginia. Kanawha: low ground, Charleston, *Biltmore 618d* (US).

Virginia. Southampton: bushy swales and borders of swampy woods near Blackwater River, Cobb's Wharf, *Fernald & Long 10382* (DUKE, FM, GH, MO, NY, US).

North Carolina. Buncombe: wet places, Biltmore, *Biltmore 618* (US). Burke: Table Rock Mt., *Biltmore 619f, in part* (US). Pender: Savanna, n. of Ward's Corner, along U.S. 421, *Godfrey 49197* (MINN, RNC).

Michigan. Ingham: Michigan State College, East Lansing, *Gray* (GH).

Wisconsin. Adams: near Elephant Back, n. of the Dells, *Orport 5 July 1949* (ILL).

Lysimachia x producta has been treated as distinct species, as a variant of *L. terrestris* and of *L. quadrifolia*, and as a hybrid between these two. As herein considered, this variable and apparently fertile population is considered to be of hybrid origin with the above mentioned species the supposed parents. Evidence in support of this conclusion is based upon morphological and distribution studies of herbarium specimens.

The parents are sympatric over the greater part of their range, and have an incomplete ecological isolation and overlap of flowering periods. Parental compatibility is inferred on the basis of the morphological intergradations exhibited by the hybrid. In some instances the hybrid is isolated in large and apparently fertile colonies. In others it is present with either or both parents. When seemingly isolated with one parent, its characteristics approach those of the cohabiting parent.

Because of the nature of the population and the degree of intergradation, distinguishing characters are of a quantitative nature and not infallible. Its elliptic to lanceolate-ovate leaves are opposite, verticillate, or rarely scattered, and glabrous beneath. An extended, terminal raceme is characterized by ordinary leaves subtending the lower flowers intergrading to foliar bracts above. The flowers are those of *L. quadrifolia* but with linear to linear-elliptic corolla-lobes.

When Fernald (1899) described two species from supposed aggregates

within this taxon, he commented upon his application of the epithet *Lysimachia producta* to one of them. It seems that Gray, after having described *L. stricta* var. *producta* from material collected at Michigan State College, studied Michaux's herbarium and there, as Fernald quotes, found *L. racemosa* to be "a strange and monstrous form of *L. stricta* with a raceme eighteen inches long, ped [icel] one inch, twice the length of the foliaceous bracts, the whole terminated by a little tuft of bracteal leaves. Pedicels also in the axils of the upper leaves." This description by Gray of Michaux's *L. racemosa* fits very well the Michigan State College material in the Gray Herbarium. Because of the discrepancy between Michaux's description in *Flora Boreali-Americana* which is of *L. terrestris*, and Gray's interpretation of the herbarium material, Fernald considered *L. racemosa* a confused name, especially since Lamarck had earlier applied it in a strict sense to *L. terrestris*.

The second of Fernald's two entities is *L. polyantha*, a name for the variety of *L. quadrifolia* given by Gray (1858) in the second edition of the Manual to what is considered as that portion of *L. x producta* which approaches *L. quadrifolia*.

12. LYSIMACHIA TERRESTRIS (L.) BSP.

(Plate XIII)

Viscum terrestris Linnaeus Sp. Pl. 1023. 1753.

Lysimachia vulgaris Walter, Fl. Carol. 92. 1788,—non Linnaeus 1753.

Lysimachia stricta Aiton, Hortus Kew. 1:199. 1789; Torrey, Fl. N. & M. U.S. 1:120. 1824. DUBY in DeCandolle, Prodr. 8:64. 1844; A. Gray, Man. Bot. 283. 1848; Chapman, Fl. S. U.S. 280. 1860; Provancher, Fl. Can. 1:383. 1862; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:19. tab. 7. 1866; A. Gray, Syn. Fl. 2. pt.1:63. 1878; Macoun, Cat. Can. Pl. 2:314. 1884; Watson & Coulter in A. Gray, New Man. Bot. ed. 6, 331. 1889; Knuth in Engler, Pflanzenr. pt. 237:299. 1905; Thenen, Phyl. Prim. 98. tab. 8. 1911.

Lysimachia bulbifera Curtis, Bot. Mag. 3:tab. 104. 1789.

Lysimachia racemosa Lamarck, Encycl. 3:570. 1791; Tabl. Encycl. 1:439. 1792; Michaux, l.c.,—p.p. max.; Poiret in Lamarck, Encycl. Suppl. 3:476. 1814; Pursh, Fl. Am. Sept. 1:135. 1814.

Lysimachia angustifolia Michaux, Fl. Bor. Am. 1:128. 1803; Pursh, l.c.; DUBY in op. cit. 64.—Non Lamarck 1791.

Tridynia racemosa Raf. ex Steudel, Nom. Bot. ed. 2, pt.2:85. 1841,—pro syn.

Lysimachia terrestris (L.) Britton, Stern, & Poggenberg, Prelim. Cat. 34. 1888; Britton & Brown, Illustr. Fl. N. U.S. 2:588. fig. 2814. 1897; Small, Fl. Se. U.S. 903. 1903; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 645. 1908; Piper & Beattie, Fl. Nw. Coast 286. 1915; Rydberg, Fl.

Rocky Mts. 651. 1917; House, Mem. No. 15. N.Y. State Mus. 2:tab. 161. 1918; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:81. 1928; Small, Man. Se. Fl. 1024. 1933; Marie-Victorin, Fl. Laurent. 431. fig. 145. 1935; Douglas in Am. Jour. Bot. 23:204. 1936; Bailey, Hortus Sec. 450. 1947; Fernald in A. Gray, Man. Bot. ed. 8, 1141. 1950; Abrams, Illustr. Fl. Pac. states 3:331. 1951.

Lysimachia stricta f. *intermedia* Peck in Report N.Y. State Mus. 47:157. 1894.

Lysimachia stricta f. *brevifolia* Peck in op. cit. 158.

Lysimachia stricta f. *bulbifera* (Curtis) Peck in l.c.

Lysimachia stricta f. *typica* Peck in l.c.

Lysimachia stricta var. *ovata* Rand & Redfield, Fl. Mt. Desert Island 129. 1894.

Lysimachia stricta var. *typica* Knuth in l.c.

Lysimachia terrestris var. *ovata* (Rand & Redfield) Fernald in Rhodora 24:76. 1922; in A. Gray, Man. Bot. ed. 8, 1141. 1950.

Erect perennial herbs 2.5–8 dm. tall, from ascending rhizomes; stem simple or branched above, glabrous, often very foliate; leaves opposite, subopposite, or rarely alternate, lower ones scale-like; medial leaves green above, glaucous beneath, with oval or oblong punctations, elliptic to lanceolate, 3–9 cm. long, 0.5–1.9 cm. wide, the apex acute to acuminate; inflorescence a terminal raceme, lowest pair of flowers occasionally from axils of somewhat reduced foliage leaves; pedicels 0.5–1.6 cm. long, divergent or ascending; bracts linear-subulate, 4–6 (10) mm. long, medial ones not half the pedicel length; calyx imbricate in the bud, lobes lanceolate 2–4 mm. long, acute to acuminate, entire, glandular-dotted or streaked, corolla rotate, yellow, with dark streaks, yellow glandular-tipped hairs within as well as on the staminal tube and filaments; corolla lobes elliptic to oblong 4–6 mm. long, 1.4–2.5 mm. wide, obtuse to rounded, entire; staminal tube 0.4–1 mm. filaments slender, unequal, 1–3.5 mm. anthers oblong 0.7–1.2 mm. notched below; ovary subglobose, dark-glandular; style slender 3–4 mm. long, subequal to the longer stamens; stigma not too evident; capsule subglobose, 2.8–3.5 mm. in diameter; seeds few, about 1.3 mm. long, trigonal to somewhat oval, edges slightly marginal, with tawny alveolate "bloom" which when removed reveals a shiny brown-black coat.

Type locality: "Habitat in Philadelphiæ pratis subhumidis. Kalm. IX." Linnaeus (1753).

Distribution: Thickets, swamps, pond borders, river bottoms, and bogs; Newfoundland, Nova Scotia to James Bay and Minnesota, southward to South Carolina and Tennessee. Introduced on Vancouver Island, British Columbia, and in western Washington with cranberry plants im-

ported from eastern North America. Flowering period: June–August. Map 10.

Newfoundland. Avalon Peninsula, boggy meadows overlying clay-slates, sandstones, and quartzites, along Upper Gully, shore of Conception Bay, *Fernald & Wiegand 6073* (CAN,GH,NY). Damp soil, meadow, near Topsail, Conception Bay, *Howe & Lang 1255* (FM,GH,NY). Hodgewater, *Ayre 373* (GH). Coastal tundra, Stephenville Crossing, *Mackenzie & Griscom 10407* (GH,US). Sandy swale, carboniferous sandstone, Stephenville, *Fernald & Wiegand 5891* (GH). Moist ground, Whitbourne, *Robinson & Schrenk 118* (CAN,FM,MINN,MO,US).

Prince Edward Island. Prince: fresh springy border of salt marsh, Green's Shore, Summerside, *Fernald & St. John 7932* (CAN,GH). Queens: Brackley Point, *Macoun 1* August 1888 (CAN,NY).

Nova Scotia. Antigonish-Guysborough: Canso, *Fowler 26* July 1901 (US). Cape Breton North-Victoria: shallow water, Ethel Lake, St. Paul Island, *Perry & Roscoe 326* (GH). Colchester-Hants: Truro, *Malte 29* July 1920 (CAN). Digby-Annapolis-Kings: gravel border, Cedar Lake, New Tusket, *Fernald & Long 24335* (GH). Halifax: sandy and shingly beach of Shubenacadie Grand Lake, *Fernald, Bartram & Long 24331* (GH). Inverness: Mabou, *Robinson 260* (NY). Pictou: sphagnous edge of pond, near Pictou, *Howe & Lang 460* (NY). Queens-Lunenburg: sandy and gravelly beach of Blystner Lake, *Fernald & Long 24333* (GH,NY). Sable Island: wet dune hollow, *St. John 1300* (CAN, GH, NY). Shelbourne-Yarmouth: West Lake, Upper Wood's Harbor, *Fernald & Fassett 24330* (GH,ILL); damp sandy beach, Harper Lake, *Fernald & Long 24336* (CAN,GH).

New Brunswick. Charlotte: open *Carex* bog behind beach, Kent's Island, Bay of Fundy, *Gleason 59* (NY); low thicket, West-side Road, Deer Island, Quoddy Bay, *Chrysler 6284* (GH). Kent: Bass River, *Fowler 30* July 1875 (NY). Restigouche-Madawaska: low meadow, Campbellton, *Chalmers* July 1877 (CAN). Royal: Hampton, *Chadbourne 16* July 1883 (GH). Victoria-Carleton: river gravels and shingly border of thicket near river, Woodstock, *Fernald & Long 14362* (CAN,GH); Westmoreland: rivage marécageux, Lac Fox Creek, *Marie-Victorin, Rolland-Germain, & Jacques 44811* (GH). York-Sunbury: sandy loam beside Richibucto Road, near Fredericton, *McKinney 6* May 1930 (NY).

Magdalen Islands. Ile de l'Etang-du-Nord, *Marie-Victorin & Rolland-Germain 9722* (GH).

Quebec. Bellechasse: grèves estuariennes, Saint-Vallier, *Marie-Victorin, Roseau, & Jacques 44112* (CAN,GH). Bonaventure: edge of Dead Waters, between Balde and des Chaleurs, Bonaventure River, *Collins, Fernald, & Pease 5869* (GH); open swamp, mouth of Bonaventure River, *Williams & Fernald 31* July 1902 (GH). Brome-Missisquoi: wet shore, Lake Champlain, Philipsburg, *Knowlton 10, 11* August 1923 (GH). Charlevoix-Saguenay: borders of ponds, Todousac, *Hill 108* (ILL); grassy bank, Etamamiou, Charnay, *St. John 90678* (GH). Châteauguay-Huntingdon: with *L. thyrsiflora* and *L. x commixta*, Châteauguay, *Marie-Victorin 1916* (GH). Hull: Gateneau Point, *Macoun 15* August 1911 (CAN). Labelle: rivages de la Gatineau a la chute du Brûle, 22 milles au nord de Mont-Laurier, *Marie-Victorin & Rolland-Germain 206* (GH). Lake St. John: Lake St. John, *Allen 1890* (NY); lieux très humides, Saint-

Methode, *Marie-Victorin, Rolland-Germain, & Meilleur 43214* (GH). L'Assomption-Montcalm: St. Lin, *Louis-Marie, Dudemaine, & Laporte 1021a* (CAN). Laval-Two Mountains: La Trappe, *Louis-Marie 24 August 1929* (NY). Montagny-L'Islet: batture, l'estuaire du Saint-Laurent, Ile Aux Grues, *Rousseau 25250* (GH). Nicolet-Yamaska: marsh, s. shore of St. Lawrence River, Ste. Angèle de Laval, *Chamberlain & Knowlton 31 July 1923* (GH). Pontiac: Iles Aux Allumettes, *Marie-Victorin, Rolland-Germain, & Meilleur 44245* (GH). Quebec-Montmorency: wet places, Lake Edward, *Blankinship 10 August 1897* (GH); stream near station, Lake Edward, *Wright 222* (GH, US). Richelieu-Verchères: lieux humides, environs de Longueuil, *Marie-Victorin 9724* (ILL). Rimouski: slaty soil, Rimouski *Fernald 1144* (GH). Shefford: champ, Granby, *Fabius 287* (NY). Sherbrooke: wet alluvium, Massawippi River, Ascot, *Knowlton 20 July 1923* (GH). St. Johns-Iberville-Napierville: sur les rivages du Richelieu, Sabrevois, *Marie-Victorin & Rolland-Germain 45520* (GH). Ungava: rivage de la rivière, Fort Georges, e. coast of Hudson's Bay, *Dutilly & Lepage 13365* (GH); rivage de la rivière, Vieux Comptoir, *Dutilly & Lepage 13385* (GH). Wright: wet place near road, Wakefield Parish, *Senn 1495* (US).

Maine. Aroostook: riverbank, Seven Island, *St. John & Nichols 2445* (CAN, NY,US); along St. John River, Fort Kent, *Williams 1 August 1900* (GH). Cumberland: sandy bog, Cumberland, *Chamberlain 61* (US); low grounds, Freedom, *Hill 8 July 1861* (ILL). Franklin: Middle Dam, Rangeley Lakes, *Robinson 2 August 1903* (GH); *Jewell June 1899* (ILL). Hancock: ditch, near Somersville, *Redfield 30 July 1890* (US); Northeast Harbor, *Rand 14 July 1897* (GH); ditches, Seal Harbor, Mt. Desert, *Redfield 93* (US). Lincoln: Bristol, *Drummond 1896* (ILL). Oxford: marsh, Denmark, *Bailey 17 August 1902* (NY). Penobscot: low ground, grasslands, Orono and vic., *Harvey & Harvey 654* (US); river beach, Mattawamkeag, *Fernald 2681* (GH). Sagadahoc: muddy shores of Merrymeeting Bay, submersed at high tide, Bowdoinham, *Fassett 172* (NY). Somerset: river intervalles, Dead River, *Fernald & Strong 463* (GH,US). Waldo: boggy border of Megunticook Lake, *Friesner 10238* (FM,ILL,NY).

New Hampshire. Carroll: damp ground, Melvin Village, *Day 23 August 1904* (GH,US); Bartlett, *Lane 14 July 1875* (GH). Cheshire: moist wooded roadside, Hinsdale, *Batchelder 9 July 1919* (US); Jaffrey, *Day 61* (GH). Coos: Osgood trail, White Mts., *Edmondson 5309* (NY); Crawford, near Armonooshe Lake, *Williams 17 July 1895* (GH). Grafton: Bottomless Pit, between Hanover and Lebanon, *Stewart 4388* (NY). Hillsboro: Hillsboro, *C.F.B. August 1865* (NY). Merrimack: margin of pond, East Andover, *Day 26 August 1903* (GH). Sullivan: shore of Otter Lake, near Lake Sunapee, *Standley & Killip 7679* (US).

Vermont. Addison: Middlebury, *Brainerd 22 June & 25 September 1880*, in part (GH). Bennington: Manchester, *Day 124* (GH,US). Chittenden: Charlotte, *Horsford 4 July 1879* (FM). Orleans: swampy shore, Willoughby Lake, Westmore, *Edmondson 5352* (NY); Willoughby, *H.H.R. 3 August 1892* (NY). Rutland: Cuttingsville, *Eggleston 1494* (US); Tinmouth Channell, *Drushel 4562* (ILL). Windham: Newfane, *Howe 4 July 1891* (NY); open, very wet swampy meadow, Townshend, *Moldenke & Moldenke 9904* (ILL,NY).

Massachusetts. Barnstable: slough, e. end of Goose Pond, Chatham, *Fernald 17287* (FM,MINN). Berkshire: border of stream, Adams, *Day 82* (GH,US); gravelly shore of Yokum Pond, Becket, *Jones & Jones 15414* (ILL); Stock-

bridge, *Britton* 28-31 July 1901 (NY). Bristol: open marshes, Salter's Point, *King* 41 (FM). Dukes: shore of Seth's Pond, West Tisbury, Martha's Vineyard, *Seymour* 1314 (GH,MINN). Essex: Ipswich, *Morong* 15 September 1875 (NY). Falmouth: roadside near Chara Pond, Woods Hole, *Drouet* 1523 (MINN). Hampden: swamp, Muddy Brook, Chicopee, *Seymour* 505 (GH); Holyoke, *Earle* 2 July 1877 (US). Hampshire: Northampton, *Watson* September 1874 (GH); low moist ground borders of woods, Worthington, 350 meters, *Robinson* 650 (GH). Middlesex: Cambridge, *DeWitte* 1838 (NY); Melrose, *Morong* 21 July 1876 (NY); Winter Pond, Winchester, *Williams* 11 September 1896 (GH). Norfolk: Hollbrook, *Greenman* 705 (GH); South Weymouth, *Faxon* 9 September 1886 (GH). Plymouth: Middleboro, *Murdock* 614 (FM). Worcester: Worcester, *Edmondson* 1462 (NY). Suffolk: n. of N. E. R. R., Mattapan, *Kennedy* 22 June 1888 (GH).

Rhode Island. Bristol: wet sandy soil near rr., Barrington, *Reynolds* 0658 (GH,ILL,NY). Newport: Block Island, *Hollick* July 1897 (NY); peaty ponds and pools between Pilot Hill and Southeast Point, Block Island, *Fernald, Hunnewell & Long* 10201 (GH); Block Island, *Spaulding* 10 August 1916 (US). Providence, *Thurber* June 1844 (GH).

Connecticut. Fairfield: low copse, Bridgeport, *Eames* 16 August 1894 (GH, US); moist ground, Terre Haute, Danbury, *Barnhart* 33 (NY). Hartford: Manchester, *Dunslow C-5* July 1922 (NY); wet places, Southington, *Andrews* 529 (GH). Litchfield: Litchfield-Morris Wildlife Sanctuary, Litchfield, *Dwyer* 2493 (US). Middlesex: Chatham, *Beals & Chamberlain* 3 July 1924 (NY). New Haven: New Haven, *Eaton* 1859 (NY); pine swamp, New Haven, *Safford* 194 (US). New London: Norwich, *Setchell* 11 July 1885 (NY).

New York. Albany: near reservoir, Guilderland Center, *House* 13333 (NYS). Bronx: McLean's Woods, *Holtzoff* 8 July 1913 (NY); Bronx Park, New York, *Nash* 27 June 1896 (NY). Broome: alluvial swale, 2 mi. w. of Union, *Smith & Weaver* 7231 (NYS). Cattaraugus: Cold Spring, *Alexander* 10 August 1927 (NYS). Chautauqua: low grounds, Cattaraugus Creek, Irving, *Johnson* 1280 (NY). Chenango: Bainbridge, *Topping* 20 July 1897 (US). Columbia: Rogers Island, Hudson River, *McVaugh* 2551 (NYS). Delaware: Stamford, *Taylor* 737 (NY). Dutchess: Hyde Park, *Taylor* 516 (NY). Erie: Muddy Creek, Angola, *Johnson* 25 June 1922 (NY). Essex: wet woods, Newcomb, *Dickey* 53 (GH). Franklin: marshy borders, Simon Pond, Tupper Lake, *Matthews* 4219 (CNC). Greene: wet meadow, near Cairo, *Nash* 28 June 1893 (NY); vic. of Tannersville, *Vail* July & August 1891 (NY). Hamilton: Big Alderbed, *Bain & Edgar* 10 July 1946 (NYS). Herkimer: gravelly flats along West Canada Creek, East Herkimer, *Haberer* 1983 (GH). Jefferson: marsh near North Sandy Point, Ellisburg twp., *Howe* 19993 (NYS). Lewis: marshy meadows, ½ mi. se. of Parker, *Hotchkiss* 276 (NYS). Madison: shore of Oneida Lake, s. of South Bay, *Haberer* 576E (NYS). Nassau: Hempstead Reservoir, Long Island, *Ferguson* 2570 (NY); Woodmere, *Wilson* 7 October 1917 (NY). New York: lower meadow bog, Van Cortlandt Park and vic., New York, *Bicknell* 7013 (NY); Van Cortlandt swamp, *Pollard* June 1893 (US). Onandago: open marshy pasture woods, Pompey twp., *House* 32092 (NYS). Oneida: marsh, n. of Jewell, *House* 25353 (NY); alluvial soil, Mohawk banks, *Haberer* 576a (GH). Orange: Port Jarvis, *Peck* July (NYS); shore of Jum Pond, Black Rock Forest, *Raup* 7389 (GH,NY). Oswego: Normal Swamp, *Sheldon* 5 July 1878 (NYS). Otsego: Cooperstown, *Parker* 24 July 1888 (GH). Queens: Flushing, *Schrenk* 24 September 1877 (NY). Richmond: Old Quarry Road,

Mariner Harbor, Staten Island, *Dowell* 2961 (NY); thicket by swamp, St. George, *Moldenke* 8000 (NY). St. Lawrence: moist soil near Pyrites Road, Canton, *Phelps* 769 (CAN,GH,US). Suffolk: muddy pond shore, e. of East Harbor, Fishers Island, *St. John* 20094 (GH); Montauk Point, *Taylor* 1607 (NY). Sullivan: vic. of Lake Shandeleer, *Wilson* 6 August 1918 (NY); Narrowsburg, *Peck* July (NYS, includes TYPES of *L. terrestris* formae *intermedia*, *variegata*, & *brevifolia* Peck). Tioga: Apalachin, Upper Susquehanna, *Fenno* 280 (NY). Tompkins: swampy woods, n. end of Round Marshes (Gracie's Swamp) and vic. Courtland, *Eames* 4810 (GH); n. shore of Beebe Lake, Fall Creek, Ithaca, *Metcalf* 7010 (GH). Ulster: Beer Kill, w. of Ellenville, *Whitney* 4764 (NYS). Warren: Stony Creek Ponds, Adirondack Mts., *Rowlee*, *Wiegand* & *Hastings* 9 July 1899. Washington: near Farley's bog, Halfway brook, e. of Tripoli, near Fort Ann, *Burnham* 8 July 1896 (GGH); Truthville, *Brushel* 9152 (ILL). Westchester: open sunny swamp, Yonkers, *Gleason* 1374 (NY); Yonkers, *Southworth* 1881 (NY).

New Jersey. Atlantic: along stream, near May's Landing, *Moldenke* & *Moldenke* 18321 (NY). Bergen: Hackensack, *Clute* 17 June 1899 (NY). Burlington: moist woods, Atsion, *Benner*, *Long* & *Bassett* 10 August 1926 (GH); Kinkora, *Taylor* 2536 (NY). Camden: rr. excavations, Hayes Mill, Atco, *Bassett* 19 July 1923 (GH,NY); swales, near Little Timber Creek, Mt. Ephraim, *Long* 19158 (GH). Hunterdon: swale, along Lamington River, $\frac{3}{4}$ mi. n. of Sutton, *Benner* 8708 (GH). Mercer: Princeton, *Macloskie* (NY). Middlesex: *Vail* June 1887 (NY); Spotswood, *Taylor* 2435A (NY). Monmouth: Farmingdale, *Taylor* 2143 (NY); edge of cattail swamp, near Keyport, *Drushel* 6754 (ILL). Morris: Budds Lake, *Britton* 28 September 1886 (NY); swamps, Budds Lake, *Mackenzie* 804 (NY). Ocean: edge of sandy bog, Jake Branch, Toms River, *Long* 13301 (GH); moist sandy soil, Toms River, *Pennell* 2563 (NY). Passaic: swampy ground, Boardville, *Mackenzie* 2720 (NY,US). Salem: swamp, *Holmes* 576 (US). Sussex: pool, near s. end of Lake Hopatcong, *Rydberg* 5 July 1917 (NY); back of Delaware River, Montague twp., *Nash* 16 July 1909 (NY).

Pennsylvania. Allegheny: Coraopolis, *Shafer* 135 (FM,NY,US). Beaver: along Raccoun Creek, near Bellowsville, *Bright* 8601 (MINN). Centre: Bald Eagle Creek, $\frac{1}{2}$ mi. sw. of Julian, *Kelly* 5 September 1939 (GH). Clinton: gravel shore, West Branch of Susquehanna River, 3 mi. nw. of Farrandsville, *Fogg* 11532 (GH). Dauphin: Harrisburg, *Small* 20 July 1888 (US); sand and gravel shore, Susquehanna River, Lucknow, *Fogg* 15748 (GH). Delaware: Lester, *Bartram* 10 June 1908 (GH). Erie: small woods, Presque Isle, *Dickey* 29 (GH). Lackawanna: Scranton, *Leggett* September 1861 (NY). Lancaster: *Galen* 1798 (CAN). Luzerne: Beech Haven, *Heller* 27 June 1889 (FM,GH). Lycoming: Trout Run, *Greene* 25 June 1898 (GH). Monroe: Pocono Plateau, *Tidestrom* 6541 (US); Tannersville, *Tyler* 4 July 1896 (NY). Northampton: Bethlehem, *Wolle* (FM). Perry, above Marysville, *Small* 4 July 1888 (FM). Pike: along brook, Kill Falls, *Nash* 12 July 1909 (NY). Wayne: quaking bog, w. shore of Lehigh Pond, 2 mi. ne. of Gouldsboro, *Adams* 3720 (GH). Wyoming: Factoryville, *Granger* 6 July 1894 (NY). York: vic. of McCalls Ferry, *Rose* & *Painter* 8188 (US).

Maryland. Allegany: Cumberland, *Schiver* 1894 (NY); stagnant pools, banks of Potomac River near Cumberland, *Smith* 2 July 1883 (US). Prince Georges: roadside among brush, e. of Riverdale, *Chase* 2383 (ILL,MINN). Wicomico:

along river, Salisbury, *Tidestrom* 12188 (GH). Worcester: Snow Hill, *Boettcher* 446 (FM).

District of Columbia. Brightwood Park swamp, *Steele* 22 September (GH).

West Virginia. Hardy: wet meadows, Baker, *Core* 2761 (GH,NY). Monongalia: swamp, Uffington, *Ammons* 14 June 1942 (US). Preston: Great River, *Smith* 10 September 1878 (US). Raleigh: under bridge in and along branch, Glen Daniels, *Tosh* 885 (US). Randolph: Read, *Greenman* 455 (FM,GH); *Pollock* 14 June 1896 (NY,US).

Virginia. Chesterfield: wooded river swamp, along Appomattox River, near Hopewell, *Fernald, Long & Smart* 5887 (GH,NY). Dinwiddie: clearings and borders of woods, e. of Burgess Station, *Fernald & Long* 11400 (GH). Henrico: sphagnous springy swales bordering white oak swamp, w. of Elko Station, *Fernald & Long* 9391 (GH). Isle of Wight: shaded wet roads, borders of low woods, Boaz, *Fernald & Long* 6331 (GH). James City: edge of woods about 5 mi. w. of Toano, *Menzel* 437 (GH). Norfolk: swale in peaty barrens, 5 mi. s. of Deep Creek, *Wiegand & Manning* 2480 (GH); between Northwest and Mayock, *Britton & Small* 25 May 1893 (NY); near Northwest, *Kearney* 1562 (US). Southampton: exsiccated bog 3 mi. w. of Cortland, *Gleason* 8649 (NY). Sussex: sandy and peaty shore sw. of Wakefield, *Fernald & Long* 14976 (GH). York: swamp, along York River, Biglers, *Grimes* 2664 (NY).

North Carolina. Avery: cranberry swamp, Linville, *Mohr* 1894 (US). Buncombe: low grounds and swamps, Biltmore, *Biltmore* 618b (FM,GH,MINN, NY,US). Cherokee: Andrews, *Huger* September 1900 (NY). Haywood: open wet ground, upper end of Lake Junaluska, *Beaver* 303 (DUKE). Henderson: Flat Rock, *Memminger* 28 June 1887 (CNC); moist soil near Hendersonville, *Biltmore* 618f (US). Iredell: bog 3 mi. w. of Harmony, *Radford* 2664 (CNC). Surry: Mt. Airy, *Biltmore* 618c (US). County not determined: Blue Ridge Mts., *Rugel* June 1841 (CAN).

South Carolina. Berkeley: along Santee River, *Walter* (ILL, photograph from BM).

Ontario. Algoma: swampy ground, Carp Lake, *Taylor, et al* 2373 (CAN, GH). Bruce: grassy zone of sandy beach, Howendale, *Watson* 2924 (NY, US); Johnson's Harbour, *Krotkov* 7696 (GH). Carleton: marsh, Britannia, *Macoun* 26 June 1911 (CAN). Frontenac: Bass River, Kingston, *Fowler* 30 July 1875 (US); Plevna, *Fowler* 28 July 1902 (GH). Huron: Wingham, *Morton* 16 July 1890 (CAN). Lambton: moist woods, Ipperwash Beach Park, Lake Huron, *Soper & Burcher* 2261 (GH). Lanark: Ross Island, Lake Rideau, *Edmondson* 1255 (NY). Lincoln: edges of ponds, *McCalla* 430 (US). Manitoulin Island: moist ground, Indian Village, South Bay, Lake Huron, *Grassl* 5429 (NY); open low ground, Cockburn Island, Lake Huron, *Grassl* 5569 (NY). Muskoka-Ontario: Gravenhurst, *Biltmore* 618a (US). Nipissing: Timagami Island, Lake Timagami, *Krotkov* 5555 (GH). Parry Sound: wet mulchy and gravelly shores, Joe Lake, Sibley twp., *Taylor, Losee, & Bannan* 789 (CAN,GH). Thunder Bay: low ground near Lake Superior, Pays Plat, *Hosie, Losee, & Bannan* 1851 (CAN,GH). Russell: near Ottawa, *Macoun* 25 June 1898 (NY); Carlsbad Springs, *Macoun* 6 June 1911 (CAN). Waterloo South: moist edge of river, Grand River, near Soon, *Montgomery* 294 (GH).

Michigan. Cheboygan: muddy shores of Douglas Lake, *Gleason & Gleason* 164 (GH,NY); nw. of Douglas Lake, Emmet, *Gates* 12196 (US). Ingham: swampy border, Pine Lake, Haslett, *Yuncker* 423 (ILL,US). Keweenaw:

swamps, *Farwell* 1792 (ILL.); sedge mat, Lake Upson, *Richards* 3795 (ILL). Mackinac: wet beaches, Lake Michigan, Groschap, *Gleason* 9851 (NY); wet sandy shore, Lake Huron, near St. Ignace, *Benner* 6603 (NY). Marquette: beaver meadow, Turin, *Barlow* 24 August 1901 (GH). Mason: bog border, Hamlin Lake, Ludington, *Chaney* 34 (FM,GH,NY,US). Menominee: marsh e. of New Bridge, Menominee, *Grassl* 2614 (NY). Oakland: n. of Cass Lake, *Chandler* 25 June 1916 (US).

Wisconsin. Adams: low borders of creek, Witches Gulch, *Heddle* 628 (FM). Ashland: swampy land near Ashland, *Gleason* 9578 (NY). Brown: Green Bay Shore, *Schuette* 2 July 1881 (FM). Douglas: Boule River, *Cheney* 7447 (GH). Green: Monroe, *Rote* (MO). Oneida: Oneida Reservation, *Schuette* 8 September 1881 (NY); Tomahawk Lake, *Cooper* 21 July 1926 (GH,NY). Polk: Deer Lake, *Baker* 6 July 1900 (GH). Sauk: marsh, Baraboo, *True* 6 July 1892 (GH). Vilas: Layner, *Wadmond* 4 July 1901 (MINN). Winnebago: marsh, South Oshkosh, *Gates & Sleeper* 1786 (ILL).

Minnesota. Anoka: Centerville, *Sandberg* 698 (US). Carlton: mouth of Otter Creek, *Moyle* 3776 (MINN). Cook: edge of Leo Lake, *Rosendahl* 6341 (MINN). Crow Wing: mucky soil, stream bed, Fort Riley, *Rosendahl & Butters* 3699 (MINN). Chisago: shores, Centre City, *Sandberg* 16884 (ILL); Lindstrom, *Taylor* June 1892 (US). Dakota: Vermilion Lake, *Arthur, Bailey, & Holway* 18 July 1886 (MINN). Goodhue: low ground, Red Wing, *Sandberg* July 1884 (MINN). Hennepin: wet places, Minneapolis, *Burglehaus* June 1892 (NY). Houston: Crooked Creek, *Lyon* 249 (MINN). Kanabee: Mara, *Sheldon* 2844 (MINN). Koochiching: along ne. shore of Krause Bay, Rainy Bay, *Moore & Moore* 11711 (MINN). Lake: low damp places, vic. of Halfway Ranger Station, *Hurd* 13 (NY); Two Harbors, *Sandberg* 646 (US). Lake of the Woods: w. bank of Pine Creek, *Moore & Moore* 10909 (MINN). Mille Lacs: Milaca, *Shelton* July 1892 (MINN,US). St. Louis: grassy hollow, Duluth, Minnesota Point, *Lakela* 1558 (FM,MINN,NY,US); lake shores, Armstrong Lake, near Ely, *Jones* 18245 (ILL,US). Stearns: St. Cloud, *Campbell* July 1896 (FM). Van Buren: low ground, *Lacota*, Herron 30 June 1891 (MINN). Winona: wet meadows, *Holzinger* July 1886 (MINN).

Ohio. Butler: near Huron River, Oxford, *Moseley* 5 June 1894 (FM). Cuyahoga: ditches, Berea, *Watson* 4 July 1894 (ILL,MINN); Berea, *Ashcraft* 6764 (ILL). Hamilton: meadow, North Bend, *Short* (GH). Jackson: wet ground, along Buckeye Creek, Liberty twp., *Bartley & Pontius* 60 (NY). Lorain: Camden Lake, *Ricksecker* 25 July 1894 (US). Portage: Garrettsville, *Webb* 229 (GH). Trumbull: low ground, along Eagle Creek, Phalanx, *Ruud* 24 July 1904 (ILL). County not determined: in pratis paludosis, *Riehl* 1836 (CAN).

Indiana. Jasper: edge of roadside ditch, Wheatfield twp., 1½ mi. sw. of Wheatfield, *Welch* 350 (ILL). Kosciusko: low sandy border, ne. side of Big Chapman Lake, *Deam* 21989 (NY); se. border of Tippecanoe Lake, *Friesner* 15388 (GH). Lake: ditches, Miller, *Pepoon* 24 June 1898 (US); wet ground, near Grand Calumet River, n. of Miller, *Chase* 183 (ILL); base of low dune s. of Pine, *Deam* 49779 (GH); rich prairie soil, Roby, *Lansing* 2786 (FM,GH,ILL,US); wet grounds, near Tolleston, *Hill* 62 (ILL). Lagrange: Fish Lake, near Ontario, *Yuncker & Yuncker* 5457 (FM). La Porte: La Porte, *Hill* 30 June (FM). Marshall: Lake Maxinkuckee, *Evermann* 801 (US). Porter: dune swales, Mineral Springs, *Peattie* 13 August 1920 (GH); marsh s. of dunes, 2 mi. e. of Tremont, *Deam* 39706 (GH). Steuben: low border of Graveyard Lake, *Deam* 4 July 1904 (US).

Illinois. Cook: low ground, South Chicago, *Hill 42* (ILL). Kankakee: Kankakee, *Crampton 400* (US). Ogle: riverbank, Oregon, *Waite 14 July 1885* (ILL, US). Stephenson: ditches, Freeport, *Johnson 20 July 1900* (US). Tazewell: Sawmill River Bog, *Ray 1300b* (ILL). Winnebago: wet field, Rockford, *Fuller 1786-H* (ILL); marsh, ½ mi. w. of Shirland, *Fell & Fell f46400, f46458* (ILL).

Tennessee. County not determined: Tennessee River Valley, *Stewart 1863* (FM).

Iowa. Linn: Cedar Rapids, *Shimek 7 June 1894* (FM). Scott: Princeton, *Ross July 1888* (FM).

British Columbia. Vancouver Island: Ucluelet, introduced from eastern North America with cranberry plants, *Macoun 29 July 1909* (CAN).

Washington. Kitsap: Wildcat Lake, *Jones 1593* (ILL). Pacific: growing by ditch in cranberry swamp, near Shoalwater Bay, *Eaton 18* (US).

Plants sent to Linnaeus by Kalm from the vicinity of Philadelphia were evidently sterile forms bearing moniliform, axillary bulblets, for in *Species Plantarum*, Linnaeus included them with the mistletoes in the genus *Viscum*. One hundred and thirty-five years later Britton, Stearns, and Poggenburg (1888) "discovered" the plants in their proper relationship and made the transfer to *Lysimachia*.

During this interim five different epithets based on specimens of flowering material were proposed. South Carolina plants were described by Walter (1788) as *L. vulgaris*. Plants from America in cultivation in England were described in 1789 in Aiton's *Hortus Kewensis* as *L. stricta*, and by Curtis (1789) as *L. bulbifera*. A Mr. Robert Squib, according to Curtis, noticed plants which produced axillary bulblets after anthesis. Upon decay of the plants in October the bulblets fell to the ground and produced new plants the following spring. In 1791 Lamarck named his "E. Carolina" material *L. racemosa*. Michaux's *L. racemosa* was a confusion of *L. terrestris* and *L. x producta*. His *L. angustifolia*, on the basis of a photograph of the type from the Michaux herbarium in the Muséum d'Histoire Naturelle, is considered conspecific with *L. terrestris*.

Several variants have been noted and described. Those of Peck (1894), principally from Narrowsburg, New York, are not of taxonomic significance. If categories below the rank of subspecies were herein given nomenclatural recognition, variety *ovata* Rand & Redfield found locally near Somerville, Maine, and Martha's Vineyard, Massachusetts, would be, at most, a forma.

Lysimachia terrestris may be distinguished from *L. quadrifolia*, with which it hybridizes, by its opposite or subverticillate, rarely alternate leaves which are glaucous beneath, and by the terminal raceme bearing flowers with rotate corollas. It extends farther north and occurs in swamps and other wet habitats rather than in the drier habitats of the more

southern *L. quadrifolia*. Its terminal raceme, without a gradual transition from foliage leaf to bract, distinguishes it from *L. x producta*.

13. *LYSIMACHIA LOOMISII* Torrey

(Plate XIV)

Lysimachia loomisii Torrey in Croom, Cat. Pl. New Bern ed. 2, 46. 1837; Small, Fl. Se. U.S. 903. 1903; Man. Se. Fl. 1024. 1933.—Non Torrey in sched. herb. Kew ex Knuth 1905.

Lysimachia angustifolia sensu Eaton & Wright, N. Am. Bot. 310. 1840, —non Lamarck 1791; nec Michaux 1803.

Lysimachia stricta var. *angustifolia* Chapman, Fl. S. U.S. 280. 1860; A. Gray, Syn. Fl. 2. pt. 1:63. 1878; Peck in Report N.Y. State Mus. 47:157, 158. 1894; Knuth in Engler, Pflanzenr. pt.237:299. 1905.

Lysimachia terrestris var. *angustifolia* (Chapman) Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:81. 1928.

Erect plants usually 2.5–6 dm. tall; rhizomes few, slender, elongated, stems glabrous below, glandular-puberulent above, slender, with many ascending foliate branches giving to the plant a fascicled habit; phyllotaxy various, opposite, subopposite, alternate or somewhat verticillate; medial stem leaves linear to narrowly elliptic, 3–5 cm. long, 2–4 mm. wide glandular-punctate, revolute, sessile or nearly so, obtuse, pinnate veins not evident; rameal leaves smaller, linear, lower leaves scale-like; racemes terminal 6–10 cm. long, glandular-puberulent; pedicels 5–12 mm. long; bracts 3–8 mm. long, linear subulate; medial bracts more than half pedicel length; calyx imbricate in the bud, tube short, lobes 2–3 mm. long, lanceolate, glandular-punctate and ciliate, corolla rotate, yellow, corolla-lobes oblong or ovate, 3.5–5 mm. long, 1.8–2 mm. wide, entire, rounded to obtuse, dark streaked; corolla tube, base of lobes, staminal tube and filaments with short, gland-tipped hairs; staminal tube about 0.4 mm. filaments 2–3.5 mm. long, unequal; anthers 0.7 mm. long, oblong, notched below; ovary ovoid, dark-glandular; style, slender, 3–4 mm. capsule globose, about 3 mm. in diameter; seeds few, about 1.5 mm. triangular, with a tawny alveolate covering.

Type localities: "Hab. New Bern, H. B. Croom, Esq. & Dr. Loomis; Robeson County, North Carolina, Rev. Mr. Curtis; Macon, Georgia, Dr. Loomis" Torrey (1837). Type collections in the herbarium of the New York Botanical Garden.

Distribution: Wet flats, ditches, savannas, and sandy pinelands, mainly of the Coastal Plain region of North Carolina, South Carolina, and Georgia. Not common. Flowering period: May, June. Map 2.

North Carolina. Brunswick: CC Camp, Southport, Mathews 12 May 1935 (CNC). Carteret: dryish pine association near bridge to Harker's Island,

Radford & Stewart 1224 (CNC). Columbus: low grassy savanna, 5 mi. se. of Whiteville, *Blomquist & Correll 9426* (DUKE). Craven: New Bern, *Croom & Loomis 1834* (NY); New Bern, *Croom* (GH,NY); savanna, near Havelock, *Godfrey 4439* (RNC,US); New Bern, *Kearney 1955* (US). Cumberland: Hope Mills, *Biltmore 2118c* (US); Hope Mills, *Alexander 27* June 1939 (NY); low ground, Fayetteville, *Biltmore 2118* (NY,US). New Hanover: Wilmington, *Word 1881* (US); wet field by roadside, 5 mi. nw. of Wilmington, *Bell 306* (CNC). Onslow: in grassy bog, Jacksonville, *Moldenke 1244* (DUKE,ILL, MINN,NY,US); dry sandy loblolly pine grounds, 9 mi. w. of Swansboro, *Radford & Stewart 1212* (CNC). Pamlico: peaty depression, Grantsboro, *Godfrey 48281* (RNC). Pender: Big Saw transition, *Wells 23* May 1925 (RNC). Robeson: pine flatwoods, 1½ mi. e. of Parkton, *Fox Beaman & Uribe 4650* (RNC); *Curtis* (NY). Wayne: boggy roadside ditch 3 mi. e. of Williams Crossroads, *Radford 4392* (CNC). County not determined: *Curtis* (GH,MO).

South Carolina. Berkeley: flatwoods, Black Creek, *Martin 1940* (CNC). Darlington: edge of pasture near paper mill, Hartsville, *Coker 14* May 1910 (CNC); wet flats along S. A. L. R. R., w. of Hartsville, *Smith 1713* (CNC). Horry: 1 mi. from Socostee, *Cox et al 14* May 1939 (CNC).

Georgia. Bigg: Macon, *Loomis* (NY).

Lysimachia loomisii, described by Torrey (1837) in Croom and Loomis' Catalogue (of New Bern plants), was based on specimens from New Bern and Robeson County, North Carolina, and Macon, Georgia. An endemic of the Coastal Plain and Piedmont regions of North Carolina to Georgia, it is generally found in savannas, wet flats, and pinelands. Closely related to the more northern *L. terrestris* with which no intermediates were observed, it may be distinguished by a fascicled-branching habit, scattered, short, linear leaves, and a glandular-puberulent inflorescence.

14. LYSIMACHIA ASPERULAEFOLIA Poiret

(Plate XV)

Lysimachia asperulaefolia Poiret in Lamarck, *Encycl. Suppl.* 3:477. 1814; Duby in DeCandolle, *Prodr.* 8:63. 1844; Wood, *Obj. Les. Bot.* 243. 1863 as *L. asperifolia*; A. Gray, *Syn. Fl.* 2. pt.1:63. 1878; Chapman, *Fl. S. U.S.* ed. 3, 298. 1897; Small, *Fl. Se. U.S.* 903. 1903; Knuth in Engler, *Pflanzenr.* pt.237:267. 1905, and Handel-Mazzetti in *Notes Bot. Gard. Edinb.* 16:81. 1928 as *L. aperulifolia*; Small, *Man. Se. Fl.* 1024. 1933.

Lysimachia herbemonti Elliott, *Sketch Bot. S.C. & Ga.* 1:232. 1817; Nuttall, *Gen. N. Am. Pl.* 1:121. 1818; Rafinesque in *Ann. Gén. Sci. Phys.* 7:192. 1820; Duby in DeCandolle, *Prodr.* 8:64. 1844; Chapman, *Fl. S. U.S.* 280. 1860; Klatt in *Abh. Naturw. Ver. Hamburg* 4. pt.4:24. tab. 12. 1866.

Tridynia herbemonti (Ell.) Raf. ex Steudel, *Nom. Bot.* ed. 2, pt.2:84. 1841,—pro syn.

Erect perennials, 3–6.5 dm. tall, the stem simple or sparingly branched, glabrous below, glandular-puberulent above, especially in the inflores-

cence; leaves sessile, in verticils of 3-4, medials lanceolate, glabrous above, glaucous beneath, glandular-punctate, 2.5-5.5 cm. long, 1-2 cm. wide, apex acute, the base rounded, margins entire, slightly revolute; evident veins of the leaf 3-5, arching from leaf-base, evident below; inflorescence a terminal bracted raceme 5-15 cm. long, lower flowers sometimes in foliage-leaf axils; pedicels 0.3-2 cm., bracts linear, 0.5-1 cm. glandular; calyx aestivation imbricate, tube short, about 1 mm., lobes lanceolate, 3-5 mm. long, about 0.6 mm. wide, acute-acuminate, entire, glandular-puberulent, dark, streaked-glandular punctations; corolla rotate to saucer-shaped, yellow, lobes lanceolate-elliptic, 6-9 mm. long, 3-4 mm. wide, sometimes dark streaked, or dotted, acute, minute glandular-capitate trichomes on margin and surfaces above and below; staminal tube 1-1.5 mm. long, filaments 3-5 mm. long, unequal; anthers ovoid-oblong, about 1 mm.; ovary globose, glandular-punctate above, style 5 mm. long, stigmatic apex slightly enlarged, ovules several, capsules almost globose 3-4 mm. in diameter, shorter than the calyx; seeds several trigonal, 1-1.5 mm. long, and covered by a thick, gray-white alveolate "bloom," finely reticulate.

Type locality: North Carolina.

Distribution: Swamp margins, savannas, moist pinelands; Coastal Plain region of North Carolina, South Carolina, and (according to Small) Georgia. Map 5.

North Carolina. Beaufort: savanna, 7 mi. s. of Washington, *Godfrey* 4394 (RNC,US). Columbus: savanna, Delco, *Godfrey* 6297 (US). Cumberland: Manchester, *Biltmore* 4118a (US); in boggy places, Fayetteville, *Biltmore* 4118c (MINN,US); margins of swamps, Hope Mills, *Biltmore* 4118d (US); growing in sphagnum in low ground, Fayetteville, *Biltmore* 4118f (ILL,NY,US); near Fayetteville, *Curtis* 1847 (MO). Iredell: Statesville, *Hyams* 4995 (NY). Pamlico: shrub bog 3 mi. s. of Grantsboro along N. C. Rt. 306, *Godfrey* 48157 (RNC). Pender: swamp margin, Big Saw, *Wells* 11 June 1926 (RNC). County not determined: *Chapman* (NY).

South Carolina. Richland: Columbia, *Herbemont* (NY,PHOTOTYPE of *Lysimachia herbemonti* Ell).

Lysimachia asperulaefolia was originally described by Poiret (1814) from material probably collected in North Carolina, but by error mentioned as having been found in Egypt by A. R. Delile. Elliott's description in 1817 of conspecific material was based upon collections by J. Herbemont near Columbia, South Carolina.

An endemic of the Atlantic Coastal Plain from North Carolina to Georgia, *L. asperulaefolia* resembles *L. terrestris* and *L. loomisii*; but with an erect and usually simple stem with well-spaced leaf verticils, it shows a greater affinity with *L. quadrifolia*. The inflorescence clearly shows a transition from axillary and whorled flowers to a usually compact,

terminal, bracted raceme of large flowers in definite verticils of reduced leaf-like bracts below and alternate or scattered near the apex. The larger flowers with glandular dotted or streaked corolla lobes, and lanceolate, glandular-ciliate calyx lobes, more nearly resemble those of *L. quadrifolia* than of *L. terrestris*. Its 3- to 5-nerved leaves distinguish it from all other American species.

Although one of the most distinctive plants of the genus, it apparently is seldom collected. Certainly it merits consideration as a subject for cultivation.

15. *LYSIMACHIA* × *COMMIXTA* Fernald

(Plate XVI)

Lysimachia terrestris × *thyrsiflora* Fernald & Wiegand in *Rhodora* 12:141. 1910; Marie-Victorin in *Naturaliste Canad.* 39:182-189. fig. 2, 3, 4. 1913; Fl. Laurent. 431. 1935.

× *Lysimachia commixta* Fernald in *Rhodora* 52:199. 1950.

Glabrous perennials, 3.5-8 (10.5) dm. tall; stems erect, stout, simple, or with well-developed branches from middle or upper nodes; lower leaves scale-like; medial leaves alternate or subopposite, thin, pale beneath, glabrous, linear-lanceolate to elliptic, 5-12 cm. long, 1.3-4 cm. wide, acute to acuminate, tapering to base; margin entire to weakly crenate, with a tendency to be revolute; dark reddish brown, round or slightly oblong, glandular-punctations evident above and below; flowers in terminal bracted racemes usually subtended by one or more lateral racemes; pedicels during anthesis 3-6 mm., becoming 5-9 mm. in fruit, solitary flowers, abortive or well-developed racemes sometimes from lower leaf axils; axillary peduncles usually divergent and to 6 cm. in length; peduncles and rachae sometimes finely pubescent with scattered, arachnose trichomes; bracts linear subulate, shorter than the pedicel; floral parts usually pentamerous or 4- to 9-merous; calyx imbricate in the bud, tube short, lobes linear-lanceolate to lanceolate, 3-4 mm. long, entire, glabrous, dark linear or rounded glandular punctations, acute to acuminate; corolla rotate to funnelform, cream-yellow, tube about 1 mm. lobes linear to elliptic, rarely spatulate, 5-8 mm. long, 1.5-2 mm. wide, dark streaked toward the rounded to obtuse apex, bases and corolla tubes often with dull red blotches and scattered glandular stalked hairs; staminal tube membranous, up to 1 mm. long, sinuses broadly rounded; filaments 3.5-7 mm., slim, unequal, the longest as long as or longer than the style, vesture of tube and filaments like that of corolla, anthers linear-oblong, about 1 mm.; ovary globose, glabrous, dark glandular-punctate above; style 5-6 mm. long; capsule globose, about 2 mm. in diameter, shorter than the calyx, ovules several; seeds when formed few, oval, in cross section triangular or flattened, tawny, finely reticulate.

Type locality: Boggy river meadow, St. Croix Junction, Calais, Maine.

Distribution: River estuaries and intertidal zones, meadows, wet slopes, and swamps; Magdalen Islands and Nova Scotia to southwestern Quebec, New York, Ontario, Michigan, Wisconsin, Minnesota, and Illinois. Locally abundant in some places. Flowering period: June–August. Map 9.

Prince Edward Island. Kings: swale near margin of North Lake, *Fernald*, *Long*, & *St. John* 7935 (CAN,GH,NY,US).

New Brunswick. Westmoreland: wet marshy land, Shediac Cape, *Hubbard* 15 July 1914 (GH).

Magdalen Islands. Fresh spring marsh, Grindstone Island, *Fernald et al* 7933 (GH).

Quebec. Beauharnois-Laprairie: swamp, near Châteauguay, *Marie-Victorin* August 1912 (CAN,NY); Châteauguay, *Marie-Victorin* August 1915 (NY,US). Chambly-Rouville: grande colonie hybride sur une berge argileuse, Iles De Boucherville, *Marie-Victorin* & *Rolland-Germain* 43748 (FM,GH); grande colonie entierement hybride sur un talus argileux, Iles De Boucherville, *Marie-Victorin* & *Rolland-Germain* 44155 (CAN,FM,GH). Charlevoix-Saguenay: margin of shallow pond, Harrington Harbor, *Lewis* 391 (NYS). Nicolet-Yamaska: sur les rivages estuariens, Saint-Pierre-Les-Becquets, *Marie-Victorin*, *Rolland-Germain*, & *Meilleur* 44121 (GH). Quebec-Montmorency: vers le haut de la zone intercotidale, Saint-Francois, (Ile D'Orleans), *Marie-Victorin*, *Rolland-Germain*, & *Meilleur* 44388 (FM,GH). Rimouski: swale bordering salt marsh, Bic, *Fernald* & *Pease* 25230 (CAN,GH).

Maine. Washington: boggy river-meadow, St. Croix Junction, Calais, *Fernald* 2170 (GH,TYPE).

Vermont. Addison: Middlebury, *Brainerd* (?) 22 June 1880 & 25 September 1880, in part (GH). Chittenden: Burlington, *Grout* 30 June 1891 (NY).

New York. Erie: Niagara River, Buffalo, *Johnson* 30 June 1923 (NYS). Jefferson: banks of Perch River above Limerick, *House* 8998 (GH,NYS). Oneida: very wet places, along Erie Canal, 2 mi. e. of Utica, Oneida, & Herkimer line, *Haberer* 1353 (GH,NY,NYS). Ontario: Canadaigua, *Webster* 24 June 1911 (NYS). Oswego: *Coville* 29 June 1887 (US). Saint Lawrence: Gouverneur, *Anthony* (NYS).

Ontario. Kenora: water edge, Ingolf, *Denike* 545 (NY). Muskoka-Ontario: Shadow River, Muskoka, *Lees* 8 July 1888 (FM). Port Arthur-Thunder Bay: sedge swamp, Port Caldwell, *Taylor*, *Bannan* & *Harrison* 1281 (CAN). Russel: environs d'Ottawa, *Rolland* 129 (GH).

Michigan. Alger: swampy woods, s. of Au Train, *Gleason* 9736 (NY).

Wisconsin. Jefferson: ditch along rr., n. of Johnson Creek, *Schallert* 765 (DUKE); Sullivan, *Schallert* 28 July 1926 (DUKE).

Minnesota. St. Louis: brookside along highway No. 4, *Lakela* 2615 (MINN).

Illinois. Cook: sandy swamps, Thornton, *Fuller* 1182 (ISM). Ogle: Byron, *Blount* 1885 (ILL). Rock Island: wet soil, near Silva, *Fuller* 13839 (ISM). St. Clair: swamp margin, near Carondelet, *Eggert* 24 May 1878 (MO). Tazewell: lowland along Illinois River, near East Peoria, *Chase* 10417 (ILL). Woodford: low ground along Illinois River, Spring Bay, *Chase* 6889 (NY).

Lysimachia x commixta Fern. represents the putative hybrid population of *L. terrestris* and *L. thyrsoiflora*. This was first collected (as *L.*

terrestris) by H. Eggert in 1878 in St. Clair County, Illinois. It was reported by Fernald & Wiegand (1910) from Calais, Maine, and was named by Fernald in 1950. Extensive local populations are known to exist in several places in Quebec and New England, and additional collections have been made in New York, Ontario, Wisconsin, Minnesota, Michigan, and Illinois.

Although somewhat varied, this hybrid can usually be identified by the presence of a terminal raceme, and similar subtending lateral ones. Vigorous individuals are marked by additional divergent axillary racemes borne below on strong peduncles up to 6 cm. in length. The leaves, pale beneath, are not strongly ascending, and have small but evident dark circular punctations. Short pedicels, long styles, and small capsules are evident. Although all observed material shows a floral morphology approaching *L. thyrsiflora*, confusion with *L. terrestris* occurs because of the terminal, somewhat open raceme. A somewhat funnellform corolla with linear or spatulate lobes, short, almost glabrous, membranous staminal tubes, ascending filaments, and acuminate calyx lobes of the hybrid may be contrasted with a rotate, darker yellow corolla, elliptic lobes, a densely glandular vesture of the longer staminal tube, erect filaments, and acute calyx lobes of *L. terrestris*. Marie-Victorin (1913) noted the hybrid as much taller (to 105 mm.) than either parent. In the fruiting condition racemes of *L. terrestris* are greatly expanded, of *L. x commixta* short and thick, yet open, and of *L. thyrsiflora* compact, oblong thyrsoid masses.

Fernald (1950) mentioned as "a striking fact" the absence of axillary bulblets in *L. terrestris* hybrids; yet specimens of *L. x commixta*, Fernald, Long, & St. John 7935 (GH,NY,US), bear them. Bulblets are much in evidence on the lateral branches here as well as on lateral branches of floriferous *L. terrestris*.

The presence of the hybrid with the parents is to be expected where they share the same ecological niche. However, there is a small degree of parental isolation. *Lysimachia terrestris* is generally found in swamps, and *L. thyrsiflora* inhabits cold bogs. Various collectors have noted extensive colonies, especially in river lowlands, occurring in the absence of either or both parents. Marie-Victorin (1913) noted it as forming extensive colonies by means of rhizomes. This hybrid and its parental relationship is not unlike that of *L. x producta*.

The hybrid is believed to be relatively infertile. Normal development and maturation were evident in only a few seeds collected from herbarium specimens. Pollen grains from the three taxa were likewise examined. Grains of the hybrid, stained with one per cent cotton-blue in lactophenol, were found when compared with parental grains to be pre-

dominantly abnormal in appearance. Seventy-five to eighty-five per cent pollen-sterility was reported by Marie-Victorin (1913).

Material from St. Clair County, Illinois, *Eggert* 1878 (MO), must be considered as extra-parental in range. The nearest known sympatric regions are lowlands along the Illinois River about two hundred miles northward in Tazewell County, Illinois, and farther northward along the Mississippi River in Scott County, Iowa. *Lysimachia x commixta* is known from Tazewell County and from Woodford, the adjoining county northward along the river and from Rock Island County, Illinois, which is across the Mississippi from Scott County, Iowa. In view of the hybrid's ability to colonize vegetatively, especially along river lowlands, it may be assumed that water-borne propagules are responsible for this southern extension.

Cytological studies of Tazewell County material have been inconclusive. No significant division figures were obtained; however a high percentage of abortive anthers and pollen cells were observed.

C. Subgenus III. NAUMBURGIA (Moench) Handel-Mazzetti

Naumburgia Moench, Meth. Suppl. 23. 1802,—as a genus.

Naumburgia (Moench) Klatt in Abh. Naturw. Ver. Hamburg 4. pt. 4:10. 1866; A. Gray, Man. Bot. ed. 5, 315. 1868; Bentham & Hooker, Gen. Pl. 2. 635. 1876; Knuth in Engler, Pflanzenr. pt.237:302. 1905; Watson & Coulter in A. Gray, Man. Bot. ed. 6, 331. 1889; Robinson & Fernald in A. Gray, New Man. Bot. ed. 7, 646. 1908; Thenen, Phyl. Prim. 98. 1911; Fernald in A. Gray, Man. Bot. ed. 8, 1141. 1950.—As a section.

Naumburgia (Moench) Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:121. 1928; in Hannig & Winkler, Pflanzenareale 2. pt.5:39. map 44. 1929,—as a subgenus.

Herbaceous perennials with simple erect stems, and opposite or verticillate leaves; flowers cream-yellow, 5- to 9-merous, in dense, axillary racemes; calyx imbricate and contorted in the bud; corolla deeply parted, lobes linear-oblong; filaments united at base; ovary subglobose, dark glandular-punctate; seeds few, trigonal, not winged.

Type species: *Lysimachia thyrsiflora* L.

A distinctive monotypic subgenus, circumpolar in distribution. In North America, with few exceptions, occurring north of 40 degrees of latitude.

16. *LYSIMACHIA THYRSIFLORA* Linnaeus¹

(Plate XVII)

Lysimachia thyrsiflora Linnaeus Sp. Pl. 147. 1753; Lamarck, Encycl.

¹ For a more extensive synonymy, see Knuth in op. cit. 302-303.

3:511. 1791; Tabl. Encycl. 1:439. 1792; Michaux, Fl. Bor. Am. 1:127. 1801; Muhlenberg, Cat. Pl. Am. Sept. 20. 1813; Curtis, Bot. Mag. 45: tab. 2012. 1818; Rafinesque, Ann. Gén. Sci. Phy. 7:193. 1820; Sprengel, Syst. Veg. ed. 16, 1:571. 1825; Klatt in Abh. Naturw. Ver. Hamburg 4. pt.4:42. tab. 24. 1866; A. Gray, Man. Bot. ed. 5, 315. 1868; Syn. Fl. 2. pt. 1:63. 1878; Knuth in Engler, Pflanzenr. pt.237:302. 1905; Thenen, Phyl. Prim. 98. tab. 8. 1911; Allen in Rhodora 22:193. 1920; Hegi, Illustr. Fl. Mittel-Eur. 5. pt.3. 1855. tab. 212, fig. 1; fig. 2859, 2860, 2724b. 1927. Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:121. 1928; Marie-Victorin, Fl. Laurent. 431. fig. 145. 1935; Douglas in Am. Jour. Bot. 23:204. 1936; Porsild in Rhodora 41:156-157, 277. 1939; Bailey, Hortus Sec. 451. 1947; Beijerinck, Zaden Atlas tab. 65, fig. 642. 1947; Hultén, Fl. Alaska & Yukon 8:1290. 1948; Fernald in A. Gray, Man. Bot. ed. 8, 1141. 1950.

Naumburgia guttata Moench, Meth. Suppl. 23. 1802,—nom. illegit.

Lysimachia capitellata Rafinesque in Med. Repos. N.Y. II. 5:354. 1808,—nom. nud.

Lysimachusa thyrsoflora (L.) Pohl, Tent. Fl. Bohem. 1:195. 1810.

Lysimachusa subcapitata Rafinesque in Med. Repos. N.Y. III. 2:333. 1811,—nom. nud.

Thyrsanthus palustris Schrank in Denkschr. Akad. Muench. 75. 1813-14.

Lysimachia capitata Pursh, Fl. Am. Sept. 1:135. 1814; Rafinesque in Ann. Gén. Sci. Phy. 7:193. 1820; Torrey, Fl. N. & M. U.S. 1:212. 1824.

Naumburgia thyrsoflora (L.) Reichenbach, Fl. Germ. Exc. 410. 1831; DUBY in DeCandolle, Prodr. 8:60. 1844; A. Gray, Man. Bot. 283. 1848; Provancher, Fl. Can. 1:384. 1862; Britton & Brown, Illustr. Fl. N. U.S. 2: 591. fig. 2821. 1897; House, Mem. No. 15. N.Y. State Mus. 2:tab. 163. 1918; Abrams, Illustr. Fl. Pac. States 3:332. fig. 3749. 1951.

Nummularia thyrsoflora (L.) Kuntze, Rev. Gen. 1:398. 1891.

Herbaceous perennials 3.5–8 dm. tall; rhizomes usually smooth, somewhat pithy; stems simple, glandular-punctate, glabrous below, puberulent above; leaves opposite or verticillate, scale-like below, lanceolate, elliptic or oblanceolate above, 5–16 cm. long, 1.2(0.5)–6 cm. wide, subsessile or petiolate; apex acute to attenuate, the base tapering; dark glandular-punctate, entire to weakly sinuate, glabrous above, glabrous or sparingly villous with fine, septate hairs beneath along the midrib and base; flowers in dense, capitate or spike-like, pedunculate racemes, 1–3 cm. long, from medial or upper axils, peduncles, rachae, and pedicels glabrous to sparingly villous, pedicels 1–4 mm. long, bracts linear subulate 3–5 mm. long, dark glandular-punctate; calyx dark glandular-punctate, tube very short, lobes 5–7, rarely 3–9, lance-attenuate, 1.8–2.8

mm. long, 0.5–1 mm. wide, entire; corolla somewhat funnellform, cream-yellow, dark streaked or dotted, tube 1–3 mm. long, sinuses rounded, sometimes with small dentations, lobes linear to lance-attenuate, usually the same number as the calyx-lobes, 2–4 mm. long, 1–2 mm. wide, obtuse or acute at the apex; staminal tube very short, about 0.2 mm. long; filaments filiform 4–5 mm. long, unequal, anthers oblong about 0.7 mm. long, ovary dark glandular-verruculose, sparingly puberulent with slender segmented trichomes, style 4.5–6 mm. long; capsule subglobose, about 2.5 mm. in diameter, dark glandular-punctate; seeds few, trigonal, about 1 mm. long, outer surface usually convex, adjacent surfaces concave, the dark rufescent coat with a tawny, alveolate covering.

Type locality: "Habitat in Europa, in paludibus." Linnaeus (1753).

Distribution: Circumboreal. River bottomlands, swamps, marshes, pond margins, and bogs; eastern Quebec to the Aleutian Islands, Alaska, southward to Pennsylvania, Missouri, and northern California; Eurasia. Flowering period: May–July. Map 11.

Nova Scotia. District and locality not determined: marshy border of pond, *Howe & Lang* 469 (NY).

Prince Edward Island. Prince: fresh springy border of salt marsh, Green's Shore, Summerside, *Fernald & St. John* 7936 (CAN, NY).

New Brunswick. Charlotte: bog, Deer Island, *Malte* 30 July 1939 (CAN).

Magdalen Islands. Fresh springy marsh, Grindstone Island, *Fernald, et al.* 7937 (CAN).

Quebec. Beauharnois-Laprairie: marshes, Châteauguay, *Marie-Victorin & Rolland-Germain* 46753 (CAN). Berthier-Maskinonge: swamp, Lanoraie, *Scoggan* 344 (CAN). Labelle: grève caillouteuse d'une île du Petit Lac Nominique, *Lucien & Eloi* 151 (CAN). Montreal: sur les rivages, Rivière-des-Prairies, *Marie-Victorin & Rolland-Germain* 46753 (CAN).

Maine. Aroostock: New Limerick, *Fernald* 28 June 1899 (MINN). Penobscot: cold meadow, Bangor, *Knight* 27 June 1905 (MINN, ILL).

Vermont. Addison: Bristol, *Brainerd* 17 June 1879 (MINN, NY); Bristol Pond Bog, *Eggleston* 21456 (NY, US); swamps, Bristol, *Pringle* 19 June 1879 (US). Bennington: Manchester, *Day* 350 (US); Pownal, *Nason* June (ILL). Caledonia: Peacham, *Blanchard* 26 June 1886 (FM, US). Orange: Fairlee, *Denslow* 27 June 1923 (MINN). Rutland: sphagnum swamp, Rutland, *Eggleston* 16 June 1892 (NY); West Rutland, *Eggleston* 16 June 1892 (FM, NY, US). County not determined: *Chapman* (NY); bogs & swamps, *Carpenter* 20 June 1911 (ILL).

Massachusetts, Berkshire: Stockbridge, *Sheer* 32 (MINN). Essex: Leach's Swamp, *Chamberlain* June (NY). Hampden: white cedar swamp, Pole Ridge Swamp, *Clark & Seymour* 693 (NY). Hampshire: Deerfield Swamp, *Jesup* June (FM). Middlesex: open swampy ground, fresh pond marshes, Cambridge, *Batchelder* 9 June 1912 (NY); South Natick, *Morong* 25 June 1879 (NY). Suffolk: Dorchester, *Churchill* 14 June 1885 (US).

Connecticut. Fairfield: swamp, Sugar Hollow, Danbury, *Barnhart* 130 (NY). Litchfield: Cornwall, *Benedict* 24 June 1909 (NY); border of lake, Salisbury,

Bissell 25 June 1900 (NY). New Haven: Beaver Meadows, New Haven, *Setchell* 10 June 1884 (US); New Haven, *Safford* 646 (US).

New York. Broome: Binghamton, *Millspaugh* 1886 (US); Pond Brook, *Clute* 1895 (NY). Cayuga: Parker's Pond swamp, Meridian, *Banker* 482 (NY). Chenango: near Brisben, *Coville* 18 June 1887 (US). Columbia: swamp, w. of New Britain Cemetery, New Lebanon, *House* 23532 (NY). Dutchess: Croyhan Hill Marsh, Pine Plains, *Hoysradt* 30 May 1876 (US). Erie: swampy places along Niagara River, near Cherry Farm, Buffalo, *Johnson* 30 June 1923 (NY). Genesee: tamarack swamp, Pavilion, *Hill* 78 (ILL). Hamilton: sunny place above water line, Mason Lake, *Lambert* 97 (CAN). Jefferson: marsh, near Woodville, *House* 8182 (CAN). Madison: mucky part of swamp, Fiddler's Green, "Pecksport," *Maxon* 19 June 1896 (NY,US). Onondaga: Baldwinsville, *Overacker* June 1897 (US). Ontario: swamps, Geneva, *Brewer & Chickering* July 1858 (FM). Oswego: Mill Creek, North Hannibal, *Pearce* 1 July 1884 (US). Putnam: Lake Mahopac, *Poggenburg* 16 June 1888 (NY). Richmond: Garretsons, *Knight* 17 June 1882 (NY); New Dorp, *Ruger* 13 June 1876 (NY). St. Lawrence: cold swamp, Canton, *Phelps* 771 (NY,US). Steuben: Cinnamers Lake, *Lucy* 9574 (FM). Tompkins: swamp, Ringwood, Ithaca, *Muenschler & Bechtel* 529 (ILL); Summit, *Hastings* 23 May 1896 (NY). Warren: peat marsh, e. of Lake George, *Burnham* 15 June 1892 (US). Washington: East Greenwich, *Fitch* 5234 (FM, MINN). Westchester: Central Avenue swamp, *Bicknell* 7015 (NY).

New Jersey. Bergen: edge of salt marsh, Carlstadt, *Pennell* 2561 (NY); New Durham, *Pollard* 23 May 1894 (US). Hunterdon: Clinton reservoir, *Miller* 23 July 1914 (NY); open swamp, Milford, *Mackenzie* 5041 (NY). Morris: Budd Lake, *Müller* 407 (NY); Great Swamp, near Chatham, *Kezer* 30 May 1936 (NY). Sussex: swamps, Cranberry Lake, *Mackenzie* 735 (NY); bog along Pequert River, w. of Springdale, *Pretz* 508 (NY). Union: Plainfield *Miller* 408 (NY). Warren: Mt. Lakes, *Ahles* 2472 (ILL).

Pennsylvania. Luzerne: Kingston, *Thurston* 6 April 1889 (US). Mercer: swamp, 1 mi. s. of Swamp Root, *Henry* 490 (FM,US).

Ontario. Algoma West: sedge margin of lagoon, n. of Magpie Falls, *Hoosie Harrison & Hughes* 2037 (CAN). Bruce: marsh, Stokes Bay, *Krotkov* 9315 (NY,US). Cochrane: e. bank of Moose River estuary, 4 mi. ne. of Moose Factory; *Baldwin* 1575 (CAN). Essex South: marsh, Amherstburg, *Macoun* 7 June 1901 (CAN). Frontenac-Addington: Kingston, *Fowler* 15 June 1901 (US). Grey North: Squaw Point, Owen Sound, *Stewart* 1643 (NY). Haldimand: swamps, Belleville, *Macoun* 29 June 1876. Kenora-Rainy River: muskeg, Ingolf, *Denike* 655 (NY). Lambton West: near Sarnia, *Dodge* 13 June 1893 (CAN). Leeds: near Rideau Ferry, *Edmondson* 5098 (NY). Manitoulin Island: grassy marsh, near Helen Bay, *Grassl* 5562 (NY). Ottawa: vic. of Ottawa, *Macoun* 14 June 1898 (FM). Oxford: Woodstock, *Fisher* 17 June 1906 (US). Patricia: rivage glaiseux, Attawapiskat, *Dutilly & Lepage* 15488 (CAN). Port Arthur-Thunder Bay: low wet swamps, Lake Nipigon, *Macoun* 11 June 1874 (CAN). Renfrew North: along Madawaska River, Algonquin Park, *Macoun* 6 July 1900 (CAN). Russell: Carlsbad Springs, *Macoun* 6 June 1911 (CAN).

Michigan. Alcona: Black River, Lake Superior, *Gillman* 6 July 1868 (NY). Cheboygan: muddy banks, Maple River, Douglas Lake, *Ehlers* 535 (US); margin of *Thuja* Swamp, near Topinabee, *Ehlers* 6051 (US). Chippewa:

border of Lake Huron, Point Detour, *Pepoon* 16888 (ILL). Houghton: swamp, Calmet, *Wood & Wood* 1497 (US); dried muddy bed of pond bordering alder swamp, ne. of Laurium, *Hermann* 8129 (NY). Ingham: marshy border of lake, Haslett, *Yuncker* 262 (ILL). Kent: Cedar Springs, *Fallass* 18 June 1897 (US). Marquette: wet shores, Michiganone Lake, Champion, *Hill* 86 (ILL); in swamp by flowing water, Turin, *Barlow* 6 July 1901 (US). Midland: swamps, Midland, *Driesbach* 6 June 1914 (FM). Oakland: near Lake Angelus, *Chandler* 18 June 1916 (US). Washtenaw: marsh, 4½ mi. se. of Ann Arbor, *Hermann* 6851 (NY,US).

Wisconsin. Brown: Green Bay, *Schuetz* 22 June 1882 (FM). Dane: Madison, *Chase* 1886 (ILL). Douglas: marsh, Superior, *Lakela* 2520 (MINN). Milwaukee: Milwaukee, *Lapham* June (US). Oneida: Three Lakes, *Wadmond* 21 June 1898 (MINN). Racine: Corliss, *Wadmond* 7 June 1903 (MINN). Vilas: Lost Lake, Saynor, *Wadmond* 4 July 1901 (MINN). Walworth: *Larix* swamp, Broomfield, *Wadmond* 3526 (MINN).

Minnesota. Aitkin: Nickols, *Sheldon* 2671 (MINN). Anoka: Decodon Pond, *Buell & Buell* 3 August 1933 (RNC). Becker: Tamarack bog, Detroit Lakes, *Nielson* 2091 (MINN). Beltrami: vic. of Bemidji, *Brand* 539 (FM). Cass: Lake Kilpatrick, *Ballard* 1375 (MINN). Chicago: Center City, *Taylor* June 1892 (MINN, US). Clay: marshy place, Buffalo State Park, *Stevens* 11 July 1947 (MINN). Clear water: birch swamp, peat, open water, Floating Bog Bay, *Grant* 2752 (NY,US); slough, Itasca Lake, *Sandberg* 1066 (US). Cook: open marsh, south of Ford Lake, *Butters, Abbe & Burns* 622 (MINN). Dakota: Vermillion Lake, *Arthur, Bailey & Holway* 421 (MINN). Hennepin: cold swamps, near Minneapolis, *Burglehaus* June 1892 (FM,ILL,US); Fort Snelling, *Mearns* 11 June 1891 (US). Hubbard: *Larix-Picea* swamp, Benedict, *Bergman* 3009 (MINN). Itasca: Bowstring, *Stork* June-July 1925 (MINN). Lake of the Woods: poplar forest, Pine Creek, *Moore & Moore* 10971 (MINN). McLeod: peat slough, Hutchinson, *Beach* 137 (MINN). Mille Lacs: Mille Lacs Reservation, *Sheldon* 2575 (MINN). Muker: Acton, *Frost* 133 (MINN). Nicollet, *Ballard* June 1892 (MINN,US). St. Louis: swamps, Armstrong Lake, near Ely, *Jones* 18243 (ILL). Small sand plain, bayside, Duluth, *Lakela* 1492 (FM,NY,US). Scott: Priar's Lake, *Ballard* 561 (MINN). Wabasha: near Lake City, *Manning* 18 June 1885 (NY). Waseca: Lake Helena, *Taylor* 443 (MINN). Winona: *Holzinger* August 1886 (MINN,US). Wright: Rockford, *Harper & Harper* 28 June 1888 (FM).

Ohio. Licking: *Stockburger* 2751 (US). Lorain: Oak Point, *Ricksecker* 26 May 1894 (US). Ottawa: Catawba Island, *Moseley* 16 May 1896 (FM,US). Stark: near Canton, *Riehl* 1836 (NY).

Indiana. Lake: slough, Miller, *Chase* 1798 (ILL,US); swamps and sloughs, Miller, *Hill* 19 (ILL). Wells: low sedge border of lakes, Jackson twp., *Dean* 979 (ILL,MINN,NY,US).

Illinois. Cook: Chicago, *Babcock* (US); prairie pond margin, near Palatine, *Chase* 8813 (ILL). Boone: marsh, 3 mi. n. of Capron, *Fell* 46350 (ISM). DuPage: marsh, Lisle, *Martinek* 186 (US); ditch, nw. of Wheaton, *Moffatt* 91 (ILL). Kankakee: wet places, low prairie, se. of St. Anne, *Fuller* 8959 (ILL, ISM). Lake: boggy prairie, s. of Lake Villa, *Gleason & Shobe* 236 (ILL); bog, near Volo, *Jones* 15167 (ILL). McHenry: wet places, Algonquin, *Nason* 5 June 1913 (ILL). Rock Island: wet ground, Rock Island, *Baker* 28 May 1891 (US). Tazewell: floodplain along Illinois River, 4 mi. above East Peoria, *Chase* 10924 (ILL). Will: wet ground, Wabash R. R., w. of Marley, *Chase* 7 June 1897

(ILL). Winnebago: Sugar River slough, 1 mi. w. of Shirland, *Fell 46314* (ISM). Woodford: cold bogs near Adam's Mill, *McDonald* June 1891 (ILL); spring-fed bog, s. of Spring Bay, *Chase 11058* (ILL).

Iowa. Allamakee: wet meadow, Mississippi Bottoms, *Tolstead* 16 July 1933 (MO). Cerro Gordo: swamp, Buffalo slough, *Shimek* 16 Aug. 1912 (MINN). Clay: grassy swamp in the outlet of Lost Island Lake, Freeman twp., *Hayden 10155* (MO,NY,US). Fayette: *Fink* 20 May 1894 (US). Linn: Cedar Rapids, *Shimek* 15 May 1896 (FM,MO). Muscatine: island, Mississippi River, near Fairport, *Collector not determined* 1894 (NY).

Missouri. Jackson: swamps, Courtney, *Bush* 26 (NY); bogs, Sibley, *MacKenzie* 72 (FM,US).

Manitoba. Selkirk: Winnipeg: wet places near Winnipeg, *Macoun* 10 August 1896 (CAN). Observation Point, Lake Winnipeg, *Macoun* 22 July 1884 (CAN). Macdonald: Aweme, *Criddle* 25 June 1926 (CAN).

North Dakota. Benson: Pleasant Lake, *Lumell* 5 August 1914 (ILL,MO,NY,US). Kidder: low meadow, Tappen, *Stevens & Kluender* 31 July 1933 (FM). Ward: riverbank, Moose River Park, *Lakela* 198 (MINN).

South Dakota. Brookings: wet ground, Elkton, *Ramsey & Saunders* 24 May 1902 (MO). Pennington: wet shady places in Rapid Canyon, *Over* 1632 (US). Roberts: marshy ground, *Over* 15404 (US).

Nebraska. Brown: Long Pine, *Bates* May 1893 (ILL). Grant: wet meadow, Lake Region 3 mi. ne. of Whitman, *Rydberg* 29 July 1893 (US). Hall: near Donipham, Platte River Valley, *Thomson* 21 May 1889 (MO). Lincoln: Hershey, *Mell* 87 (US). Thomas: Middle Loup River, near Thedford, *Rydberg* 14 June 1893 (NY,US).

Northwest Territories. Mackenzie: Fort Rae, *Russell* 13 August 1923 (CAN).

Saskatchewan. Maple Creek: damp places, Cypress Hills *Macoun* 27 June 1894 (CAN). Melfort: edge of brook, 2 mi. w. of Bennock, *Breitung* 701 (CAN); near Windrum Lake n. of Churchill River, *Bryenton* 172 (CAN). Melville: cold wet swamp, along Cut Arm Creek, *Macoun* 24 July 1894 (CAN). North Battleford: north shore, Lake Athabaska, *Harper* 78 (US); sandy pond margin, vic. of Wolverine Pt., Lake Athabaska, *Raup* 6827 (CAN,MO,NY).

Alberta. Athabaska: floating bog, Egg Lake, *Harper* 40 (US); floating bog, edge of pond, Egg Lake, Athabaska Delta, *Harper* 32 (US). Wetaskiwin: edge of great bog, Pigeon Lake, *Turner* 5004 (CAN).

Montana. Flathead: Big Fork, *Butler* 377 (NY); Big Fork, *Jones* 24 June 1900 (MO,US); Columbia Falls, *Williams* 904 (CNC,FM,NY,US).

Idaho. Bonner: s. end of Priest Lake, 900 m., *Leiberg* 2784 (US). Freemont: along Snake River, St. Anthony, *Cronquist* 1501 (MO). Kootenai: Coeur d'Alene, *Rust* 303 (US).

Colorado. Larimer: meadow, Big Thompson, Estes Park, *Moyer* 30 August 1898 (MINN,NY); riverbank, Fort Collins, 1550 m., *Cowen* 324 (MO,NY,US).

British Columbia. Cariboo: San Jose River at Williams Lake, *Munro* 8 July 1949 (CAN). Nanaimo: Wellington, *Macoun* 4 July 1908 (CAN,NY). Vancouver: damp places, New Westminster, *Macoun* 28 August 1893 (CAN). Yale: Lake Osyoos, *Macoun* 6 June 1905 (CAN).

Utah. Cache: swampy meadow, Logan, *Cotter* 30 May 1919 (MINN).

Washington. Grant: muddy shore of Blue Lake, *Eyerdam* 664 (FM). King: swampy border, Bitter Lake, *Benson* 1551 (MO). Klickitat: boggy meadows,

Falcon Valley, *Suksdorf* 6590 (ILL,MO,NY,US). Okanogan: Mason Creek, 650 m., *Sandberg & Leiber* 250 (MINN,NY,US). San Juan: Lake Tucker, *Zeller & Zeller* 1108 (MINN,MO,NY,US). Spokane: Spokane, *Piper* 3514 (NY). Stevens: wet meadow, Colville River, near junction with Columbia River, *Boner & Weldert* 223 (MO,NY). Whatcom: Northwood Swamp, *Muen-scher* 5066 (MO). Yakima: Toppenish, *Henderson* 2425 (MINN).

Oregon. Klamath: marsh, Buck Lake, *Coville & Applegate* 47 (US). Marion: Lake Labish, near Salem, *Howell* 1513 (MINN,MO,NY,US).

California. Plumas: Prattville, 1400 m., *Jones* 5 July 1897 (MO,US). Siski-you: near Mt. Shasta, 1850 to 2100 meters, *Brown* 640 (FM,MO,NY,US).

Alaska. Atka, Aleutian Islands, *York* 45470 (MO). Near Fairbanks, *Anderson* 7115 (CAN). Pond edge, Kodiak, *Trelease* 4747 (MO). Smith Lake, 10 mi. w. of Fairbanks, *Porsild & Porsild* 603 (CAN). Yukon River, Holy Cross Mission, *Porsild & Porsild* 832 (CAN).

Moench (1802) proposed *Naumburgia* as a genus distinct from *Lysimachia*, and to it transferred *L. thyrsiflora* as its species. His principal basis, the distinct stamens, is unsound, and the name *N. guttata* is invalidated by the citation of *L. thyrsiflora* in synonymy.

The presence of staminodium-like structures in the corolla tube sinuses has been considered as another basis for upholding *Naumburgia* as a genus. Allen (1920) observed American, European, and Asiatic material and found the absence of such structures to be the rule. Douglas (1936) found no evidence of staminodia. Minor projections of staminal-tube sinus tissue have been observed here as well as in taxa of subgenus *Lysimachia*. Only these could be considered as staminodia.

Lysimachia thyrsiflora is readily distinguished by dense, head-like racemes of cream-yellow flowers on medial axillary peduncles. It supposedly hybridizes with *L. terrestris* to form the somewhat infertile populations designated as *L. x commixta*.

D. Subgenus IV. THEOPYXIS (Grisebach) J. D. Ray, grad. nov.

Theopyxis Grisebach in Goett. Abh. 6:127. 1856,—as a genus.

Theopyxis (Griseb.) Bentham & Hooker in Gen. Pl. 2:635. 1876; Pax in Engler & Prantl, Pflanzenf. 4. pt.1:113. 1899; Knuth in Engler, Pflanzenr. pt.237:305. 1905,—sensu amplif.; Reiche, Fl. Chile 5:97. 1910; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:81. 1928; in Hannig & Winkler, Pflanzenareale 2. pt.5:40. map 45. 1929; Sandwith in Hooker's Icon. Pl. 35:pt.2. tab. 3499. 2-5. 1943.—As a section.

Herbaceous perennials with ascending to erect stems arising from thickened rhizomes; stems glabrous or pubescent with slender septate trichomes; leaves alternate, membranous, entire, eciliate; inflorescence various; calyx valvate in the bud, lobes lanceolate, glandular-punctate; corolla rotate, white, lobes sometimes dark spotted, minutely ciliate;

staminal tube adnate to corolla tube, its distal and free rim less than one millimeter long, membranous, the sinuses wide, not rounded; filaments filiform; anthers elliptical; style filiform, longer than the stamens; capsule dehiscent, subglobose; seeds numerous, reddish-brown, trigonal, membranous-winged.

Type species: *Lysimachia sertulata* Baudo.

Distribution: Moist habitats usually at elevations of 1000 to 3800 meters in the Sierra Madre del Sur of Oaxaca, Mexico, and in Guatemala; also in the Cordillera des los Andes of Ecuador and Chile.

Four geographically isolated and little-known species comprise the subgenus *Theopyxis*. They are found in the montane regions of Mexico, Central America, and in South America, isolated from one another by several hundred miles. The species are marked by similar characteristics of habit, indument, phyllotaxy, leaf form and structure, perianth, androecium, ovary, and seeds.

Despite significance of flower color in the genus, Handel-Mazzetti (1928) included *Theopyxis* sensu Bentham and Hooker as a section of his large, yellow-flowered subgenus *Eulysimachia* interpolated between sections *Seleucia* Bigel. sensu Hand.-Mazz. and *Lysimastrum* Endl. Other than this linear sequence no explanation of its relationship was offered. *L. sertulata* with its umbellate clusters and occasional solitary axillary flowers and the slightly reduced *L. mexicana* are considered nearest to the progenitor of the modern populations. The degree of divergence between them and the intervening *L. andina* and *L. steyermarkii* with their predominantly axillary inflorescence is not great.

KEY TO THE SPECIES OF SUBGENUS THEOPYXIS

- A. Inflorescence long-pedunculate, of axillary and terminal umbels, rarely reduced to solitary and axillary flowers; medial leaves usually 6–12 cm. long, 2–4 cm. wide. B
- B. Umbels usually many flowered (10–15), leaves elliptic to elliptic-lanceolate, rarely oblanceolate, apex attenuate; stem puberulent above, calyx lanceolate, acuminate, 1.5–3 cm. long. Indigenous to Chile
 - 17. *L. sertulata*
- BB. Umbels usually few flowered (2–5), leaves oblanceolate, apex long attenuate; stem glabrous; calyx linear-lanceolate, attenuate, 3–4.5 mm. long. Indigenous to Mexico. 18. *L. mexicana*
- AA. Inflorescence various, not long pedunculate, medial leaves 1.5–6 cm. long, 0.5–2.5 cm. wide. C
- C. Inflorescence of axillary or terminal umbels, racemose or solitary in lower leaf axils; pedicels 1.5–2.5 cm. long, straight or flexed, corolla lobes elliptic, petioles 4–15 mm. long. Indigenous to Guatemala. 19. *L. steyermarkii*
- CC. Flowers solitary in leaf axils, somewhat racemose; pedicels 2 (1)–5 cm. long, S-formed; corolla lobes ovate, petioles 3–5 mm. long. Indigenous to Ecuador. 20. *L. andina*

17. *LYSIMACHIA SERTULATA* Baudo

(Plate XVIII)

Lysimachia sertulata Baudo in Ann. Sci. Nat. II. 22:347. 1843.*Theopyxis chilensis* Grisebach in Goett. Abh. 6:127. 1856.*Lysimachia umbellata* Philippi in Linnaea 30:195. 1859-60; Klatt in Abh. Naturw. Ver. Hamburg 4:pt.4. 21. tab. 10. 1866.*Lysimachia chilensis* (Griseb.) Pax in Engler & Pratl. Pflanzenf. 4. pt.1. 113. 1899; Knuth in Engler, Pflanzenr. pt.237. 308, fig. 62. 1905; Reiche, Fl. Chile 5:97. 1910; Handel-Mazzetti in Notes Bot. Gard. Edinb. 16:81. 1928.*Lysimachia mellico* Kunze in sched. ex Knuth in l.c., Poeppig in sched. ex Knuth in l.c.*Lysimachia febrifuga* Poeppig in sched. ex Knuth in l.c.

Herbaceous perennials 1.5–10 dm. tall with thick, horizontal, jointed and scarred rhizomes; stem erect, stout at base and somewhat angular, simple, glabrous or with indumentum of loose septate hairs 1–3 mm. long, becoming glandular-punctate and puberulent above; leaves alternate, membranous, elliptic-lanceolate, rarely oblanceolate, loosely hairy along the midrib and larger veins, glandular-punctate, especially along the entire to crenulate-repand margin; medial leaves 6(3)–12 cm. long, 2.5–4 cm. wide; tapering into winged petioles to 5 cm. long, apex acuminate, upper leaves becoming bracteate; inflorescence of pedunculate axillary and terminal bracteate umbels, 10–15 flowered above to 2–5 below, occasionally with solitary flowers in lower leaf axils; medial peduncles to 6 cm. long; bracts foliate to linear subulate; rachis, peduncles and pedicels glandular-punctate; calyx tube about 0.5 mm. long, lobes lanceolate, acuminate, 1.5–3 mm. long, about 1.5 mm. wide, glandular-punctate within the margin; corolla white, rotate, tube about 0.5 mm. long, sinuses narrow; corolla-lobes broadly elliptic, 3.5–6 mm. long, 2–4 mm. wide, ciliate, apiculate; staminal tube inconspicuous, finely ciliate, membranous, minutely glandular-puberulent; filaments filiform, 3–5 mm. long, anthers oval-oblong, semi-versatile; ovary subglobose, glabrous, ovules numerous; style filiform, 4–8 mm. long; stigma somewhat truncate; capsules subglobose, reddened above, 3–4 mm. in diameter, style persistent; seeds numerous, oval, about 1.3 mm. long, reddish-brown, finely reticulate, trigonal with 3 longitudinal and membranous wings.

Type locality: Chile.

Distribution: Usually shaded places at elevations of 200 to 1200 meters, occasionally in the lower littoral levels. Provinces of Linares, Malleco, Cautin, Valdivia, and Llanquihue, Chile.

Chile. Linares: Los Huallis, Barros 5203 (GH). Cautin: Tolten, *Claude-Joseph* 1906 (GH,US); shady places, edge of forest, Hotel Tolhuaca and

along road to Banos Calientes, 1140 to 1180 meters, *Morrison & Wagenknecht 17058* (GH,MO). Llanquihue: water or very wet ground; waterfall over granite rocks, in sun, 1 km. e. of Peulla, Lago Todos los Santos, 250 meters, *West 4835* (GH); along streamlets in rocky ravine, Peulla, *Pennell 12647* (FM,GH,NY,US). Malleco: margin of water, Pailahueque ca. 200 meters, *Pivian 205* (GH). Valdivia: Valdivia, *Buchtien 1899* (US); Valdivia, 15 meters, *Montero O. 1321* (GH); Panquipulli, *Claude-Joseph 4695* (US); 140 meters, Panquipulli, *Werdermann 347* (GH,MO,NY,US). Province not determined: La Aquade, *Gunckel 15444* (GH).

On the basis of fruiting material collected by Lechler on the lower mountain ranges of south-central Chile, Grisebach (1856) described *Theopyxis* as a new genus with *T. chilensis* the species. Noting resemblances with *Dodecatheon*, *Cortusa*, and *Cyanoglossum*, he sought by deriving the name from the first to indicate affinity. Later Rudolph Philippi described conspecific flowering material from the same locality, Valdivia, as *L. umbellata*. The transfer of *T. chilensis* to *Lysimachia* was made by Pax in 1899.

Although specimens of plants 10–20 cm. tall, with short petiolate, ovate leaves and reduced umbels are noted, plants, 5–10 dm. tall, with long-petiolate, lanceolate leaves and an extended spray-like inflorescence composed of axillary and terminal few-to-many flowered umbels seem more typical. There is a tendency toward a reduction in the number of flowers. Umbels are frequently progressively reduced below and are borne in the axils of unreduced leaves. In *Claude-Joseph 1906* (GH) such an umbel is reduced to a solitary pedicellate flower.

Apparently confined to the western slopes and levels of the Andes in Chile, the species extends from the central province of Linares southward to Llanquihue, where at approximately forty-one degrees south latitude it is the southernmost *Lysimachia*. It may be found in wet or moist, usually shady places and is tolerant of a lower range of elevation than other species of subgenus *Theopyxis*. Extensions from the interior slopes of 1200 meters to the littoral levels occur. Flowering begins in December and continues at least until March in the interior.

18. LYSIMACHIA MEXICANA Knuth

(Plate XIX)

Lysimachia mexicana Knuth in Engler, *Pflanzenr.* pt.237:308. fig. 62. 1905; Handel-Mazzetti, *Notes Bot. Gard. Edinb.* 16:81. 1928; Standley in *Field Mus. Nat. Hist. Pub. Bot. Ser.* 8:322. 1931; Sandwith in *Hooker's Icon. Pl.* 35:pt.2. tab. 3449. 2-4. 1943.

A single collection from the state of Oaxaca, Mexico, by Henri Galeotti was the basis for Knuth's (1905) brief description:

"Glaberrima. Folia lanceolata, apice long acuminata. Pedicelli ina-

equales. Bracteeae longiores, quam in *L. chilensis* [*L. sertulata*]. Corolla magna. Ceterum *L. chilensis* [*L. sertulata*] plane conformis, fortasse eiusdem varietas."

The descriptive notes to follow are based upon a fragmentary, post-flowering specimen of Liebmann which shows only the upper portion of the plant.

Stem glabrous, with scattered, short, dark striations; leaves somewhat oblanceolate, 6–12 cm. long, 2–3 cm. wide, glabrous above, sparsely villous below, glandular-punctate, especially near the entire margin, tapering to the winged petiolate base, apex attenuate and ending in a small blunt point, flowers either axillary or in few-flowered, long pedunculate axillary and terminal umbellate clusters, subtending bracts linear-subulate, up to 8 mm. long, glandular-punctate; pedicels 2.5–5.5 cm. long; calyx linear-lanceolate, 3–4 mm. long; seeds numerous, elliptic, 1–1.3 mm. long, trigonal, light brown, with 3 narrow membranous wings.

Type locality: "Mexiko: Cordillere bei Oaxaca, 1500. (Galeotti n. 7228!)" Knuth (1905).

Distribution: Known only from Sierra Madre del Sur, Oaxaca, Mexico. Mexico. Oaxaca: Pelado, *Liebmann* August 1842 (FM).

Of the two collections cited in literature I have examined only the one cited above. It differs from *L. sertulata* in having longer leaf apices, linear-lanceolate and attenuate calyx-lobes, and fewer-flowered umbels. Additional collections of this little-known species are necessary in order to learn its range of variation. Knuth's statement (1905) that the Mexican species may be a variety of *L. sertulata* can then be evaluated.

19. *LYSIMACHIA STEYERMARKII* Standley

(Plate XX)

Lysimachia steyermarkii Standley in Field Mus. Nat. Hist. Pub. Bot. Ser. 22:369. 1940; Sandwith in Hooker's Icon. Pl. 35:pt.2. tab. 3449. 4. 1943.

Ascending to erect herbaceous perennials 1–7.5 dm. tall, rhizomes elongate, somewhat thickened; stems simple, ochraceous, villous below, glabrate or with short stalked glandular hairs above; leaves alternate, lower ones broadly elliptic to ovate, tapering into a petiole, emarginate, medials elliptic to lanceolate, 3–6 cm. long, 1.5–2.5 cm. wide, entire, pale beneath, sparingly villous to glabrate, dark glandular-punctate, tapering at the base, the apex acute to acuminate, blunt tipped; villous, winged petioles 4–15 mm. long; flowers in axillary or terminal, short pedunculate, umbellate clusters or terminal and appearing racemose due to reduction of upper leaves to bracteate structures; pedicels slender, 1.5–2.5 cm. long, straight or flexed, glandular-puberulent; calyx glandular-punctate, lobes

entire, linear-lanceolate, attenuate, 3–4 mm. long, about 1 mm. wide; corolla white, rotate, tube about 0.5 mm. long, sinuses narrow; corolla lobes broadly elliptic, 4–7 mm. long, 3–5 mm. wide, with few dark glandular-punctations, ciliate with short-stalked, glandular-tipped hairs; staminal tube a short membranous ring about 0.3 mm. long, minutely glandular-puberulent; filaments slender, about 4 mm. long, dilated at the base; anthers oblong-ovoid, notched below, about 0.6 mm. long; ovary subglobose, about 1.5 mm. in diameter at the base, few glandular trichomes near summit, style slender, 5–7 mm. long, stigma slightly enlarged style tip; capsules subglobose, 2.5–3.3 mm. in diameter, with the fruiting calyx purpurescent; membranous longitudinal wings on the ridges, similar to but smaller than *L. sertulata* seeds.

Type locality: Department of Quezaltenango, Guatemala, on moist, steep banks at base of rocky cliff, Volcán de Zunil, elevation of 2500 to 3800 meters. Collected 22 January 1940, by Julian Steyermark 34772. Type in herbarium of Chicago Natural History Museum.

Distribution: Moist steep slopes, limestone bluffs, cloud forests, at elevations of 2400 to 3800 meters, Departments of Quezaltenango and Huehuetenango, Guatemala.

Guatemala. Huehuetenango, Sierra de los Cuchumatanes: along streams in cloud forests with *Abies*, Cerro Cananá, between Nucapuxlac and Cananá 2500 to 2800 meters, *Steyermark* 49040 (FM,US); rich cool forest around Cruz de Limón, 3½ mi. e. of San Mateo Ixtatán, 2900 meters, *Steyermark* 48507 (FM, US); by waterfall, all over rocks and slopes, by dripping water on travertine limestone in forested ravine, above San Juan Ixcay, 2400 meters, *Steyermark* 49996 (FM,US); high bluffs, above San Juan Ixcay, 2400 meters, *Steyermark* 50070 (FM); limestone bluffs, between Tojquiá and Caxín, 3700 meters *Steyermark* 50158 (FM,US); Quezaltenango: moist steep bank at base of rocky cliff, Volcán de Zunil, *Steyermark* 34772 (FM TYPE).

The original description by P. C. Standley gives the height of the stem as 16–19 cm., and the inflorescence as consisting of axillary fascicles above the middle of the stem. The holotype shows not only axillary flowers but also a short pedunculate axillary few-flowered umbel and a terminal umbellate cluster. *Steyermark* 48057 (FM) from a rich moist cool forest, elevation 2900 meters, on the Sierra de los Cuchumatanes has 2–3 flowered axillary and short pedunculate umbels and is intermediate in height; *Steyermark* 49996 (US), from rocks and slopes near waterfalls, has pedunculate umbels in upper leaf axils; and *Steyermark* 49996 (FM), due to reduction of upper leaves, shows a terminal racemose inflorescence. The latter collection consists of two sheets of tall plants (to 7.8 dm.) with thick, densely villous stems, and sessile basal offshoots. The leaves strongly resemble analogous ones of *L. andina*. *Steyermark* 50158 (FM,US) collected on limestone bluffs near the summit of Sierra de los

Cuchumatanes is of small plants with strictly solitary axillary flowers. These variations of inflorescence, coexistent in *L. sertulata* and *L. steyermarkii*, render the degree of morphological divergence between the two species relatively small. Although not difficult to separate by casual examination, technical differences between these and other taxa of the subgenus hardly exist.

20. *LYSIMACHIA ANDINA* Sandwith

(Plate IX)

Lysimachia andina Sandwith in Hooker's Icon. Pl. 35:pt.2. tab.3499. 1933.

Because of an insufficient series of material for study, the original description by N. Y. Sandwith (1943) is given:

Herba perennis, nisi basin versus glabra, caulibus e radice longe fibrosa ut videtur ascendentibus arcuatis atque flexuosis usque ad apicem crebre foliosis, 30 cm. vel ultra longis, siccitate brunneis tenuiter striatulis inconspicue angulatis nitidulis, inferne pilis multicellularibus plerumque sparse indutis ceterum glabris sed glandulis minutis plus minusve copiose notatis, simplicibus vel breviter uniramosis; internodia 0.5–2.8 cm. longa. Folia inferiora obovato-cordiformia, apice late truncato-emarginata atque deltoideo-cuspidatula, basi in petiolum 3–5 mm. longum ad 2 mm. latum cuneatim attenuata, 0.9–2.2 cm. longa, 0.8–1.5 cm. lata; superiora lanceolata vel elliptica, apicem versus vel late acuminata vel sensim attenuata acuta, basi in petiolum latum ad 5 mm. longum sensim attenuata, patula vel patentia, apicem versis sensim decrescencia, 1.5–4.7 cm. longa, 0.5–1.8 cm. lata; omnia tenuiter chartacea, ut videtur plerumque glabra (in exemplo cl. Pearcei costa subtus necnon paginae foliorum inferiorum pilis multicellularibus sunt indutae), marginibus sub lente tenuiter cartilagineis siccitate saltem irregulariter sinuato-erosulis, viridia, subtus pallidiora siccitate fere grisea, punctis lineolisque aurantiacis siccitate saepius nigrescentibus ubique praesertim secus margines crebre notata, nervis lateralibus utroque costae latere 3–5 ascendentibus subplanis, venulis sub lente laxo reticulatis. Flores racemosi, scilicet foliorum axillis solitarii, longipedicillati; pedicelli 3–5 cm. longi, ascendentes vel patuli, graciliter saepe modo S-formi arcuato-flexuosi, glandulis minutis brevissime pedicellatis praediti. Calyx fere ad basin partitus, lobis anguste lanceolatis 4–5 mm. longis ad 1.5 mm. latis, prope margines glandulis crebre punctatis rarius striolatis, sursum demum incrassatis atque recurvatis. Corolla alba, fere usque ad basin partita, expansa ut videtur fere rotata, 1.5–2.5 cm. diametro; tubus 0.75 mm. longus; lobi late ovati, acuti vel breviter late acuminati, 0.8–1.2 cm. longi, 6.5–8 mm. lati, tenuiter venosi, glandulis brevissime pedicellatis copiose marginati. Stamina corollae tubo 0.5 mm. supra basin affixa neque tubo suo proprio praedita sed basi membrana annulari elevata con nexa; filamenta gracilia, 5.5 mm. longa; antherae brevissimae, oblongo-subgloboosae, 0.75–1 mm. longae. Ovarium globosum, 1 mm. altum et paulo latius diametro; stylus 5–6 mm. longus. Capsula tenuissime costato-striatula, valvis 5 dehiscens, 3–4 mm. longa, post dehiscencia 4–5 mm. diametro, lobis calycinis brevior. Semina numerosa, circiter 1 mm. longa, trialata, alis brunneis, corpore saturatius colorato.

Type locality: "Ecuador. Prov. Loja: Rio de Uarunamaca, Dec. 18th 1876, Andre 4590 (typus); 'fleur blanche. Plante délicateuse.' Prope Lima (lapsu calami pro Loja?), July 1876, André sine no. Prov. Azuay: district of Sigsig, on the upper eastern slopes of the Eastern Cordillera around Churrucos, 3000–3200 m., amongst scrub on wet rubbly slopes, fl. Oct., betw. 1876 and 1894, Lehmann 5148; 'perennial herb with thin, switch-like, rarely branched stems up to 1 m. long. Leaves dark green, slightly shining. Flowers white.' 'Equador, 10-11,000 ft.,' ann. 1861-2, Pearce: this sheet consists of three short reduced form due to some factor of ecology or exposure; the multicellular hairs are plentiful and conspicuous on the stems, and extend to the midrib of the lower surface of most of the leaves and even to both surfaces of the lowermost of them." Sandwith (1933).

Distribution: Moist ground at elevations of 3000 to 3500 meters provinces of Santiago-Zamora, Azuay, and Loja, Ecuador.

Ecuador. Loja: Rio de Uarunamaca, *André 4590* (ILL, photograph of the TYPE at Kew). Santiago-Zamora: moist springy slopes, between Loma de Galapagos and headwaters of Rio Tintas, 3200 to 3505 meters, *Steyermark 53498* (FM,ILL).

Lysimachia andina was described by Sandwith at Kew from old and long-unidentified collections from Loja and Azuay provinces. It was re-collected by Steyermark in 1942 from adjacent Santiago-Zamora. The more recent collection is of smaller plants than the type material but may represent reduced forms. Consisting of two sheets, the specimens, in flower and fruit, have leaves 1.5–4 cm. long and 0.8–1.2 cm. wide. The S-formed pedicels are 1–3.5 cm. long and bear flowers, the corolla-lobes of which are 5.5 mm. long and 4 mm. wide, the filaments, about 3.5 mm. long, and the style about 4 mm. long. The seeds also are reduced in size. Although below the ranges of variation indicated in the original description given above, these specimens appear conspecific with the type collections.

E. Subgenus V. PALLADIA (Moench) Handel-Mazzetti

Palladia Moench, Meth. Pl. Marb. 429. 1794,—as a genus.

Ephemerum Reichenbach, Consp. 127. 1821; Fl. Germ. Exc. 409. 1831,—as a genus, p.p.

Ephemerum (Reichenb.) Endlicher, Gen. Pl. 2:732. 1839; Duby in De-Candolle, Prodr. 8:61. 1844; Klatt in Abh. Naturw. Ver. Hamburg 4: pt. 4:11. 1866; Knuth in Engler, Pflanzenr. pt.237:285. 1905.—As a section, p.p.

Coxia Endlicher, op. cit. 733,—as a genus.

Bernadina Baudo in Ann. Sci. Nat. II. 22:348. 1843,—nom. nud., p.p. max.

Apochoris Duby in l.c.,—as a genus.

Lubinia (Comm. ex Vent.) Klatt in op. cit. 29; Knuth in op. cit. 273.—As a section, p.p. max.

Palladia (Moench) Handel-Mazzetti in Notes Bot. Gard. Edinb. 16: 106. 1928,—p.p. max. exclud. section *Marginatae*; in Hannig & Winkler, Pflanzenareale 2. pt.5:41. map 48. 1929.

A large subgenus of European and Asian species represented in North America by plants in cultivation, and occasional "escapes." They are herbaceous perennial herbs with erect stems, simple or branched above, pubescent with septate trichomes; leaves alternate or opposite; terminal racemes spike-like; calyx deeply parted; corolla white, deeply parted, somewhat campanulate; staminal tube short, sinuses broadly rounded; anthers linear; ovary and capsules globose.

21. *LYSIMACHIA CLETHROIDES* Duby¹

Lysimachia clethroides Duby in DeCandolle, Prodr. 8:61. 1844.

Plants frequently cultivated in gardens and occurring as "escapes"; stems erect, 5–10 cm. tall, simple, villous above, glabrescent below; leaves alternate, elliptic to lanceolate, tapering into a short, winged petiole, apex acute, puberulent, glandular-puncticulate; racemes dense, pedicels evident, bracts linear-subulate; calyx imbricate in the bud, lobes ovate, obtuse; corolla contorted in the bud, white, not glandular dotted, lobes elliptic, apex rounded; staminal tube evident, glandular-puberulent, adnate to the corolla, filaments short, about 1 mm. long, anthers linear, versatile; style short, thick, stigma minutely hairy; ovary glabrous, ovules numerous, capsules turbinate, 10-nerved, usually 5-valvate.

Type locality: "Hab. in Japoniâ (Thunb. et Burmann!)" Duby (1866).

Although reports of escapes from adjacent gardens are not uncommon, the following location is the only one known to the author in which *L. clethroides* has become a well-established and apparently naturalized colony: New Jersey. Bergen: base of rock cliffs, Greenbrook Falls, Henry Hudson Drive, Ahles 839 (ILL).

Other representative species of subgenus *Palladia* occasionally in cultivation in the United States and sometimes confused with *L. clethroides* are *L. fortunei* Maxim. and *L. barystachys* Bunge. The former may be distinguished from *L. clethroides* by its slender spike-like raceme, short pedicels with longer bracts, and the occurrence of opposite leaves; the latter, by larger flowers and linear elliptic leaves with obtuse apices.

¹ For additional synonymy, see Knuth in Engler, Pflanzenz. pt.237. 290. 1905.

IX. EXCLUDED NAMES

Lysimachia glauca Rafinesque in Western Minerva 41. 1821,—nomen nudum.

Steironema aquaticum Rafinesque in First Cat. Bot. Gard. Transylvania Univ. 15. 1824,—nomen nudum.

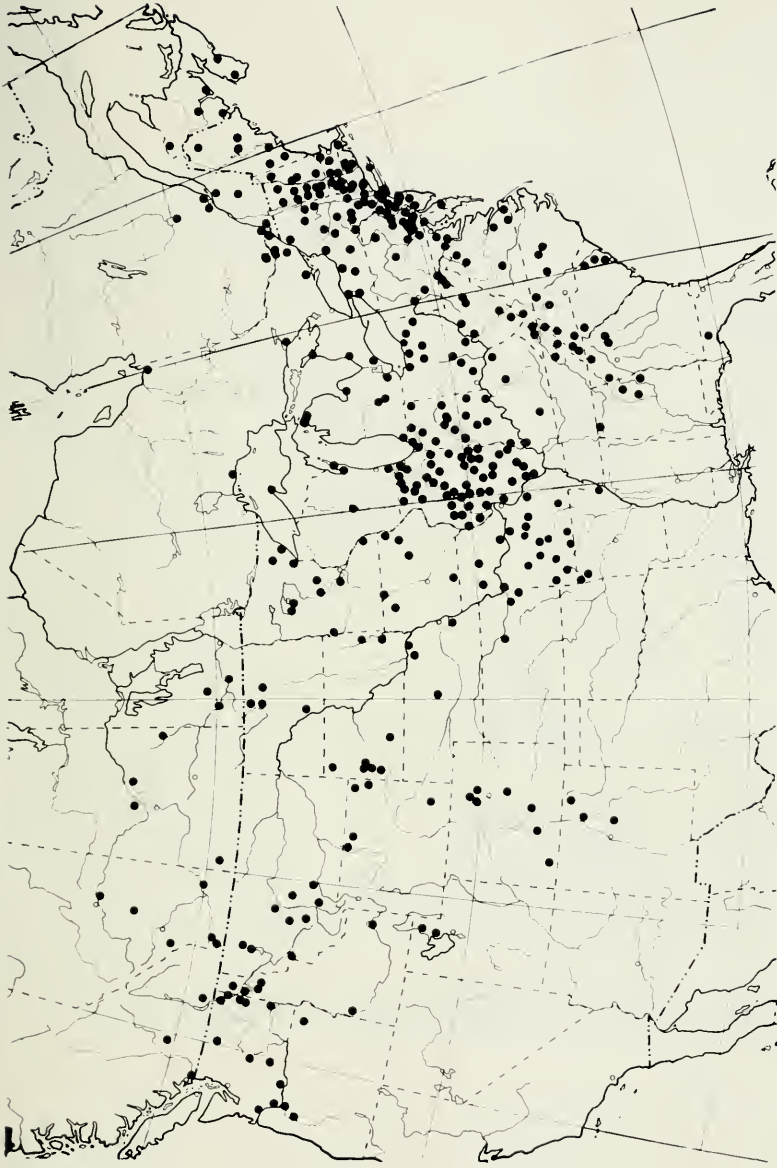
Lysimachia sessilifolia Rafinesque in Atl. Journ. 1:151. 1832. Said by Rafinesque to be “near to *L. revoluta*.” The description is applicable to no known member of the genus.

Lysimachia mollis Rafinesque, Herbarium Rafinesquianum 79. 1833,—nomen nudum.

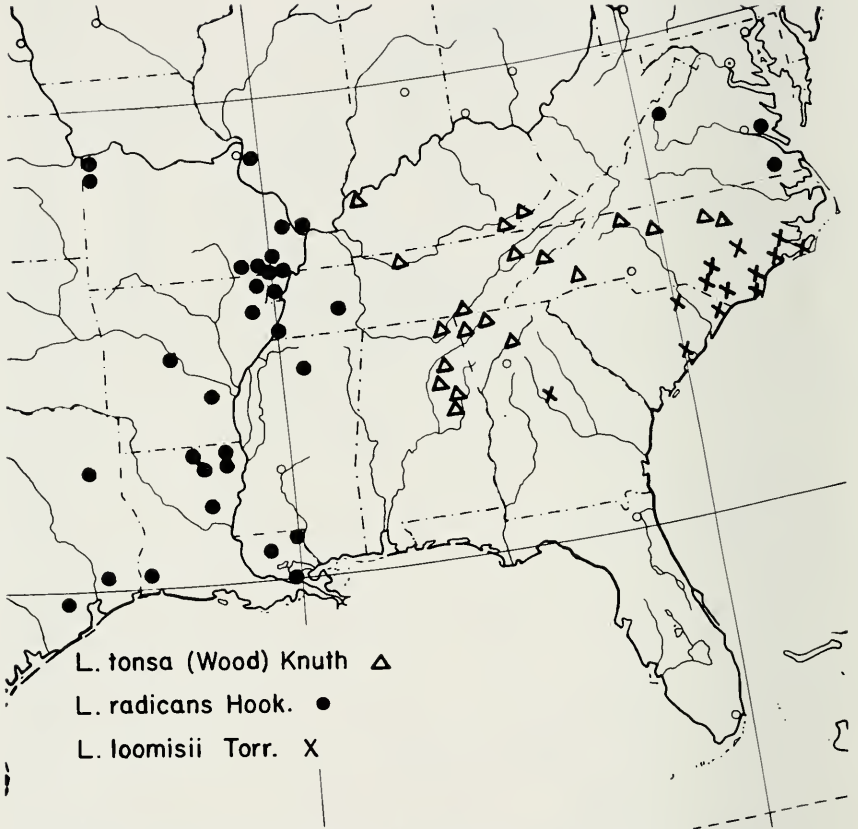
Lysimachia glaucophylla Hooker & Arnott, Bot. Beech. Voy. 306. tab. 68. 1841. Originally accredited to Mexico, this plant is at present known from the Bonin Islands off Japan. Its original citation as to locality was probably due to a mix-up of specimens from the two localities.

Lysimachia marginata Macloskie, Flora Patagonica in Scott, Rep. Princeton Univ. Exp. to Patagonia 8. pt.2:652. fig. 84. 1905.—Not a *Lysimachia* but *Anagallis alternifolia* Cav. var. *repens* (D’Urv.) Knuth.

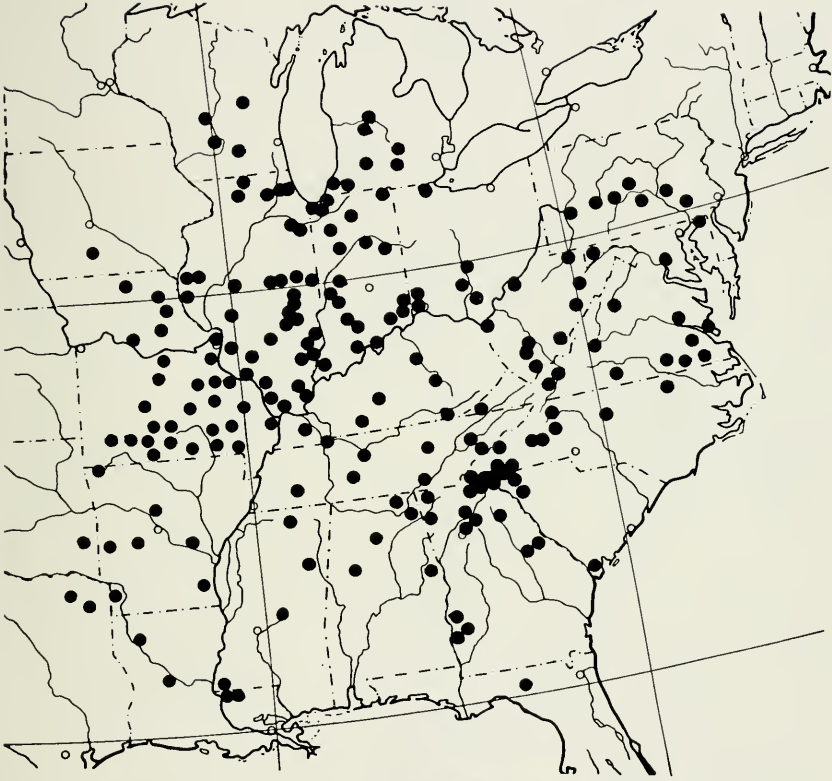
MAPS AND PLATES



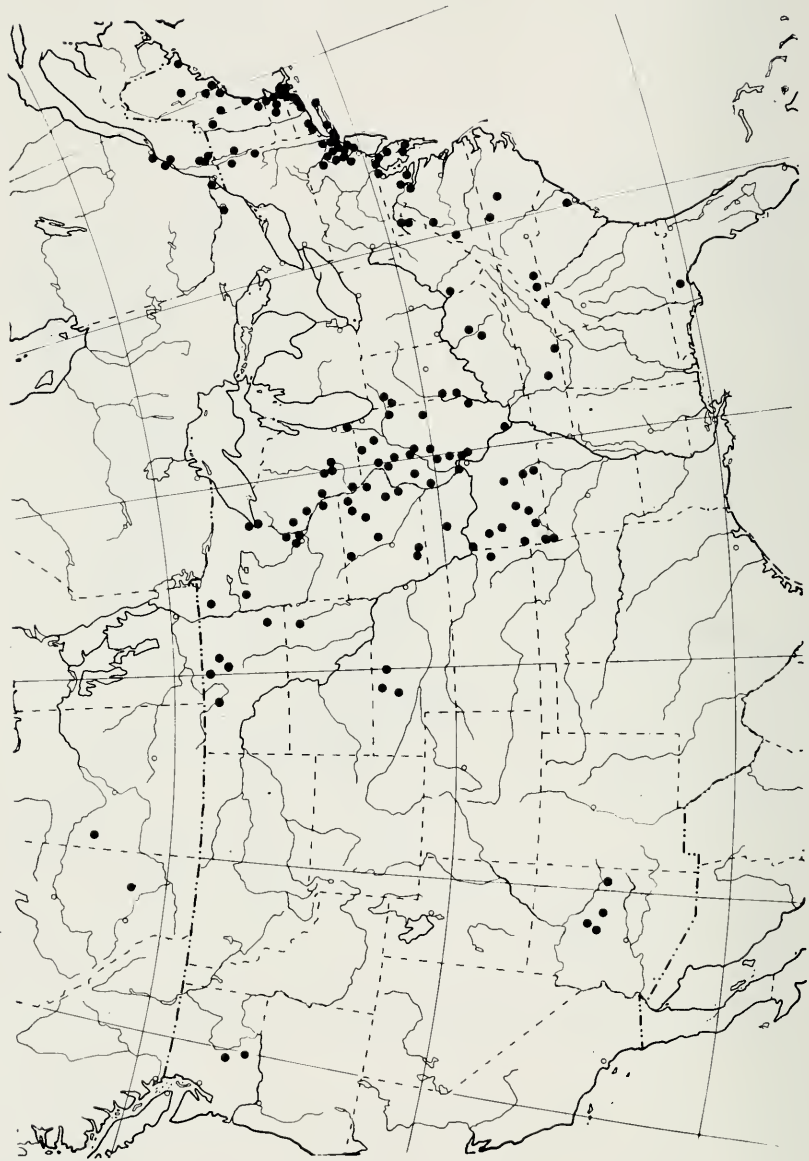
MAP 1. Distribution of *Lysimachia ciliata*. (All maps are based on Goode Map No. 302, and are used with permission of the University of Chicago Press.)



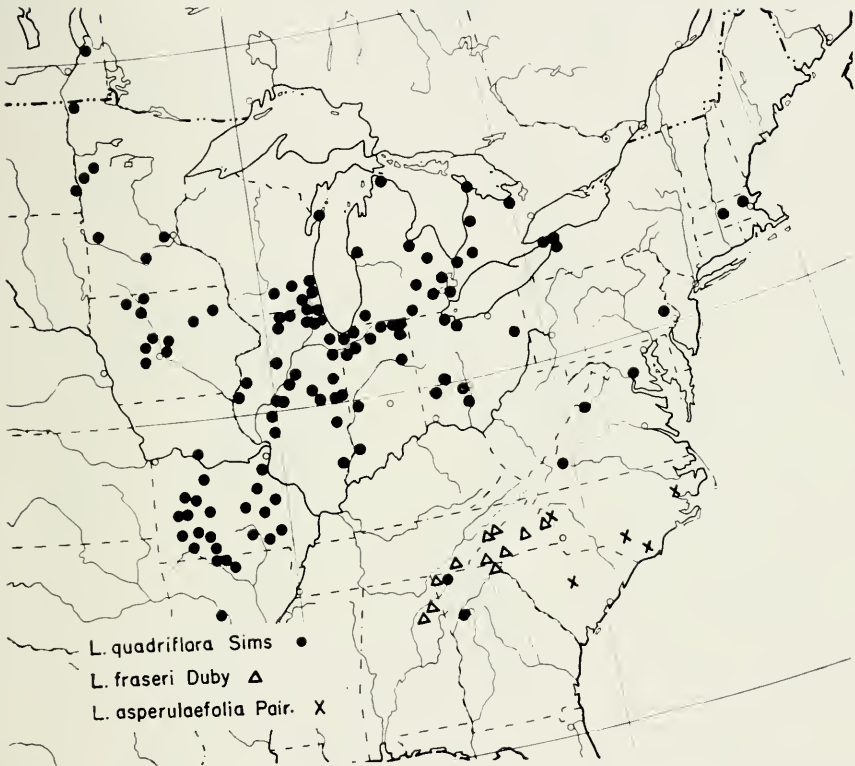
MAP 2. Distribution of *Lysimachia tinsa*, *L. radicans*, and *L. loomisii*.



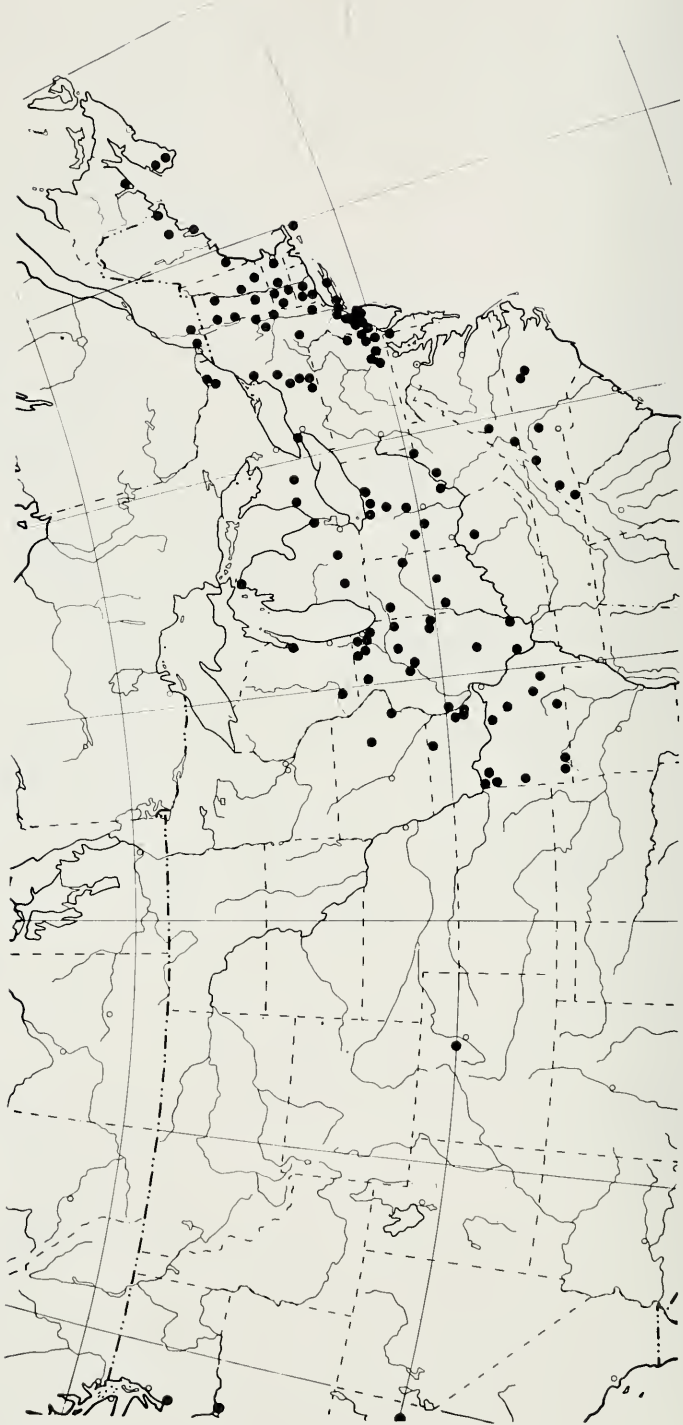
MAP 3. Distribution of *Lysimachia lanceolata* ssp. *lanceolata*.



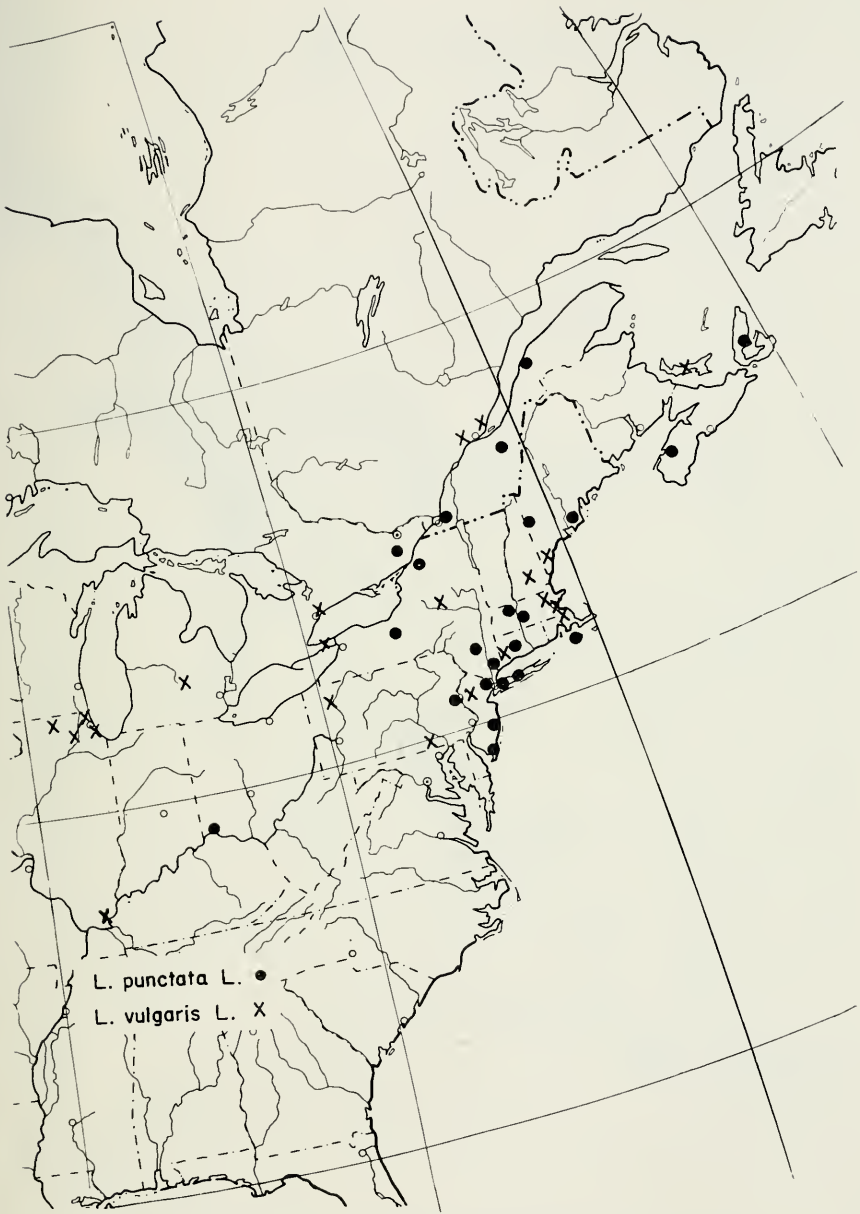
MAP 4. Distribution of *Lysimachia lanceolata* ssp. *hybrida*.



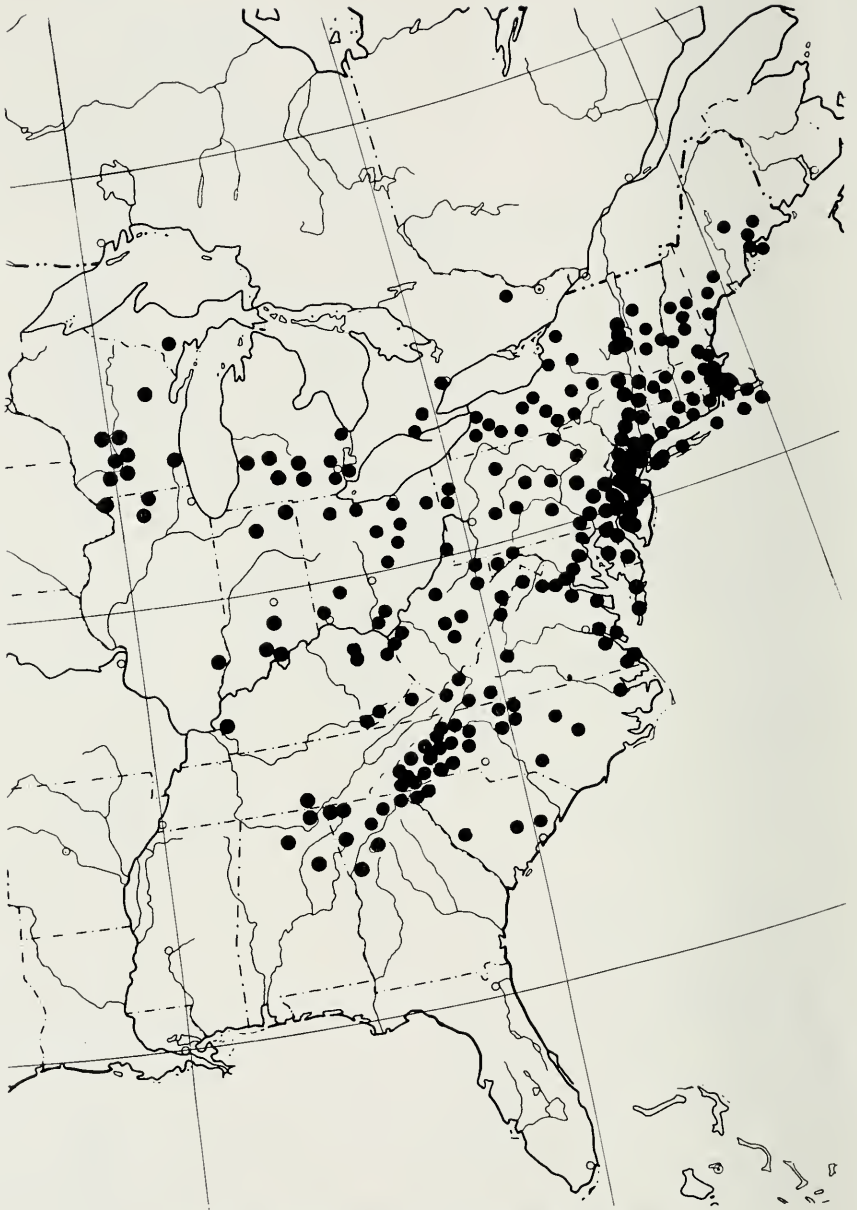
MAP 5. Distribution of *Lysimachia quadriflora*, *L. fraseri*, and *L. asperulaefolia*.



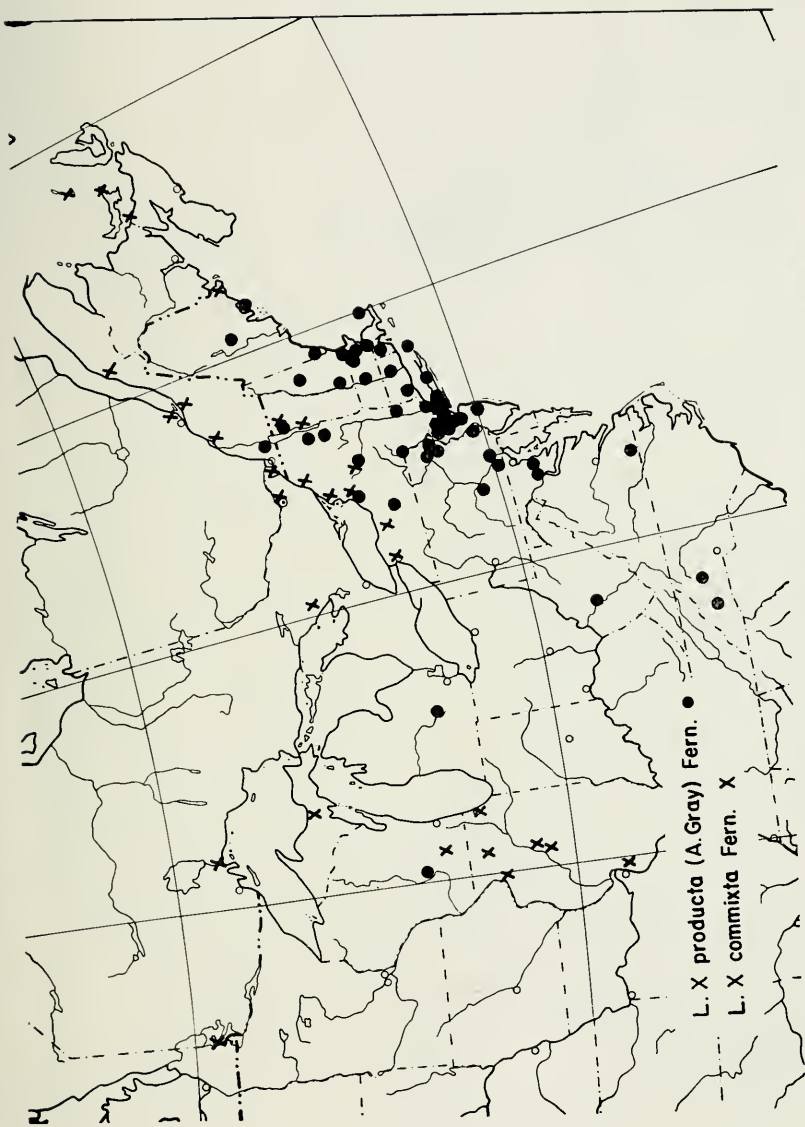
MAP 6. Distribution of *Lysimachia nummularia*.



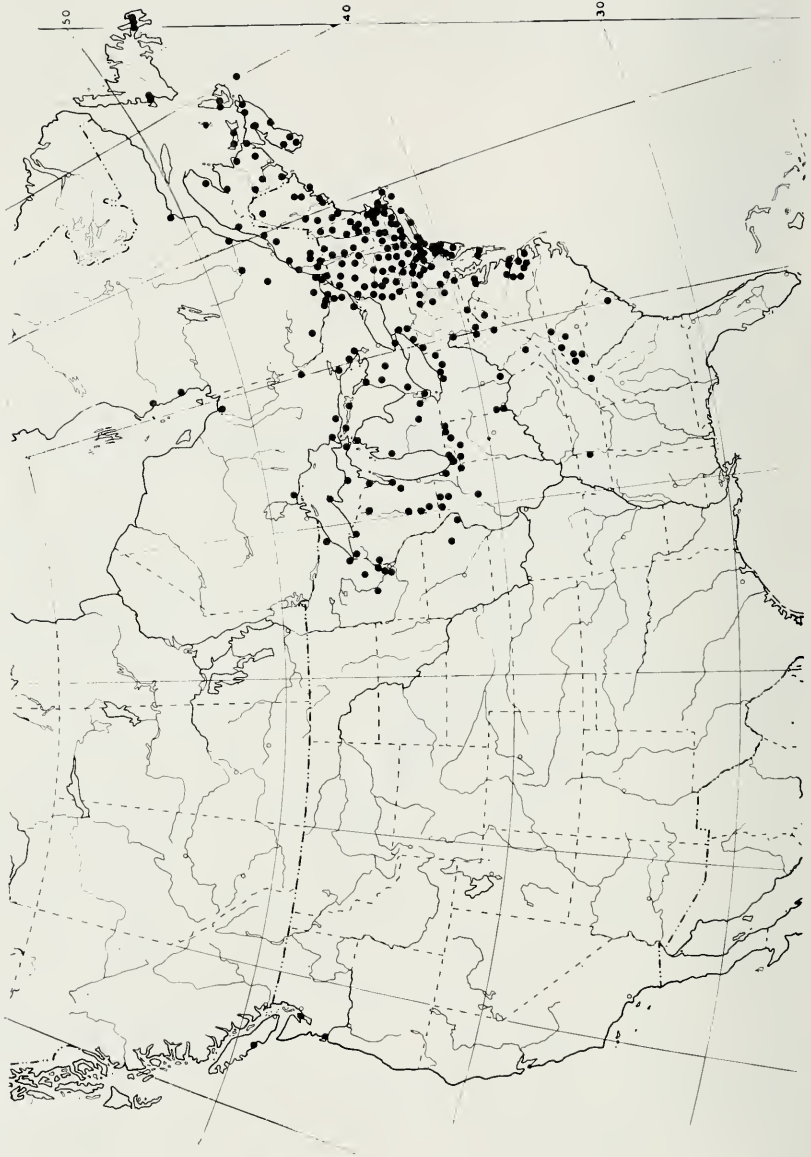
MAP 7. Distribution of *Lysimachia punctata* and *L. vulgaris*.



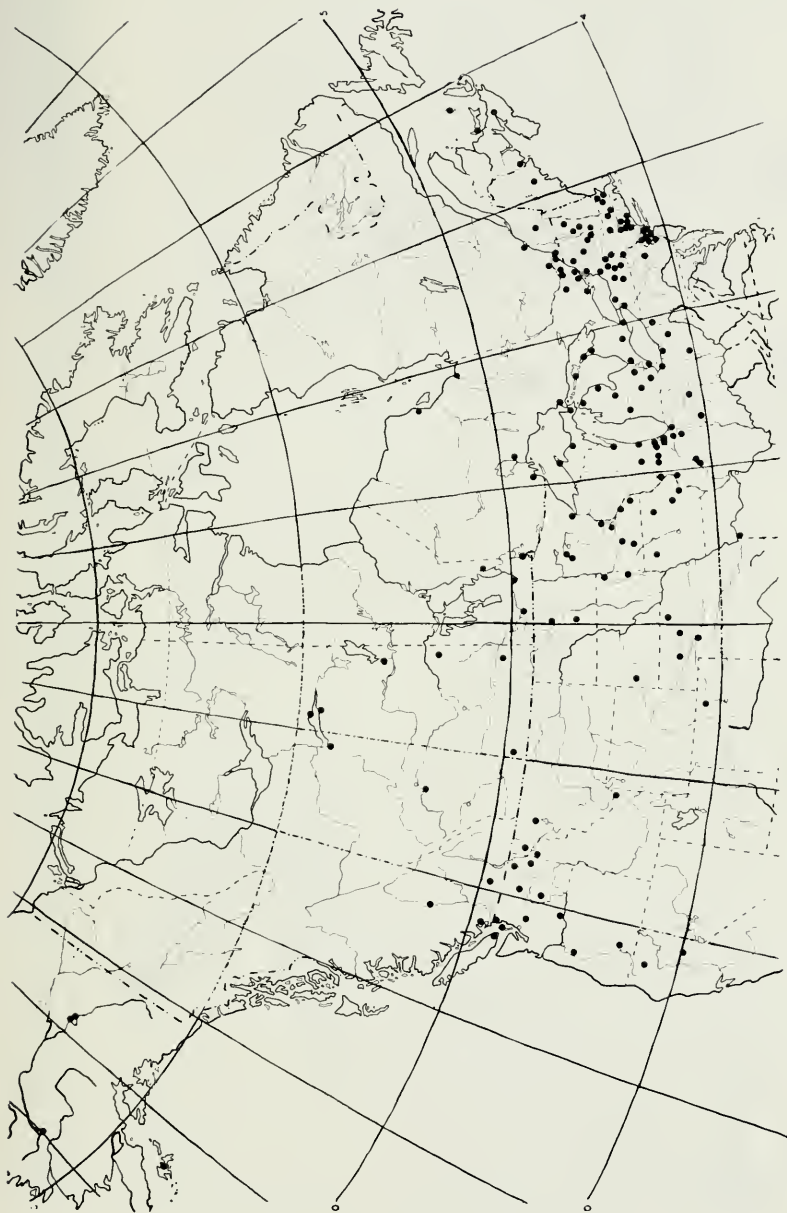
MAP 8. Distribution of *Lysimachia quadrifolia*.



MAP 9. Distribution of *Lysimachia x producta* and *L. x commixta*.



MAP 10. Distribution of *Lysimachia terrestris*.



MAP 11. Distribution of *Lysimachia thyrsiflora*.



PLATE I. Typical specimen of *Lysimachia ciliata*. Spring Mill Bog, Tazewell Co., Illinois, Chase 8860 (ILL).



PLATE II. Typical specimen of *Lysimachia tonsa*. In open woods on bluffs of Tennessee River, Knoxville, Knox Co., Tennessee, Ruth June 1895 (US).



PLATE III. Typical specimen of *Lysimachia x producta*. Michigan State College, Ingham Co., Michigan, Gray (GH).

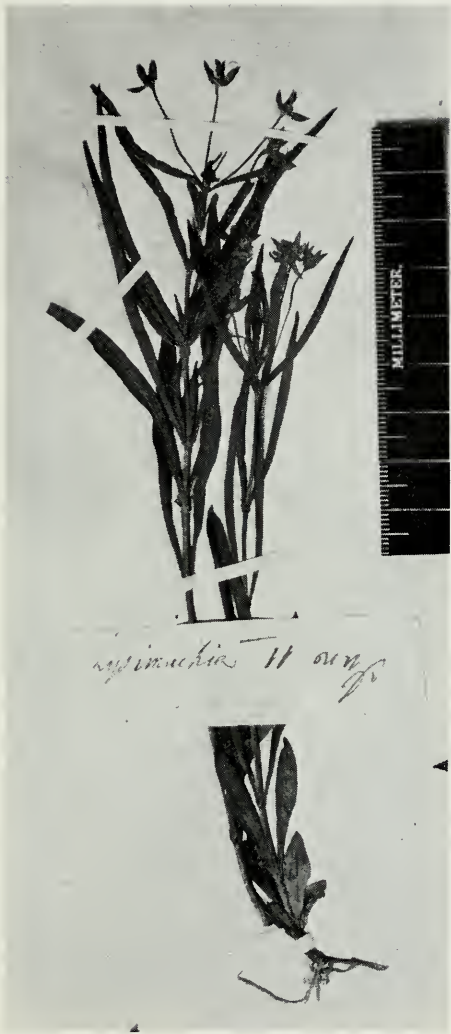


PLATE IV. Type of *Lysimachia lanceolata* ssp. *lanceolata*. Along Santee River, Berkeley Co., South Carolina, Walter (ILL, photograph of TYPE from BM).



PLATE V. Type of *Lysimachia lanceolata* ssp. *hybrida*. "Hab. in Caroline." Michaux (ILL, photograph of TYPE from P).



PLATE VI. Typical specimens of *Lysimachia lanceolata* ssp. *lanceolata*. Ironton, Iron Co., Missouri, Savage & Stall 41 (FM).



PLATE VII. Typical specimen of *Lysimachia lanceolata* ssp. *hybrida*. Wet prairie, Valley Township, Stark Co., Illinois, Chase 13 August 1897 (ILL).



PLATE VIII. Type of *Lysimachia radicans*. Jacksonville, Washington Parish, Louisiana, *Hooker* 1835 (ILL, photograph of TYPE from KEW).



PLATE IX. Type of *Lysimachia andina*, Rio de Uarunamaca, Loja, Ecuador, André 4590 (ILL, photograph of TYPE from KEW).



PLATE X. Typical specimens of *Lysimachia quadriflora*. Fountaindale, Winnebago Co., Illinois, Bebb 1867 (NY).



PLATE XI. Typical specimens of *Lysimachia fraseri*. Flats of the French Broad River, near Biltmore, Buncombe Co., North Carolina, *Biltmore 4120* (US).



PLATE XII. Typical specimens of *Lysimachia quadrifolia*. Greensboro, Guilford Co., North Carolina, *Biltmore 619b* (US).



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FLORA OF QUEBEC

Lysimachia terrestris (L.) BCP

Hab. and Loc. Matapedia River

Matapedia: gravelly flats.

Collector, J. Rousseau

Aug. 12-14, 1929

PLATE XIII. Typical specimens of *Lysimachia terrestris*. Gravelly flats, Matapedia, Quebec, Rousseau 32435 (GH).



PLATE XIV. Typical specimens of *Lysimachia toomistii*. In grassy bog, Jacksonville, Onslow Co., North Carolina, Moldenke 1244 (US).



PLATE XV. Typical specimens of *Lysimachia asperulaefolia*. In sphagnum, low ground, Fayetteville, Cumberland Co., North Carolina, Biltmore 4118f (ILL).



PLATE XVI. Type (sheet No. 3) of *Lysimachia x commixta*. Boggy river meadow, St. Croix Junction, Calais, Washington Co., Maine, Fernald 2170 (GH).



FLORA OF WOODFORD COUNTY, ILLINOIS, U.S.A.
Lysimachia thyrsiflora L.
Chase 11058 (ILL.)
Spring-fed bog, south of
Spring Bay, Woodford Co., Illinois

PLATE XVII. Typical specimen of *Lysimachia thyrsiflora*. Spring-fed bog, south of Spring Bay, Woodford Co., Illinois, Chase 11058 (ILL).



PLATE XVIII. Typical specimen of *Lysimachia sertulata*. Along streamlets in rocky ravine, 200-300 m., Peulla, Llanquihue Prov., Chile, Pennell 12647 (GH).



PLATE XIX. Typical specimen of *Lysimachia mexicana*. Pelado, Oaxaca, Mexico, Liebmann August 1842 (FM).



PLATE XX. Type of *Lysimachia steyermarkii*. Moist steep banks at base of rocky cliff, Volcán Zunil, 2500-3800 m., Dept. of Quetzaltenango, Guatemala, *Steyermark* 34772 (FM).

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 Earle, R. E.—(1);—(12).
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 Ely, Mrs. A. F.—(5).
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- Fernald, M. L. 28, 11860,—(11); 255, 328 (3b); 289 (1); 1144, 2681, 17287 (12); 2170 (15); 14652 (3a);—(16).
- Fernald, M. L., Bartram, E. B., & Long, B. 24331 (12).
- Fernald, M. L., Bartram, E. B., Long, Bayard, & St. John, H. 7933 (15); 7937 (16).
- Fernald, M. L., & Fassett, N. C. 24330 (12).
- Fernald, M. L., Hunnewell, F. W. 2nd., & Long, B. 10199 (11); 10201 (12).
- Fernald, M. L., & Long, B. 4125, 18979 (10); 6331, 9391, 11400, 14362, 14976, 24333, 24335, 24336 (12); 6332, 10778, 10779, 11109, 11401, 11402 (4); 7139, 8411, 10385, 10387, 11108, 15332 (3a); 8409, 10383, —(1); 10382, 14360 (11).
- Fernald, M. L., Long, B., & Linder, D. H. 22247 (1).
- Fernald, M. L., Long, B., & St. John, H. 7935 (15).
- Fernald, M. L., Long, B., & Smart, R. F. 5887 (12); 5888 (3a).
- Fernald, M. L., Long, B., & Torrey, G. S. 10200 (10).
- Fernald, M. L., & Pease, A. S. 25230 (15).
- Fernald, M. L., & St. John, H. 7932 (12); 7936 (16); 11156 (8).
- Fernald, M. L., & Strong, W. C. 463 (12).
- Fernald, M. L., & Svenson, H. K. 1015, 1016 (3b).
- Fernald, M. L., & Wiegand, K. M. 3891, 6073 (12).
- Fink, B. 254a (1);—(16);—(5);—(3b).
- Fisher, G. L.—(16).
- Fisher, H. L.—(3b);—(8).
- Fitch, A. 5234 (16).
- Fitzpatrick, T. J., & Fitzpatrick, M. F. L.—(1);—(5);—(3b).
- Fogg, J. M., Jr., 11532, 15748 (12); 12454, 14268, 11902 (10).
- Forbes, F. F. 2819 (3b).
- Fort, I. E. 141 (6).
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- Fowler, J. — (12); — (1); — (6); — (16).
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- Fox, W. B., & Beaman, J. H., 4730 (10).
- Fox, W. B., & Beaman, J. H., & Uribe, H. 4650 (13).
- Fox, W. B., & Godfrey, R. K. 1473, 3343 (10); 3099 (3a); 3379 (1); 1609, 2436 (6).
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- Freer, R. S. 1504 (10).
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- Fretz, C. D. 20 (6);—(11);—(3b).
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- Frost, W. D. 133 (16); 277 (1).
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- Fuller, G. D. 698, 5319, 9133, 10583, 10662, 11822 (1); 1182, 13839 (15); 1786-H (12); 2471-H, 8190, 13066 (3a); 8556 (6); 8959 (16); 9243 (8); 10497 (10); 10882, 11875 (5).
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- Gates, F. C., & Gates, M. T. 9791 (1).
- Gates, F. C., & Sleeper, R. R. 1786 (12).
- Gayle, E. E. 771 (10).
- Gershoy, A. 564 (3b).
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- Gilbert, F. A.—(10).
- Gilbert, Grace—(10).
- Gillman, H.—(1);—(6);—(16);—(10).

- Gleason, H. A. 903 (5); 1388, 8597, 8811, 8865, 9019, 9496, 9553, 9899, 9927 (1); 8473, 8556, 8711, 8833, — (10); 8649, 9578, 9851 (12); 8747, — (6); 9147, 9258, 9993,—(3a); 9736 (15).
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- Glowenke, S. L. 7059 (10); 7490 (11); 8177 (1).
- Godfrey, R. K. 4394, 6297, 48157 (14); 4439 (13); 48247 (10); 48281 (13); 49197 (11); 49530 (6).
- Godfrey, R. K., & Tryon, R. M., Jr. 431 (1); 657 (3b).
- Goessl, C. 8358 (3b).
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- Goddard, C.—(5).
- Gooding, L. N. 668 (3b).
- Gorman, M. W. 811 (1).
- Granger, Annie D.—(1);—(12);—(7);—(10).
- Grant, M. L. 2752 (16); 2822 (1).
- Grassl, C. O. 2614, 5429, 5569 (12).
- Graves, E. W. 718a (2);—(6).
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- Grout, A. J.—(15);—(3b).
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- Haas, Flora A. 1607 (3a).
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- Hahn, H.—(5).
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- Harford, W. G. W., & Dunn, G. W.—(1).
- Harper, E. T., & Harper, S. A.—(16).
- Harper, F. 32, 40, 78 (16).
- Harper, R. M. 116, 3665, 4002 (3a); 208, 284 (2); 1288, 3423 (10);—(1).
- Harrington, W. H. 1443 (1).
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- Hasse, H. E.—(1);—(4).
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- Heller, A. A., & Halbach, E. Gertrude 1041 (1).
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- Hendricks, C.—(1).
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- Henry, L. K. 515 (10); 590 (16); 615 (1).
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- Hermann, F. J. 6619, 9041 (3a); 6851, 8129 (16); 6917 (5); 8726, 9514, 10531 (10); 8956 (6).
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- Herron, C. L.—(1);—(12).
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- Hill, E. J. 19, 78, 86 (16); 35, 126 (5); 42, 62, 108,—(12); 44 (1); 63, 141 (10); 88,—(3a).
- Hills, Alice L. 3372-0 (1).
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- Hollick, A.—(1);—(12).
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- Holzinger, J. M.—(16); —(3b); —(1); —(12).
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- Leavitt, R. G.—(10).
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