

# The Genus *Asparagus* in Southern Africa\*

by

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## ABSTRACT

A revision of the genus *Asparagus* in South Africa, South West Africa, Bechuanaland, Basutoland, and Swaziland has been undertaken.

Notes are given on the value of most of the characters which have been used in the separation of species, recent literature on the nature of *Asparagus* assimilatory organs, and a technique for the examination of chromosomes. Chromosome counts are listed for ten taxa.

There is a key to the forty species and four varieties. In the main part of the work these taxa are described, and their synonymy, taxonomy, distribution and habitats dealt with. Six species and one variety are new.

The following are the new species and combinations: *A. setaceus* (Kunth) (*Asparagopsis setacea* Kunth), *A. mucronatus*, *A. macowanii* Bak. var. *zuluensis* (N. E. Br.) (*A. zuluensis* N. E. Br.), *A. rigidus*, *A. densiflorus* (Kunth) (*Asparagopsis densiflora* Kunth), *A. aethiopicus* L. var. *angusticladus*, *A. falcatus* L. var. *ternifolius* (Bak.) (*A. aethiopicus* L. var. *ternifolius* Bak.), *A. aspergillus*, *A. obermeyerae*, *A. krebsianus* (Kunth) (*Asparagopsis krebsiana* Kunth), *A. acocksii*, *A. crassicladus*.

Several plants of horticultural importance occur in South Africa. The three best known are *A. plumosus*, which is reduced here to synonymy under *A. setaceus* (Kunth) Jessop, and *A. sprengeri* and *A. myersii*. *A. sprengeri* is being reduced to synonymy under *A. densiflorus* (Kunth) Jessop, *A. myersii*, which is a *nomen nudum*, is also regarded as belonging to *A. densiflorus*.

## INTRODUCTION

The earliest record of a South African *Asparagus*, which can be authenticated, is that of an artist, probably Hendrik Claudius, who accompanied Governor Simon van der Stel on an expedition to Namaqualand during the second half of 1685 and the beginning of 1686. One of the illustrations which he made was of *A. capensis* L. Subsequently several other species were described, and some of them illustrated, but by 1753 Linnaeus could include only five South African species of *Asparagus* in his Species Plantarum. Thunberg, as a result of his own collecting, brought this number up to 13 in his Prodrromus. The next major contribution was that of Roemer and Schultes, Systema Vegetabilium (1829), in which nearly thirty species were mentioned. Many new names, many of them superfluous, were added by Kunth in 1850 when he divided the genus as it is defined at the present into three genera. He referred seven of his species to *Myrsiphyllum*, which consisted of plants with solitary, flattened cladodes and axillary flowers. The remaining species were divided into *Asparagus*, with supposedly dioecious flowers and eight South African species, and *Asparagopsis*, with 23 South African species.

Baker, whose monograph was published in 1875, provided the most recent complete work on the genus. In this monograph, Baker recognised 40 species from South Africa and, 21 years later, in the Flora Capensis, he included an additional four.

Since Baker, several authors have added an occasional name, based especially on South West African material. The most important work has been that of Schinz on South West African plants in 1896, Salter, who revised the genus for the Flora of the Cape Peninsula, and Kies, who revised part of the section Africani in 1951. Phillips (1951) estimated that the total number of South African species was about 70.

\* Based on an M.Sc. thesis, submitted to the University of Cape Town in 1964

Partly as a result of these additional species, and in the absence of a revision of the whole genus, or even the South African species, the available classification was found to be in considerable need of revision. Salter stressed this need in the Flora of the Cape Peninsula in 1950, and an examination of such works as Wilman's Preliminary Check List of the Flowering Plants and Ferns of Griqualand West shows a large number of unidentified specimens.

It was, therefore, decided to undertake a complete revision of the genus in South Africa, accompanied where possible by field work. Most of this work was undertaken while the author was a student at Cape Town University. The assistance of many members of the staff of both the Bolus herbarium and the University of Cape Town Botany Department is gratefully acknowledged. A special debt is owed to Dr. E. A. Schelpe who supervised the work and provided much valuable advice. The revision was completed at the National Herbarium, Pretoria, where several members of the staff provided very useful advice. In particular Mrs. A. A. Mauve's knowledge of the Transvaal species has been a great help. Acknowledgements are due to the University of Cape Town Botany Department for the photographs of *Asparagus mucronatus* and *A. crassicaulus*. The remaining illustrations were prepared at the Botanical Research Institute, Pretoria.

Specimens have been loaned, or other assistance has been provided, by the directors and curators of the following herbaria: The Albany Museum Herbarium; the Herbarium, Berlin-Dahlem; The British Museum; the Herbarium of Trinity College, Dublin; the Royal Botanic Gardens, Kew; the Herbarium of the University of Kiel; the National Botanic Gardens and South African Museum herbaria at Kirstenbosch; Rijksherbarium, Leyden; the Botanische Staatssammlung, Munich; the Natal Herbarium; the National Museum of Natural History, Paris; the Stellenbosch Herbarium; the Botanic Gardens and Museum, Uppsala; the Windhoek Herbarium; and the Botanische Garten und Museum der Universität, Zurich.

In the distribution lists all specimens cited have been examined by the author. In the larger species not all specimens seen have been cited, but a specimen from each magisterial district has been selected for citing. When no herbarium abbreviation follows the citation of a specimen, a specimen of that collecting is in the National Herbarium, Pretoria. When there is no specimen in the National Herbarium only one herbarium is cited for each collecting although duplicates may have been seen from other herbaria.

#### TAXONOMIC CHARACTERS

Up to the present, there has been no satisfactory delimitation of the species. This is partly because no-one has undertaken a major revision of the group since the Flora Capensis in 1896, and partly because, in the absence of diagnostic floral characters, most of the species must be defined on vegetative characters. These are often extremely susceptible to environmental factors, and this is aggravated by the wide distribution of many of the species.

A list of the characters of use in defining taxa below generic level is given here, with notes on the general value of the different characters.

##### (a) *Perianth segments*

All have six, fairly small (1–6 mm long), white or near white tepals. The members of the inner whorl are sometimes slightly broader than the outer segments, and the distal margins are sometimes slightly ciliate. These characters are frequently variable within a single species. A few species are characterised by having the distal half of the tepals reflexed.

*(b) Stamens*

The six stamens sometimes have a pair of minute lateral spurs at the bases of their filaments. This character was first used in Salter's treatment in the Flora of the Cape Peninsula, and is probably of value. The anthers vary from greenish through yellow to orange and black. Work on fresh material suggests that colour is useful, but on dried specimens the colour can usually not be determined.

*(c) Fruit*

The fruit is generally a wrinkled, fleshy berry with two or three seeds, and globose in shape, but dry, smooth fruits as in *A. exuvialis*, and single-seeded berries as in *A. scandens*, occur. One species, *A. crispus*, has an ovoid berry, and *A. glaucus* has a persistent perianth enclosing the fruit. The fruit characters are usually reliable at specific level.

*(d) Peduncles*

All species have flowers borne solitarily on the ultimate flowering stalks. In *A. stipulaceus* and *A. capensis* these stalks are reduced to discs. As all leaves are reduced to scales, it is not strictly correct to refer to umbels or racemes. By treating the cladodes as leaves, the use of the conventional terminology will be of value. The term *peduncle* will be used for the flower stalk except in the section *Racemosi*, where the term *pedicel* will be used for the final flower stalks and *peduncle* for the main axis of the inflorescence. Inflorescences (termed racemes here) consisting of branches bearing only a series of bracts and pedicels occur. However, in species producing racemes, cladodes sometimes appear at the bases of the pedicels. In two species, *A. minutiflorus* and *A. rigidus*, the inflorescence, which appears to be a reduced raceme, consists of a peduncle, one to three terminal pedicels, and sometimes one lateral pedicel. In some species both terminal and axillary flowers occur as in *A. africanus*, but in others terminal, as in *A. setaceus*, or axillary peduncles, as in *A. scandens*, are diagnostic. The umbels, referred to by Baker, are clusters of terminal flowers, and are rarely found as the only type of inflorescence on a plant. However, exceptions to this occur in the sections *Striati* and *Capenses*. The peduncles may be solitary, paired or numerous, and these characters are sometimes useful at specific level. In all species the peduncles are articulated and in *A. nelsii* sometimes twice.

*(e) Roots*

The roots may be tuberous or fibrous. Classification cannot usually be based on further subdivision of tuber type as the tubers are particularly susceptible to environmental conditions. This is discussed further under *A. asparagoides*. In many species there is a single root-stock bearing lateral tubers, but in most species of the section *Racemosi* there are several roots each bearing lateral tubers. This condition is preceded in young plants by the direct attachment of the tubers to the root-stock.

*(f) Stems*

Roots and aerial stems are produced from perennial rhizomes in all species. Annual and perennial aerial stems occur, but the duration of the life of the aerial stem may vary under different conditions. In *A. exuvialis* the aerial stem is perennial, but the cladodes are deciduous, and after a month or two are replaced. Some species are predominantly climbers and others erect. In each of these groups exceptions may be produced by the effect of the environment, particularly the presence or absence of support and the amount of light reaching the plant. The aerial stem may have a smooth, wrinkled (Fig. 1b), grooved (Fig. 1a), ridged (Fig. 1c) or hispid surface. These characters are sometimes useful. In *A. exuvialis* the outer layers of the aerial stems and branches peel. (Fig. 2d). In several species, including *A. compactus* and *A. retrofractus*, the grooved white outer layers disintegrate, leaving the stem smooth and brown. Another character of occasional value is aerial stem colour, as in *A. denudatus*, which has a green aerial stem.

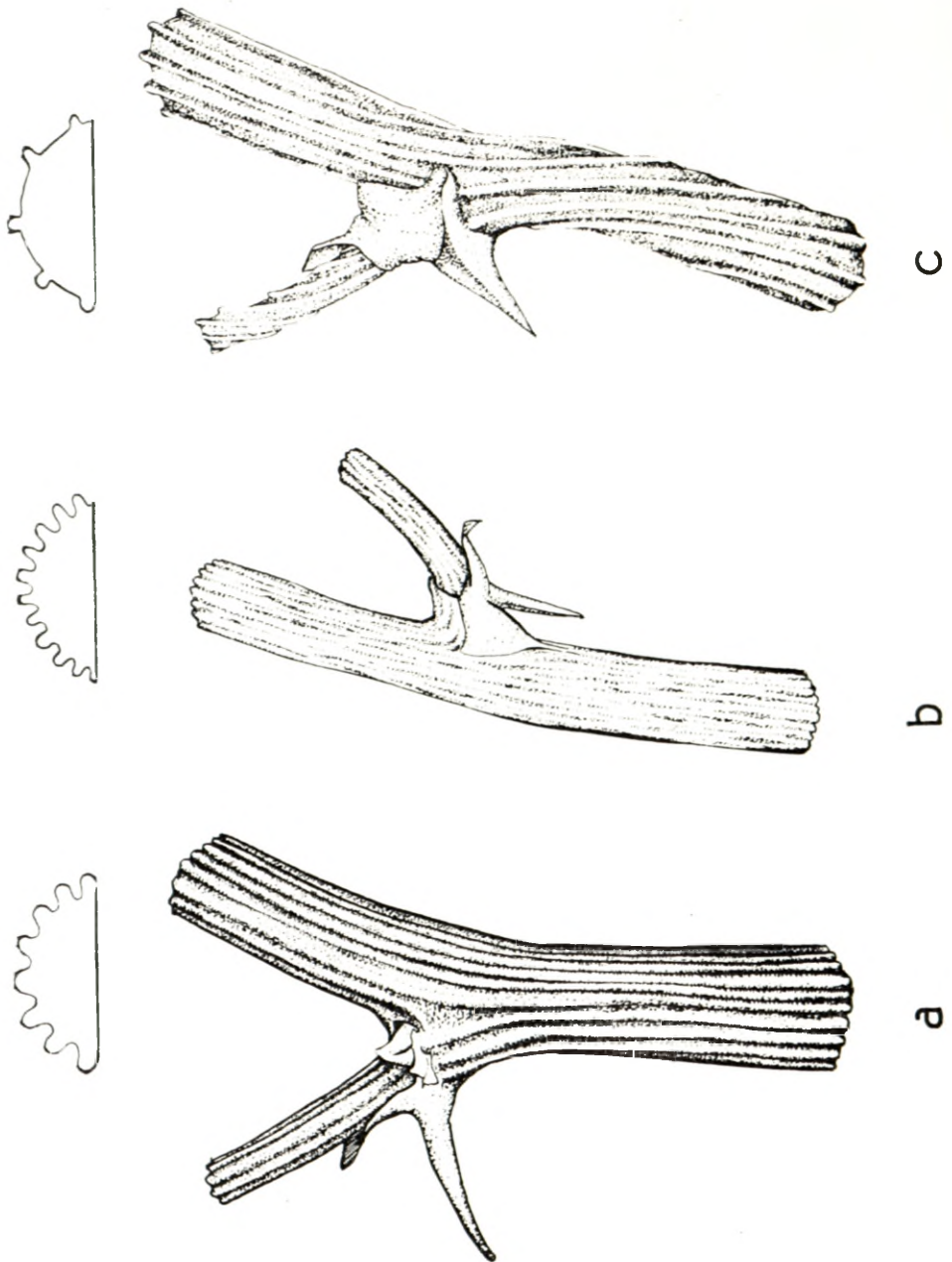


FIG. 1.—Stem surface characters: a, *Asparagus compactus*, grooved; b, *A. denudatus*, wrinkled; c, *A. aethiopicus* var. *aethiopicus*, ridged.

(g) *Branchlets*

Branchlets, which are ultimate, specialised branches bearing cladodes and flowers, occur in some species, especially in the section *Capenses*, where they are fascicled. (Fig. 2b).

(h) *Cladodes*

Up to the beginning of the nineteenth century, the photosynthetic organs of *Asparagus* were regarded as leaves. By the middle of the twentieth century, however, it had come to be accepted by most botanists that they are modified branches. Several conflicting theories exist, and these need to be considered. The three most important theories propounded this century are those of Arber (1924 & 1925), Schlittler (1953 & 1959) and Kausmann (1955).

Arber divided the genus *Asparagus* (sensu lato) into *Myrsiphyllum* (containing *A. asparagoides* and *A. undulatus*), in which she considered that the assimilatory organs were leaves, and *Asparagus* in which she considered them to be branches. She cut serial sections through the plumules of *A. asparagoides* and found what she believed to be the axillary shoot of which the assimilatory organ was the prophyll. In *Asparagus* she, and later Kausmann, found what they took to be reduced leaves borne on the organs, which they therefore regarded as cladodes.

While Kausmann agreed with Arber about the nature of the organs of *Asparagus* sensu Arber, and supported the view with developmental investigations, he disagreed with her about the nature of the organs of *A. asparagoides*. His ontogenetic work suggested that these were also cladodes, and not true leaves.

Schlittler took the opposite view to that of Kausmann and, basing his evidence on a criticism of other workers' conclusions, and by comparing the assimilatory organs of what he believed to be related plants, arrived at the conclusion that they were leaves in all species.

While no satisfactory conclusion to this controversy has yet been reached, it has been decided that the term cladode will be used throughout this revision. The present author feels that the weight of evidence is on the side of this view, and believes this to be the more generally accepted point of view.

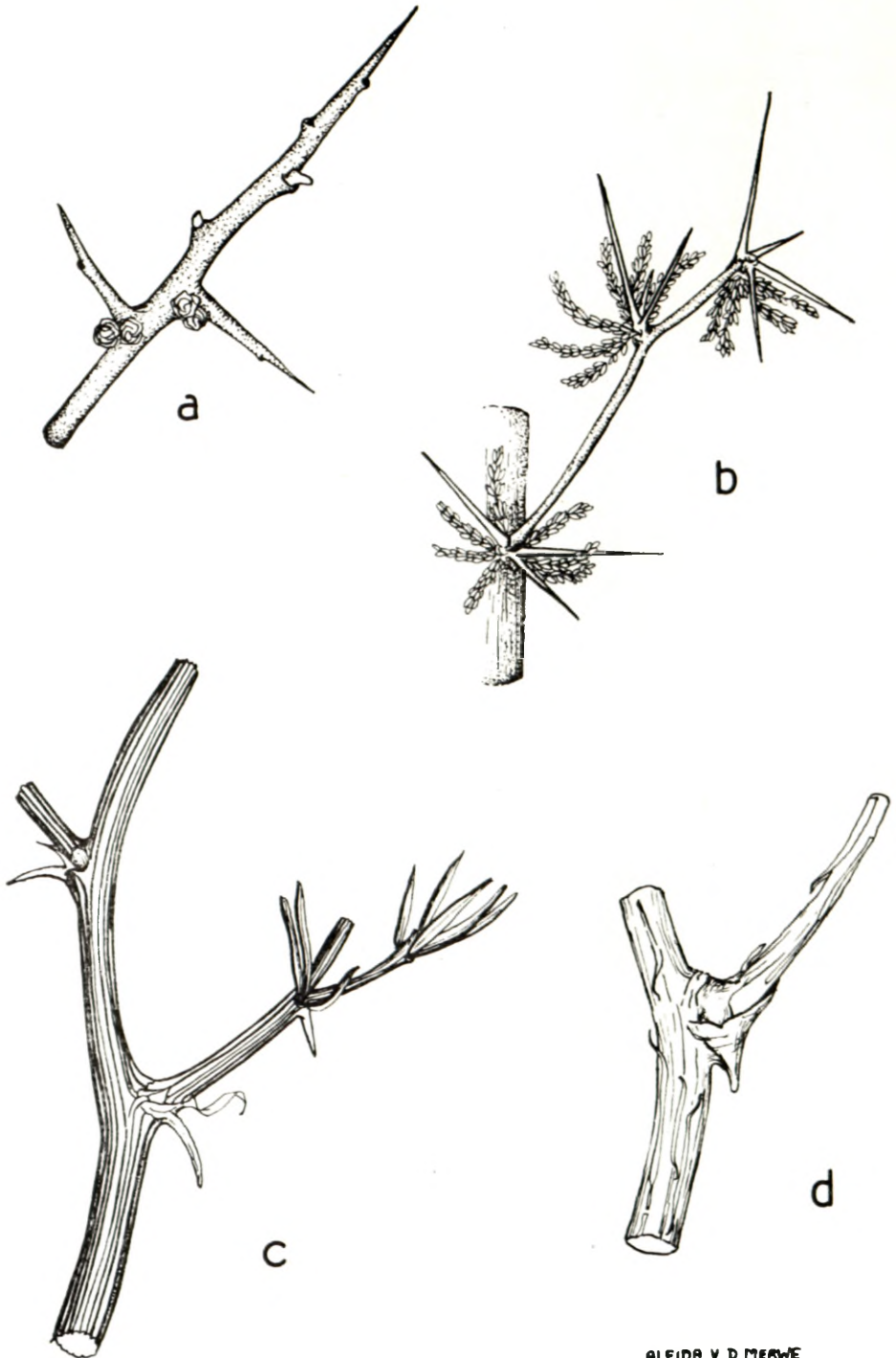
The cladodes may be single, 3-nate or variable. These three characters are generally reliable. In many species the cladodes are flattened. In most, however, they are terete or angled, but several species are variable in this character, such as *A. juniperoides*. All species have a single vein except the section *Myrsiphyllum* and *A. striatus*. The cladodes are sometimes scabrid, but this is rarely a reliable feature.

(i) *Leaves*

Leaves are always reduced. Sometimes they are firm, as in *A. exuvialis*, but usually with a more or less free, papery and scarious part. (Figs. 2c & d).

(j) *Spines*

Spines are formed from branches in the section *Capenses*, one in *A. glaucus*, three or more in the others. (Fig. 2b). In all other species where spines are formed they are formed from reduced leaves. Many species, which usually have spines, have individuals without them. The spines may be straight or recurved, spreading or reflexed, but these characters are generally rather variable. In species with spines, the presence or absence of spines on the ultimate branches is often significant.



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FIG. 2.—Diagnostic characters: a, spines formed from modified branches showing aborted nodes; b, fascicled spines formed from modified branches lacking aborted nodes; branchlets well differentiated and fascicled; c, spine formed from a modified leaf with the non-spinous portion chartaceous; d, spines formed from a modified leaf with the non-spinous portion hard, deltoid and entire; outer layers of the stem peeling in strips.

## SUBGENERIC GROUPS

Other than Kunth (1850), the only botanists before Baker (1875) who subdivided the genus, did so on the presence or absence of spines—in many species one of the most variable characters. Kunth recognised three genera: *Asparagus*, *Asparagopsis* and *Myrsiphyllum*. *Myrsiphyllum* included the herbaceous species with flattened cladodes. *Asparagus* was separated from *Asparagopsis* in, supposedly, being dioecious. Although in *A. officinalis* L. this is undoubtedly the case, for most of the species he placed in *Asparagus* his information was faulty. The species within each genus recognised by Kunth do not show a particularly large number of characters in common while, in several cases, undoubtedly similar species were placed in different genera. As none of the South African species which Kunth placed in his construction of *Asparagus* is dioecious, his use of this character to separate *Asparagus* from *Asparagopsis* was incorrectly applied to the South African species. His genus *Myrsiphyllum* was retained by Baker (1875 and 1896) as a subgeneric group, and will be treated as a section in this work.

Baker (1896) included all species in one genus, which he divided into nine sections. The characters he used for separating these sections were: the presence or absence of spines; the shape of the cladodes, and the number of these in a cluster; the number of flowers in a cluster; whether or not the branchlets were fascicled; and the type of inflorescence.

In each of his sections there are closely similar species, but also many with little in common. His section *Myrsiphyllum* has been retained here with a slight change, and the section *Capenses* includes all the species he included. While it would be unwise to propose a revision of the sections of *Asparagus* with only a knowledge of the genus in Southern Africa, the following sections appear to reflect the natural grouping of the species in South Africa. In each, the more important characters are printed in italics. The species which would be included in each are indicated by their numbers in this work.

1. *Capenses*

Roots not tuberous. Aerial stems perennial, woody. *Branchlets fascicled. Cladodes fascicled, terete. Spines axial in origin. Peduncles usually terminal. Anther filaments not spurred. Berries globose, fleshy or dry.*

This section contains the same plants as Baker's section *Capenses*.

Species: 1-4.

2. *Africani*

Roots not tuberous. Aerial stems usually perennial. Branchlets, when present, usually solitary. Cladodes fascicled, terete. Spines frequent, foliar in origin. Peduncles axillary or terminal. Anther filaments not spurred except in *A. fasciculatus*. Berries globose, fleshy.

This section has no outstanding characters, but is identifiable by a combination of root, spine, cladode and inflorescence characters. It contains species from Baker's sections *Declinati*, *Umbellati*, *Thunbergi* and *Africani*.

Species: 5-16.

3. *Exuviali*

Roots tuberous. Aerial stems perennial, woody. *Cladodes fascicled, terete. Spines foliar in origin, usually small and blunt. Peduncles axillary. Anther filaments not spurred. Fruit dry and smooth.*

A monotypic section containing *A. exuvialis*, which Baker included in his section *Declinati*.

Species: 17.

#### 4. *Racemosi*

*Roots tuberous.* Aerial stems woody or softly woody. *Branchlets* often present. Cladodes fascicled or occasionally solitary, flattened or subulate, with one vein. Spines often present, foliar in origin. *Flowers generally borne in racemes.* Anther filaments not spurred. Fruit a berry.

This section includes Baker's sections *Racemosi*, *Falcati* and *A. juniperoides* from his section *Myrsiphyllum*.

Species: 18-33.

#### 5. *Striati*

*Roots tuberous.* Aerial stems perennial. Branchlets absent. *Cladodes* sometimes solitary, flattened to terete, firm, with one or several veins. Spines absent or poorly developed. *Peduncles terminal.* Anther filaments not spurred.

This section contains part of Baker's sections *Striati* and *Umbellati*.

Species: 34 and 35.

#### 6. *Scandentes*

*Tubers present.* Aerial stems somewhat herbaceous, perennial. Branchlets absent. *Cladodes ternate*, flattened, with one vein. Spines absent. *Peduncles axillary.* Anther filaments not spurred. Fruit globose, fleshy, with one seed.

This section contains two species which Baker included in his section *Striati*.

Species: 36 and 37.

#### 7. *Crispi*

*Tubers present.* Aerial stems annual. Branchlets absent. Cladodes ternate, terete or flattened. Spines absent. *Peduncles axillary.* *Anther filaments spurred.* *Fruit ovoid*, fleshy, many-seeded.

This section is monotypic, containing *A. crispus*, which Baker included in his section *Declinati*.

Species: 38.

#### 8. *Myrsiphyllum*

*Tubers present.* Aerial stems annual. *Cladodes flattened*, with more than one vein, solitary. Spines absent. *Peduncles axillary.* *Anther filaments spurred.* Fruit fleshy, globose.

This section is the same as Baker's, except that *A. juniperoides* has been removed.

Species: 39 and 40.

### CYTOLOGICAL INVESTIGATIONS

While a thorough investigation of chromosome numbers could not be undertaken, a technique has been used which has provided counts for ten plants.

It was found that young shoots were as satisfactory as either germinating seed radicles or roots, and that they are more readily obtainable. Pollen Mother Cells are extremely difficult to get at the right stage as they develop when the buds cannot easily be recognised.

The following procedure was developed:



Shoot tips were placed in 0.01 per cent aqueous colchicine solution for three to four hours, before being fixed in Acetic Alcohol (1:3) for twenty to twenty four hours. They were then hydrolysed in 20 per cent HCl at 63 degrees centigrade for three to eight minutes, depending on the thickness of the material. Two changes of distilled water for at least five minutes each were used before the shoot tips were squashed in 2 per cent Aceto-Orcein.

The following numbers were obtained:—

<i>Species</i>	<i>No.</i>
<i>A. capensis</i> .....	40
<i>A. stipulaceus</i> .....	80?
<i>A. fasciculatus</i> .....	20
<i>A. thunbergianus</i> .....	20
<i>A. retrofractus</i> .....	20
<i>A. densiflorus</i> (sprengeri form).....	60
<i>A. krebsianus</i> .....	20
<i>A. asparagoides</i> (broad cladode form).....	20
<i>A. asparagoides</i> (narrow cladode form).....	20
<i>A. asparagoides</i> (pubescent form).....	20

## ASPARAGUS

*Asparagus L.*, Sp. Pl. 313 (1753); Thunb., Prodr. 65 (1794); Fl. Cap. ed. Schult. 332 (1823); Bresler, Diss. (1823); R. & S., Syst. Veg. 7: 317 (1829); Kunth, Enum. Pl. 5: 57 (1850); Bak. in Journ. Linn. Soc. Bot. 14: 594 (1875); Benth. & Hook. f., Gen. Pl. 3: 765 (1883); Bak. in Fl. Cap. 6: 256 (1896); Fl. Trop. Afr. 7: 425 (1898); Marloth, Fl. S. Afr. 4: 83 (1915); Krause in Pflanzenfam. Auf. 2, 15a: 362 (1930); Salter in Fl. Cape Penins. 172 (1950); Hutch., Fam. Flow. Pl. 2: 608 (1959); Sölch, Beitr. Fl. Südwest-Afr. 31 (1961). Type species: *A. officinalis* L.

*Medeola* L., Sp. Pl. 339 (1753), partly, as to *M. asparagoides* L.

*Myrsiphyllum* Willd. in Ges. Naturf. Fr. Berl. Mag. 2: 25 (1808); Kunth, Enum. Pl. 5: 105 (1850). Type species: *M. asparagoides* (L.) Willd.

*Asparagopsis* Kunth in Abh. Akad. Berl. 35 (1842); Enum. Pl. 5: 76 (1850). Type species: *A. albus* (L.) Kunth.

*Hecatris* Salisb., Gen. Pl. Fragm. 66 (1866). Type species: *H. asparagoides* (L.) Salisb.

Roots often tuberous, but frequently fibrous. *Stems* erect or climbing, annual or more often perennial and woody, often much-branched; final branches sometimes fasciated and morphologically distinct from the main branches. *Cladodes* solitary or fasciated, with one or more veins. *Leaves* greatly reduced. *Flowers* borne singly on the final flowering stalks, which may be arranged terminally, in the axils of cladodes, or on specialised branches lacking cladodes; the final flowering stalk always articulated. *Perianth segments* six, free or nearly so, more or less similar, ascending or spreading, up to 6 mm long, white or nearly so. *Stamens* six, fused to the perianth segments towards their base. *Ovary* of three fused carpels containing three chambers; ovules several, axile; style with three short branches or divided nearly to the base. *Berry* 1—several-seeded, globose, or rarely ovoid, usually red, less often black or brown.

Distributed throughout Africa and in most of Europe, Asia and Australia. 40 species recognised in Southern Africa.

- 1 Cladodes conspicuously flattened:
  - 2 Cladodes more than one-veined:
    - 3 Flowers axillary:
      - 4 Stem smooth, usually climbing; tubers sessile or distant..... 39. *A. asparagoides*
      - 4a Stem scabrid and often with longitudinal wings, erect; tubers distant.... 40. *A. undulatus*
    - 3a Flowers terminal..... 34. *A. striatus*
  - 2a Cladodes one-veined:
    - 5 Plants herbaceous, twining; flowers axillary or terminal:
      - 6 Cladodes all in one plane..... 36. *A. scandens*
      - 6a Cladodes not all in one plane..... 37. *A. ramosissimus*
    - 5a Plants woody or, if rather softly woody, then erect; flowers usually racemose:
      - 7 Cladodes solitary:
        - 8 Stems pubescent..... 18. *A. oxyacanthus*
        - 8a Stems glabrous:
          - 9 Spur of the leaves spine-shaped; tepals and cladodes without a ciliate margin; stems usually well lignified; from the southern Cape and the eastern parts of South Africa..... 22. *A. densiflorus*
          - 9a Spur of the leaves not spine-shaped; tepals and usually the cladodes with a ciliate margin; stems softly woody; from the western Cape and S.W.A. 19. *A. juniperoides*
      - 7a Cladodes several at a node:
        - 10 Stems erect ..... 22. *A. densiflorus*
        - 10a Stems climbing:
          - 11 Cladodes more than 35 mm long..... 26. *A. falcatus* var. *falcatus*
          - 11a Cladodes less than 35 mm long:
            - 12 Racemes branched; cladodes usually very dark after drying 26. *A. falcatus* var. *ternifolius*
            - 12a Racemes simple; cladodes not usually darkening on drying:
              - 13 Branches grooved; from the southern and south-west Cape 25. *A. aethiopicus* var. *aethiopicus*
              - 13a Branches smooth; from the eastern Cape and the eastern and northern parts of South Africa..... 25. *A. aethiopicus* var. *angusticladius*
  - 1a Cladodes terete, angled, or absent during the flowering period:
    - 14 Flowers in racemes:
      - 15 Cladodes solitary:
        - 16 Spur of the leaves spine-shaped; tepals and cladodes without a ciliate margin; stems usually well-lignified; from the southern Cape and the eastern parts of South Africa..... 22. *A. densiflorus*
        - 16a Spur of the leaves not spine-shaped; tepals and usually the cladodes with a ciliate margin; stems softly woody; from the southern Cape and S.W.A..... 19. *A. juniperoides*
      - 15a Cladodes several at a node, or absent during the flowering period:
        - 17 Cladodes terete or oval in section, 0·8 mm or more thick..... 32. *A. crassicladius*
        - 17a Cladodes angled or, if terete, then less than 0·8 mm thick, or absent during the flowering period:
          - 18 Branches, at least the younger, densely pubescent, scabrid or tubercled; peduncles grey to brown; flowers white:
            - 19 Branches ridged or grooved; cladodes often absent during the flowering period 27. *A. asperigillus*
            - 19a Branches smooth..... 31. *A. acocksii*

- 18a Branches glabrous or, if slightly pubescent, then the stems erect and the flowers yellowish or greenish yellow:
- 20 Stems erect:
- 21 Final branches grooved..... 22. *A. densiflorus*
- 21a Final branches smooth:
- 22 Flowers white; from the eastern parts of South Africa.... 23. *A. saundersiae*
- 22a Flowers yellowish or greenish yellow; mainly from the western and northern Cape, Bechuanaland and S.W.A., but recorded from the northern Transvaal..... 33. *A. nelsii*
- 20a Stems twining:
- 23 Spines present on all branches; branchlets never well differentiated 30. *A. krebsianus*
- 23a Spines absent from ultimate branches; branchlets sometimes well differentiated:
- 24 Stems usually grooved; branchlets differentiated; cladodes more than  $\frac{1}{2}$  mm thick, angled; perianth segments 2.5-3.0 mm long..... 28. *A. racemosus*
- 24a Stems smooth; branchlets not generally differentiated; cladodes very narrow, less than  $\frac{1}{2}$  mm thick; perianth segments usually 1.5-2.0 mm long  
24. *A. buchananii*
- 14a Flowers not in racemes:
- 25 Branches spine-tipped; spines formed from modified branches, usually at least 3-nate:
- 26 Spines solitary; perianth enclosing the fruit..... 4. *A. glaucus*
- 26a Spines rarely solitary; perianth not enclosing the fruit:
- 27 Flowers sessile; spines completely smooth:
- 28 Average cladode length less than 5.5 mm; plant widely branched:
- 29 Cladodes at least 1.5 mm long; branches and stems generally fairly slender; from the southern and western Cape, and S.W.A. away from the coast  
1. *A. capensis* var. *capensis*
- 29a Cladodes less than 1 mm long; branches and stems more robust: from the west coast..... 1. *A. capensis* var. *litoralis*
- 28a Average cladode length more than 5.5 mm; plants of a "fox-tail" form  
2. *A. stipulaceus*
- 27a Flowers pedunculate; spines bearing nodes, which are usually reduced to minute protuberances (Fig. 2a)..... 3. *A. suaveolens*
- 25a Branches not spine-tipped; spines formed from modified leaves, solitary, or absent:
- 30 Stem rigid; flowers mainly terminally 1-3-nate on peduncles, but sometimes also laterally solitary on the peduncles:
- 31 Cladodes more than 0.4 mm broad; spines 4 mm or less long; stems glabrous  
21. *A. rigidus*
- 31a Cladodes less than 0.3 mm broad; the longest spines at least 5 mm long; stems usually more or less scabrid or pubescent..... 20. *A. minutiflorus*
- 30a Stems variable; flowers axillary or terminal on normal branches:
- 32 Cladodes three at a node except at nodes where there is a branch and then only two:
- 33 Cladodes 1 mm or more broad; fruit globose..... 37. *A. ramosissimus*
- 33a Cladodes less than 1 mm broad; fruit ovoid..... 38. *A. crispus*
- 32a Cladodes solitary, paired or numerous at a node, or absent during the flowering period:
- 34 Flowers all terminal:
- 35 Stems smooth, climbing, repeatedly branched; cladodes and ultimate branches all in one plane..... 6. *A. setaceus*
- 35a Stems grooved, erect or climbing to 2 m or rarely more; final branches and cladodes not all in one plane:
- 36 Branches usually reflexed; cladodes laterally usually several; plant more or less herbaceous, and often climbing or scrambling..... 35. *A. subulatus*

- 36a Branches usually ascending; cladodes laterally usually solitary; plant more woody and robust, always erect..... 34. *A. striatus*
- 34a Flowers all, or at least some, axillary:
- 37 Cladodes solitary..... 19. *A. juniperoides*
- 37a Cladodes not solitary:
- 38 Young branches never both white and grooved:
- 39 Usually climbers or scramblers; stems tortuous:
- 40 Aerial stems annual, softly woody; peduncles articulated at the base of the flower..... 9. *A. fasciculatus*
- 40a Aerial stems perennial, rarely annual; peduncle not articulated at the base of the flowers:
- 41 Stems smooth or regularly grooved, sometimes lacking cladodes towards the ends of the branches; spines often well-developed; colour of stems variable..... 5. *A. africanus*
- 41a Stems irregularly, longitudinally wrinkled; cladodes always evenly distributed along the entire length of the branches, or completely absent; spines absent or poorly developed; stems green to greyish green..... 7. *A. denudatus*
- 39a Stems erect, straight or zigzagging with straight internodes:
- 42 Outer layers of stems and branches peeling; leaf firm and entire (Fig. 2d)..... 17. *A. exuvialis*.
- 42a Outer layers of stems and branches not peeling; leaf usually with a chartaceous free portion (Fig. 2c):
- 43 Plant completely glabrous:
- 44 Spines absent or poorly developed:
- 45 Branches green:
- 46 Stem zigzagging; branches more or less spreading... 7. *A. denudatus*
- 46a Stem straight; branches virgate..... 8. *A. virgatus*
- 45a Branches not green:
- 47 Plant up to 1 m high; from the southern Cape 12. *A. macowanii* var. *macowanii*
- 47a Plant over 1½ m high: widespread, but not in the southern Cape 12. *A. macowanii* var. *zuluensis*
- 44a Spines present and pungent, at least on the stems and main branches 10. *A. thumbergianus*
- 43a Ultimate branches pubescent..... 11. *A. mucronatus*
- 38a Young branches and often all the aerial stems and branches white and grooved:
- 48 Stems bearing fascicled, simple branches or less often secondary branches present..... 29. *A. obermeyerae*
- 48a Axes repeatedly branched; branches solitary or less often 2- or 3-nate:
- 49 Spines present on all ultimate branches:
- 50 Cladodes ascending, straight; plant over 1 m high, bushy 15. *A. laricinus*
- 50a Cladodes spreading, often arcuate; stems more or less erect, less than 1 m high..... 14. *A. compactus*
- 49a Spines absent from ultimate branches:
- 51 Cladodes 4 mm or less long..... 16. *A. microrhaphis*
- 51a Cladodes 5 mm or more long:
- 52 Branches zigzagging; stems often scrambling or climbing; from the western half of South Africa..... 13. *A. retrofractus*
- 52a Branches straight; stems erect; from the wetter parts of the southern Cape and the eastern half of South Africa:
- 53 Stems up to 1 m high; from the Cape 12. *A. macowanii* var. *macowanii*
- 53a Stems over 1½ m high; from Natal and the Transvaal 12. *A. macowanii* var. *zuluensis*

1. *A. capensis* L., Sp. Pl. 314 (1753). Type: Cape of Good Hope, without precise locality, collector unknown, in Herb. Plukenet (BM, holo.; PRE, photo.).

Roots fibrous. *Stems* erect, usually with several wide-spreading branches, up to 1 m high, brown or green, zigzagging, terete, pubescent when young, terminating in a spine. *Branches* similar to the stems. *Branchlets* fascicled, not replacing spines, spineless except occasionally for a terminal spine, pubescent. *Lateral spines* formed from modified branches, usually 3-nate, rarely more numerous, smooth, spreading at right angles to one another, straight or recurved, the central one longest, brown or green with a brown tip; some of the central spines on the older parts of the plant replaced by normal branches. *Cladodes* terete, usually slightly recurved, 1.5–6 mm or more long, glabrous or very minutely pubescent. *Leaves* scarious, with marginal hairs, sometimes very greatly reduced. *Flowers* sessile, 1- or 2-nate, terminal. *Perianth segments* oblong-obovate, 2–4.5 mm long, white with a green or purple median streak; margin serrate. *Stamens* nearly as long as the perianth segments; anthers about 0.5 mm long, yellow. *Ovary* about 1 mm long; style about 1 mm or less long. *Berry* globose, 4 mm diameter, 1-seeded, red; perianth persistent.

South-west Cape, northwards to the southern parts of South West Africa, and eastwards to Port Elizabeth.

For key to varieties, see key to species.

(a) var. *capensis*.

*A. capensis* L., Sp. Pl. 314 (1753); Jacq., Hort. Schoen. t.266 (1798); Thunb., Prodr. 66 (1794); Bresler, Diss. 21 (1826); Bak. in Journ. Linn. Soc. Bot. 14: 617 (1875); Fl. Cap. 6: 263 (1896); Salter in Fl. Cape Penins. 173 (1950); Sölch, Beitr. Fl. Südwest-Afr. 36 (1961). *A. triacanthus* Burm. f., Prod. Fl. Cap. 10 (1768), nom. illegit. Type: as for *A. capensis*. *A. nelsonii* Bak. in Journ. Linn. Soc. Bot. 14: 617 (1875); Fl. Cap. 6: 264 (1896). Type: South Africa, *Nelson* s.n. (BM, holo.; PRE, photo.).

*Asparagopsis passerinoides* Kunth, Enum. Pl. 5: 90 (1850), nom. illegit. Type: as for *A. capensis*.

The typical variety is characterised by the generally smaller plants, narrower stems and branches, and by the larger cladodes, which are always linear and more than 1 mm long.

This variety occurs over the entire range of the species except the coast of Namaqualand and South West Africa. It occurs from sea-level to about 1,000 feet, especially in sandy soils. Among shore vegetation it may form dense bushes about 1 m high, with thick branches and short, thicker cladodes, while at higher altitudes it is generally more sparsely branched and smaller, with narrower branches and cladodes. It is one of the commoner species of *Asparagus* in the winter rainfall area. Flowering is affected by, but not dependant on, fires. Flowers have been recorded in February and from April to August. The flowers are sweetly scented.

CAPE.—Bellville: Melkbosch, *Wasserfall* 159 (NBG). Bredasdorp: near Elim, *Schlechter* 10476 (BOL). Caledon: Grietjesgat, between Sir Lowrys Pass and Palmiet River, *Ecklon & Zeyher* s.n. Calvinia: Calvinia, *Compton* 19484 (NBG). Cape: Lion's Head, *MacOwan* 1977 (SAM). Carnarvon: 10 miles N.E. of Carnarvon, *Hafström & Acocks* 194. Clanwilliam: Langekloof, *Schlechter* 8029 (BOL). Hay: 16 miles E. of Griquatown, *Acocks* 2191. Hopefield: Hopefield, *Jessop* 455 (BOL). Knysna: Keurboom's River at Postpad, *Fourcade* 207 (BOL). Laingsburg: Ngaapkop, *Compton* 14591 (NBG). Malmesbury: Malmesbury, *Marloth* s.n. (STE). Middelburg: Witkransnek, *Acocks* 21415. Montagu: Fonteinkloof, *Lewis* s.n. (NBG). Murraysburg: Murraysburg, *Tyson* 38 (BOL). Namaqualand: Garies, *Thorne* s.n. (SAM). Paarl: Tigerberg, *Pillans* 8656 (BOL). Piketberg: The Rest, *Barker* 3590 (NBG). Port Elizabeth: Red House, *Paterson* 1109 (BOL). Somerset West: Strand, *Parker* 3805 (BOL). Stellenbosch: Stellenbosch, *Bond* s.n. (NBG). Steynsburg: Steynsburg, *Thode* 5636 (STE). Tulbagh: Saron, *Schlechter* 7886. Uitenhage: Uitenhage, *Cooper* 1573 (BOL). Uniondale: Joubertina, *Horn* s.n. Vanrhynsdorp: near Vanrhynsdorp, *Marloth* 7794. Victoria West: above Victoria West reservoir, *Smith* 2404. Worcester: Nature Reserve, *Olivier* 8. Wynberg: Rondebosch, *Wolley Dod* 1143 (BOL).

SOUTH WEST AFRICA.—Luderitz: Zebrafontein, *Merxmüller & Giess* 3325 (M); 6 miles N. of Witputz Police Station, *Merxmüller & Giess* 3446 (M).

Linnaeus, in his *Species Plantarum*, wrote: “*Asparagus aculeatus, triplici spina, surrectus. Pluk. alm. 54, t. 15, f. 4*”. But this figure does not show a plant with ternate spines as described. On the page of text, page 54, to which Linnaeus referred, Plukenet wrote: “*Asparagus aculeatus, triplici spinâ surrectus, Prom. Bon. Spei. Phytogr. Tab. 78, fig. 3*”. While the polynomial is the same as that used by Linnaeus, the figure is therefore different. This figure does show a plant with ternate spines. It would, therefore, seem likely that Tab. 78, fig. 3 should accompany Linnaeus’ citation of “*Pluk. alm. 54*”, and the reference to Tab. 15, fig. 4 was an error. As the specimens, labelled *A. capensis*, in the Linnaean Herbarium do not fit Linnaeus’ description, they cannot be regarded as types. Both the Plukenet figure and the specimen on which it was based in the Plukenet Herbarium match the polynomial in having ternate spines. The specimen is therefore regarded as the holotype.

The binomial *Asparagus triacanthus* was accompanied, in Burmann’s work, only by a reference to Plukenet’s *Phytographia* t. 78, f. 3, which is the figure regarded by the present author as the illustration on which Linnaeus based his *A. capensis*. These names are therefore synonymous.

*Asparagopsis passerinoides* Kunth is also a superfluous name for *A. capensis* of Linnaeus. Kunth cited both Linnaeus’ description and the correct Plukenet figure.

Occasionally an atypical form occurs under trees. This form has longer cladodes—up to 8 mm long—and a more lax habit. Also, it often has more numerous spines at a node than is usual in this species. A specimen of this form, collected by Nelson and now in the British Museum, was named *A. nelsonii* by Baker. He separated *A. nelsonii* from *A. capensis* on the grounds that its branches were terminated by a spine. There are few, if any, specimens of *A. capensis* in which the branches are not terminated by a spine, however. No difference was found between these forms after they had been cultivated near one another for two years. Nor is it possible to separate these forms in the field because of specimens showing intermediate characters.

(b) var. *litoralis* *Suess. & J. Karl.* in *Mitt. Bot. Staatssam. München* 2: 50 (1950). Type: South West Africa, Pomona, *Dinter* 6367 (B, holo.!; BOL!, PRE!, SAM!, Z!).

This variety is characterised by the larger plant, more robust stems and branches, and small size of the cladodes. The cladodes are so reduced as to give a granular appearance to the branchlets.

Restricted to the coast from Lambert’s Bay in the Clanwilliam district to Luderitz Bay in South West Africa. Flowers have been recorded in May.

CAPE.—Clanwilliam: Lambert’s Bay, *Muir* s.n. (SAM); 5 miles N. of Lambert’s Bay, *Taylor* 3951; Elandsbaai, *Strey* 427 (M). Namakwaland: south of Hondeklip Bay, *Pillans* s.n. (BOL).

SOUTH WEST AFRICA.—Luderitz: Luderitz Bay, *Peyer* 5 (Z); Pomona, *Dinter* 6367; Oranjemund, *Merxmüller* 2335; Sturmvoegelbucht, *Merxmüller* 2241; Buchbergen, *Dinter* 6463a (B).

There are specimens which show several intermediate characters between the two varieties of this species. These occur in littoral vegetation but, although possessing the more robust form of the second variety, do not have the extremely reduced cladodes. A specimen of this form was grown near a specimen of the typical form of variety *capensis* for about five years. During this time the differences were maintained. This may indicate that a genetic difference is involved, but this is not of sufficient magnitude either to create a third variety or to raise variety *litoralis* to specific status.

2. *A. stipulaceus* *Lam.*, *Encyc.* 1: 297 (1783); *Bresler, Diss.* 5 (1826); *R. & S., Syst. Veg.* 7: 333 (1829); *Salter in Fl. Cape Penins.* 173 (1950). Type: Cape, *Sonnerat* s.n. (P, holo.; PRE, photo!).

*Asparagopsis stipulacea* (Lam.) Kunth, Enum. Pl. 5: 91 (1850).

*Asparagus densus* Soland. ex Bak. in Journ. Linn. Soc. Bot. 14: 616 (1875). Type: Cape, without precise locality, *Auge* s.n. (BM, holo.; PRE, photo.!).

Roots fibrous. *Stems* erect to 50 cm high, rarely more, not usually producing branches, pubescent, grey-green to brown, ending in spines, angled or terete, ridged when young, slightly zigzagging. *Branches* short, few or absent, not forming secondary branches, spine-tipped. *Lateral spines* ternate, the longest occasionally replaced by a branch, spreading at right angles to one another, straight or slightly curved, green with a brown-red tip, up to 2 cm long. *Branchlets* fascicled, spineless or sometimes terminating in a spine, grooved. *Cladodes* firm, terete or angled, slightly mucronate, sometimes scabrid, 5–10 mm long, almost always 3-nate. *Leaf* scarious, fringed with hairs. *Peduncles* represented by a minute disc, terminal, 1- or 2-nate. *Perianth segments* oblong-obovate, white with a green or purple median streak, 5–6 mm long, spreading, the margin serrate. *Stamens* almost as long as the perianth; anthers 0.7–0.8 mm long, yellow-green. *Ovary* 1–1.5 mm long; style 1 mm long. *Berry* fleshy, globose, red, 1- or 2-seeded.

This species grows in sandy soils, often in vegetation with a high proportion of Restionaceae, and usually within sight of the sea, from the west coast of the Cape Peninsula to the eastern parts of the Bredasdorp district. It is particularly affected by fires and rarely flowers except after fires. Flowers have been recorded in April, May and July. Fruits are rarely produced. Even in areas where large numbers of plants have flowered, it is usually impossible to find fruits. This is possibly associated with polypoidy.

CAPE.—Bredasdorp: Mierkraal, *Schlechter* 10536; De Hoop, *Barker* 8731 (NBG); Baardskeeders bos, *Oliver* s.n. (BOL); near Gansbaai, *Oliver* s.n. (BOL). Caledon: Rooi Els, *Jessop* s.n. (BOL); Betty's Bay, *Oliver* s.n. (BOL). Wynberg: Karbonkelberg, *Oliver* s.n. (BOL). Simonstown: Vasco da Gama, *Salter* 8046A (BOL); *Jessop* 135 (BOL); Buffels Bay, *Guthrie* s.n. (BOL); *Oliver* s.n. (BOL); Miller's Point, *Pillans* 8532 (BOL); Clovelly, *Salter* 8210 (BOL); Kalk Bay, *Jessop* 47 (BOL); *Oliver* s.n. (BOL); St. James, *Michell* s.n. (BOL); hills near Fish Hoek, *Peers* s.n.

The type specimen was collected by Sonnerat at the Cape. Two specimens have been mounted on the same sheet. That on the left is of an *Asparagus*, and matches Lamarck's description. The other is of a *Psoralea*. The specimen on the left has, therefore, been selected as the type.

*A. capensis* and *A. stipulaceus* are very similar, and their separation is sometimes difficult. *A. capensis* is larger and considerably more branched, while *A. stipulaceus* is usually more pubescent and has larger cladodes and flowers. At Rooi Els where the two species grow together on a slope above the river, they retain their distinguishing characters.

Chromosome counts were made on specimens of *A. capensis* from about four miles inland from Ysterfontein, in the Malmesbury district, and of *A. stipulaceus* from about half way up the mountain behind Kalk Bay in the Simonstown district. The diploid number was found to be 40 for the former species and very near to—probably exactly—80 for the latter. This difference in chromosome number suggests that the small qualitative differences between the two species is not only the result of inadequate sampling of the populations of each form.

3. *A. suaveolens* Burch., Trav. 2: 226 (1822); Pole Evans in Flow. Pl. S. Afr. 11: t. 409 (1931). Type: Griquatown, *Burchell* 1956 (K, holo.!.; PRE, photo.!).

*A. spinescens* Steud. ex R. & S., Syst. Veg. 7: 334 (1829). Type: Cape, without precise locality, *Ludwig* s.n. *A. triacanthus* Willd. ex R. & S., Syst. Veg. 7: 334 (1829). Type: Cape, *Lichtenstein* in Herb. Willd. no. 6693. *A. burchellii* Bak. in Journ. Linn. Soc. Bot. 14: 618 (1875); Fl. Cap. 6: 264 (1896). Syntypes: "Cap. Bon. Spei in

aridis", *Burchell* 2962 (K!); *Zeyher* (*Asparagus* 10); *Cooper* 1574. *A. stipulaceus* sensu Bak. in Journ. Linn. Soc. Bot. 14: 617 (1875); Fl. Cap. 6: 264 (1896). *A. spinosissimus* Kuntze, Rev. Gen. Pl. 3: 315 (1893); Sölch, Beitr. Fl. Südwest-Afr. 39 (1961). Type: Cathcart, *Kuntze* s.n. (NY, holo.; BOL, photo!). *A. omahekensis* Krause in Bot. Jahrb. 51: 447 (1914); Sölch, Beitr. Fl. Südwest-Afr. 38 (1961). Type: "Zwischen Gobabis und Oas", *Dinter* 2711 (B, holo.!.; SAM!). *A. intangibilis* Dinter in Fedde, Rep. 29: 269 (1931); Sölch, Beitr. Fl. Südwest-Afr. 37 (1961). Type: "Grosse Karasberge", *Dinter* 5168 (B, holo.!).

*Asparagopsis triacantha* (Willd.) Kunth, Enum. Pl. 5: 91 (1850). *A. zeyheri* Kunth, Enum. Pl. 5: 92 (1850). Type: Without locality, *Zeyher* s.n. *A. spinescens* (R. & S.) Kunth, Enum. Pl. 5: 93 (1850).

Roots fibrous. Stems erect, to 1 m, or occasionally climbing or scrambling to 0.5 m, zigzagging, spine-tipped, glabrous or pubescent, pale cream coloured to brown. Branches similar to the stems, usually spreading or ascending, but occasionally reflexed. Lateral spines 3-, 5- or 7-nate, at least the lateral ones of each group usually bearing sterile nodes (Fig. 2a), pungent, well-developed, straight or arcuate, spreading or reflexed. Branchlets fascicled, paired to numerous, herbaceous, arcuate or straight, up to 3 cm long. Cladodes borne on branchlets, fascicled, subulate, spreading or ascending, 3-6-nate, 1-10 mm or more long. Peduncles solitary, terminal on branchlets, 1-4 mm long, articulated near the base. Perianth segments obovate, 1.5-3.5 mm long, the outer whorl frequently, perhaps always, with a purple streak. Stamens nearly as long as the perianth segments, narrow; anthers about 1/3 mm long, orange to yellow. Style divided for less than half its length; ovary sessile, 12-14-ovuled. Berry one-seeded, globose, 3-3.5 mm diameter, red or black; perianth persistent.

This is one of the commoner species of *Asparagus* in the summer rainfall area, occurring in Rhodesia, large parts of South West Africa, Bechuanaland and most of the areas to the south, and extending into the winter rainfall area as far as the Clanwilliam district in the north and Caledon in the east. It has not been recorded from Basutoland and there are few records from the south-eastern parts of South Africa. It occurs in coastal vegetation, low bush, open forest and Karroid vegetation. Flowers have been recorded in most months, but particularly in autumn and early summer. There does not seem to be any geographical variation in flowering period.

CAPE.—Albany: Botha's Hill, *Rogers* 3417 (BOL). Alexandria: Debeqa Valley, *Galpin* s.n. Aliwal North: Doctor's Drift, *Gerstner* 245. Barkly West: near the Vaal River, *Nelson* 176. Bathurst: Port Alfred, *Salisbury* s.n. (GRA). Bedford: Witmos, *Galpin* 3081. Bredasdorp: Mierkraal, *Schlechter* 10527. Caledon: Caledon, *Esterhuysen* s.n. (BOL). Cathcart: 1 mile from Henderson on Cathcart road, *Stony* 2805. Clanwilliam: Langkloof, *Schlechter* 8050. Cradock: 10 miles E. of Cradock, *Jessop* 656. De Aar: De Aar, *Acocks* 632. East London: East London, *Thode* 6653 (STE). Frasersburg: Frasersburg, *Nel* s.n. (STE). Gordonia: Gordonia district, *Kotze* 852. Graaff-Reinet: Graaff-Reinet, *Bolus* 411 (BOL). Hankey: Hankey, *Barker* 7853 (NBG). Hay: Elmdale, *Acocks* 2231. Heidelberg: 5 miles W. of Heidelberg, *Jessop* 591. Kentani: Columbia Mission Station, *Pegler* 1451 (BOL). Kimberley: 7 miles N.E. of Kimberley, *Leistner* & *Joynt* 2650. King Williams Town: King Williams Town, *Sim* 1060 (BOL). Komga: Komga, *Flanagan* 1793. Kuruman: 10 miles S. of Kuruman, *Louw* 842. Ladismith: Prinspoort, *Bond* 306 (NBG). Laingsburg: Tweedside, *Marloth* 12076. Middelburg: Grootfontein, *Theron* 94. Montagu: Cogman's Kloof, *Barker* 8625 (NBG). Murraysburg: Roads Poort, *Tyson* 212 (GRA). Namakwaland: Doornpoort, *Pillans* 5466 (BOL). Pearston: by the Blyde River, *Burchell* 2962 (K). Phillipstown: Potfontein Station, *Schweickerdt* 1196. Oudtshoorn: near dam, *Britten* 1624. Port Elizabeth: Cradock Place, *Galpin* 6439. Postmasburg: west entrance to Langkloof, *Leistner* 1164. Prieska: near Prieska, *Bryant* J368. Prince Albert: Farm Damascus, *Marloth* 11276. Queenstown: Long Hill, *Galpin* 2095. Riversdale: Langeberg, *Muir* 2529 (BOL). Robertson: Klaasvoogds, *Van Niekerk* 372 (BOL). Somerset East: Somerset East, *Van Niekerk* 435 (BOL). Swellendam: National Bontebok Park, *Liebenberg* 6536. Taungs: Kankatjies, *Acocks* 538. Uitenhage: near Uitenhage, *Schlechter* 2573. Uniondale: 8 miles from Uniondale on Willowmore road, *Fourcade* 6256. Vryburg: Tiger Kloof, *Brueckner* 487. Worcester: Veld Reserve, *Van Breda* 21.

NATAL.—Camperdown: Nagle Dam, *Wells* 1361. Ubombo: Ubombo, *Gerstner* 3400 (NH). Weenen: Mielietuin, *West* 1204.



ORANGE FREE STATE.—Bloemfontein: south of Glen, *Mostert* 326. Boshoff: between Boshoff and Windsorton Road, *Burt Davy* s.n. Fauresmith: Fauresmith commonage, *Leistner* 1099. Kroonstad: Kroonstad, *Pont* 196. Parys: Parys, *Rogers* 5175. Trompsburg: Lucerne, *Henrici* s.n. Winburg: Willem Pretorius Game Reserve, *Bakker* 1004.

SWAZILAND.—Hlatikulu, Ingwavuma Poort, *Ben Dlamini* s.n.

TRASVAAL.—Barberton: Barberton, *Thorncroft* 844 (NH). Brits: Jacksonstun, *Van Vuuren* 292. Groblersdal: 4 miles S. of Bethal Mission Station, *Mönnig* 48. Heidelberg: The Kloof, *Thode* 3435 (STE). Johannesburg: Milner Park, *Moss* 17583. Lichtenburg: Grasfontein, *Sutton* 461. Lydenburg: Farm Parys, *Barnard & Mogg* 702. Marico: Zeerust, *Thode* 1508. Messina: Messina, *Rogers* 19297 (BOL). Middelburg: Tautesberg, *Young* A163. Pietersburg: Reebok Vlei, *Mauve* 4295. Potchefstroom: Losberg, *Theron* 693 (NH). Potgietersrus: Mosdene, *Galpin* 342. Pretoria: near Pretoria, *Schlechter* 3584. Roodepoort: Spitskop, *Archibald* 2829 (GRA). Sibasa: 7 miles N.W. of Punda Milia, *Codd & De Winter* 5556. Ventersdorp: Goedgedacht, *Sutton* 612. Vereeniging: Klipriviersberg, *Gilliland* s.n. (BOL). Waterberg: Towoomba Pasture Research Station, *Codd* 6116. Zwartuggens: Zwartuggens, *Story* 5638.

SOUTH WEST AFRICA.—Gobabis: Okasondana, *Walter* 4145 (M). Grootfontein: Otaviberge, *Rehm* s.n. (M). Rehoboth: Hoachanas, *Dinter* 1948 (SAM). Warmbad: Narudas-Kanus, *Dinter* 5168.

BECHUANALAND.—Molepolole, *Story* 4869.

In the south-western Karroo, Little Karroo and as far east as the Albany district there are two forms. One of these is erect and has spreading to ascending branches, while the other, to which Baker gave the name *A. burchellii*, varies from erect to climbing and usually has reflexed branches and spines. Evidence, based both on herbarium material and on field observations, has shown that these forms are linked by many intermediates and cannot be given taxonomic recognition. These intermediates occur in the eastern regions of the distribution of the two forms but are absent in the west. In the Transvaal there are also two forms which exist side by side. The larger form is glabrous, and has black berries, while the smaller is pubescent, has a particularly neat appearance, smaller cladodes, spreading branches and red berries. It was again not found possible to separate these two forms when the variability of the plants of this species from other areas of South Africa is taken into consideration. Two "fox-tail" forms have been recorded. One of these, from the Laingsburg district, is only about 25 cm high. It has been collected by Rogers (BOL 16322, Tvl. Museum 21167). The other, which is often over 1 m high, has been collected several times, for example *Mogg* 22407 (PRE), in the Loskop Dam area in the Transvaal. Little-branched forms occur in most areas where this species is found, and it is not felt that this character should be regarded as taxonomically significant in this species.

4. *A. glaucus* *Kies* in *Bothalia* 6: 229, fig. 5 (1954); *Sölch*, *Beitr. Fl. Südwest-Afr.* 36 (1961). Type: Fauresmith, Groenvlei, *Kies* 340 (PRE, holo.!).

Roots fibrous. *Stems* erect, up to 50 cm high, smooth, glabrous, woody, slightly zigzagging. *Branches* spreading to ascending, solitary; stems and branches white at first, becoming brown, often spine-tipped, but frequently damaged. *Branchlets* 1–3 cm long, solitary or paired, straight, grooved, greenish, borne at the bases of spines or branches, terminating in a spine. *Lateral spines* solitary, mostly less than 1 cm long, occasionally up to 2 cm long, straight or recurved, slightly ascending or spreading, pungent, bearing sterile nodes and often bearing lateral spines. *Cladodes* 2–10 mm long, glaucous, fascicled, frequently 3-nate, terete, frequently up to 0.5 mm thick. *Leaves* very reduced; lateral buds present at the bases of branches and spines. *Peduncles* axillary, 2-nate, 2 mm long, borne on branchlets or spines, articulated near the centre. *Perianth segments* similar, broadly oblong-obovate, spreading, 3.5–4.0 mm long, margins smooth, rather tough, green in bud, becoming greenish-white with a green keel, with a bloom. *Stamens* about 3 mm long; filaments white, flattened laterally; anthers oblong, about 1 mm long. *Ovary* shortly stalked; the ovules about 9 in each chamber; style branches shortly fused at the base. *Fruit* globose, 4 mm diameter, containing a single seed, surrounded by a persistent perianth.

Found in the dry areas from the Oudtshoorn district in the south-west, northwards to Keetmanshoop and eastwards to Bloemfontein. It appears to have a strong preference for brakish soils. Flowers have been recorded from October to December.

CAPE.—Cradock: Jakkalsfontein, *Acocks* 17516. Hanover: Hanover, *Sim* s.n. Kimberley: Mollers Pan, *Acocks & Hafström* H874; Leeuwpoot, *Burt Davy* 9553. Oudtshoorn: Kruispad, *Compton* 21779 (NBG). Uniondale: bank of the Olifant's River, *Fourcade* 6265 (BOL).

ORANGE FREE STATE.—Bloemfontein: De Brug, *Acocks* 8464. Fauresmith: Groenvlei, *Kies* 340; Heuningberg, *Marais* 124; Veld Reserve, *Henrici* 3981. Luckhoff: Rose Marie, *Verdoorn* 2148; *Henrici* 4535. Trompsburg: Ventersvlei, *Verdoorn* 1153.

SOUTH WEST AFRICA.—Keetmanshoop: Great Karasberg, Noachabeb–Witmond, *Örtendahl* 425.

This species has similarities with *A. suaveolens*, but differs in having solitary spines, fewer branches at each node, axillary peduncles, and larger, thicker perianth segments which envelope the fruit.

5. *A. africanus* Lam., Encyc. 1: 295 (1783); Bresler, Diss. 9 (1826); R. & S., Syst. Veg. 7: 331 (1829); Bak. in Journ. Linn. Soc. Bot. 14: 619 (1875); Fl. Cap. 6: 265 (1896); Marloth, Fl. S. Afr. 4: pl. 20 (1915); Salter in Fl. Cape Penins. 175 (1950); Kies in Bothalia 6: 177 (1951). Type: Cape without precise locality, *Sonnerat* s.n. (P, holo.; PRE, photo.!).

*Asparagus dependens* Thunb., Prodr. 66 (1794); Bresler, Diss. 17 (1826); Kunth, Enum. Pl. 5: 74 (1850). Type: Cape of Good Hope, without precise locality, *Thunberg* s.n. (UPS, holo.!). BOL!, PRE! photos). *A. cooperi* Bak. in Gard. Chron. 1: 818 (1874); Journ. Linn. Soc. Bot. 14: 613 (1875); Fl. Cap. 6: 263 (1896); Flow. Pl. S. Afr. 13: t.503 (1933). Type: Cape without precise locality, *Cooper* s.n. (K, holo.!). PRE, photo.!). *A. multiflorus* Bak. in Journ. Linn. Soc. Bot. 14: 610 (1875); Fl. Cap. 6: 261 (1896); Kies in Bothalia 6: 177 (1951). Type: "Somerset division", *Bowker* s.n. (K, holo.!). PRE, photo.!). *A. asiaticus* sensu Bak. in Journ. Linn. Soc. Bot. 14: 618 (1875); Fl. Cap. 6: 265 (1896). *A. burkei* Bak. in Journ. Linn. Soc. Bot. 14: 607 (1875); Fl. Cap. 6: 261 (1896). Type: South Africa, Crocodile River, *Burke* s.n. (K, holo.!). PRE, photo.!). *A. pilosus* Bak. in Journ. Linn. Soc. Bot. 14: 610 (1875). Type: Bechuanaland, near Lake Ngami, *McCabe* 15 (K, holo.!). PRE, photo.!). *A. fleckii* Schinz in Bull. Herb. Boiss. 1, 4, app. III: 44 (1896); Sölch, Beitr. Fl. Südwest-Afr. 37 (1961). Type: S.W.A., Hoachanas, *Fleck* 901 (Z, holo.!). PRE, photo.!). *A. judtii* Schinz in Bull. Herb. Boiss. 1, 4, app. III: 44 (1896); Sölch, Beitr. Fl. Südwest-Afr. 37 (1961). Type: S.W.A., Hoachanas, *Fleck* 901 (Z, holo.!). *A. conglomeratus* Bak. in Fl. Trop. Afr. 7: 428 (1898); in Vierteljahrsschr. Naturf. Ges. Zürich 49: 176 (1904). Type: Ngamiland, Kwebe, *Lugard* 52 (K, holo.!). PRE, photo.!). *A. bechuanicus* Bak. in Fl. Trop. Afr. 7: 429 (1898). Type: Bechuanaland, Nakalechwe, *Lugard* 25 (K, holo.!). PRE, photo.!). *A. lugardii* Bak. in Fl. Trop. Afr. 7: 431 (1898). Type: Bechuanaland, near Lake Ngami, *Lugard* 31 (K, holo.!). PRE, photo.!). *A. dinteri* Engl. & Krause in Bot. Jahrb. 45: 155 (1910); Sölch, Beitr. Fl. Südwest-Afr. 36 (1961). Type: "Bei Neitsas", *Dinter* 676 (B!, SAM!). *A. patens* Krause in Bot. Jahrb. 51: 448 (1914). Type: S.W.A., Haribes, *Engler* 6570 (B!). *A. francisci* Krause in Bot. Jahrb. 51: 449 (1914). Type: S.W.A., "Zwischen Omuramba und Omatako", *Seiner* 689a (B!). *A. rivalis* Burch. ex Kies in Bothalia 6: 179 (1951); Sölch, Beitr. Fl. Südwest-Afr. 38 (1961). Type: Kosiefontein, *Burchell* 2587 (K, holo.!). PRE, photo.!).

*Asparagopsis lamarckii* Kunth, Enum. Pl. 5: 87 (1850), nom. illegit. Type: as for *A. africanus*. *A. juniperina* Kunth, Enum. Pl. 5: 85 (1850). Type: Swartkops River, *Drege* 8576. *A. schlechtendalii* Kunth, Enum. Pl. 5: 90 (1850). Type: Olifants River, *Krebs* s.n.

Roots fibrous. Stems woody, twining, either climbing to about 3 m or forming low bushes up to about 1 m high, glabrous to pubescent, smooth or slightly grooved, slightly zigzagging, grey-brown to greenish. Branches solitary, much-branched, similar

to the stems, but with a greater tendency to pubescence and grooving, usually spreading, but in some forms—particularly the pubescent specimens—strongly reflexed. *Cladodes* fascicled, up to 20-nate, but often about 8-nate, straight or slightly arcuate, subulate, generally 5–10 mm long, ascending to spreading. *Spines* usually present on at least the stems and larger branches, spreading to reflexed, usually straight, pale in many specimens but frequently reddish brown, up to 1 cm or more long, usually with the rest of the leaf forming well-developed spurs. *Peduncles* axillary and a few sometimes terminal, up to 20-nate, but frequently 2- or 3-nate, up to 5–8 mm long, articulated below the centre. *Perianth segments* similar, entire, oblong-obovate, 2.5–3.5 mm long, white. *Stamens* nearly as long as the perianth segments. *Style* and ovary each about 1 mm long. *Fruit* globose, fleshy, red, about 6 mm diameter, with a single seed.

This species usually occurs in bushy or wooded areas, where it climbs, but also occurs in more open vegetation where it forms bushes or scrambles among rocks. It grows mainly in the damper parts of South Africa, but also occurs in drier areas and in South West Africa, Bechuanaland and further north. Flowers have been recorded from August to May.

CAPE.—Albany: Grahamstown, *Galpin* 284. Alexandria: Kowie Road from Southwell, *Britten* 2596. Aliwal North: Orange River, *Gerstner* 160. Barkly West: Vaal River at Sydney, *Acocks* H830. Bathurst: Port Alfred, *Rogers* 16623 (BOL). Bedford: Bedford, *Gane* 118 (GRA). Bellville: Tigerberg, *Pillans* 8659 (BOL). Caledon: Baviaan's Kloof, Genadendal, *Gillett* 855 (BOL). Cape: Porcupine Buttress, *Jessop* 12 (BOL). Cathcart: 5 miles N. of Cathcart, *Jessop* 660. Cradock: 17 miles along Wapadberg road from Graaff-Reinet–Middelburg road, *Jessop* 653. East London: East London, *Bokelman* 5–28 (NBG). Fort Beaufort: Beaufort, *Cooper* 523 (BOL). George: near George, *Barker* 6856 (NBG). Gordonia: Kakoup, 50 miles S.W. of Olifantshoek, *Leistner* 2046. Graaff-Reinet: near Graaff-Reinet, *Bolus* 132 (BOL). Heidelberg: 5 miles W. of Heidelberg, *Jessop* 589. Herbert: St. Clair, without collector 237 (GRA). Humansdorp: Ratelsbosch, *Fourcade* 552. Kentani: Kobongaba Hills, *Pegler* 1463. Kimberley: Christian's Drift on Riet River, *Leistner* 1995. King Williams Town: King Williams Town, *Sim* 1063 (BOL). Knysna: Leisure Island, *Taylor* 1019 (NBG). Komga: Komga, *Flanagan* 299. Mafeking: Mafeking, *Burt Davy* 11087. Middelburg: Groot Vlei, Van Wyk's Vlei, *Archibald* 3042 (GRA). Mossel Bay: Gouritz Valley, *Horn* s.n. Mount Currie: Kokstad, *Mogg* 5177. Oudtshoorn: near Cango, *Bolus* 12369 (BOL). Paarl: Klein Drakenstein at Salem, *Bolus* s.n. (BOL). Peddie: Fish River Valley below Breakfast Vlei, *Acocks* 1190. Port Elizabeth: Cradock Place, *Galpin* 6408. Queenstown: Queenstown, *Galpin* 2152. Somerset East: Zuurberg, *Compton* 20284 (NBG). Stellenbosch: Franschoek, *Schlechter* 9218. Stockenström: Hogs Back, *Rattray* s.n. (GRA). Stutterheim: Ripplemead, Kabousie, *Hutton* 482 (GRA). Tarkastad: near Hofmeyer turning on Cradock–Tarkastad road, *Jessop* 655. Uitenhage: Enon, *Thode* A2769 (NH). Umondale: between Krakeel and Joubertina, *Jessop* 595. Vryburg: Stella, 30 miles N. of Vryburg, *Hardy & Bayliss* 1244. Wynberg: Orange Kloof, *Wolley Dod* 2470 (BOL).

BASUTOLAND.—Leribe, *Dieterlen* 346.

NATAL.—Bergville: Natal National Park, *Edwards* 962. Camperdown: Bothas Hill, *Hutchinson, Forbes & McClean* 55 (NH). Durban: Berea, *Forbes* 383 (NH). Eshowe: Eshowe, *Gerstner* 2405. Estcourt: Dalton Bridge, *Acocks* 10626. Himeville: 5 miles N. of Himeville, *Jessop* 664. Inanda: Inanda, *Wood* 989 (NH). Klip River: near Colenso, *Wood* 4089 (NH). Lions River: 5 miles along Merrivale–Boston road, *Moll* 937. Mtunzini: Umlalazi Nature Reserve, *Ward* 4275. New Hanover: Albert Falls, *Comins* 84 (NH). Nongoma: Bangonoma, *Gerstner* s.n. (NH). Pietermaritzburg: Pietermaritzburg, *Schlechter* 3297 (BOL). Pinetown: Gillitts, *Lansdell* s.n. (NH). Richmond: Richmond, *Schlechter* 6717 (BOL). Umlazi: Isipingo, *Wood* 12480 (NH). Umvoti: Greytown, *Wylie* s.n. Utrecht: Tweekloof, Altemooi, *Thode* A212.

ORANGE FREE STATE.—Bethlehem: Kloof, *Potgieter* 81. Bloemfontein: Bloemfontein, *Potts* s.n. (BOL). Boshoff: Smitskraal, *Burt Davy* 10305. Fauresmith: Sleutelpoort, *Henrici* 2593. Harris Smith: Maccavlei, *Brandmuller* 119. Kroonstad: Kroonstad, *Pont* 195. Winburg: Willem Pretorius Game Reserve, *Leistner* 2975.

SWAZILAND.—Near Golle, *Compton* 29105; Forbes Reef, *Compton* 30974; Stegi, *Compton* 26021.

TRANSVAAL.—Barberton: Berea Hill, *Galpin* 622. Christiana: Bloemhof, Kameelpan, *Theron* 5633. Ermelo: Mavieriestad, *Pott* s.n. Heidelberg: Suikerbosrand, *Mogg* 18129. Johannesburg: Zoo Kopjes, *Moss* 10498. Krugersdorp: Jack Scott Private Nature Reserve, *Wells* 2413. Letaba: Tzaneen, *Rogers* 12506 (GRA). Lydenburg: Lydenburg, *Thode* A1648 (NH). Middelburg: Olifant's River Gorge, *Mogg* 22445. Nelspruit: 10 miles S. of Lower Sabie, *Codd* 6134. Pietersburg: Haenertsburg, *Rogers* 19041 (BOL). Pilgrim's Rest: Sabie, *Rogers* 23090. Potchefstroom: Potchefstroom,

*Burt Davy* 48. Potgietersrus: Mosdene, *Galpin* 17346. Pretoria: Pretoria, *Schlechter* 3603. Soutpansberg: Spelonken, *Jenkins* s.n. Standerton: Standerton, *Leendertz* s.n. Ventersdorp: Goedgedacht, *Sutton* 522. Vereeniging: Lagerspoort, *Mogg* 19532. Wakkerstroom: Oshoek, *Devenish* 97. Warmbad: Warmbad, *Leendertz* s.n. Waterberg: banks of the Limpopo, *Leipoldt* 71 (BOL).

SOUTH WEST AFRICA.—Grootfontein: West Runtu "in Okavongotal", *Volk* 1860a (M). Luderitz: Aus, *Peyer* 15 (Z). Mariental: 60 miles from Mariental, *Liebenberg* 5154. Okahandja: Okahandja, *Höpfner* c-65 (Z). Omaruru: Brandberg, *Rodin* 2713. Otjiwarongo: Okosongomingo, *Volk* 2568 (M). Rehoboth: Gravenstein, *Volk* 11502 (M). Warmbad: Naruchas, *Dinter* 7214 (M). Windhoek: Voigtland, *Walter* 75 (M).

BECHUANALAND.—Toteng, N.E. tip of Lake Ngami, *Story* 4690; 10½ miles N.N.W. of Kan, *De Winter* 7350.

Lamarck described *A. africanus* from a specimen which was sent from the Cape by Sonnerat. The description mentions the angled stems and spine and cladode characters which are typical of the form growing in the south-west Cape. This is the area where Sonnerat is likely to have been able to have collected it. The holotype is in the Lamarck Herbarium in Paris. Lamarck also cited Plukenet's *Phytographia*, t. 374 f. 4. This figure shows a slightly tortuose stem without spines, but Plukenet mentioned the presence of spines in his description. The locality was given as Africa. If this figure is intended to represent the Cape species, the shape of the cladodes and absence of spines makes it a very poor likeness.

Kunth cited *Drege* 8576, which was collected at the Swartkops River, as the type of *Asparagopsis juniperina*. All the characters described are those of this species. In particular, the spines, described as "ferruginea", are very characteristic. *Asparagopsis schlechtendalii* Kunth is also likely to be a synonym for this species. The type was collected along the Olifants River, but Kunth does not indicate which Olifants River this is. The plant, is described as woody with flexuose branches. The cladodes and axillary flowers are typical for *A. africanus*, but there is not enough information to be absolutely certain.

Because various authors have used the name *A. asiaticus* L. for the species treated here as *A. africanus*, it is desirable to discuss the typication of *A. asiaticus* here. Linnaeus cited his *Hortus Cliffortianus*, page 122 (1737) in his description of *A. asiaticus*. In this work, there is a reference to Plukenet's *Phytographia* (1699) t. 15 f. 4. As there is no specimen with this name in the Linnaean Herbarium, the Plukenet figure would be regarded as the iconotype if there is no specimen in Herb. Sloane in the British Museum upon which this illustration is based. Plukenet cited his species as "e Maderaspatans"; that is from the eastern coast of Peninsular India. Whether or not the Indian species is synonymous with the South African plants called *A. africanus* in this treatment would require further work on the material from India and Africa. There are, however, several characters of Linnaeus' description and of the figure which make it very unlikely that these plants are conspecific. Linnaeus described the stems as erect, and the figure also shows a rigidly erect stem. The figure also does not match the South African species as it appears to have spines on the final branches. It therefore seems better to regard this name as not applicable to the South African species until work is done on the genus in a wider geographical context. This decision is in agreement with that of Kies (1951).

Those South African Asparagi with fascicled, terete cladodes, stems tortuous and not white and grooved, final branches and cladodes not horizontal as in *A. setaceus* have been included in this species. The variation within these limits, as can be seen from the description, is very great. It is possible that further field work would reveal the limits of significant groupings within this definition, but, judging from the available material and data, there seems to be no way of correlating any of the variable characters in order to subdivide the group.

The form in the south-west Cape, *A. africanus* of Baker, has well-developed, reddish spines, and tends to be less tortuous. This is replaced to the east by a more pubescent form with straighter, reflexed branches and cladodes, referred to by Baker as *A. africanus* var. *dependens*. More generally over most of the summer rainfall area there is a less spiny, more tortuous form with narrower stems, branches and cladodes, which was referred to *A. asiaticus* by Baker. This form becomes slightly herbaceous, and may even produce annual stems.

In hot, dry areas specimens occur in which cladodes do not form, or are reduced, towards the tips of the branches. This may be associated with the environment. Several species have been based on specimens of this form, among them *A. burkei* Bak. and *A. judtii* Schinz.

It is difficult to distinguish *A. africanus* from *A. setaceus*. The form of branching and cladode arrangement which are so well known and characteristic of the horticultural plants occurs in wild populations over a large part of South Africa. Intermediate forms do occur, however, in which the branching shows some similarity with *A. africanus*. When there is any doubt, these species may be separated by the terminal flowers of *A. setaceus*, and axillary flowers of *A. africanus*.

6. *A. setaceus* (Kunth) Jessop, comb. nov. *Asparagopsis setacea* Kunth, Enum. Pl. 5: 82 (1850). Type: "Drege, Herb. no. 8584. c.v.s. in Herb. reg. Berol. et Luc." (KIEL, lecto!).

*Asparagus declinatus* sensu Bak. in Journ. Linn. Soc. Bot. 14: 609 (1875); Fl. Cap. 6: 261 (1896). *A. plumosus* Bak. in Journ. Linn. Soc. Bot. 14: 613 (1875); Planchon in Flor. des Serres ser. II, 23: t.2413-2414 (1880); Bak. in Fl. Cap. 6: 260 (1896). Syntypes: Port Natal, Drege 4482 (K!); British Kaffraria, Cooper 202, partly, (K!); without locality, Gerrard & McKen 754.

Roots fibrous. Stems twining, smooth or grooved, glabrous, greenish to reddish-brown. Branches similar to the stems, solitary. Cladodes linear, fine, arcuate, terete, up to 10-nate, up to 10 mm long; final branches and cladodes all in the same plane, horizontal (homalotropic). Spines not usually present, reflexed. Peduncles terminal, usually solitary, rarely up to 3-nate, 2-5 mm long, articulated near the middle, pendent. Perianth segments cream-white, oblong-obovate, entire, similar, about 3 mm long. Stamens slightly shorter than the perianth segments; anthers  $\frac{1}{4}$ - $\frac{1}{3}$  mm long. Styles shortly divided, about 1 mm long; ovary about 1 mm long. Berry red, fleshy, up to 3-seeded, about 6 mm diameter.

This species occurs mainly in forests, but also in open country provided there is sufficient support, from the Riversdale and Swellendam districts in the south-west, through the eastern Cape and Natal into the Transvaal. To the north its range continues into Rhodesia, and in the east into Mozambique. Flowers have been recorded from September to April.

CAPE.—Albany: Sandy Drift near Grahamstown, Daly 6 (GRA). Alexandria: Olifantshoek between mouths of Bushman's and Sunday's Rivers, Ecklon & Zeyher s.n. Bathurst: Horseshoe on Kowie River, Barker 9267 (NBG). George: Karatara, Drege 8584 (KIEL). Humansdorp: Ratelsbos, Fourcade 377 (BOL). Kentani: woods near Kentani, Pegler 345. King Williams Town: King Williams Town, Sim 1043 (BOL). Knysna: Knysna, Marloth 7504. Komga: Komga woods, Flanagan 1711. Queenstown: Umbombola Mountains, Galpin 2091. Riversdale: above Novo, Muir 2837 (GRA). Somerset East: Boschberg, MacOwan 1917 (SAM). Stockenström: Katberg near Sanatorium, Schönland 4307 (GRA). Swellendam: Grootvadersbos, Zeyher 4167 (BOL). Umtata: Convent of the Holy Cross, without collector. Willowvale: Qora River mouth, Hilner 443.

NATAL.—Durban: woods near Durban, Wood 437 (BOL). Eshowe: Eshowe, Lawn 730 (NH). Estcourt: Giant's Castle, Symons 40. Hlabisa: Hluhluwe Game Reserve, Ward 2159. Inanda: Wood 1649 (BOL). Nkandla: Nkandla Forest, Nixon s.n. (NH). Ubombo: near turning to Mkuzi Game Reserve, Jessop 668.

SWAZILAND.—Mbabane, Malagwane Hills, Ben Dlamini s.n. (NBG).

TRANSVAAL.—Barberton, *Thorncroft* 2116. Belfast: Belfast, *Leendertz* 7953. Brits: Jacksonstun, *Van Vuuren* 65. Krugersdorp: 1 mile N.W. of Krugersdorp, *Mogg* 20305. Letaba: Grootbos Government Forest Reserve, *Scheepers* 896. Nelspruit: Numbi, *Van der Schijff* 1614. Pietersburg: near Woodbush, *Gillett* 3192 (BOL). Pilgrim's Rest: Mariepskop, *Van der Schijff* 5006. Pretoria: Fountains Valley, *Repton* 717. Soutpansberg: Downs, *Junod* 4133. Ventersdorp: Goedgedacht, *Sutton* 715.

In his description of *Asparagopsis setacea*, Kunth cited only one collecting, namely *Drege* 8584. However, he referred to two specimens, of which one was in Berlin, and has now been destroyed, and one in "Herb. Luc.". This specimen is now in Kiel. It is labelled *Drege* 8584b and was collected at Karatara in the George district.

Baker cited several specimens in his description of *A. plumosus*. Of these, *Drege* 4482 (K) from Port Natal, and *Cooper* 202, partly, (K) from British Kaffraria, have been seen by the present author. A third specimen, *Gerrard & McKen* 754 without precise locality, could not be found at Kew. Baker cited *Asparagopsis setacea* Kunth under the synonymy of *Asparagus declinatus* L. He separated *A. declinatus* from *A. plumosus* on the cladodes being filiform in *A. plumosus* but more robust in *A. declinatus*. *Asparagus declinatus* was described by Linnaeus in his *Species Plantarum* (1753) as being spineless, with declinate branches, and setaceous cladodes, and as coming from Africa. Baker upheld this species in both the *Journal of the Linnean Society*, and in the *Flora Capensis*, and cited *MacOwan* 1917 and *Thunberg* s.n. These gatherings are included here in *A. setaceus*. It is possible that *A. declinatus* L. and *A. setaceus* are conspecific, but the true identity of *A. declinatus* is obscure and it is best discarded as a *nomen dubium*.

7. *A. denudatus* (Kunth) Bak. in *Journ. Linn. Soc. Bot.* 14: 606 (1875); *Fl. Cap.* 6: 258 (1896). Type: Queenstown, Stormberg, *Drege* 3533 (BOL, lecto!).

*Asparagopsis denudata* Kunth, *Enum. Pl.* 5: 82 (1850).

*Asparagus namaensis* Schinz in *Bull. Herb. Boiss.* 1, 4, app. III: 44 (1896); Sölch, *Beitr. Fl. Südwest-Afr.* 37 (1961). Type: Great Namaqualand, *Fleck* 307a (Z, holo!). *A. pearsonii* Kies in *Bothalia* 6: 179 (1951); Sölch, *Beitr. Fl. Südwest-Afr.* 38 (1961). Type: Raman's Drift, *Pearson* 4003 (K, holo.).

Roots fibrous. Stems erect to about 1 m or scrambling to nearly 2 m, zigzagging, glabrous, smooth or wrinkled but never regularly grooved, green; the outer layers easily separable from the aerial stems and branches, but not peeling. Branches usually solitary but sometimes 2- or 3-nate, frequently—especially the more distal ones—spreading or reflexed, not bearing branchlets, similar to the stems. Cladodes terete, straight or slightly arcuate, up to 30 mm long, up to 5-nate laterally but usually 2- or 3-nate terminally (rarely up to 8-nate terminally), the outer layers often lost from the distal parts of the cladodes after maturity. Spines developed only on the larger branches and the stems, small, reflexed, straight, up to 3 mm long, pale coloured. Peduncles often terminal and up to 4-nate or rarely more, axillarily only 2- or 4-nate, 2-6 mm long, articulated near or below the centre. Perianth segments entire, similar, oblong to oblong-obovate, greenish white to yellowish white, 2.5-3.0 mm long. Stamens slightly shorter than the perianth segments; anthers orange. Style about 1 mm long, shortly divided; ovary about 1 mm long. Berry red, up to 3-seeded, about 4 mm diameter.

This species is found in two areas with rather different climates. In the north-west it occurs over most of the drier areas of South West Africa, Bechuanaland and the north-west Cape. In the south-east it is confined to Basutoland and the neighbouring areas of the Cape and Orange Free State. Flowers have been recorded from October to April in the south-east, but are apparently mainly restricted to the second half of this period in the north-west.

CAPE.—Aliwal North: Elandshoek, *Bolus* 151. Cathcart: Cathcart, *Comins* 1741. Gordonia: Aughrabies Falls, *Leipoldt* 4437 (BOL). Herschel: Majuba Nek near Sterkspruit, *Hepburn* s.n. (GRA). Queenstown: Long Hill, *Galpin* 2092 (BOL). Sterkstroom: Stormberg, *Drege* 3533 (BOL). Wodehouse: Buffelsfontein, *Stretton* 66.

BASUTOLAND.—Leribe, mountain slopes, *Dieterlen* 828; Mafeteng, Tatai River, *Dieterlen* s.n.; Mamathes, *Jacot Guillarmod* s.n.

ORANGE FREE STATE.—Ficksburg: Westburg, *Galpin* 13881. Paul Roux: Rexford, *Acocks* 13174.

SOUTH WEST AFRICA.—Bethanie: Kuibis, *Range* 854 (SAM). Gibeon: Haribes, *Volk* 12168 (M). Karibib: road to Roten Kuppe, *Kinges* 3184 (M). Keetmanshoop: 3.6 miles from Aroab on road to Koes, *De Winter* 3457. Kaokoveld: Otjitundua, *Barnard* s.n. (SAM). Lude itz: Weissenborn, *Kinges* 2404. Maltahöhe: Duwisib, *Volk* 12482 (M). Okahandja: Osondu, *Walter* 1364 (M). Ovambo-land: Odonga-Nukuambi, *Rautanen* 105 (Z). Swakopmund: Walvis Bay, *Hardy & De Winter* 1442.

Kunth based his description of this species on *Drege* 3533. The specimen in the Berlin Herbarium has been destroyed and, as the specimen bearing this number in the Bolus Herbarium matches Kunth's description, it has been selected as a lectotype.

*Asparagus denudatus* was characterised mainly by the absence of cladodes, but several specimens have been found in which a few cladodes are present. In all collections which include both flowering and sterile material, the sterile specimens invariably have cladodes. This shows that the absence of cladodes is only a seasonal phenomenon. The surface characters of the stems and the appearance of the spines are extremely characteristic both of the typical material of *A. denudatus*, which was originally described from the south-eastern Cape, and of typical *A. namaensis*, which was described from South West Africa. These two species were separated from one another on the presence or absence of cladodes. As it has been shown that this is not as significant a character as previously thought, it is more satisfactory to combine these species.

8. *A. virgatus* *Bak.* in *Saund. Ref. Bot.* t. 214 (1870); *Journ. Linn. Soc. Bot.* 14: 606 (1875); *Fl. Cap.* 6: 259 (1896). Type: Somerset East, Boschberg, *Burchell* 3197 (K, lecto.!).

Roots fibrous. Stems erect to 1 m, straight, glabrous, smooth, slightly herbaceous. Branches similar to the stems, ascending, solitary, not bearing branchlets. Cladodes up to 7-nate, but frequently 3-nate, up to 25 mm long, usually straight. Spines only represented by a blunt spur, never pungent. Peduncles terminal and axillary, up to 6-nate, 5-9 mm long, usually articulated below the centre. Perianth segments oblong-ovate, similar, entire, 3-4 mm long, pale yellowish green. Stamens slightly shorter than the perianth segments. Style shortly divided, 1 mm long; ovary sometimes slightly more than 1 mm long; cells 3- or 4-ovuled. Berry globose, 1-seeded, smooth or wrinkled, about 5 mm diameter, red.

This species occurs in most parts of the wetter areas of the eastern half of South Africa. It is particularly frequent on the margins of forests, but also grows in other shady places. It also occurs in Rhodesia and Mozambique. Flowers have been recorded mainly from September to January, but also in April.

CAPE.—Aliwal North: Elands Hoek, *Bolus* 205 (BOL). Barkly East: Barkly East, *Gerstner* 180. Cathcart: Inverthorn, *Barker* 3513 (NBG). East London: East London, *Ratray* s.n. (GRA). Kentani: Kobongaba River, *Pegler* 1462. King Williams Town: King Williams Town, *Sim* 1050 (BOL). Komga: Komga, *Flanagan* 1292. Mount Currie: Kokstad, *Mogg* 1805. Somerset East: Zuurburg, *Holland* 199. Stockenström: Katberg, *Ecklon & Zeyher* s.n. (BOL). Stutterheim: Donga Range, *Acocks* 9336. Uitenhage: Uitenhage, *Schmutz* s.n. (BOL).

BASUTOLAND.—Maseru, *Compton* 22534 (NBG).

NATAL.—Bergville: Cathedral Peak, *Esterhuysen* 12878. Camperdown: Cato Ridge, *Fairall* 147 (NBG). Durban: Isipingo, *Schlechter* 2993 (BOL). Eshowe: near Reservoir, *Lawn* 554 (NH). Estcourt: Estcourt, *West* 1334. Hlabisa: Hluhluwe Game Reserve, *Ward* 2283. Inanda: Inanda, *Wood* 1373 (NH). Klip River: Van Reenen, *Franks* s.n. (NH). Lions River: Howick Falls, *Barker* 3567 (NBG). Ngwavuma: Lebombo Mountains, Gwalaweni Forest, *Strey* 4692. Nongoma: 11 miles N. of Nongoma, *Jessop* 672. Pietermaritzburg: Oribi, *Lawson* 641 (NH). Ubombo: near turning to Mkuze Game Reserve, *Jessop* 667. Utrecht: Utrecht, *Thode* A1297.

SWAZILAND.—Mbabane, Fonteyn, *Compton* 25980 (NBG); Isateki Beacon, *Compton* 27313.

TRANSVAAL.—Barberton: Barberton, *Galpin* 1155. Belfast: Belfast, *Bruce* 480. Brits: Jacksonstuintuin, *Van Vuuren* 211. Ermelo: Breyten, *Burt Davy* s.n. Letaba: Duivelskloof, *Scheepers* 328. Lydenburg: 4½ miles N. of Branddraai, *Codd* 6713. Marico: Zeerust, *Leendertz* 11324. Middelburg: near Botsabelo, *Marloth* 11751. Pietersburg: Magoebaskloof, *Papendorf* 230. Pilgrim's Rest: Nooitgedacht, *Young* A656. Potgietersrus: Naboomspruit, *Galpin* 343. Pretoria: Wonderboom Reserve, *Repton* 2015. Rustenburg: Kloof, *Lanham* s.n. Soutpansberg: Soutpansberg, *Burt Davy* 2654. Wakkerstroom: Oshoek, *Devenish* 407. Warmbad: near Warmbad, *Acocks & Hafström* 196. Waterberg: Zandspruit near Sandrivierspoort, *Forssman* s.n.

An illustration accompanies the type description. There is also a reference to the manuscript name, *A. sylvaticus* Burch. There is a specimen in the Kew herbarium, collected by Burchell on the Boschberg, bearing a label with the name *A. sylvaticus* on it. As this specimen matches both Baker's description and the figure, and it is extremely likely that this is the source of the manuscript name to which Baker referred, it is necessary to choose, in the absence of any other specimen, between this specimen and the illustration for the lectotype of this species. The specimen is preferred.

*De Winter* 3909 from Okavongo (M, PRE) has been regarded as belonging to this species, but has rather large thorns, and rather woody stems and branches. Its true identity is obscure.

9. *A. fasciculatus* Thunb., Fl. Cap. ed. 2: 329 (1818). Type: Cape without precise locality, *Masson* s.n. (UPS, holo.!; BOL!, photos).

*Asparagopsis consanguinea* Kunth, Enum. Pl. 5: 76 (1850). Type: Cape without precise locality, *Drege* s.n. (?KIEL!, ?K!).

*Asparagus consanguineus* (Kunth) Bak. in Journ. Linn. Soc. Bot. 14: 615 (1875); Fl. Cap. 6: 260 (1896).

Roots slightly thicker than usual for this section, but not tuberous. *Stems* prostrate or weakly climbing to about 1 m, glabrous, softly woody, usually light brown or less often green, especially when young, to dark brown, zigzagging at the nodes. *Branches* solitary, usually slightly reflexed; final branches not well enough defined to be regarded as branchlets, very narrow, often consisting of a single internode with a fascicle of cladodes at the base, or rarely with more than two or three internodes. *Cladodes* often extremely fine, linear, arcuate, numerous in a fascicle, 15–30-nate or more, up to 7 mm long, but often only about 4–5 mm long; the cladodes in each fascicle usually not overlapping those of adjacent nodes. *Spines* may be present on the lower parts of the main stems, but rarely exceeding 2–3 mm in length. *Peduncles* axillary or terminal, 1–3-nate, variable in length, up to 5 mm long, articulated at the base of the flower. *Perianth segments* oblong, reflexed, about 4 mm long, with a broad brownish streak. *Stamens* as long as the perianth segments, with a spur at the base; anthers yellow, about 0.5 mm long. *Style* about 2 mm long. *Berry* yellow, fleshy, globose, wrinkled, normally 3-seeded.

This species occurs in the south-western Karroo, as well as parts of the western Cape. It is frequent in the coastal vegetation of the Sand Veld, but has not been recorded further south than Milnerton. Flowers have been recorded from March to June.

CAPE.—Calvinia: 5½ miles S. of Loeriesfontein, *Acocks* 14414. Cape: near Blaauwberg, *Oliver* s.n. (BOL). Ceres: Muishond River, *Esterhuysen* 1805. Clanwilliam: Clanwilliam, *Zeyher* 1675 (STE). Hopefield: Langebaan, *Jessop* 70 (BOL). Laingsburg: Whitehill, *Compton* 14645 (NBG). Malmesbury: S. side of Paardeberg, *Van Niekerk* 358 (BOL). Namakwaland: Witbank, *Pillans* 5113 (BOL). Tulbagh: Saron, *Schlechter* 7890. Vanrhynsdorp: Bitterfontein, *Ecklon & Zeyher* 1675.

There appears to be no doubt from the protologue that this was the species which Thunberg was describing. There are three specimens labelled *A. fasciculatus* in the Thunberg Herbarium. Of these two do not match Thunberg's description as they



have well developed spines. The third, however, matches in every character. This specimen, on which is written: "e. Cap. b. Spei. Mason", belongs to *A. fasciculatus* as contrued here. The collector was probably Francis Masson, who was in South Africa at the same time as Thunberg.

Kunth based his species on a Drege specimen, but he did not give either the locality or collecting number. In his description, he mentioned the apical articulation of the peduncle, which is the best character of this species, the climbing habit, the lack of spines, and the numerous, fascicled cladodes. Two specimens collected at the Cape by Drege, and showing the above characters, have been examined by the author. The specimen at Kiel lacks a number. As Kunth mentioned in his *Enumeratio Plantarum* other specimens which are now in the Kiel Herbarium, it seems possible that this was the specimen on which Kunth based his species. This specimen also lacks a locality. A specimen in the Kew Herbarium was collected between the Krom River and Petrusfontein on the Piketberg. It also lacks a number and may be an isotype.

In several respects *A. fasciculatus* does not seem to belong to the section *Africani* but rather to the section *Crispi*. It has numerous cladodes, fibrous roots and few-seeded fruits, characteristic of the section *Africani*, but the spurred anther filaments and herbaceous habit would refer it to the section *Crispi*. On balance, it seems to be best placed in the section *Africani*.

10. *A. thunbergianus* Schult. in R. & S., *Syst. Veg.* 7: 333 (1829); Bak. in *Journ. Linn. Soc. Bot.* 14: 615 (1875); Fl. Cap. 6: 262 (1896); Salter in *Fl. Cape Penins.* 175 (1950). Type: Cape Peninsula, *Thunberg* s.n. (UPS, holo.!, BOL!, PRE!, photos).

*Asparagus albus* sensu Thunb., *Prodr.* 66 (1794). *A. capensis* sensu Marloth, *Fl. S. Afr.* 4: pl. 20 (1915).

*Asparagopsis dregii* Kunth, *Enum. Pl.* 5: 84 (1850). Type: Cape of Good Hope. *Drege* s.n. (?K, iso.). *A. thunbergii* Kunth, *Enum. Pl.* 5: 85 (1850), nom. illegit. Type: as for *A. thunbergianus*. *A. niveniana* sensu Kunth, *Enum. Pl.* 5: 88 (1850).

Roots fibrous. *Stems* erect to 1 m, or forming a dense bush up to 150 cm high and 200 cm broad, in dense shade sometimes climbing to 150 cm, pale to dark brown, glabrous, zigzagging. *Branches* glabrous, spreading or ascending, solitary, similar to the stems. *Cladodes* fascicled, terete, slightly arcuate, 3–8 mm long, rarely up to 20 mm, ascending or spreading. *Peduncles* axillary or terminal, usually solitary, 3–6 mm long, articulated below the centre. *Perianth segments* spreading, white, obovate, 2–3 mm long. *Stamens* nearly as long as the perianth segments; anthers brown, 0.5 mm long. *Styles* about 1 mm long; ovary about 1 mm long. *Berry* globose, up to 8 mm diameter, with a single seed, red.

This species occurs, usually in low bush, from the Cape Peninsula to Clanwilliam in the north and Uitenhage in the east. Flowers have been recorded from January to June.

CAPE.—Bellville: Tigerberg, *Pillans* 8658 (BOL). Bredasdorp: Nachtwacht, *Smith* 3022A. Caledon: Hermanus, *Rogers* 26572. Cape: above Camps Bay, *Marloth* 9492. Clanwilliam: Clanwilliam, *Leipoldt* 408 (SAM). George: Montagu Pass near Herold, *Jessop* 592. Hopefield: between Hopefield and Paternoster, *Leipoldt* 3895 (BOL). Humansdorp: along river, *Britten* 1162. Knysna: Belvidere, *Duthie* 763 (BOL). Malmesbury: Darling Flora Reserve, *Rycroft* 1911 (NBG). Paarl: Dal Josaphat, *Tyson* 858 (BOL). Piketberg: Het Kruis, *Stephens & Glover* s.n. (SAM). Riversdale: *Albertinia* commonage, *Muir* 931. Simonstown: W. of Simonstown, *Wolley Dod* 933 (BOL). Somerset West: Knorhoek, *Jessop* 77 (BOL). Stellenbosch: Stellenbosch, *De Jongh* s.n. Swellendam: Grootvadersbos, *Taylor* 1042 (NBG). Tulbagh: Saron, *Schlechter* 7887. Uitenhage: Theescomb, *Paterson* 853 (BOL). Wellington: Wellington, *Thomson* 153. Wynberg: Kirstenbosch, *Middlemost* 2008 (NBG).

Thunberg included *Asparagus albus* L. in his *Prodromus plantarum Capensium*. In his herbarium, there is a sheet labelled "*Asparagus albus*, p. Withering". On this sheet there is a specimen of *A. thunbergianus* Schult., but there is also a specimen of

another species—perhaps *A. albus* L. from Europe. The specimen of *A. thunbergianus* is of a young shoot, but it shows the reflexed, solitary spines, smooth (somewhat wrinkled during drying) stem and general appearance of a young shoot of *A. thunbergianus*. The description, however, applies equally well to either specimen. It seems probable that Thunberg did not realise that there were specimens from different countries on this sheet, but recognised the European specimen as *A. albus* L.

Schultes described *A. thunbergianus* as being from the Cape Peninsula. He described it as a shrub up to two feet or more high with grooved stems and with solitary, recurved spines and fascicled cladodes. He cited Thunberg's *A. albus* L. as a synonym, and as no other specimen on which he could have based his species is known to have existed the Thunberg specimen may be regarded as the holotype.

*Asparagopsis dregii* was described by Kunth as having been collected at the Cape of Good Hope by Drege, but this specimen was destroyed in Berlin. The branches were described as smooth, glabrous and spinous. He regarded it as very similar to *Asparagopsis thunbergii* (based on *Asparagus thunbergianus* Schult.) but the description makes it very likely that these names were based on specimens of the same species. A specimen in Kew was collected by Drege but, like the specimen which Kunth had, had no number. It is labelled "Table Mountain and Devils Mountain. *Asparagopsis dregei* Kth.". It seems very likely that this is an isotype.

*Asparagus nivenianus* Schult. was based on a specimen collected by Niven at the Cape. This specimen has not been located and it is not possible to tell from the description whether this was a specimen of *A. thunbergianus* or of *A. africanus*. This name must therefore be regarded as a *nomen dubium*. Kunth transferred the epithet to *Asparagopsis* and cited Ecklon 95b from the Cape as the only specimen he had seen of *Asparagopsis niveniana*. A specimen of this collecting in the Munich Herbarium is of *A. thunbergianus*.

11. *A. mucronatus* Jessop, sp. nov., *A. thunbergiano* Schult. affinis, sed caulibus ramisque maioribus, bracteis manifesto evolutis et ad basim ramulorum persistentibus differt. PLATE 1.

Radices non tuberosi. *Caules* recti ad 2 m, plerumque c. 1 m, basi bracteis manifestissime evolutis ad 2 cm longis, glabri, costis magnis, basi recti, supra tortuosi, cani vel fuscii. *Rami* caulium partibus distalibus similes, rami minores nonnumquam pubescentes vel scabridi, *Ramuli* fasciculati, ad 6-nati, pubescentes vel scabridi, recti ad 6 cm longi; ramuli juvenes saepe bracteis manifesto evolutis et basi persistentibus ad 5 mm longis. *Cladodia* recta vel arcuata, teretes, mucrone non-spinoso et non-colorato, 3–8 mm longa, in ramulis orta, ad 10-nata. *Spinae* magnae, recurvae. *Pedunculi* in ramulis axillares, 1-vel 2-nati, 4–7 mm longi, submedio articulati. *Perianthii segmenta* oblongo-obovata, 3–4 mm longa, margine integro, similia. *Stamina* quam perianthii segmenta paulum breviora; antherae  $\frac{1}{4}$  mm longae, subglobosae. *Ovarium* fere 1 mm longum; stylus breviter ramosus, c. 1 mm longus. *Bacca* globosa, succulenta, deinde rugosa, rubra, fere 5 mm diam., seminibus 1 vel saepe 2.

Type: Cape: Middelburg district, Grootfontein, *Theron* 551 (PRE, holo.).

Roots fibrous. *Stems* erect to 2 m, usually about 1 m high, bearing very pronounced, acute bracts up to 2 cm long at the base, glabrous, smooth, with large ridges, straight at the base, becoming slightly zigzag, grey to brown. *Branches* similar to the distal parts of the stems, the younger ones sometimes pubescent or scabrid. *Branchlets* fascicled, up to 6-nate, pubescent or scabrid, straight, up to 6 cm long, often bearing well-developed bracts up to 5 mm long when young and persisting towards the base. As the stems are at least biennial, at times new and old branchlets occur simultaneously, in which case the younger ones are paler, more pubescent, and bearing larger bracts, and possibly peduncles. *Cladodes* straight or arcuate, terete, with a non-pungent,

colourless mucro, 3–8 mm long, borne on the branchlets, up to 10-nate. *Peduncles* axillary on the branchlets, 1- or 2-nate, 4–7 mm long, articulated below the middle. *Perianth segments* oblong-obovate, 3–4 mm long, entire, similar. *Stamens* slightly shorter than the perianth segments; anthers  $\frac{1}{2}$  mm long, rather globose. *Ovary* about 1 mm long; style shortly divided, slightly less than 1 mm long. *Berry* globose, fleshy, wrinkled when ripe, about 5 mm diameter, with a single or occasionally two seeds, red.

This species is fairly common in at least some parts of the Karroo and Little Karroo, but also occurs as far east as the Cathcart district. Flowers have been recorded from October to December.

CAPE.—Albany: Queens Road, *Britten* 5159 (GRA); Botha Hill, *Dyer* 1124 (GRA); Plutos Vale, *Jessop* 637. Calvinia: Calvinia, *Schmidt* 358. Cathcart: about 5 miles N. of Cathcart, *Jessop* 661. Graaff-Reinet: Graaff-Reinet, *Henrici* 4943. Hay: Blaauwbosput, *Acocks* 2011. Herbert: Valschfontein, *Acocks* 2598; Heuningneskloof, *Moran* s.n. (BOL). Kimberley: Mauretzfontein, *Acocks* 2580; *Acocks* 4957 (BOL). Laingsburg: Matjiesfontein, *Foley* 62. Middelburg: Grootfontein, *Theron* 551 (BOL). Montagu: between Dobbelaarskloof and Montagu, *Esterhuysen* 1872; 10 miles N.E. of Montagu, *Jessop* 678. Port Elizabeth: Redhouse, *Denman* 282; *Paterson* 960 (BOL); *Paterson* 977 (BOL). Vanrhynsdorp: Langeberge, *Marloth* 12953. Worcester: Veld Reserve, *Olivier* 276.

The greatest similarity is with *A. thunbergianus*. It is, however, a much larger and more robust plant. It also differs in having scale leaves, and pubescence on the final branches.

12. *A. macowanii* Bak. in Journ. Linn. Soc. Bot. 14: 609 (1875). Type: Albany, *Zeyher* 879 (K, lecto.!; BOL!).

Roots fibrous. *Stems* erect, softly woody, glabrous, smooth or slightly grooved, usually white, up to about 2 m high. *Branches* similar to the stems, solitary. *Cladodes* fascicled, numerous, terete, arcuate, up to about 12 mm long. *Spines* not well-developed, absent from final branches. *Peduncles* terminal or axillary, sometimes solitary but usually up to 12-nate, articulated proximally. *Perianth segments* oblong to oblong-obovate, 2.5 mm long, pale. *Stamens* slightly shorter than the perianth segments; anthers less than 0.25 mm long; ovary 1.5–2 mm long, ovoid. *Fruit* not known.

Southern Cape, eastwards through Natal, and in the eastern districts of the Transvaal. Also in Mozambique.

For key to varieties see key to species.

(a) var. *macowanii*.

*A. macowanii* Bak. in Journ. Linn. Soc. Bot. 14: 609 (1875); Fl. Cap. 6: 261 (1896).

The typical variety is characterised by its smaller size. The stems are rarely over 75 cm high. The stems are sometimes grooved at first, but soon become smooth.

This variety occurs in the southern Cape from Knysna to Komga, and inland as far as Glen Grey. Flowers have been recorded from September to November and in April and May.

CAPE.—Albany: Howieson's Poort, *Zeyher* 879 (BOL, K). Bathurst: Horseshoe on the Kariega River, *Jessop* 616. Bedford: Bedford, *Gane* 88 (GRA). Glen Grey: White Kei Falls, *Galpin* 2504. Knysna: Plettenbergbaai, *Rogers* 26747. Komga: Prospect Farm, *Flanagan* 296. Somerset East: Somerset East, *MacOwan* s.n. (BOL, SAM); *Rogers* 161; 164 (GRA); Boschberg, *Tyson* 1878.

Baker, in his type description, cited *Zeyher* 879 from Albany and *MacOwan* 1917 from Somerset East. In the Flora Capensis, however, he removed the *MacOwan* specimen to *A. declinatus*. It therefore seems best to regard the *Zeyher* specimen as

the lectotype. There are specimens of a MacOwan collecting of this species in the Bolus and South African Museum herbaria. This collecting is not numbered but was also collected in the Somerset East district. It seems possible that these are of the same collecting as the specimen seen by Baker when he drew up the original description. It would otherwise be hard to explain the epithet.

(b) var. *zuluensis* (N. E. Br.) Jessop, stat. nov.

*A. zuluensis* N. E. Br. in Kew Bull. 1912: 283 (1912). Type: Zululand, Wylie sub Medley Wood 11969 (K, holo.!; NH!, PRE!).

This variety differs from the typical variety in being a much larger plant. The stems are much-branched and up to 2 m high. The stems and branches are always smooth and whitish. Spines are developed, although not large or pungent, on the main stems and branches only.

Occurs from the Camperdown district in the south, through Zululand and into the eastern Transvaal as far north as the Pilgrim's Rest district. Flowers have been recorded from September to November.

NATAL.—Camperdown: Cato Ridge, McClean & Ogilvie s.n. (NH). Eshowe: Umlalazi Bridge, Lawn 750 (NH). Hlabisa: Hluhluwe Game Reserve, Ward 4334. Mahlabatini: Umfolozi Game Reserve, Ward 4379. Mtonjaneni: Mtonjaneni, Gerstner 3665. Mtunzini: Ngoya Forest Reserve, Huntley 268.

TRANSVAAL.—Barberton: Barberton, Thorncroft 16. Piet Retief: 13 miles from Pongola to Gollel, Dyer & Verdoorn 5832. Pilgrim's Rest: Eileen Orpen Dam near Tshokwane, Codd 6138.

N. E. Brown based *A. zuluensis* on a single collecting from Zululand by Wylie. Medley Wood made the herbarium specimens which he distributed from a specimen growing in the Durban Botanic Garden. A plant which is very likely the original Wylie specimen is still growing in these gardens near the herbarium.

The differences between this and the type variety are not usually distinguishable from herbarium material unless a note on the habit accompanies the specimen. The distribution of the two varieties, however, makes it possible to identify with certainty material of which the origin is known.

13. *A. retrofractus* L., Sp. Pl. 313 (1753); Bresler, Diss. 10 (1826); R. & S., Syst. Veg. 7: 330 (1829); Bak. in Journ. Linn. Soc. Bot. 14: 621 (1875); Fl. Cap. 6: 266 (1896); Salter in Fl. Cape Penins. 176 (1950). Type: without locality or collector (LINN No. 434.4, holo.; NBG!, PRE!, photos).

*Asparagopsis retrofracta* (L.) Kunth, Enum. Pl. 5: 78 (1850).

*Asparagus africanus* Lam. var. *microphyllus* Bak. in Fl. Cap. 6: 266 (1896). Type: Kuruman, Kosi Fontein, Burchell 2572 (K, holo.; PRE, photo!). *A. microphyllus* (Bak.) Kies in Bothalia 6: 178 (1951).

Roots fibrous. Stems scrambling or weakly climbing to 2 m or more, or forming dense bushes up to 2 m or more high, white and grooved at first, but becoming brown and smooth, zigzagging; swollen lateral buds are present at the nodes. Branches similar to the stems, spreading or reflexed, not bearing branchlets, pubescent when young. Cladodes fascicled, 6–30 mm long, arcuate, terete, spreading or ascending, not all the same length. Spines sometimes present, strongly reflexed, occasionally pungent, up to 6 mm long, never borne on the final branches. Peduncles axillary or terminal, usually 2–6-nate, 5–40 mm long, articulated below the centre. Perianth segments white with a green streak, narrow obovate, spreading, 3 mm long, margins entire, similar. Stamens almost as long as the perianth segments; anthers orange. Style divided for about half its length, 1 mm long; ovary slightly longer than the style. Berry globose, 1–3-seeded, 5 mm diameter, orange; perianth generally persistent.

This species occurs mainly in the drier areas of South West Africa and the Karroo, but extends into the winter-rainfall area as far as the Cape Peninsula. Flowers have been recorded mainly from April to June, but also at other times.

CAPE.—Barkly West: Klipvei, *Esterhuysen* 2083 (BOL). Beaufort West: Sunnyside, *Esterhuysen* 4357. Bellville: Tigerberg, *Pillans* 4758 (BOL). Caledon: 12 miles west of Caledon, *Salter* 7215 (BOL). Calvinia: Calvinia, *Schmidt* 556. Cape Town: Porcupine Buttress, *Pillans* 4327 (BOL). Carnarvon: 12 miles from Carnarvon on Van Wyks Vlei road, *Acocks* 1741. Ceres: Karroopoort, *Marloth* 9008. Clanwilliam: Modderfontein, *Gillett* 3695 (BOL). Gordonia: Aughrabies Falls, *Jessop* 351 (BOL). Graaff-Reinet: 14 miles north of Graaff-Reinet, *Jessop* 651. Herbert: Campbell Kloof, *Wilman* 4069 (BOL). Laingsburg: Whitehill, *Compton* 8523 (NBG). Malmesbury: near Darling, *Bolus* 12859 (BOL). Montagu: Cogman's Kloof, *Barker* 959 (NBG). Namakwaland: Hondeklip Bay, *Pillans* s.n. (BOL). Oudtshoorn: road to Armoed via Baakens Kraal, *Britten* 1706. Prieska: Prieska district, *Bryant* J224. Stellenbosch: Papagaaisberg, *Duthie* 452 (STE). Vanrhynsdorp: Heerenlogementsberg, *Zeyher* 1674 (BOL). Vryburg: Vryburg, *Mogg* 8976. Worcester: Welgevonden, *Esterhuysen* 1903.

SOUTH WEST AFRICA.—Gibeon: Harris, *Fleck* 296a (Z). Keetmanshoop: Swartkop, *Ortendahl* 83. Ludertiz: Aus, *Peyer* 15 (Z). Maltahöhe: Duwisib, *Volk* 126363 (M). Warmbad: Kanus, *Range* 907 (SAM). Windhoek: Windhoek, *Rogers* 30480 (Z).

Linnaeus, in his type description, cited Plukenet, Phyt. t.375 f.3. This figure shows the typical characters of *A. retrofractus* L. as construed here. There is a specimen in the Linnaean Herbarium labelled *A. retrofractus* and probably received before 1753 (see Jackson, 1912). This specimen is therefore likely to be the holotype.

This species is replaced to the east by *A. laricinus* which, particularly on herbarium material, is sometimes difficult to distinguish. Usually a less regular arrangement of the cladodes distinguishes *A. retrofractus*, but the typically ascending arrangement of the cladodes is not always apparent in *A. laricinus*, which can then be identified by having small spines on the final branches, and by its more eastern distribution. In the field, *A. retrofractus* can often be recognised as a climber or scrambler, while *A. laricinus* is a large bush.

14. *A. compactus* *Salter* in Journ. S. Afr. Bot. 6: 165 (1940); Fl. Cape Penins. 175 (1950); Kies in Bothalia 6: 179 (1951). Type: Cape Peninsula, Orange Kloof, *Wolley Dod* 2521 (BOL, holo.!).

*A. africanus* Lam. var. *wrightii* Bak. in Journ. Linn. Soc. Bot. 14: 619 (1875); Fl. Cap. 6: 266 (1896). Type: Simons Bay, *Wright* 454.

Roots fibrous. Stems erect, normally about 50 cm long, zigzagging, woody, white, minutely pubescent, grooved; outer layers sometimes lost leaving the stems brown and smooth. Branches spreading to ascending, similar to the stems. Cladodes fascicled, commonly up to 10-nate terminally, and fewer laterally, more or less straight, ascending to spreading, 3-angled, rarely up to 1 mm thick, rigid, 10–30 mm long. Spines pungent, spreading, recurved or reflexed, present on the aerial stems and all branches. Peduncles axillary or terminal, 1- or 2-nate laterally, and up to 4- or 5-nate terminally, 5–7 mm long, articulated below the centre. Perianth segments obovate, similar, entire, white, about 3 mm long. Stamens slightly shorter than the perianth segments, not spurred; anthers about  $\frac{3}{4}$  mm long. Style divided for nearly half its length, about 1 mm long. Berry globose, fleshy, red, about 6 mm diameter, 1–3-seeded.

This species is confined to the south-western Cape, occurring from near sea-level to 3,000 ft or more on well-drained mountain slopes. Flowers have been recorded in October, December, January and from March to May.

CAPE.—Bellville: south side of Tigerberg, *Pillans* 8655 (BOL). Caledon: Swartberg near Caledon, *Schlechter* 10364. Cape: Paarden Eiland, *Salter* 8268. Ceres: Milner Peak, *Esterhuysen* 7804 (BOL). Malmesbury: near Kalabas Kraal, *Salter* 7198 (BOL). Paarl: above Franschoek, *Jessop* 102 (BOL). Piketberg: Porterville, *Loubser* 810 (BOL). Simonstown: Clovelly, *Salter* 8209 (BOL). Somerset

West: Knorhoek, *Jessop* 89 (BOL). Stellenbosch: Swartboskloof, *Van Rensburg* 268 (STE). Sutherland: near Sutherland, *Du Toit* s.n. (BOL). Tulbagh: Sneeuwgat Valley, Great Winterhoek, *Phillips* 1880 (SAM). Wellington: Bains Kloof, *Salter* 7307 (BOL). Wynberg: Orange Kloof, *Wolley Dod* 2521 (BOL).

The holotype is cited by Salter as *Wolley Dod* 2521 (BOL). Salter regarded this species as very probably identical with *A. africanus* var. *wrightii* Bak., which was based on *Wright* 454. Baker's description mentioned grooved branches. The cladodes were given as very stout, angled, with a groove down each face, and the berries as being larger than for the typical variety. This is not adequate to identify the species with certainty, but with the locality, given as Simonstown, it is almost certainly this species. According to Salter (1940), Professor Compton searched for the type in Europe, but was unable to find it.

15. *A. laricinus* Burch., Trav. 1: 537 (1822); Bresler, Diss. 40 (1826); R. & S., Syst. Veg. 7: 337 (1829); Kunth, Enum. Pl. 5: 75 (1850); Bak. in Journ. Linn. Soc. Bot. 14: 620 (1875); Fl. Cap. 6: 267 (1896); Sölch, Beitr. Fl. Südwest-Afr. 37 (1961). Type: Hay, between Griquatown and Wittewater, *Burchell* 1971 (K, holo.!; PRE, photo.).

*Asparagus africanus* Lam. var. *concinus* Bak. in Journ. Linn. Soc. Bot. 14: 619 (1875); Fl. Cap. 6: 266 (1896). Type: Pearston, Bruintjes Hoogte, *Burchell* 3020 (K, holo.!; PRE, photo.). *A. concinns* (Bak.) Kies in Bothalia 6: 178 (1951).

Roots fibrous. Stems erect, forming much-branched shrubs up to 2 m high, but usually only about 150 cm or less, often zigzagging or tortuous, woody, white, pubescent and usually grooved when young, but soon losing the outer layers and becoming smooth and darker. Branches similar, but retaining the grooved outer layers longer. Cladodes fascicled, 15–60-nate laterally, more numerous terminally, more or less straight, ascending, terete, fine but rigid, all approximately the same length at each node, 8–30 mm long. Spines pungent, ascending to recurved, usually present on all branches. Peduncles axillary or terminal, commonly up to 7 or 8 terminally and 3 or 4 laterally, up to 7 mm long, articulated below the centre. Perianth segments obovate, similar, entire, white, 2.5–3 mm long. Stamens slightly shorter than the perianth segments, not spurred; anthers about  $\frac{3}{4}$  mm long. Style divided for nearly half its length, about 1 mm long. Berry globose, about 6 mm diameter, fleshy, red, 1–3-seeded.

This species has a wide distribution from the south-eastern Cape to South West Africa, Bechuanaland and the Transvaal. Flowers have been recorded from September to December.

CAPE.—Albany: Mountain Drive, Grahamstown, *Britten* 2805 (GRA). Aliwal North: Elandshoek, *Bolus* 204 (BOL). Barkly West: Daniels Kuil, *Esterhuysen* 1153 (BOL). Cathcart: Fairford, *Cotterell* 126 (GRA). Fort Beaufort: Fort Beaufort, *Zeyher* s.n. Hay: between Wittewater and Griquatown, *Burchell* 1971 (K). Herbert: Heuningneskloof Station, *Moran* s.n. (BOL). Kimberley: Kimberley, *Moran* s.n. (BOL). Mafeking: Mafeking, *Burt-Davy* s.n. Mount Currie: Kokstad, *Mogg* 1806. Port Elizabeth: Swartkops Estuary, *Archibald* 4914 (GRA). Port St. Johns: Eagles Nest, *Schönland* 4077. Somerset East: Somerset East, *Bowker* s.n. (BOL). Sterkstroom: Andriesberg, *Galpin* 2168. Vryburg: Armoedsvlakte, *Mogg* 7922.

BATUTOLAND.—Leribe, *Dieterlen* 406.

NATAL.—Mooi River: Warley Common, *Mogg* 7152. Mtonjaneni: Melmoth, *Lawn* 1828 (NH). Mtunzini: Ginginhlovu, *Wyllie* s.n. (NH). Umzinto: Dumisa, *Rudatis* 1735.

ORANGE FREE STATE.—Bloemfontein: Leeuwkop, *Potts* s.n. (BOL). Fauresmith: Veld Reserve, *Henrici* 3951. Harrismith: Rensburgskop, *Jacobsz* 103. Kroonstad: Kroonstad, *Pont* 485. Senekal: Doornkop, *Goossens* 649. Thaba Nchu: The Willows, *Roberts* 2992. Vredefort: near Vredefort, *Pole Evans* 19474H. Wepener: sandstone hillside, *Acocks* 1172. Winburg: W. Pretorius Game Reserve, *Bakker* 1006.

TRANSVAAL.—Barberton: Malelane, *Murphy* s.n. Belfast: Dullstroom, *Codd* 5638. Bethal: Steenkool River, *Weintraub* s.n. Ermelo: Nooitgedacht, *Henrici* 1128. Germiston: Wattles, *Moss* 10503. Heidelberg: Suikerbosrand, *Mogg* 18133. Johannesburg: near Johannesburg, *Watt & Brandwyk* 2207. Kroonstad: Kroonstad, *Pont* 485. Krugersdorp: 30 miles W.N.W. of Johannesburg, *Mogg*

24235. Lichtenburg: Witstinkhoutboom, *Liebenberg* 44. Lydenburg: Steenkampsberg, *Young* A428. Marico: near Zeerust, *Vander Merwe* 128 (BOL). Pilgrim's Rest: between Pilgrim's Rest and Sabie, *Rogers* 20564. Potchefstroom: Potchefstroom, *Burt-Davy* 48. Pretoria: Irene, *Rogers* 11406 (BOL). Vereeniging: Vereeniging, *Leendertz* s.n. Wakkerstroom: Oshoek, *Devenish* 1157. Warmbad: Warmbad, *Leendertz* s.n. Wolmaransstad: Boskuil, *Sutton* 56.

SOUTH WEST AFRICA.—Gobabis: Okasondana, *Walter* 4163 (M). Windhoek: Voigtland, *Walter* 116 (S.W.A. Herb.).

BECHUANALAND.—Gaberones, *Rogers* 6254; Pharing, Kanye, *Hillary & Robertson* 466.

Burchell cited only his C.G. 1971 from between Griquatown and Wittewater. This specimen, in the Kew Herbarium, is therefore taken as the holotype.

In some areas, particularly to the south and east of its distribution, plants occur with rather small cladodes, but otherwise the normal characters for this species. A specimen of this form, *Burchell* 3020 from Bruintjes Hoogte, was described by Baker as *A. africanus* var. *concinus*. Kies raised this variety to specific status, but in the present author's opinion there are no grounds for giving this form taxonomic recognition.

This species is similar in many respects to both *A. retrofractus* L. and *A. macowanii* Bak. var. *zuluensis* (N. E. Br.) Jessop. The characters by which it can be distinguished from *A. retrofractus* are given under that species. The regular arrangement of the cladodes, the usually grooved stems, the development of spines on the final branches, and the more western distribution serve to distinguish it from *A. macowanii* var. *zuluensis*.

16. *A. microrhaphis* (*Kunth*) *Bak.* in Journ. Linn. Soc. Bot. 14: 612 (1875); Fl. Cap. 6: 262 (1896). Type: Queenstown, *Drege* 3534 (BOL, lecto!).

*Asparagopsis microrhaphis* *Kunth*, Enum. Pl. 5: 83 (1850).

*Asparagus stellatus* *Bak.* in Journ. Linn. Soc. Bot. 14: 612 (1875); Fl. Cap. 6: 262 (1896). Syntypes: "Albert Div.", *Cooper* 622 (K!); Aliwal North, Witteberge, *Drege* 8589 (K!).

Roots fibrous. Stems erect to 3 m, glabrous or minutely pubescent, ashen grey, grooved but becoming smooth and brown, softly woody, straight, much-branched, Branches similar to the stems, also branched, not bearing branchlets. Cladodes fascicled, glabrous or minutely pubescent, usually up to about 8-nate but occasionally up to 25-nate, 1–4 mm long. Spines usually well developed on aerial stems and main branches. Peduncles axillary, 1- or 2-nate, 5–6 mm long, articulated below the centre. Perianth segments oblong-obovate, entire, similar, spreading, white, 3–4 mm long. Stamens almost as long as the perianth segments. Styles shortly divided, about 1 mm long. Fruit not known.

This species occurs in bush or on grassy slopes in the eastern Cape, Basutoland and Natal. Flowers have been recorded in October and December.

CAPE.—Herschel: Herschel, *Gerstner* 18. Mount Ayliff: Kokstad, *Mogg* 1912. Queenstown: Table Mountain, *Drege* 3534 (BOL). Sterkstroom: Andriesberg, *Galpin* 2169. Wodehouse: Buffelsfontein, *Stretton* 65.

BASUTOLAND.—Leribe, *Dieterlen* 301; Mafateng, Thababa-Morena, *Dieterlen* 1374.

NATAL.—Bergville: Ndedema River Valley, *Killick* 1861. Estcourt: Giants Castle, *Symons* 38. Lions River: Inhleyane, *Moll* 1286. Wakkerstroom: 7 miles N.E. of Wakkerstroom, *Acocks* 11525 (NH).

Kunth, in his description of *Asparagopsis microrhaphis*, cited *Drege* 3634. The holotype is likely to have been destroyed in Berlin, but there is a specimen with this number in the Bolus Herbarium. As it matches Kunth's description in every detail this specimen has been selected as a lectotype.

A number of specimens, such as *Cooper* 622 and *Drege* 8589, are representatives of a group possibly deserving varietal status. They have extremely small and very numerous cladodes. This group was described by Baker under the binomial *A. stellatus*. No specimens of this vegetative form have ever been collected in flower, however, and it seems likely that this is only a seasonal form.

17. *A. exuvialis* Burch., Trav. 1: 432 (1822); Bresler, Diss. 40 (1826); R. & S., Syst. Veg. 7: 337 (1829); Kunth, Enum. Pl. 5: 74 (1850); Bak. in Journ. Linn. Soc. Bot. 14: 608 (1875); Fl. Cap. 6: 259 (1896); Schinz in Bull. Herb. Boiss. 1, 4, app. III: 42 (1896); Salter in Fl. Cape Penins. 175 (1950); Sölch, Beitr. Fl. Südwest-Afr. 36 (1961). Type: "Along the Vaal River, Griqualand West", *Burchell* 1768 (K, holo.!: PRE, photo!).

*A. ecklonii* Bak. in Journ. Linn. Soc. Bot. 14: 615 (1875); Fl. Cap. 6: 258 (1896). Type: South Africa, without locality, *Ecklon & Zeyher* s.n. (TCD, holo.!: PRE, photo.!: PRE, iso.!). *A. hereroensis* Schinz in Bull. Herb. Boiss. 1, 4, app. III: 43 (1896). Syntypes: Rehoboth, *Fleck* 295a (Z!); Harris, *Fleck* 549 (Z!).

Roots tuberous; the tubers almost sessile, about 5–10 cm long. *Stems* erect or twining, usually about 50 cm high, but occasionally up to about 2 m, woody, glabrous, smooth; the outer layers of the young stems pale, and peeling to leave the stems darker, sometimes almost black, straight or zigzagging. *Branches* similar to the stems, often spreading. *Cladodes* fine, terete, fascicled, from 5–30 mm long, deciduous. *Spines* absent or poorly developed, and reflexed; the leaf firm and deltoid, of a rather characteristic shape. *Peduncles* axillary, generally paired, but up to about 5-nate, articulated near or below the middle, 3–5 mm long; the flowers opening in a racemose sequence along the branches. *Perianth segments* oblong-obovate, entire, similar, about 3.5–4 mm long, with a brown or purplish streak, spreading. *Stamens* not spurred, nearly as long as the perianth segments; anthers yellow, about  $\frac{3}{4}$  mm long. *Style* shortly divided, about 1 mm long; ovary about 1 mm long. *Fruit* globose, turning black, dry, smooth; perianth not persistent.

This species is generally found in the Karroo and Kalahari, but does occur in moist areas as well. It is distributed from the south-western Cape northwards to the northern Transvaal, Bechuanaland and South West Africa. Flowers have been recorded from October to April. In the Cape Peninsula, and probably other areas, the flowers open in the morning, close at mid-day, and the following morning the next flower on the branch opens.

CAPE.—Barkly West: Daniels Kuil, *Esterhuysen* 1149 (BOL). Bellville: Kanonberg, *Compton* 115622 (NBG). Cape: Paarden Eiland, *Salter* 8294 (BOL). Clanwilliam: Lange Kloof, *Schlechter* 8051. Cradock: W. of Rayner's Koppie, *Acocks* 11926. Kimberley: Dorstfontein, *Acocks* 1404. Kuruman: Kaap Plateau, *Marloth* 14070. Malmesbury: Darling Flora Reserve, *Barker* 8670 (NBG). Namakwaland: Doornpoort, *Pillans* 5467 (BOL). Port Elizabeth: Redhouse, *Paterson* 963 (BOL). Postmasburg: Postmasburg, *Esterhuysen* 1153. Prieska: Dragoender, *Bryant* 1174. Queenstown: Queenstown, *Rogers* 2321 (GRA). Tulbagh: Wolseley, *Schlechter* 9949. Uitenhage: *Ecklon & Zeyher* 607. Vanrhynsdorp: Klawer, *Andrae* 411. Williston: Williston Station, *Smith* 2445. Worcester: near De Doorns, *Bolus* 13201. Wynberg: Princess Vlei, *Jessop* 88 (BOL).

ORANGE FREE STATE.—Bloemfontein: Bestersput, collector unknown, 13. Fauresmith: Voëlfontein, *Kies* 338. Jacobsdal: near Heuningneskloof Station, *Phillips* 3480. Luckhoff: Rosemarie, Kalkbult, *Henrici* 4260.

TRANSVAAL.—Pilgrim's Rest: 20 miles W. of Satara, *Codd* 6197. Potgietersrus: Naboomsrpuit, *Galpin* 347. Pretoria: 6 miles W. of Hammanskraal, *Kies* 371. Sibasa: Punda Milia, *Lang* s.n. Soutpansberg: Soutpan, *Obermeyer, Schweickerdt & Verdoorn* 51.

SOUTH WEST AFRICA.—Grootfontein: 157 miles E. of Grootfontein, *Storj* 6199 (M). Karibib: Marmorwerk, *Volk* 2757 (M). Luderitz: Aus, *Dinter* 6136 (B). Okahandja: Otjihua, *Dinter* 329 (SAM). Otjiwarongo: Okosongomingo, *Volk* 2523 (M). Outjo: Kamanyab and Kaross, *Thorne* s.n. (SAM). Rehoboth: Rehoboth, *Fleck* 295a (Z). Warmbad: Sandfontein, *Wilman* 1602 (SAM). Windhoek: Voigtland, *Walter* 2778 (M).

BECHUANALAND.—Ngami See, *Schinz* 900 (Z); Mochudi, *Marloth* 950.



There is a form from the north-eastern Transvaal in which the stems are more tortuous than usual, the flowers are more than 2-nate, and the perianth segments are yellowish (e.g. *Codd* 6197, *Obermeyer*, *Schweickerdt* & *Verdoorn* 97, *Lang* s.n. and *Van der Schijff* 911; all in PRE). This form does not seem to be sufficiently different to warrant separate taxonomic status.

18. *A. oxyacanthus* *Bak.* in Journ. Linn. Soc. Bot. 14: 625 (1875); Fl. Cap. 6: 270 (1896). Type: Somerset East, *Bowker* s.n. (K, holo.!; PRE, photo.!).

Tubers distant, about 6 cm long. *Stems* often unbranched, erect, smooth, straight, up to about 50 cm long, pubescent, with numerous narrow, softly spinous leaf spurs, grey to brown. *Branches* solitary, lacking branchlets, similar to the stems. *Cladodes* solitary, oblong, up to 4 cm, rarely to 8 cm, long, with a median vein and thickened margin, mucronate. *Peduncles* 2 mm long, solitary in the axils of large bracts, articulated distally. *Perianth segments* obovate, obtuse, white, 2–3 mm long, spreading to ascending, rather variable in width, but the inner whorl broader. *Anthers* large, up to 0.7 mm long. *Style* branches free, short; ovary globose. *Fruit* not known.

This species is restricted to the area from the Bathurst district to the East London district. It occurs mainly on rather dry slopes, particularly the slopes above the Fish River. Flowers have been recorded from October to January.

CAPE.—Albany: Overlooking Kaffir Drift, *Leach* & *Bayliss* 12646; Fraser's Camp, *Maguire* 632 (NBG). Bathurst: Fish River, *Dyer* 3375; *Schlechter* 6105 (BOL); Kleinemonde, *White* 952 (SAM). East London: East London, *Ratray* s.n. (GRA); Green Point, *Smith* 3765; East London Park, *Wood* s.n. Peddie: Bergha River Valley opposite Wooldridge, *Acocks* 11885.

This is one of the "fox-tail" species of the section *Racemosi*, but can easily be distinguished by the broad, mucronate cladodes, and the pubescent stem.

19. *A. juniperoides* *Engl.* in Bot. Jahrb. 10: 3 (1889); Schinz in Bull. Herb. Boiss. 1, 4, app. III: 44 (1896); Sölch, Beitr. Fl. Südwest-Afr. 37 (1961). Type: S.W.A., Aus, *Marloth* 1538 (B, holo.!).

Tubers sessile or shortly stalked, fusiform. *Stems* erect, glabrous, grooved, straight, annual, up to 1 m high. *Branchlets* narrow, numerous, up to 3 cm long, borne directly on the stems; branchlets and cladodes ascending, forming a dense cylinder round the stem. *Cladodes* solitary, flattened, usually very narrow, linear, often with ciliate margins, up to 1 cm long. *Leaves* not forming spines. *Peduncles* axillary, solitary, about 2 mm long, articulated distally. *Perianth segments* similar, oblong, with ciliate margins, ascending, 6 mm long, white with a green streak. *Stamens* nearly as long as the perianth segments; filaments not spurred; anthers minute, yellow. *Ovary* globose, 1.0–1.5 mm long. *Berry* globose, with one to three seeds, about 5 mm diameter, red.

This species occurs from Tulbagh, up the west coast into South West Africa. Flowers have been recorded from April to July.

CAPE.—Clanwilliam: Lange Kloof, *Schlechter* 8028; *Zeyher* 4167 (STE); Graafwater, *Zinn* s.n. (SAM). Namakwaland: Spektakel, *Esterhuysen* 5867 (BOL); Kamieskroon, *Lewis* 2146 (SAM); Vioolsdrif, *Middlemost* s.n. (NBG); Doornpoort, *Pillans* 5379 (BOL); Witbank, *Pillans* 5139 (BOL). Tulbagh: Tulbaghkloof, *Zeyher* s.n. (BOL). Vanrhynsdorp: 5 miles N. of Nuwerus, *Compton* 20571 (NBG); near Klaver Station, *Marloth* 7794; Heerenlogementsberg, *Zeyher* s.n. (BOL).

SOUTH WEST AFRICA.—Luderitz: Kuckaus, *Dinter* 3723; Spitskop, *Merxmüller* & *Giess* 3418; Tsirub, *Range* 2074 (B).

20. *A. minutiflorus* (*Kunth*) *Bak.* in Journ. Linn. Soc. Bot. 14: 616 (1875); Fl. Cap. 6: 263 (1896). Type: Delagoa Bay, *Forbes* s.n. (B, holo.!; PRE, photo.!).

*Asparagopsis minutiflora* *Kunth*, Enum. Pl. 5: 85 (1850).

Roots tuberous; tubers distant or lateral on the roots. *Stems* erect, almost straight, softly woody, ridged, usually scabrid along the ridges, pale, up to about 50 cm long. *Branches* usually absent. *Branchlets* straight usually fascicled, ascending, branched, very narrow, spineless, ridged, scabrid, up to about 5 cm long. *Cladodes* 3-angled, up to about 10 mm long and about 0.2 mm thick, up to about 8-nate laterally but more numerous terminally, slightly arcuate. *Spines* usually present on the stems, slender, terete, pungent, more or less straight and spreading, the longest from 5–12 mm long, brown. *Peduncles* borne on stems and less often on branches, solitary or paired, about 3 mm long. *Pedicels* usually 2- or 3-nate and terminal, but occasionally lateral and solitary, borne in the axils of prominent bracts, about 1 mm long, articulated near the middle. *Perianth segments* oblong-obovate, 2–3 mm long; the apex of the inner whorl dentate. *Stamens* nearly as long as the perianth segments; anthers minute. *Style* shortly divided, about 1 mm long; ovary about 1 mm long. *Fruit* with a smooth surface, 1-seeded, up to about 7 mm diameter.

This species has been recorded from a range of habitats, from stony hillsides to dense thorn-scrub on the flats, widely spread over most of Natal, the eastern Transvaal and Mozambique.

NATAL.—Estcourt: Rondedraai, *Acocks* 10817. Ingwavuma: 10 miles S.E. of Ingwavuma, *Codd* 10296. Ngotshe: "Ngotsche", *Gerstner* 2516 (BOL). Nongoma: Bangonomo, *Gerstner* s.n. (NH). Ubombo: Mkuze Game Reserve, *Gerstner* 4597.

SWAZILAND.—Stegi, Tambuti Ranch, *Compton* 30940; St. Phillips Mission Station, *Gerstner* s.n. (NH).

TRANSVAAL.—Barberton: Avoca, *Thorncroft* 3006. Letaba: 3½ miles W. of Letaba Camp, *Codd & Dyer* 4694. Pilgrim's Rest: 6 miles N.E. of Skukuza, *Codd & Verdoorn* 5484.

This and the following species have a unique type of inflorescence by which they can be distinguished from any other species. In these the raceme has apparently been so reduced as to leave only 2–4 flowers which are borne terminally. In a few specimen there may be one or two lateral flowers as well showing what is probably an intermediate stage between these species and the rest of the Section *Racemosi*.

21. *A. rigidus* *Jessop*, sp. nov., *A. minutifloro* *Bak.* affinis, sed cladodiis maioribus, spinis minoribus, caulibus glabris differt. PLATE 2.

Caules erecti, leviter tortuosi, lignei, costati, glabri, saepe virides, ad 60 cm longi. *Rami* solitarii, leviter tortuosi, quam caules costatiores, brevissimi, multum ramosi, plus minusve ascendentes, ad 8 cm longi; rami ultimati non ramulos eximios lateraliter facti. *Cladodia* valde 3-angulata, lateraliter ad 3-nata et terminaliter fere 6-nata, plerumque ad 10 cm longa et 0.5–0.9 mm crassa, plus minusve recta, mucrone tereti fuscoque; cladodiorum margines saepe costa subtiliter serrata cellarum dilatarum. *Spinae* absentes vel ad 4 mm longae, reflexae. *Pedunculi* in ramis orti, solitarii vel gemini, c. 3 mm longi. *Pedicelli* plerumque 2–4-nati terminales sed saepe in pedunculis laterales, prope medium articulati. *Perianthii segmenta* oblongo-obovata, 2–3 mm longa, integra. *Stamina* fere perianthii segmenta aequilonga; antherae c. 0.5 mm longae. *Stylus* breviter ramosus, c. 1 mm longus. *Ovarium* c. 1 mm longum. *Bacca* semine 1, c. 5 mm diam.

Type: Transvaal: Pilgrim's Rest district, Mariepskop, *Killick & Strey* 2380 (PRE, holo.).

Stems erect, slightly zigzag, woody, ridged, glabrous, often green, up to 60 cm long. *Branches* solitary, slightly zigzagging, more strongly ridged than the stems, very short, much branched, more or less ascending, up to about 8 cm long; the final branches not forming specialised branchlets. *Cladodes* strongly 3-angled, up to 3-nate laterally and about 6-nate terminally, usually up to about 10 cm long and 0.5–0.9 mm thick, more or less straight, with a terete, brown mucro; the margins of the cladodes

frequently bearing a minutely serrated ridge of enlarged cells. *Spines* absent or up to 4 mm long, reflexed. *Peduncles* borne on the branches, solitary or paired, about 3 mm long. *Pedicels* usually 2- to 4-nate and terminal but often lateral on the peduncles, articulated near the middle. *Perianth segments* oblong-obovate, 2–3 mm long, entire. *Stamens* nearly as long as the perianth segments; anthers about 0.5 mm long. *Style* shortly divided, about 1 mm long; ovary about 1 mm long. *Fruit* 1-seeded, about 5 mm diameter.

This species grows among scrub in rocky areas. Although it is mainly restricted to the south-eastern parts of the Transvaal, there is a single record from the Pietersburg district. Flowers have been recorded only in November.

TRANSVAAL.—Barberton: Barberton, *Pott* 5546; Saddleback Mountain, *Thorncroft* 790 (NH). Pietersburg: The Downs, *Rogers* 21982. Pilgrim's Rest: Mariepskop, *Killick & Strey* 2380; *Van der Schijff* 5589; 8 miles N. of Sabie on Graskop road, *Codd & de Winter* 3313.

This species resembles the preceding in the nature of the inflorescence, but can be separated by the fewer, larger cladodes, smaller spines, and glabrous stems.

## 22. *A. densiflorus* (Kunth) Jessop, comb. nov.

*Asparagopsis densiflora* Kunth, Enum. Pl. 5: 96 (1850). Type: Cape, *Lalande* s.n. (P, lecto.; PRE, photo.!).

*Asparagus sarmentosus* sensu Bak. in Journ. Linn. Soc. Bot. 14: 625 (1875); Fl. Cap. 6: 270 (1896). *A. myriocladus* Bak. in Journ. Bot. Lond. 18: 43 (1889); Fl. Cap. 6: 271 (1896). Type: Inanda, *Medley Wood* 355 (K, holo.!: PRE, photo.!: NH!). *A. sprengeri* Regel in Acta Horti Petrop. 11: 302 (1890); Bak. in Fl. Cap. 6: 271 (1896). Type: described from a cultivated specimen from Durban. *A. myersii* Hort., nomen nudum.

Roots tuberous; the tubers either borne directly on the rhizome or laterally on the roots. *Stems* erect or weakly decumbent, straight or slightly tortuous, finely ridged, glabrous, 30–60 cm long, green to brown. *Branches* similar to the stems, but not usually formed. *Branchlets* numerous, grooved, occasionally over 10 cm long, spreading or ascending. *Cladodes* flattened or rarely 3-angled, slightly arcuate, 5–15 mm long, weakly to strongly mucronate, commonly solitary, but sometimes ternate or numerous, with a distinct midrib when flattened. *Spines* usually well-developed, but not often pungent, usually absent from the final branches, reflexed, the leaf attenuate. *Peduncles* rather shorter than the branchlets, occasionally not differentiated. *Pedicels* solitary, generally articulated near the centre. *Perianth segments* more or less similar, oblong-obovate, obtuse, spreading, white or pale pink, about 2–5 mm long. *Stamens* three quarters of the length of the perianth segments; anthers small. *Styles* divided for about half their length. *Berry* globose, about 5 mm diameter, 1-seeded, red.

This species grows in a range of habitats, mainly in the coastal areas of the south-eastern Cape and Natal, from coastal dunes to open rocky places or woods. It has also been recorded from Inhaca Island. Flowers have been recorded from October to March and in July.

CAPE.—Albany: Howieson's Poort Hills, *Galpin* 3084. Alexandria: Alexandria Forest, *Jessop* 612. Bathurst: Port Alfred, *Galpin* 2948. Bedford: Bedford, *Potts* 1730 (BOL). East London: East London beach, *Bokelman* 3–28 (NBG). Kentani: Kentani, *Pegler* 1482 (BOL). Keiskammahoek: Keiskammahoek, *Stayner* 53 (GRA). Kirkwood: between Rautenbach's Drift and Addo Drift, *Burchell* 4208 (K). Komga: Komga, *Flanagan* 2211. Mount Ayliff: Kokstad, *Tyson* 3158. Mqanduli: Koffiebaai, *Van der Schijff* 5447. Peddie: Kaffir Drift, *Compton* 17829 (NBG). Port Elizabeth: Redhouse, *Paterson* 531 (BOL). Queenstown: Umbombola Mountain, *Galpin* 2094 (GRA). Somerset East: Kommadagga, *Burchell* 3302 (K). Uitenhage: Swartkops River, *Ecklon & Zeyher* 1061.

NATAL.—Durban: near Durban, *Medley Wood* 7559 (NH). Eshowe: Eshowe, *Lawn* 781 (NH). Hlabisa: Hluhluwe Game Reserve, *Ward* 2941. Inanda: Inanda, *Medley Wood* 1626 (BOL). Lower Tugela: Tugela Beach, *Johnson* 408 (NBG). Mahlabatini: Mahlabatini, *Gerstner* 3525 (NH). Port

Shepstone: Beach Terminus, *Thode* 3429 (STE). Ubombo: Mkuze Game Reserve, *Ward* 3984. Umzinto: Scottburgh, *Thode* 3424 (STE). Utrecht: Utrecht, *Thode* A1298. Weenen: Griffins Hill, *Acocks* 11413 (NH).

ORANGE FREE STATE.—Without precise locality, *Cooper* 3603 (K).

TRANSVAAL.—Barberton: Sheba, *Thorncroft* 14.

Linnaeus described *A. sarmentosus* as having solitary, linear-lanceolate cladodes; as being flexuose, and as having recurved spines. He cited Hermann's *Hortus Academici Lugduno-Batavus* t. 650, which shows the tuber characters. Another plate, t. 63, shows the aerial parts. There is a specimen, LINN No. 434.15, labelled *A. sarmentosus* in the Linnaean Herbarium, but this does not fit the description as it has fascicled cladodes. There is no specimen of this species in the Hermann Herbarium in Leyden, and the figures must be regarded as iconotypes. Both Linnaeus and Hermann gave the source of the material as Ceylon. According to Trimen (1898) there are two species to which this name might apply in Ceylon, *A. falcatus* L. and *A. gonocladus* Bak. These are both much-branched twiners, and it is unlikely that either could be synonymous with *A. sarmentosus* sensu Bak. from South Africa. The name *A. sarmentosus* L. can therefore not be applied to the South African species.

As Regel described *A. sprengeri* from Durban, and as he mentioned that it had racemes and a striate stem, it is very likely that this name is synonymous with *A. densiflorus* as construed here. Regel also mentioned that this species had been introduced into Europe through horticulture. The plant generally known in horticulture as *A. sprengeri* fits Regel's description and plants of this form grow near Durban, making it very probable that this is the correct application of the binomial. Another cultivated form of *A. densiflorus* is known as *A. myersii* (often misspelt *meyeri*), but this name has never been validly published.

This is an extremely variable species, but no practical way of subdividing it has been found. It can be identified by the fact that it never climbs to more than a little over a metre, and then only weakly twining, not twisting to any extent round its support. The racemes may be obscured by the development of cladodes at the nodes, but are never reduced to the form found in *A. minutiflorus* and *A. rigidus*. The stems are grooved or ridged, but always glabrous, and branches are usually absent, although branchlets are well developed.

23. *A. saundersiae* Bak. in Journ. Bot. Lond. 18: 42 (1889); Fl. Cap. 6: 269 (1896). Type: Natal, *Saunders* s.n. (K, holo.!; BOL!).

Stems woody, erect to climbing, up to 2 m high, hardly zigzagging, slender, glabrous, smooth, yellowish or golden-brown. Branches similar to the stems, wide spreading to ascending, usually solitary, lacking spines. Cladodes fascicled, about 6–8-nate, less than  $\frac{1}{2}$  mm broad, angled, subulate, ascending or spreading, up to 1.5 cm long, slightly arcuate. Spines usually well-developed, absent from the final branches, up to 1 cm or more long, pungent, spreading, slightly recurved. Peduncles 1–4-nate, usually about 4 cm long. Pedicels solitary, 5–6 mm long, articulation variable. Perianth segments serrate, obovate, about 3 mm long, white. Stamens nearly as long as the perianth segments; anthers minute, globose, yellow. Ovary stalked; style shortly divided. Fruit not known.

This species occurs mainly at the margins of forests in the south-eastern and eastern parts of South Africa, possibly as far north as Kenya. It occasionally grows in the open, even on dry, exposed slopes. Flowers have been recorded from November to May.

CAPE.—Lusikisiki: between Port St. Johns and Lusikisiki, *Hutchinson* 1780. Mqanduli: Mqanduli, *Pegler* 599. Port St. Johns: about 5 miles N.E. of Port St. Johns, *Jessop* 663.

NATAL.—Camperdown: Camperdown, *Carnegie* s.n. (NH); *Franks* s.n. (NH); Botha's Hill, *Medley Wood* s.n. (NH). Eshowe: Eshowe, *Gerstner* 2841 (BOL). Hlabisa: near Hluhluwe, *Wells* 2039; Hlabisa, *Ward* 2971. Mtonjaneni: Umhlatuzi Road, *Lawn* 331 (NH). Nongoma: Nongoma, *Gerstner* 4423 (NH); 11 miles N. of Nongoma, *Jessop* 670. Pinetown: Marionhill, *Kolbe* s.n. (BOL). Richmond: Richmond Road, *Schlechter* 6740.

SWAZILAND.—Isateki Beacon, *Compton* 27312.

TRANSVAAL.—Letaba: Duiwelskloof, *Scheepers* 1059.

This species is rather similar to *A. buchananii* Bak. The main difference is that *A. buchananii* is a climber with very large spines which are characteristically flattened at the base. The yellowish colour of the stems and branches of *A. saundersiae* often distinguishes it from *A. buchananii* which usually has rather browner stems and branches.

24. *A. buchananii* Bak. in Kew Bull. 1893: 211 (1893); Fl. Trop. Afr. 7: 434 (1898). Type: Nyasaland, *Buchanan* 1503 (K, lecto.!; PRE, photo.!); *Buchanan* 757.

Stems woody, climbing to at least 9 metres, tortuous and often strongly zigzagging, glabrous, very variable in colour, smooth. Branches similar to the main stems. Branchlets often well-defined, solitary, lacking spines, spreading to ascending. Cladodes fascicled, about 6- to 8-nate, less than  $\frac{1}{2}$  mm broad, angled, terete or grooved, subulate, ascending or spreading, up to 1.5 cm long, slightly arcuate. Spines well-developed, absent from final branches, up to 4 cm or more long on the main stems, dorsally flattened towards the base, usually reflexed. Peduncles 1- to 4-nate, 2-4 cm long, usually solitary. Pedicels solitary, 3-5 mm long, articulation variable. Perianth segments serrate, obovate to oblong-obovate, 1.5-3 mm long, white. Stamens nearly as long as the perianth segments; anthers minute, globose, yellow to brown. Ovary stalked, style slightly divided. Berries fleshy, about 5 mm diameter, 1- or 2-seeded, red.

This species is a forest climber from Natal in the south to at least as far north as Nyasaland. Flowers have been recorded from April to June, and in September and November.

NATAL.—Mapumulo: near Thringspost, *Mauve* 4207. Ubombo: Makatini Flats, *Vahrmeyer* 432.

TRANSVAAL.—Barberton: Sheba Valley, *Thorncroft* 3006. Groblersdal: Loskopdam, *Mauve* 4278. Lydenburg: Bothas Hoek, *Repton* 5947; Sekhukhuneland, *Barnard* 448. Nelspruit: Numbi, *Van der Schijff* 29. Pietersburg: Thabina, *Schweickerdt* 1019; Molopo Reserve, *Gerstner* 5322. Potgietersrus: Ihlenfeldt 2067. Sibasa: Punda Milia, *Codd* 5292. Soutpansberg: Elim, *Obermeyer* s.n. Wakkerstroom: Slangapies Mountains, *Burt Davy* 1937. Warmbad: 5 miles N. of Warmbad, *Vahrmeyer & Tölken* s.n. Waterberg: near Elmeston, *Meeuse* 10537.

SOUTH WEST AFRICA.—Grootfontein: 8 miles E. of Runtu, *De Winter* 3776a. Ovamboland: Oshikango, *De Winter & Giess* 7054.

Baker cited *Buchanan* 1503 and *Buchanan* 757, both from the Shiré highlands in Nyasaland, in his description of *A. buchananii*. It is proposed that *Buchanan* 1503 (K) be the lectotype.

This species, particularly if the characters of the main stems are not known, may be difficult to distinguish from *A. saundersiae*. The characters of use in distinguishing these species are given under *A. saundersiae*. It may also be difficult to distinguish from the northern forms of *A. aethiopicus*, which have flattened cladodes and generally lack the large spines. These spines are the most characteristic feature of the plant, and may reach more than 4 cm and be extremely pungent and strongly reflexed. The flattened base is conspicuous even in fairly small spines, but may occur to a small degree in *A. aethiopicus*.

25. *A. aethiopicus* L., Mant. 32 (1767). Type: Cape without precise locality (LINN No. 434.6, neo.; NBG!, PRE!, photos).

Tubers stalked, borne laterally on the main roots, about 30 cm long, fusiform to ovoid. *Stems* climbing to about 7 m or erect to 1 m, woody, terete, glabrous. *Branches* grooved, spreading or recurved, similar to the stems. *Branchlets* sometimes well-defined, grooved, straight. *Cladodes* flattened, linear, mucronate in many specimens, 3–6-nate or more numerous, 10–40 mm long, 1–2 mm broad, with a single vein. *Spines* usually present at all nodes, but often absent on final branches, spreading or reflexed, often pungent, up to 1 cm long or occasionally more. *Leaves* and bracts sometimes ciliate. *Peduncles* usually 3–15 cm long, paired, unbranched. *Peduncles* usually single or paired, 2–4 mm long, usually articulated near the centre, but variable. *Perianth segments* obovate, about 3 mm long, often with a ciliate margin, spreading, white. *Stamens* almost as long as the perianth segments; anthers orange, 0.5 mm long. *Style* short, 0.6 mm long; ovary about 1 mm long. *Berry* globose, 5–7 mm diameter, with 1–3 seeds, red; perianth not persistent.

Mainly a forest climber, this species also occurs in coastal vegetation and in parts of the Little Karroo and Namakwaland. Distributed over a large area from the south-western Cape to central Africa.

For key to the varieties see key to species.

(a) var. **aethiopicus**.

*A. aethiopicus* L., Mant. 32 (1767); R. & S., Syst. Veg. 7: 335 (1829); Bak. in Journ. Linn. Soc. Bot. 14: 626 (1875); Fl. Cap. 6: 271 (1896); Salter in Fl. Cape Penins. 175 (1950). *A. lanceus* Thunb., Prodr. 66 (1794). Type: without precise locality, *Thunberg* s.n. (UPS, holo.!; BOL!, PRE!, photo.).

*Asparagopsis lancea* (Thunb.) Kunth, Enum. Pl. 5: 106 (1850). *A. aethiopica* (L.) Kunth, Enum. Pl. 5: 95 (1850).

In this variety the stems are grooved. The cladodes appear to be more opaque and tend to be a little broader and shorter than average.

This variety is confined to the Cape Province, occurring mainly in the coastal forests from the Cape Peninsula to Humansdorp. Flowers have been recorded from January to June and in October.

CAPE.—Bredasdorp: Uilenkraal Forest, *Taylor* 286 (NBG). Caledon: Danger Point, *Pillans* 9541 (BOL). Cape: Camps Bay, *Pappe* s.n. (SAM). Clanwilliam: near Lambert's Bay, *Leipoldt* 4244 (BOL). George: Wilderness, *Van Niekerk* 211 (BOL). Humansdorp: Ratelsbosch, *Fourcade* 245 (BOL). Knysna: The Point, *Taylor* 1331 (SAM). Ladismith: Anysberg Dam, *Stokoe* 8520 (BOL). Namakwaland: Witbank, *Pillans* 5121 (BOL). Riversdale: Bottebersfontein, *Muir* 1421. Robertson: Robertson, *Schmidt* 24. Simonstown: Clovelly, *Walgate* s.n. (BOL). Swellendam: Bonnievale, *Marloth* 12006. Wynberg: Houtbaai, *Compton* 15598 (NBG).

Linnaeus described *A. aethiopicus* as having solitary, recurved spines, angled branches and linear-lanceolate cladodes. He also mentioned that it came from the Cape, and was similar to *A. falcatus*, but differed in having fewer cladodes, reflexed spines, and flexuose, angled branches. The specimen in the Linnaean Herbarium bears the letters "H.U.", indicating a cultivated specimen from the Uppsala Gardens, as does the description in the Mantissa, and shows the typical cladodes and stem characters of this variety. The Linnaean specimen is possibly from the same plant as that described, but is unlikely to have been the actual specimen described, as Jackson (1912) does not indicate that this specimen was in the Enumeration of 1767 of the specimens in the Linnaean Herbarium. This specimen is therefore selected as the neotype.

In the south-western Karroo and in the Little Karroo there are plants which combine some of the characters of this species and *A. racemosus*. Both have grooved branches and the form of branching characteristic of the south-western Cape specimens of *A. aethiopicus*. Where the cladodes are flattened, specimens are placed in this

species. In flat-cladode forms from the Swellendam area (e.g. *Stokoe* 8520 from the Anysberg Dam) there are exceptionally well-developed spines present on the final branches. In the Laingsburg area (e.g. *Jessop* 355 from near Matjesfontein) the same development of spines occurs, but the cladodes are three-angled, and these plants must therefore be placed in *A. racemosus*.

(b) var. **angusticladius** *Jessop*, var. nov.

*A. ternifolius* sensu Hooker fil. in Bot. Mag. t. 7728 (1900). *A. sprengeri* sensu Wright in Bot. Mag. t. 8052 (1906).

Haec varietas caulibus levibus, cladodiis longioribus angustioribus et statu sicco leviter perucidis distinguitur. PLATE 3.

Type: Transvaal: Middelburg district, Olifants River Gorge, *Mogg* 22470 (PRE, holo.).

This variety is distinguished by the smooth stems, and the longer and narrower cladodes which appear to be slightly translucent when dry.

It is found over most of the Transvaal, but occurs also in Natal, Swaziland, the extreme eastern parts of the Cape Province, and in a large part of east Africa. Flowers have been recorded in September and October.

CAPE.—Kentani: Kentani, *Pegler* 840. King William's Town: King William's Town, *Sim* 1061 (BOL).

NATAL.—Lower Tugela: Darnall, *Schmidt* 11 (NH). Mtunzini: Tugela Beach, *Johnson* 408 (NBG). Utrecht: Kaffir Drift, *Thode* A250.

SWAZILAND.—Mbabane, Dalriach, *Compton* 30739 (NBG); Hlatikulu, *Compton* 28903 (NBG); Mpiisi, *Compton* 30112 (NBG); Stegi, *Compton* 28020 (NBG).

TRANSVAAL.—Barberton: Barberton, *Thorncroft* 843 (NH). Brits: Weltevreden 61, *Mogg* 20391. Carolina: Arnheimburg, *Roberts* s.n. Heidelberg: Kuilfontein, *Mogg* 20727. Johannesburg: 9 miles N.W. of Johannesburg, *Mogg* 19188. Krugersdorp: Jack Scott Private Nature Reserve, *Wells* 2412. Middelburg: Olifants River Gorge, *Mogg* 22470. Nelspruit: Amajuba Mountain, *Liebenberg* 3118. Piet Retief: 27 miles S.E. of Piet Retief, *Codd* 10268. Pretoria: Pienaar's River area, *Repton* 3727. Soutpansberg: Elim, *Obermeyer* 592.

Baker described *A. aethiopicus* var. *ternifolius* in 1871. This variety has been transferred to *A. falcatus*. J. D. Hooker, in Bot. Mag. t. 7728, raised this variety to specific rank, but it is clear that the plant on which the illustration was based is referable to the variety described above. Wright, in 1906, described a plant which was also illustrated in the Botanical Magazine, and considered it to be *A. sprengeri*, but referred to *A. ternifolius* as being a later synonym. Again, the figure is of a climber and must be referred to this variety.

26. *A. falcatus* L., Sp. Pl. 313 (1753). Type: Burmann, Flora Zeylanica t. 13, f. 2. (1737)

Stems climbing or scrambling, tortuous, smooth, glabrous, pale, much-branched. Branches usually solitary, spreading, similar to the stems. Cladodes flattened, straight or falcate, with a prominent vein, up to 9 cm long and 7 mm broad, dark green. Spines well-developed, recurved, pungent, strong, often borne on vegetative branchlets; the rest of the leaf not usually developed. Peduncles up to 4-nate laterally, more numerous terminally, usually about 3–5 cm long, unbranched or branched. Pedicels 4–8 mm long, articulated proximally, 1- or 2-nate. Perianth segments oblong to obovate, the inner whorl slightly narrower than the outer, 2·5–4 mm long, cream to white. Stamens almost as long as the perianth segments; anthers small and globose. Style short; ovary about 1 mm long. Berry fleshy, about 5 mm diameter, 1- or 2-seeded, red.

This species occurs in the eastern Cape and northwards through east Africa to Asia. Flowers have been recorded in South Africa from September to February.

For key to the varieties see key to species.

(a) var. **falcatus**.

*A. falcatus* L., Sp. Pl. 313 (1753); Bresler, Diss. 2 (1826); Kunth, Enum. Pl. 5: 71 (1850); Bak. in Journ. Linn. Soc. Bot. 14: 626 (1875); Fl. Cap. 6: 271 (1896).

The typical variety has larger cladodes, which are usually 3.5–9 cm long and more or less falcate. The inflorescence is simple.

This variety occurs over the entire range of the species, mainly in forest. Flowers have been recorded from December to February in South Africa.

CAPE.—East London: East London, *MacOwan* 2413 (BOL). Kentani: Kentani, *Pegler* 1335. Port St. Johns: Port St. Johns, *Galpin* 3491.

NATAL.—Durban: Berea, *Medley Wood* 150. Eshowe: Eshowe, *Lawn* 73 (NH). Ingwavuma: Kosi Bay, *Vahrmeyer* 494. Lower Tugela: Tugela Beach, *Johnson* 607 (NBG). Mtunzini: Ngoya Forest, *Wells & Edwards* 61 (NH). Nkandla: Qudeni Forest, *Davis* 119 (NH). Pinetown: Umgababa, *Bayer* 862. Ubombo: Makatini Flats, *Vahrmeyer* 429.

Linnaeus described *A. falcatus* as having solitary spines, and ensiform, falcate leaves. He reported its origin as being from Ceylon. He also cited Burmann's *Flora Zeylanica* t. 13, f. 2 (1737). This figure must be regarded as an iconotype in the absence of a specimen from which it was drawn. This specimen should be in Paris according to Lanjouw and Stafleu (1954), but is apparently missing from the collection. According to Jackson (1912), a specimen did not appear in the Enumerations of the Linnaean Herbarium. Moreover, the specimen in the Linnaean Herbarium, LINN No. 434.3, has short cladodes, and is in fact *A. aethiopicus* var. *aethiopicus*. The specimen in the Linnaean Herbarium cannot, therefore, be regarded as the type. Four specimens from Ceylon, the type locality for *A. falcatus*, were loaned to the author by the Director of the Kew Herbarium. These specimens match several specimens, such as *Thode* A1563 (PRE) from Zululand and *Goldsmith* 123/62 (PRE) from Melsetter, exactly. In a few respects most Ceylon specimens are not a perfect match of the South African plants, however. The racemes are shorter, being only from 1–2 cm long, and the cladodes are longer, from 4–12 cm, and narrower, often only about 2 mm broad. These characters cannot, however, be regarded as being of significance taxonomically.

(b) var. **ternifolius** (Bak.) *Jessop*, comb. nov.

*A. aethiopicus* L. var. *ternifolius* Bak. in Saund. Ref. Bot. t. 261 (1871). Type: Natal, *Cooper* sub *Saunders* 1448 (K, holo.!; PRE, photo!). *A. aethiopicus* L. var. *natalensis* Bak. in Fl. Cap. 6: 272 (1896). Type: Natal, Inanda, *Medley Wood* 1351 (K, holo.!; PRE, photo.!; NH!).

This variety has shorter cladodes than the typical variety, being up to about 35 mm long. The inflorescence is branched.

This variety does not occur in the Cape Province and probably does not extend as far north as the typical variety. Its habit is similar, but it does not appear to climb to such a height, perhaps only two or three metres. It tends to occur in drier areas and the height may be associated with this. Flowers have been recorded from September to December.

NATAL.—Camperdown: Drummond, *Gerstner* 2421. Hlabisa: Hluhluwe Game Reserve, *Ward* 1535. Inanda: Umzinyati Falls, *Medley Wood* 1357 (SAM). Lower Tugela: Tugela Valley below Sans Souci, *Edwards* 1685. Mtonjaneni: Mkubaa Valley, *Acocks* 12936. Mtunzini: Mandini, *Gerstner* 2817 (NH). Nongoma: 11 miles N. of Nongoma, *Jessop* 671. Umfolozi: about 3 miles N.W. of Empangeni, *Jessop* 665. Ubombo: Mkuze, *Galpin* 13649. Umvoti: between Greytown and Tugela Ferry, *Edwards* 922.

SWAZILAND.—Ingwavuma Poort, *Compton* 28903; Hlatikulu, Sipopaneni, *Murdoch* 125 (NBG); Blue Jay Ranch, *Compton* 29570 (NBG).



TRANSVAAL.—Barberton: Komatipoort, *Van der Schijff* 1130. Waterberg: near Elmeston, *Meuse & Strey* 10430.

The climbing species of *Asparagus* with racemes and flattened cladodes can be readily divided into four groups, but the status which should be allotted to these is not easily decided. It has been decided that the most natural grouping is to place the two groups in which the cladodes dry very dark, often almost black, together under *A. falcatus*. These two can be separated with certainty only because of the difference in inflorescence. Although plants with branched racemes tend to have shorter cladodes than those with simple racemes, there is a complete intergradation in the cladode length of these varieties. The other two groups, in which the cladodes dry a lighter colour, are placed as varieties of *A. aethiopicus* and are differentiated from each other on the basis of the stems being grooved or smooth.

27. *A. aspergillus* *Jessop*, sp. nov., *A. racemoso* Willd. affinis, sed caulibus scabridis, rectoribus cinereisque, antheris fuscis differt. PLATE 4.

*A. racemosus* sensu Sölch, Beitr. Fl. Südwest-Afr. 38 (1961).

Caules ascendentes vel erecti ad 2 m, lignosi, sulcati vel costati, scabridi, cani. Rami caulibus similes sed saepe sulcatiores et scabridiores, solitarii, divaricati vel ascendentes. Ramuli 1-3-nati, plus minusve divaricati, recti, sulcatissimi. Cladodia fasciculata, multa, angulata, recta vel arcuata, ad 4 cm longa et  $\frac{1}{2}$  mm crassa, sed plerumque c. 1.5-2 cm longa, plerumque flore absentes. Spinae in caulibus praecipue ramis et plerumque ramulis, sed non in pedunculis, pungentes, divaricatae vel leviter reflexae, leviter recurvae, ad 1 cm longae, pallide fuscae. Pedunculi gemini, nonnunquam cladodiis instructi. Pedicelli solitarii vel interdum gemini, 1.5-2.5 mm longi, prope florem articulati. Perianthii segmenta oblongo-obovata, integra, 2-4 mm longa, alba. Stamina quam perianthii segmenta paulo breviora; antherae fuscissimae. Stylus 1-1 $\frac{1}{2}$  mm longus; rami c.  $\frac{1}{2}$  mm longi. Baccus globosus, seminibus 1 vel 2, c. 6 mm diam., ruber, pericarpio rugoso.

Type: Transvaal: Letaba district, near Birthday Road at Mamaranga, *Breyer* in TRV 19063 (PRE, holo.).

Stems twining or erect to 2 m, woody, grooved or ridged, scabrid, pale grey. Branches similar to the stems, but often more prominently grooved and scabrid, solitary, spreading to ascending. Branchlets 1-3-nate, more or less spreading, straight, strongly grooved. Cladodes fascicled, numerous, angled, straight or arcuate, up to  $\frac{1}{2}$  mm thick and 4 cm long, but usually about 1.5-2 cm long, usually absent during the flowering period. Spines present on the main stems, branches and usually on the branchlets, but not on the peduncles, pungent, spreading or slightly reflexed, slightly recurved, up to 1 cm long, pale brown. Peduncles paired, sometimes bearing cladodes, usually 2-5 cm long, but up to 15 cm, not usually bearing spines. Pedicels solitary or less often paired, 1.5-2.5 mm long, articulated near the flower. Perianth segments oblong-obovate, entire, 2-4 mm long, white. Stamens a little shorter than the perianth segments; anthers very dark coloured. Style 1-1 $\frac{1}{2}$  mm long; branchlets about  $\frac{1}{2}$  mm long. Berry globose, 1- or 2-seeded, about 6 mm diameter, red, with a wrinkled pericarp.

This species occurs in the northern Transvaal, Bechuanaland, northern South West Africa and Rhodesia. Flowers have been recorded in October and June.

TRANSVAAL.—Letaba: near Birthday Road at Mamaranga, *Breyer* in TRV 19063. Messina: Zeerust, Tokwe Farm, *Breyer* s.n.; Messina, *Rogers* 19418. Pilgrim's Rest: 20 miles N. of Satara, *Van der Schijff* 518.

SOUTH WEST AFRICA.—Caprivi: east of Cuando River, *Curson* 900. Grootfontein: Oshikango, *De Winter & Giess* 7053. Kaokoveld: Orumane, *Abner* A23 (M); 15 miles E. of Ohopuho, *Merxmüller* 1517.

This species was confused with *A. racemosus* Willd. by Sölch (1961), but is clearly distinct. The stems differ in being grey, scabrid, and straighter. The spines tend to be rather more slender. The anthers are very dark, almost black, giving the inflorescence the appearance of being covered by the fruiting bodies of an *Aspergillus*.

28. *A. racemosus* Willd., Sp. Pl. 2: 152 (1799). Type: India, in herb. Willdenow (B, holo.; PRE, photo.!).

*A. tetragonus* Bresler, Diss. 27 (1826); Wright in Bot. Mag. t. 8288 (1909). Type: South Africa, *Mundt & Maire* s.n. *A. racemosus* Willd. var. *tetragonus* (Bresler) Bak. in Journ. Linn. Soc. Bot. 14: 624 (1875); Fl. Cap. 6: 269 (1896).

*Asparagopsis floribunda* Kunth, Enum. Pl. 5: 98 (1850), nom. illegit. Type: as for *A. racemosus*. *A. subquadrangularis* Kunth, Enum. Pl. 5: 94 (1850). Type: "Eckl. et Zeyh. Herb. Cap. n. 171. (v.s. in Herb. Luc.)".

Stems twining, climbing, woody, usually grooved, glabrous. *Branches* similar to the stems, solitary, spreading to ascending. *Branchlets* usually 1- to 3-nate, spreading or ascending, straight, grooved, spineless. *Cladodes* fascicled, numerous, angled, straight, up to 1 mm broad, generally 1–2 cm long, green at first but turning greyish. *Spines* pungent, usually about 3–4 mm long, brownish to greyish. *Peduncles* paired, up to 10 cm long. *Pedicels* 1- or 2-nate laterally, more numerous terminally, 2–3 mm long, articulated near or below the centre. *Perianth segments* similar, obovate-oblong, 2.5–3.0 mm long. *Stamens* not appreciably shorter than the perianth segments; anthers about  $\frac{1}{4}$  mm long. *Style* short, shortly divided. *Berry* globose, 1-seeded, about 6 mm diameter, with a wrinkled pericarp, red.

This species is distributed from the southern Cape through east Africa and into Asia. It climbs or scrambles to four metres, but usually only about two metres, in bush or forest. Flowers have most frequently been recorded from March to July in South Africa.

CAPE.—Albany: Queensroad, *Schönland* 4357 (GRA). Alexandria: De Bega, *Archibald* 5908. Bathurst: Port Alfred, *Schönland* s.n. (GRA). Beaufort West: Sunnyside, *Esterhuysen* 4359. Cathcart: 5 miles N. of Cathcart, *Jessop* 658. Cradock: 10 miles east of Cradock, *Jessop* 654. East London: near Nahoon Mouth, *Galpin* 5737. Heidelberg: 5 miles W. of Heidelberg, *Jessop* 590. Humansdorp: Gamtoos Gorge, *Compton* 23448 (NBG). King William's Town: King William's Town, *Sim* 1052. Knysna: Blaauwkrantz, *Dyer* 2029 (GRA). Komga: Prospect Farm, *Flanagan* 299 (SAM). Ladismith: Sandberg W. of Calitzdorp, *Wurts* 1371 (NBG). Middelburg: Doornberghoek, *Acocks* 8665. Mosselbaai: Gouritz Valley, *Horn* s.n. Port Elizabeth: near Port Elizabeth, *Rodin* 1228 (BOL). Riversdale: near Kweekkraal, *Muir* 3140. Somerset East: Cookhouse, *Schlechter* 2750. Uitenhage: Redhouse, *Rogers* 2793 (SAM). Umtata: near Umtata, *Acocks* 10910. Uniondale: Kouga River, *Compton* 5214 (BOL). Willowmore: Willowmore, *Marloth* 14129.

NATAL.—Estcourt: Pasture Research Station, *West* 364. Lions River: 5 miles along Merrivale-Boston road, *Moll* 934. Ubombo: near the turning to Mkuze Game Reserve, *Jessop* 669. Utrecht: 4 km from Utrecht on Knight's Pass road, *Story* 1766. Weenen: Mielietuin, *West* 1209.

SWAZILAND.—Ingwavuma Poort, *Compton* 28579 (NBG).

TRANSVAAL.—Lydenburg: 16 miles beyond Malipsdrif, *Obermeyer & Verdoorn* 22; Erasmus Pass, *Strey* 3719.

Willdenow described *A. racemosus* from India. The South African material differs from most specimens examined from India by the author in having well-defined branchlets, grooved stems and straighter cladodes, but all these characters are so variable as not to warrant even varietal status when the whole range of variation over the range of the species is considered. For example, one specimen from Madras, *Jacob* 17549 (K), differs from South African specimens only in having spines on the final branches. *Walker* 56 (K) from Ceylon matches the South African plants even more closely, as it has grooved stems, and lacks the spines on the final branches. Bresler considered that the South African plants were specifically different, and named them *A. tetragonus*. Baker reduced this species to varietal status.

*Asparagopsis floribunda* Kunth is a superfluous name for *A. racemosus* Willd. *Asparagopsis subquadrangularis* was described as having setaceous cladodes, grey stems and pedicels 2 mm long. The inflorescence is a raceme. Kunth cited the specimen as "Eckl. et Zeyh. Herb. Cap. no. 171. (v.s. in Herb. Luc.)". According to De Candolle (1880), the Luca specimens were at Kiel, but this specimen appears to have been destroyed. It is very likely that this name is referable to *A. racemosus*, although no authentic material has been seen.

29. *A. obermeyerae* Jessop, sp. nov., *A. racemoso* Willd. affinis, sed caulibus erectis et canis, ramis canis, floribus axillaribus differt. PLATE 5 and 6.

Caules erecti, lignosi, glabri, plus minusve recti; caules juvenes cani vel luteo-cani sulcati, maturi fuscii leves; ad fere 1 m alti. *Rami* caulibus similes, fasciculati, constanter cani et sulcati, simplices vel ramis paucis brevibus, ad 15 cm longi. *Cladodia* fasciculata, multa, angulata, plus minusve recta, 12–15 mm longa, c. 0.2 mm crassa, statu sicco fuscescentes. *Spinae* pungentes, fere rectae, patentes, caulibus ramisque ortae, ad 15 mm longae, cauli concolores. *Pedicelli* solitarii vel gemini, ramis orti, fere vel supra medio articulati, 2–3 mm longi. *Perianthii segmenta* obovata vel oblongo-obovata, 2.5–3 mm longa, margine integro, similia, margine pallido. *Stamina* quam perianthii segmenta breviora; antherae c.  $\frac{1}{4}$  mm longae. *Stylus* c.  $\frac{1}{4}$  mm longus, semidivisus. *Baccus* globosus, semine 1, c. 8 mm diam., levis, perianthio persistenti.

Type: Transvaal: Pietersburg district, near Boyne on road to Wolkberg, *Mauve* 4442 (PRE, holo.).

Stems erect, woody, glabrous, more or less straight, pale grey or yellowish-grey and grooved when young, but becoming brown and smooth, up to almost 1 m high. *Branches* similar to the stems, fascicled, persistently greyish and grooved, simple or with a few short branches, up to 15 cm long. *Cladodes* fascicled, numerous, angled, more or less straight, 12–15 mm long, about 0.2 mm thick, darkening with drying. *Spines* pungent, almost straight, spreading, borne on branches, articulated near or above the middle, 2–3 mm long. *Perianth segments* obovate or oblong-obovate, 2.5–3 mm long, entire, similar, with a pale margin. *Stamens* shorter than the perianth segments; anthers about  $\frac{1}{3}$  mm long. *Style* about  $\frac{2}{3}$  mm long, divided for about half its length. *Berry* globose, 1-seeded, about 8 mm diameter, smooth, with a persistent perianth.

This species has been recorded only from dry, bushveld slopes in the Pietersburg district. Flowers have been collected in October.

TRANSVAAL.—Pietersburg: Subiaco Mission, Molepo Reserve, *Gerstner* 5359; Naauwpoort, *Bremekamp* & *Schweickerdt* s.n.; Chunes Poort, *Hafström* & *Acocks* 197; 10 miles E. of Boyne. *Mauve* 4294; *Mauve* 4442.

While this species most nearly resembles *A. racemosus*, it differs in having axillary flowers, in its erect habit, and in the pale grey, grooved stems and branches. This last character is shared with several species, such as *A. compactus*, in the section *Africani*. It also resembles the *Africani* in having axillary flowers, but the fascicled branches place it rather in the *Racemosi*.

It is named after Mrs. Mauve who has taken a particular interest in the genus, and collected the type material of this species.

30. *A. krebsianus* (Kunth) Jessop, comb. nov.

*Asparagopsis krebsiana* Kunth, Enum. Pl. 5: 93 (1850). Type: Cape, without precise locality, *Krebs* s.n.

Tubers stalked, borne laterally on the main roots, about 30 cm long, fusiform. *Stems* erect or scrambling, slightly zigzagging, woody, smooth or slightly ridged, grey-green, glabrous. *Branches* solitary, almost always grooved, much-branched, similar to the stems. *Cladodes* fascicled, three-angled, rigid, mucronate, 15–20 mm long or sometimes only 1 cm or less, linear. *Spines* present on all stems and branches, pungent, slightly recurved, browner than the stems and branches; the rest of the leaf not conspicuous. *Peduncles* 1–4-nate, with or without spines, up to 10 cm long, articulated near the centre; the proximal half greatly thickened. *Perianth segments* oblong to obovate, the outer whorl narrower, 2.5–4 mm long, white, reflexed near the centre of each segment. *Stamens* nearly as long as the perianth segments. *Style* slightly less than 1 mm long, divided for about half its length; ovary about 1 mm long. *Berry* smooth, 1-seeded, red; perianth not persistent.

*A. krebsianus* may scramble among rocks or on bushes in wetter areas, but is generally more or less erect and usually occurs on fairly dry slopes. It has been recorded from the eastern Cape and parts of the Transvaal. Specimens, which may be referable to this species, have been collected in South West Africa. Flowers have been collected in most of the summer months from October to April.

CAPE.—Albany: Grahamstown, *Daly & Sole* s.n.; *Penther* 1462 (BOL). Alexandria: Alexandria, *Archibald* 5488. Cathcart: Inverthorn, *Barker* 3469 (NBG). Komga: Komga, *Flanagan* 2377. Peddie: Peddie, *Barker* 7821 (NBG). Victoria East: Tukululu, *Acocks* 11145.

TRANSVAAL.—Brits: Jacksonstun, *Codd* 6805. Krugersdorp: Baviaanspoort, *Smith* 351. Lydenburg: Driekop, *Mogg & Barnard* s.n. Pretoria: Pretoria Koppies, *Leendertz* 531; Derdepoort, *Robertson* 123.

*Asparagopsis krebsiana* is based on a specimen collected by Krebs at the Cape. The Krebs specimens were mainly at Kiel according to De Candolle (1820). A large part of the Kiel Herbarium has been destroyed, and it does not now have the specimen. Most of the plants on which Kunth worked were in Berlin, but there is no specimen there either. The plant was described as having three-angled cladodes, spinous final branches, racemes, and pedicels 3 mm long. As Krebs did collect in the eastern Cape where the species described above occurs, and as *A. krebsianus* as construed here does match Kunth's description in every detail, there seems little doubt as to the correct application of the epithet. It is proposed, should an isotype of Krebs' specimen not be found, that *Flanagan* 2377 (PRE) from Komgha be taken as the neotype. Duplicates of this collecting have been seen by the author in the Bolus and Albany Museum Herbaria.

The type of *A. confertus* Krause was *Engler* 6764 from Schakalskuppe in the Luderitz district. A specimen from the Berlin-Dahlem Herbarium of this collecting has been examined by the author, and appears to be identical with *A. krebsianus* although the cladodes are a little shorter than the average, being about 10–15 mm long. It seems likely that despite the considerable gap between this locality and the nearest known for *A. krebsianus* it should be referred to this species. Other specimens of this form are *Range* 1715 (B, SAM) from the type locality and *Dinter* 6155 (B) from Aus.

31. *A. acocksii* *Jessop*, sp. nov., *A. racemoso* Willd. affinis, sed caulibus erectioribus, levibus et pubescentibus differt. PLATE 7.

Caulis lignei, erecti vel scandentes, tortuosi, teretes, pubescentes, leves, cani. *Rami* divaricati vel ascendentes, recti vel leviter tortuosi, plerumque solitarii sed aliquando ad 3-nati. *Cladodia* subulata, plerumque ad 6 mm longa, arcuata vel recta, acuminata, multi-nata, glabra. *Spinae* manifeste evolutae, leviter recurvae, omnino in caulibus et ramulis vegetativis. *Pedunculi* in paribus, plerumque fere 3 cm longi, aliquando spinosi. *Pedicelli* 1–3-nati, 3–4 mm longi, fere 1 mm e ramo articulati. *Perianthii*

*segmenta* similia, oblongo-obovata, fere 3 mm longa, margine integra. *Stamina* quam *segmenta* perianthii leviter breviora; antherae fere  $\frac{1}{2}$  mm longae. *Stylus* brevis, semi-divisus; ovarium fere sessile, ad fere 2 mm longum. *Bacca* fere 6 mm longa, semine solitario, laevigata.

Type: Cape: Cradock district, 12 miles N.N.E. of Fish River Station, *Acocks* 16296 (PRE, hol.).

Stems erect to scrambling, zigzagging, woody, terete, smooth, grey, densely pubescent. *Branches* spreading to ascending, straight or slightly zigzagging, usually solitary but sometimes up to 3-nate. *Cladodes* subulate, usually up to 6 mm long, arcuate or straight, acuminate, many in a bundle, glabrous. *Spines* well-developed, slightly recurved, present on all stems and vegetative branches. *Racemes* paired, usually about 3 cm long, sometimes bearing spines. *Pedicels* 1-3-nate, 3-4 mm long, articulated about 1 mm from the branch. *Perianth segments* similar, oblong-obovate, about 3 mm long, entire. *Stamens* slightly shorter than the perianth segments; anthers about  $\frac{1}{2}$  mm long. *Style* short, divided for about half its length; ovary almost sessile, up to about 2 mm long. *Fruit* about 6 mm diameter, 1-seeded, smooth.

This species does not appear to be common anywhere, but is spread over a large part of the drier southern areas of the Cape. In the west it is known from Namakwaland and in the east there are single records from both Zululand and the Transvaal. Despite this disjunct distribution, the characters are sufficiently distinct to make it very likely that the specimens are all correctly included in this species. Flowers have been collected from October to January and in March.

CAPE.—Beaufort West: Sunnyside, *Esterhuysen* 5036 (BOL). Bedford: 13 miles N.N.E. of Cookhouse. *Acocks* 11908. Cradock: 12 miles N.N.E. of Fish River Station, *Acocks* 16296. Graaff-Reinet: Wimbledon, *Henrici* 4964. Namakwaland: Holgat, *Pillans* 5178 (BOL). Port Elizabeth: Redhouse, *Paterson* 978 (BOL). Uitenhage: Aloes, *Drege* s.n.

NATAL.—Ingwavuma: Ndumu Game Reserve, *Ward* 2034.

TRANSVAAL.—Lydenburg: 2 miles N. of Ohrigstad, *Young* A616.

This is one of the most densely pubescent species in South Africa. The normally strongly arcuate cladodes and recurved spines are also characteristic. The nearest species is *A. racemosus* from which it can be distinguished by the pubescence, the smooth stems, and more erect habit. Another species with many similarities is *A. nelsii*, which has a whitish stem, well-defined branchlets and yellowish flowers.

32. *A. crassicladus* *Jessop*, sp. nov., *A. racemoso* Willd. affinis, sed ramulis minus manifestis, cladodiis crassioribus, racemis pedicellisque brevioribus differt. PLATE 8.

Caules lignei, tortuosi, teretes, plerumque pubescentes, cani vel cano-fusci, aliquando cortice cano exuviales. *Rami* divaricati vel ascendentes, leviter tortuosi, 1-vel 3-nati. *Cladodia* transversa sectioni ovalia, acuminata, 12-25 mm longa, interdum scabrida, lateraliter 1- ad 3-nata, terminaliter ad 12-nata. *Spinae* manifeste evolutae, reflexae, omnino in caulibus et ramulis vegetativis. *Racemi* in paribus dispositi, ad 6 cm longi. *Pedicelli* 2-6-nati, 3-4 mm longi, c. 1 mm e ramo articulati. *Segmenta perianthii* similia, oblonga, aliquando leviter obovata, 3 mm longa, lacticolorata. *Stamina*  $\frac{3}{4}$  perianthii segmentorum aequantia; antherae minutae. *Ovarium* 1 mm longum, breviter stipitatum: stylus fere 0.5 mm longus, semi-divisus.

Type: Cape: Uniondale district, Kouga, *Esterhuysen* 4670 (BOL, hol.).

Stems woody, tortuous, terete, usually slightly pubescent, grey or brownish grey, sometimes with the outer layers peeling. *Branches* spreading or ascending, slightly tortuous, 1- or 3-nate. *Cladodes* oval in cross section, acuminate, 1-3-nate laterally, up to 12-nate terminally, sometimes scabrid, 12-25 mm long. *Spines* well-developed, reflexed, sometimes persistent on all vegetative stems and branches. *Racemes* paired,

up to 6 cm long. *Pedicels* 2-6-nate, 3-4 mm long, articulated about 1 mm from the peduncle. *Perianth segments* similar, oblong, sometimes slightly obovate, 3 mm long, cream coloured. *Stamens* three quarters of the length of the perianth segments; anthers minute. *Ovary* shortly stalked, 1 mm long; style about half as long, divided for about half its length. *Fruit* not known.

This species is a climber to about 2 m on bushes in the southern Cape from the Uniondale district in the west to at least as far east as the Somerset East district. Flowers have been recorded from December to February.

CAPE.—Albany: Sushington Valley, *Britten* 2724 (GRA); Penrock Farm, *Dyer* 1193 (GRA). Alexandria: 9 miles from Salem towards Alexandria, *Jessop* 609. Bathurst: Horseshoe on the Kariega River, *Jessop* 617. Kirkwood: Addo Reserve, *Repton* 5674. Somerset East: 1 mile W. of Bruintjes-hoogte, *Jessop* 645. Uniondale: Kouga, *Esterhuysen* 4670 (BOL); *Ecklon & Zeyher* s.n. (BOL).

This species is very similar in general habit to *A. racemosus*, but sometimes has spines on the final branches and differs in the shape of the cladodes and in the length of the peduncles and pedicels. There is little differentiation of branchlets.

33. *A. nelsii* *Schinz* in Bull. Herb. Boiss. 1, 4, app. III: 44 (1896); Sölch, Beitr. Fl. Südwest-Afr. 38 (1961). Type: S.W.A., 'Hereroland', *Nels* 20 (Z, holo.!).

Stems erect, somewhat zigzagging, smooth, sometimes slightly pubescent, grey-white becoming brown as the outer layers disintegrate, generally up to about 50 cm high. *Branches* spreading to ascending, solitary except on the older parts of the plant where they may be paired, similar to the stems. *Branchlets* usually a pale yellow to pale brown, solitary except on the older parts where they may be paired. In young plants solitary herbaceous branchlets occur on solitary woody branches, but in the older parts, branches and branchlets become more numerous and may become indistinguishable from one another. *Cladodes* narrow, terete, fascicled, 10-20 mm long, appearing after the flowers. *Spines* well-developed on all stems, branches, branchlets and peduncles, spreading to recurved; the larger ones grey with brown apices; the smaller brown. *Peduncles* 3-5 cm long, unbranched, or up to about 10 cm long, and branched, pale grey to yellowish, solitary or up to about 10-nate. *Pedicels* articulated once just below the centre, or sometimes twice, 2-5 mm long, up to 4-nate. *Perianth segments* similar, free or fused for up to about one fifth of their length, entire, 3-4 mm long, oblong-obovate, yellowish. *Stamens* slightly shorter than the perianth segments. *Style* and *ovary* each about 1 mm long; ovules 8 or 9 per cell. *Berry* globose, about 5 mm diameter, 1- or rarely 2-seeded, red.

This species is widespread and fairly frequent in the dry Karriod and Kalahari areas of the northern Cape, Bechuanaland and South West Africa. Flowers have been recorded from August to October.

CAPE.—Gordonia: 11 miles N.E. of Twee Rivieren, *Leistner* 2899. Hay: 8 mile E. of Postmasburg, *Acocks* s.n. Kenhardt: near Pofadder, *Jessop* 352 (BOL). Kuruman: Tellery Pan near Kuruman River, *Leistner* 2167.

TRANSVAAL.—Soutpansberg: Hackthorne Farm, *Codd* 4336.

SOUTH WEST AFRICA.—Gibeon: Haribes, *Volk* 12188 (M). Grootfontein: Onguma, *Walter* 416 (M). Keetmanshoop: Gariganus, *Acocks* 15656. Maltahöhe: Duwisib, *Volk* 12685 (M). Okahandja: Okahandja, *Dinter* 282 (SAM). Otjiwarongo: Quickborn, *Bradfield* 89. Outjo: Outjo, *Thorne* s.n. (SAM). Ovamboland: Oshikango, *Loeb* 447. Rehoboth: Rehoboth, *Fleck* 212 (Z). Warmbad: Warmbad, *Wandres* s.n. (Z). Windhoek: Windhoek, *Rogers* 29773 (Z).

BECHUANALAND.—Toteng, *Story* 4661; Ngamiland, *Curson* 556.

34. *A. striatus* (*Linn. f.*) *Thunb.*, Prodr. 65 (1794); Bak. in Journ. Linn. Soc. Bot. 14: 621 (1975); Fl. Cap. 6: 267 (1896); Sölch, Beitr. Fl. Südwest-Afr. 39 (1961). Type: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, holo.!).

*Dracaena striata* Linn. f., Suppl. 204 (1781). *D. erecta* Linn. f., Suppl. 204 (1781); R. & S., Syst. Veg. 7: 346 (1829). Syntypes: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, a!, b!). *D. stricta* Schult. in R. & S., Syst. Veg. 7: 346 (1829), in errore *D. striata*.

*Asparagus erectus* (Linn. f.) Thunb., Prodr. 65 (1794); Bak. in Journ. Linn. Soc. Bot. 14: 621 (1875); Fl. Cap. 6: 267 (1896). *A. engleri* Krause in Bot. Jahrb. 51: 450 (1914). Type: S.W.A., Great Karasberg, *Engler* 6651 (B, holo.!).

*Myrsiphyllum striatum* (Linn. f.) Kunth, Enum. Pl. 5: 110 (1850). *M. erectum* (Linn. f.) Kunth, Enum. Pl. 5: 109 (1850).

Tubers borne laterally on the roots. *Stems* erect, glabrous or minutely pubescent, woody, grooved, almost straight, greenish. *Branches* ascending, similar to the stems, but often more zigzagging, not bearing branchlets. *Cladodes* terminal and 2- or 3-nate and lateral and solitary in most specimens, very variable in shape from linear to almost lanceolate, 10–40 mm long, 1–5 mm broad, rarely almost terete, very firm and rigid. *Spines* often not developed, small, reflexed, hardly ever pungent: the remaining part of the leaf with an entire margin. *Peduncles* in terminal fascicles varying from 1–2 or less often up to 15 or more, about 5 mm long, articulated below the centre. *Perianth segments* 3–4 mm long, oblong-obovate with a serrate apex or not, similar. *Stamens* not spurred, almost as long as the perianth segments; anthers about  $\frac{1}{2}$  mm long. *Style* branches very short; style about 1 mm long. *Berry* fleshy, about 5 mm diameter, generally 1- or 2-seeded, red.

This species occurs in dry areas, particularly on rocky hills, over much of the Cape Province east of Laingsburg. There are also a few records from the Orange Free State and South West Africa. Flowers have been recorded from August to January and in March.

CAPE.—Adelaide: 3 miles from Adelaide on Bedford road, *Jessop* 644. Albany: Grahamstown, *Schlechter* 2633 (GRA). Alexandria: Bushman's River Poort, *Galpin* 2976. Aliwal North: Orange River, 3 miles down from Aliwal North, *Gerstner* 62. Bathurst: Hopewell, *Acocks* 11128. Beaufort West: Sunnyside, *Esterhuysen* 4356 (BOL). Calvinia: Calvinia, *Schmidt* 232. Clanwilliam: Brakfontein, *Ecklon & Zeyher* s.n. (BOL). Cradock: Cradock, *Killick* 796. De Aar: near De Aar, *Schweickerdt* 1206. Graaff-Reinet: near Graaff-Reinet, *Bolus* 516 (BOL). Hay: Floradale, *Esterhuysen* s.n. Humansdorp: Kabeljaauw, *Burt-Davy* s.n. Kirkwood: Addo Reserve, *Repton* 5703. Kuruman: Lohatla, *Esterhuysen* 2414 (BOL). Laingsburg: Ngaap Kop, *Compton* 9242 (NBG). Middelburg: Middelburg, *Theron* 454. Murraysburg: The Cave, *Tyson* 242 (GRA). Oudtshoorn: near Cango, *Britten* 1771 (GRA). Port Elizabeth: Swartkops River, *Zeyher* 480. Prieska: Prieska, *Bryant* J330. Queenstown: Oxtou Manor, *Galpin* 7373. Riversdale: Riversdale, *Bolus* s.n. (BOL). Somerset East: Boschberg, *MacOwan* 1773 (SAM). Uniondale: Kouga near Misgund, *Compton* 7483 (NBG). Uitenhage: The Aloes, *Drege* 3164 (GRA). Victoria West: Slypfontein, *Rehm* s.n. Willowmore: Willowmore, *Watt & Brandwyk* 2396.

ORANGE FREE STATE.—Fauersmith: Botanical Reserve, *Pole Evans* 1794. Thaba Nchu: Thaba 'Nchu, *Roberts* 2945.

SOUTH WEST AFRICA.—Warmbad: Kanus, *Dinter* 3072 (SAM). "Grosse Namaland", *Fleck* 306a (Z).

Thunberg did not cite a Linnaean synonym for *A. striatus* but there is no reasonable doubt that the omission of *Dracaena striata* was accidental, as all other species collected at the Cape by Thunberg and regarded as *Dracaena* species by Linnaeus are cited. *D. striata* and *D. erecta* were described in the same work, and the epithet *striatus* is preferred by the present author as it is in more common use.

Linnaeus separated these two species on *D. erecta* being herbaceous and *D. striata* being woody, with striate cladodes. Neither of these characters has any significance as both are woody, although often green, and have striate cladodes. Baker (1896), who realised the worthlessness of these characters, separated his concept of these two species on whether the flowers were solitary (in *A. erectus*) or not. This character does not seem to have any taxonomic significance.

Schultes cited both *A. striatus* and *D. striata* as synonyms for his *D. stricta*, the spelling of which is, therefore, very likely to have been an orthographic error.

35. *A. subulatus* Thunb., Prodr. 66 (1794); R. & S., Syst. Veg. 7: 326 (1829); Kunth, Enum. Pl. 5: 74 (1850); Bak. in Journ. Linn. Soc. Bot. 14: 612 (1875); Fl. Cap. 6: 262 (1896). Type: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, holo.!; BOL!; PRE!, photos).

Tubers borne laterally on the roots. *Stems* erect, slightly zigzagging, glabrous or minutely pubescent, woody, grooved, greenish. *Branches* reflexed or at least spreading, similar to the stems, but more zigzagging. *Cladodes* often paired terminally and single laterally, but sometimes up to 10 or more terminally and paired laterally, terete, grooved, up to about 2.5 cm long and 1 mm broad, rather firm. *Spines* rudimentary or absent, the remainder of the leaf not scarious. *Peduncles* in terminal fascicles varying from 1–15, 3–5 mm long, articulated below the centre. *Perianth segments* 3–4 mm long, oblong-obovate, sometimes much narrowed towards the apex, entire, similar. *Stamens* not spurred, almost as long as the perianth segments; anthers about  $\frac{1}{2}$  mm long. *Style* branches rather short; style about 1 mm long. *Fruit* about 5 mm diameter, fleshy, 1–3-seeded; perianth persistent and conspicuous.

This species occurs mainly in dry areas, especially on rocky slopes, mainly in the south-eastern parts of the Cape, but also in parts of the Transvaal, Natal and Mozambique; flowers have been recorded from September to December.

CAPE.—Albany: Sandy Drift near Grahamstown, *Daly* 70 (SAM). Alexandria: valley south of Signal Hill, *Galpin* 2923. Bathurst: West bank of Kowie, *Britten* 1875. Butterworth: overlooking the Butterworth River, *Pegler* 2078 (BOL). Cathcart: near the Swart Kei River, 15 miles N. of Cathcart, *Roberts* 1827A. East London: Chalumna causeway, *Barker* 6966 (NBG). Fort Beaufort: Fort Beaufort, *Taylor* s.n. (GRA). Humansdorp: Zeekoe River mouth, *Fourcade* 5802 (NBG). Kentani: Kentani, *Pegler* 2078. King William's Town: King William's Town, *Sim* 1047 (BOL). Kirkwood: Addo National Park, *Archibald* 3781. Komga: Kabousie River near Komga, *Flanagan* 2584 (BOL). Peddie: 15 miles from Peddie towards East London, *Barker* 3969 (NBG). Port Elizabeth: Swartkops River, *Ecklon & Zeyher* 250. Queenstown: Newstead below Otterburn, *Acocks* 12158. Uitenhage: Aloes, *Drege* 3162. Umtata: near Umtata, *Acocks* 10971. Victoria East: Breakfast Vlei, *Barker* 2834 (NBG).

NATAL.—Camperdown: Umgeni Valley, *Forbes* 1257 (NH). Lower Umfolosi: Umfolosi Game Reserve, *Ward* 1665 (NH). Mahlabatini: Mahlabatini, *Gerstner* 2825. Msinga: 3 miles S. of Tugela Ferry, *Codd* 6336. Ngotche: about  $\frac{1}{2}$  mile from Pongola Bridge on Magudu road, *Edwards* 3193. Nongoma: 11 miles N. of Nongoma, *Jessop* 673. Ubombo: Mkuze Game Reserve, *Ward* 3991. Umtintzo: Umpambinyoni River, *Thode* 3430 (STE).

TRANSVAAL.—Barberton: Budd's Farm near Kaap Muiden, *Thorncroft* 3065 (NH). Lydenburg: Lulu Mountains, *Mogg* 16890. Pilgrim's Rest: 1 mile N.E. of Skukuza, *Codd* 5718. Soutpansberg: Ingwe Motel, *Jacobsen* 1876.

The only significant variation in this species is in the number of cladodes in a bundle. Although there are few species of *Asparagus* in South Africa in which both solitary and numerous cladodes occur on different specimens, this character has been found so variable in this species as not to be of any value taxonomically.

36. *A. scandens* Thunb., Prodr. 66 (1784); Bresler, Diss. 5 (1826); R. & S., Syst. Veg. 7: 325 (1829); Bak. in Saund., Ref. Bot. t. 21 (1869); Journ. Linn. Soc. Bot. 14: 622 (1875); Fl. Cap. 6: 268 (1896); Salter in Fl. Cape Penins. 174 (1950). Syntypes: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, a!, b!; BOL!, PRE!, photos).

*Asparagus pectinatus* Delile in Red., Lil. t. 407 (1813). Type: "l'orangerie du jardin la Malmaison".

*Asparagopsis scandens* (Thunb.) Kunth, Enum. Pl. 5: 78 (1850).



Roots tuberous; the tubers 2–3 cm long, about 0.5 cm broad, borne on long stalks. *Stems* weakly scrambling or climbing to 2 m, perennial, glabrous, green, tortuous, not zigzagging at the nodes. *Branches* wide-spreading or ascending, angled. *Cladodes* ternate, one conspicuously longer than the other two, spreading in the same plane on all ultimate branches on the same branch, linear-lanceolate, falcate, with a single prominent vein, bright green, 0.5–1.5 cm long, 0.8–1.6 mm broad. *Leaves* much-divided, scarious, not spine-forming. *Peduncles* axillary, usually solitary, occasionally 2–3-nate, 8–12 mm long, articulated in the distal half. *Perianth segments* obovate, the outer whorl slightly smaller, the margins entire or minutely toothed, spreading, 3–4 mm long, white or rarely pinkish. *Stamens* nearly as long as the perianth segments; filaments not spurred; anthers yellow,  $\frac{1}{4}$  of the length of the filaments. *Style* 1 mm long; ovary 1 mm long, with 3 ovules per chamber. *Berry* globose, 1-seeded, red.

This species grows in shady places where there is perennial moisture, from the Cape Peninsula in the west to Zitzikama in the east. Generally it is found on coastal mountains below about 2,000 feet. Flowers are produced irregularly, but have been recorded in January, September and October.

CAPE.—Caledon: Betty's Bay, *Topper* 88 (NBG). George: Forest between Wilderness and George, *Story* 3561. Humansdorp: Hofman's Bos, *Britten* 1325 (GRA). Knysna: Blaaukrantz Pass, *Galpin* 4738. Paarl: Franschoek, *Phillips* 1345 (SAM). Riversdale: Grootvadersbos, *Zeyher* 8570b (STE). Stellenbosch: Jonkershoek, *Rodin* 3233. Swellendam: Strawberry Hill, *Van der Merwe* s.n. (STE). Tulbagh: Tulbaghklouf, *Ecklon & Zeyher* s.n. Wynberg: Devils Peak, *Wolley Dod* 1739 (BOL).

37. *A. ramosissimus* Bak. in Gard. Chron. n. s., 2: 6 (1874); Journ. Linn. Soc. Bot. 14: 622 (1875); Fl. Cap. 6: 268 (1896). Type: "Cooper in Hort. Saunders 5102".

*A. scandens* Thunb. var. *deflexus* Bak. in Journ. Linn. Soc. Bot. 14: 622 (1875); Fl. Cap. 6: 268 (1896). Type: Somerset East, Boschberg, *MacOwan* 1771 (BOL!, SAM!).

Stems weak and scrambling or climbing, up to 1 m long, probably usually perennial, herbaceous. Stems and branches grooved, glabrous, slightly zigzagging, greenish. *Ultimate branches* reflexed at the base, similar to the other branches. *Cladodes* angled or flattened, linear, 3-nate, 5–15 mm long. *Leaves* not spine-forming. *Peduncles* solitary, 2–10 mm long, articulated distally. *Perianth segments* similar, entire, obovate, about 3 mm long, spreading, white. *Stamens* nearly as long as the perianth segments; filaments not spurred; anthers up to 1 mm long. *Style* sometimes at least, unbranched about 1 mm long; ovary about 1.5 mm long. *Berry* globose, fleshy, up to nearly, 1 cm diameter, 1- or 2-seeded, red.

This species occurs in moist shady places from the Worcester district through the southern Cape and Natal up to the eastern Transvaal. Flowers have been recorded from September to January and in June.

CAPE.—Heidelberg: between Port Beaufort and Riversdale, *Lewis* 5941 (NBG). George: Cradockberg, *Esterhuysen* 30168. Keiskammahoek: Cala Forest Reserve, *Story* 3269 (GRA). King William's Town: Pirie, *Flanagan* 2235. Mount Ayliff: Insiswa Mountains, *Schlechter* 6439. Mount Currie: Mount Currie, *Stephany* 33 (GRA). Riversdale: Kampscheberg, *Muir* 2977 (BOL). Somerset East: Boschberg, *MacOwan* 1771 (SAM). Stockenström: Hogsback, *Barker* 1901. Stutterheim: Fort Cunynghame, *Galpin* 2439. Swellendam: Tradouw Pass, *Walgate* 914 (NBG). Victoria East: Victoria East, *Rattray* 338. Worcester: Welgevonden, *Esterhuysen* 1902 (BOL).

BASUTOLAND.—Leribe, Pitzeng, *Dieterlen* 707.

NATAL.—Bergville: Ndedena, *Esterhuysen* 28502 (BOL). Estcourt: Cathkin Park, *Howlett* 47.

ORANGE FREE STATE.—Bethlehem: Golden Gate National Park, *Roberts* 3229.

SWAZILAND.—N.W. of Mbabane, *Compton* 30552.

TRANSVAAL.—Barberton: Ivy Range, Moodies, *Thorncroft* 338. Ermelo: Spitskop, *Pott* 15118. Pilgrim's Rest: Graskop, *Galpin* 14531. Pretoria: Wonderboomspruit, *Mogg* 14754. Wakkerstroom: Oshoek, *Devenish* 206.

Baker described *A. ramosissimus* as "Wide climbing, leaves obscurely spurred at the base, cladodes 3- to 8-nate, flattened, linear, falcate, acute,  $\frac{1}{4}$  to  $\frac{3}{8}$  inches long, spreading. Flowers solitary at the tips of the branchlets". There are two characters in this description which are rare in the specimens examined by the present author. These are the 3- to 8-nate cladodes and the terminal flowers. Both of these characters do occur, however, and there is no other species which fits this description. In 1875, Baker cited "Cooper in Hort. Saunders 5102", but added that the description was made from a figure by Fitch. This drawing does not appear to have been published, and Moss (Ms. in National Herbarium, Pretoria) could not find a specimen of the species among the specimens in Cooper's complete set at Kew.

In 1896, Baker wrote that his description of *A. ramosissimus* was from a living plant in Wilson's garden at Reigate. It is likely that no specimen has been preserved, and no other specimen was cited in any of Baker's works.

38. *A. crispus* Lam., Encyc. 1: 295 (1783); Bresler Diss. 22 (1826); R. & S. Syst. Veg. 7: 326 (1829); Kunth, Enum. Pl. 5: 73 (1850); Bak. in Journ. Linn. Soc., Bot. 14: 607 (1875); Fl. Cap. 6: 259 (1896); Marloth, Fl. S. Afr. pl. 20 (1915); Salter in Fl. Cape Penins. 174 (1950). Type: "L'Isle de France", collector unknown, (P, holo.; PRE, photo.).

*A. flexuosus* Thunb., Prodr. 66 (1794); Kunth, Enum. Pl. 5: 74 (1850). Type: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, holo.!, BOL!, PRE!, photos). *A. decumbens* Jacq., Hort. Schoenbr. 1: 51, t. 97 (1797); Bresler, Diss. 21 (1826). Type: Cape of Good Hope without precise locality, collector unknown.

*Asparagopsis decumbens* (Jacq.) Kunth, Enum. Pl. 5: 77 (1850).

Roots tuberous; the tubers borne on short stalks, 3-6 cm long, 0.5-1.5 cm broad. *Stems* annual, weak, straggling or climbing, usually up to 1 m long, much-branched, angled, zigzagging at the nodes, glabrous, green. *Branches* reflexed at the base, curving upwards, similar to the stems. *Cladodes* ascending, ternate, except where a normal branch is formed when they are paired, borne at nodes towards the ends of branches, soft or slightly firm, slightly arcuate, flattened or angled, 3-9 mm long, less than 1 mm broad and usually less than  $\frac{1}{2}$  mm broad. *Leaves* frequently forming soft spine-shaped processes, grey. *Peduncles* solitary, axillary, 6-11 mm long, articulated distally. *Buds* cylindrical. *Perianth segments* reflexed from their centres, but forming a cylinder proximally; the base of the flower truncate; segments similar, entire, linear-oblong, whitish with a pale brown or green streak, 4-5 mm long. *Stamens* about 3 mm long, orange; filaments broadened towards their bases, and with minute spurs. *Style* 1.5 mm long; ovary 1.5 mm long, with 2-4 ovules in each chamber. *Berry* ovoid, 3-9-seeded, 8-15 mm long, pale coloured; style persistent and conspicuous; perianth persistent.

This species grows in a wide range of habitats from coastal sands to rich mountain soils, but has a rather restricted distribution. It occurs in the south-western Cape from St. Helena in the north, round the coast as far as Swellendam. It also grows as far inland as Worcester. Flowers have been recorded from June to October.

CAPE.—Caledon: *Van Niekerk* 739 (BOL). Cape: Robben Island, *Walgate* 494 (NBG); Signal Hill, *Dümmer* 1600 (SAM). Clanwilliam: between the Olifant's River and Brakfontein, *Ecklon & Zeyher* s.n. Humansdorp: mouth of Klein River, *Zeyher* 4155 (BOL). Malmesbury: Darling Flora Reserve, *Rycroft* 1931 (NBG). Paarl: Tigerberg, *Pillans* 8657 (BOL). Robertson: Robertson, *Van Niekerk* 383. Simonstown: Lakeside Plateau, *Jessop* 62 (BOL). Somerset West: Knorhoek, *Jessop* 61 (BOL). Stellenbosch: Jonkershoek, *Duthie* 527 (STE). Tulbagh: Saron, *Schlechter* 7892 (GRA). Worcester: Karroo Garden, *Leighton* 1037 (NBG). Wynberg: Kirstenbosch, *Salter* 7356 (BOL).

Lamarck described this species from a specimen in the Lamarck Herbarium. This specimen is described as having been collected on Mauritius. The only Mauritian species is *A. umbellulatus* Bresler, which differs in having fascicled cladodes, flowers not solitary, peduncles articulated near the centre and a globose fruit. The locality must, therefore, either be wrongly given or the plant must have been cultivated.

The illustration by Jacquin includes an accurate drawing of the flower, which shows the truncate base and cylindrical proximal part characterising *A. crispus* Lam.

39. *A. asparagoides* (L.) Wight in Century Dictionary II: 845 (1909); Salter in Fl. Cape Penins. 173 (1950). Type: Tilli, Cat. Plant Horti Pisani t. 12, f. 1, 2 (1723).

*Medeola asparagoides* L., Sp. Pl. 339 (1753); Delile in Red., Lil. t. 442 (1816). *M. angustifolia* Mill., Gard. Dict. ed. 8 (1768). Type: Tilli, Cat. Plant. Horti Pisani t. 12 "myrti folio angustiore" (1723).

*Dracaena medeoloides* Linn. f., Suppl. 203 (1781). Type: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, holo.!, BOL!, PRE!, photos). *D. volubilis* Linn. f., Suppl. 204 (1781). Type: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, holo.!, BOL!, PRE!, photos).

*Asparagus volubilis* (Linn. f.) Thunb., Prodr. 66 (1794); Bak. in Journ. Linn. Soc. Bot. 14: 628 (1875); Fl. Cap. 6: 272 (1896). *A. medeoloides* (Linn. f.) Thunb., Prodr. 66 (1794); Marloth, Fl. S. Afr. 4: pl. 20 (1915). *A. kraussii* Bak. in Journ. Linn. Soc. Bot. 14: 628 (1875); Fl. Cap. 6: 272 (1896), nom illegit. Type: as for *Myrsiphyllum kraussianum* Kunth. *A. kraussianus* (Kunth) MacBride in Contrib. Gray Herb. 56: 17 (1794); Salter in Fl. Cape Penins. 174 (1950), sub *A. kraussianus*. *A. kuisibensis* Dinter in Fedde, Rep. 29: 270 (1931). Type: S.W.A., Kuisib, *Tjuezu* in Herb. Dinter 4698 (B, holo.). *A. ovatus* Salter in Journ. S. Afr. Bot. 6: 167 (1940); Fl. Cape Penins. 174 (1951); Dyer in Flow. Pl. Afr. 29: t. 1146 (1943). Type: Cape, Rugby, Salter 8214 (BOL, holo.!, NBG!, PRE!). *A. multituberosus* Dyer in Bothalia 6: 442 (1954). Type: Ceres, Karooport, *Marloth* 9006 (PRE, holo.!, STE!).

*Ruscus volubilis* Thunb., Prodr. 13 (1794); Kunth, Enum. Pl. 5: 276 (1950). Type: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, holo.!, BOL!, PRE!, photos).

*Myrsiphyllum asparagoides* (L.) Willd. in Ges. Naturf. Fr. Berl. Mag. 2: 25 (1808); Kunth, Enum. Pl. 5: 105 (1850); Hook. f. in Bot. Mag. t. 5584 (1866). *M. angustifolium* (Mill.) Willd. in Ges. Naturf. Fr. Berl. Mag. 2: 25 (1808); Kunth, Enum. Pl. 5: 106 (1850). *M. falciforme* Kunth, l.c., 107 (1850). Type: Cape without precise locality, *Drege* 2704a in "Herb. Luc." (K, iso.). *M. gramineum* Kunth, l.c., 108 (1850). Type: "M. striatum *Schlechtend. in Herb. reg. Berol., excl. synonym. (v.s.) et? Hort. Berol.* 1847". *M. kraussianum* Kunth, l.c., 107 (1850). Type: Wynberg, Constantia, *Krauss* 1333.

*Hecatrix asparagoides* (L.) Salisb., Gen. Plant. 66 (1866).

Tubers varying from almost sessile to 7 cm distant, usually 5–15 cm long. *Stems* climbing to 3 m, scrambling or under exceptional circumstances erect, tortuous, glabrous, terete or angled, annual. *Branches* similar to the stems, spreading or ascending. *Cladodes* broadly ovate to lanceolate, with an obtuse base, sessile, 1–7 cm long, up to about 7 prominent veins and numerous smaller ones. *Leaves* scarious, not forming spines. *Peduncles* 1- or 2-nate, 3–8 mm long, articulated near the flower. *Perianth segments* similar, entire, linear-oblong, 5–6 mm long, spreading at first, later reflexed from the centre of each segment, white. *Stamens* nearly as long as the perianth segments; anthers 0.5 mm long; filaments with two basal spurs. *Ovary* 2 mm long; style 2–3 mm long, the branches sometimes only loosely fused; ovary chambers with 4–9 ovules. *Berry* globose, 6–10 mm diameter, up to 8-seeded, red; perianth persistent.

It is distributed from the south-western Cape through the eastern parts of South Africa and north to Kenya and the Congo. The flowering period is mainly June to September, but varies according to the time of the rainfall. In the Transvaal, flowering usually occurs in January and February.

CAPE.—Albany: Frasers Camp, *Maguire* 636 (NBG). Alexandria: near Sandflats, *Burtt Davy* 14249 (BOL). Barkly East: Barkly Pass, *Rattray* 7324. Bathurst: Kowie River, *MacOwan* 1920 (SAM). Bellville: De Grendel, *Esterhuysen* 23057 (BOL). Bredasdorp: Strandkloof, *Compton* 14778 (NBG). Caledon: Uilenkraal, *Taylor* 1584 (SAM). Calvinia: near Middelpost, *Salter* 3484 (BOL). Cape: near Rugby, *Salter* 8214. Ceres: Karroopoort, *Marloth* 9006. Clanwilliam: Brakfontein, *Schlechter* 7974. Colesberg: Arundel, *Acocks* 17992. East London: near Cove Rock, *Galpin* 3102, Fort Beaufort: near Fort Beaufort, *Story* 2226. George: Wilderness, *Van Niekerk* 251 (BOL). Graaff-Reinet: Graaff-Reinet, *Bolus* 463 (BOL). Humansdorp: Ratelsbos, *Fourcade* 53 (BOL). Kentani. Kentani, *Pegler* 1240 (BOL). King William's Town: Amabele, *De Vries* 23. Kirkwood: Addo Bush, *Marloth* 6439. Knysna: Knysna Village, *Fourcade* 5885 (BOL). Komga: Prospect Farm, *Flanagan* 315. Laingsburg: White Hill, *Compton* 11200 (NBG). Malmesbury: Darling Flora Reserve, *Rycroft* 1969 (NBG). Montagu: Montagu, *Levyms* s.n. (BOL). Namakwaland: Silverfontein near O'okiep, *Drege* 2704b (K). Peddie: near Woodridge, *Acocks* 11886. Piketberg: Avontuur Mountain, *Pillans* 7571 (BOL). Port Elizabeth: Perseverance, *Paterson* 67 (GRA). Queenstown: Invana, *Cooper* 328 (BOL). Riversdale: Vet Rivier, *Muir* 353. Simonstown: Smitswinkel, *Wolley Dod* 3009 (BOL). Somerset East: Boschberg, *MacOwan* s.n. (SAM). Somerset West: Fir Grove, *Parker* 4485 (BOL). Stellenbosch: near Mill Stream, *Duthie* 1479 (STE). Stockenström: Andriesberg, *Galpin* 2536 (GRA). Tulbagh: Saron, *Schlechter* 4876 (GRA). Uitenhage: Enon, *Thode* A2771. Uniondale: near Laudina Store, *Acocks* 14643. Vanrhynsdorp: Giftberg, *Phillips* 7619 (SAM). Wellington: Wellington, *Thomson* s.n. Worcester: De Doorns, *Geriche* s.n. Wynberg: Kirstenbosch, *Salter* 7596 (BOL).

BASUTOLAND.—Leribe, *Dieterlen* 102.

NATAL.—Bergville: Cathedral Peak Forest Reserve, *Killick* 1723. Camperdown: Mid Illovo: *Thode* 3432 (STE). Eshowe: Eshowe, *Gerstner* 3754 (NH). Inanda: Inanda, *Medley Wood* 623 (NH). Kranskop: Kranskop, *Thode* 3419 (STE). Lions River: Dargle Forest, *Moll* 1233. Ngotche, Ngome Forest, *Gerstner* 4396. Pietermaritzburg: Allerton, *Mogg* 6620.

ORANGE FREE STATE.—Bethlehem: Clarens, *Van Hoepen* s.n. Bloemfontein: Glen, *Mostert* 363. Lindley: near Lindley, *Phillips* s.n. (BOL).

SWAZILAND.—Near Hlatikulu, *Compton* 26393 (NBG).

TRANSVAAL.—Barberton: Umvoti Creek, *Galpin* 857. Belfast: near Machadadorp, *Bruce* 481. Ermelo: Ermelo, *Rogers* 14782 (BOL). Johannesburg: Jeppe, *Gilmore* 520. Krugersdorp: near Krugersdorp, *Mogg* 23103. Letaba: Duiwelskloof, *Scheepers* s.n. Lichtenburg: Grasfontein, *Sutton* 581. Middelburg: Boschhoek, western Steenkampsberg, *Young* A384 (NH). Pietersburg: Blaauwberg, *Dyer* 9152. Pilgrim's Rest: Mariepskop, *Van der Schijff* 4784. Potchefstroom: Nootgedacht, *Cohen* s.n. Wakkerstroom: Wakkerstroom, *Beeton* 124 (SAM).

SOUTH WEST AFRICA.—Grootfontein: Otavibirge, *Dinter* 743 (SAM); Otavi, *Dinter* 5547 (B).

Linnaeus, in his *Species Plantarum*, cited M. A. Tilli's "Catalogus Plantarum Horti Pisani" (1723) t.12, f.1 & 2. There is no specimen labelled *Medeola asparagoides* in the Linnaean Herbarium so that Tilli's figure, which shows specimens with solitary, many-veined cladodes and tortuous stems should be regarded as the iconotype, as this was the only illustration cited.

Miller regarded the specimen in Tilli's plate with larger cladodes as the type of Linnaeus' species, and coined the name *Medeola angustifolia* for the form with smaller cladodes shown in the other figure on the same plate.

*Dracaena volubilis* Linn. f. was based on a Thunberg specimen from the Cape. The specimen in the Linnaean Herbarium, a photograph of which has been examined by the author, has ternate cladodes as opposed to the alternate cladodes mentioned in the type description and according to Jackson (1912), it does not occur in the enumerations of the Linnaean Herbarium. It can, therefore, not be considered as a type. The sheet in the Thunberg Herbarium labelled *Asparagus volubilis* has three specimens which agree with the younger Linnaeus' description of *Dracaena volubilis* and with the present author's concept of *Asparagus asparagoides*. Thunberg's *A. volubilis* was described in the same words as *Dracaena volubilis* Linn. f., and

reference was made to "Linnaeus Syst. 334". The only reference to this species earlier than Thunberg's Prodrumus appears to be the Supplementum of the younger Linnaeus. Stearn (1961) mentions that both Linnaeus the younger and Thunberg played a part in adding to the elder Linnaeus' manuscript of this work. It is therefore very likely that "Linnaeus Syst. 334" refers to this manuscript.

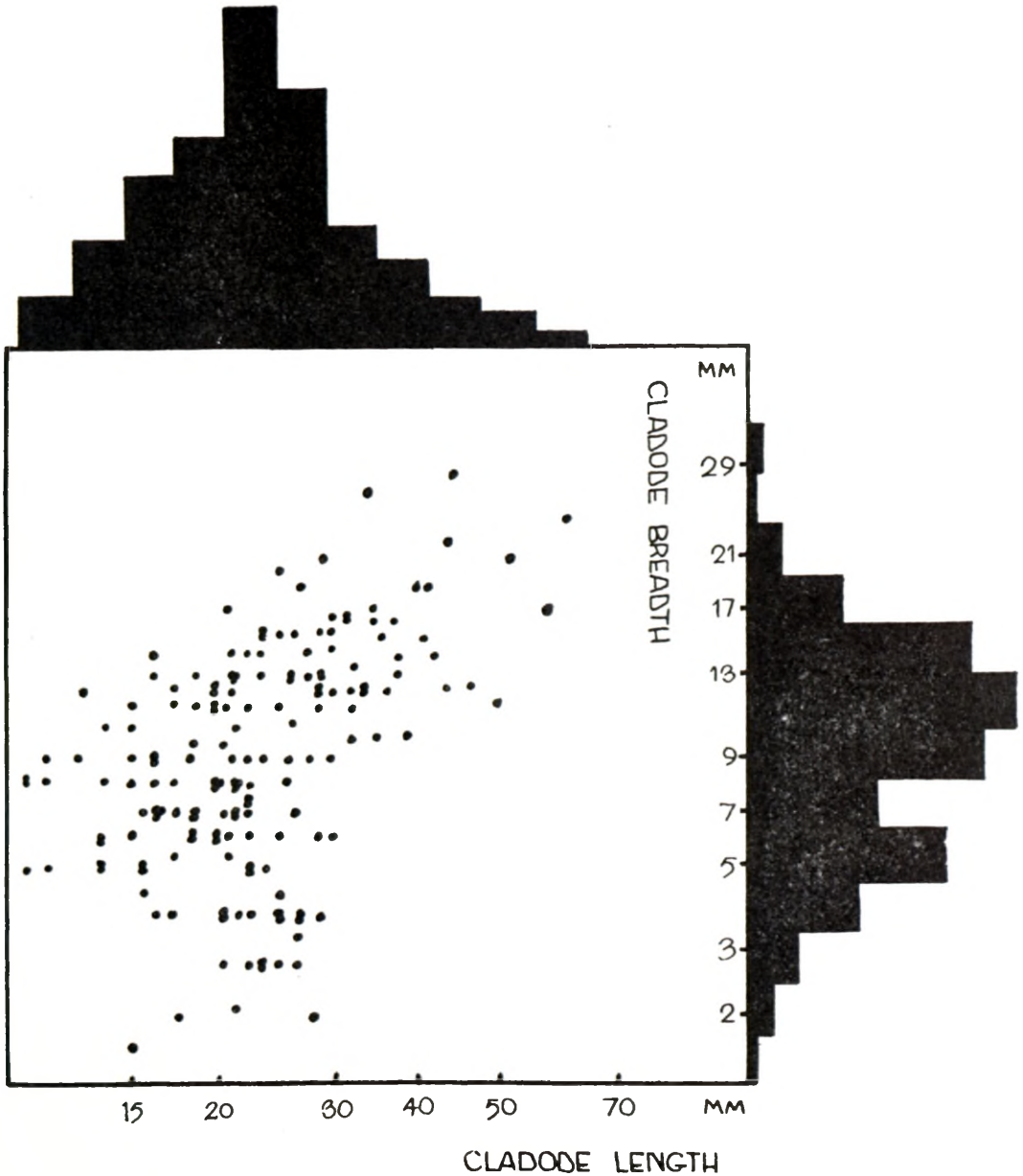


FIG. 3.—Scatter diagram and histograms showing cladode length and breadth, and the relation of these characters to one another, in *Asparagus asparagoides*

The holotype of *Myrsiphyllum falciforme* was cited by Kunth as being in "Herb. Luc.". This specimen was, therefore, likely to have been in Kiel, but is not there now, and has probably been destroyed. The specimens cited by Kunth under his *M. gramineum* are all likely to have been destroyed in Berlin. He described this species as a climber with flattened, solitary cladodes, and there can, therefore, be no reasonable doubt as to the correct application of the name. *Krauss* 1333, which is the type of *M. kraussianum*, has not been traced. Kunth's description, however, clearly places it in the synonymy of this species. He spelt the collector's name *Krause*, but the correct spelling is *Krauss*, and the correct spelling of the binomial should have been *M. kraussianum*.

There is considerable variation in the size and shape of the cladodes of *A. asparagoides* as construed by the present author. Both *A. kraussianus* and *A. volubilis* were described from specimens with lanceolate cladodes, while *A. ovatus* and *A. multituberosus* were described from specimens with ovate cladodes. *A. asparagoides* appears to have been described from an illustration showing cladodes of an ovate-lanceolate form in the left hand figure and lanceolate cladodes in the right hand figure. As *A. kraussianus* sensu Salter and *A. asparagoides* sensu Salter (1950) are frequently found in similar environments and sometimes near one another, it seems likely that their difference is genotypic, and not merely the effect of different habitats. In order to determine the taxonomic value of cladode shape in this group in South Africa, the scatter diagram and histograms (Fig. 3) were drawn. These show that there is no justification for subdivision of *A. asparagoides*, as construed here, on the basis of cladode shape or size. In the eastern Cape there is a narrow-cladode form with a strong garlic-like smell. Without any other subsidiary character, however, it was felt that this form could not be given taxonomic recognition.

The other important character which has been used for the separation of species in this complex is the tuber arrangement. The tubers of *A. ovatus* were described as distant as opposed to those of *A. asparagoides* sensu Salter (1950), which were sessile. The tuber character of *A. ovatus* may be associated with the loose sand in which the plants occur. The typical form of *A. asparagoides* with sessile tubers generally occurs in soils of a heavier texture. Parker collected specimens which he claimed had both sessile and distant tubers and, in the experience of the present author, it is, often impossible to define the difference between sessile and distant tubers as there is a complete gradation between these two forms. There is also a gradation between the rooting system in *A. multituberosus*, where the tubers are very numerous and only about 5 cm long, and that in *A. asparagoides* sensu Salter in which there are about twelve tubers, each about 10–15 cm long. The specimens which have been placed in *A. multituberosus* come from dry areas with very hard soils such as occur on the Giftberg near Vanrhynsdorp.

40. *A. undulatus* (Linn. f.) Thunb., Prodr. 66 (1794); Bak. in Journ. Linn. Soc. Bot. 14: 628 (1875); Fl. Cap. 6: 273 (1896); Marloth, Fl. S. Afr. 4: pl. 20 (1915); Salter in Fl. Cape Penins. 173 (1950); Sölch, Beitr. Fl. Südwest-Afr. 39 (1961). Type: Cape of Good Hope without precise locality, *Thunberg* s.n. (UPS, holo.!; BOL!, PRE!, photos).

*Dracaena undulata* Linn. f., Suppl. 203 (1781); R. & S., Syst. Veg. 7: 346 (1829).

*Myrsiphyllum undulatum* (Linn. f.) Kunth, Enum. Pl. 5: 109 (1850).

*Asparagus klinghardtianus* Dinter in Fedde, Rep. 29: 270 (1931). Type: S.W.A., Klinghardtgebirge, *Dinter* 3998 (B, holo.!; PRE!).

Tubers distant, 0.8–1.5 mm broad, 25–50 mm long. Stems erect, frequently with minute obtuse processes giving them a rough surface, annual, up to 60 cm high, but usually less, angled, the edges often produced into wings in the upper parts, green.

*Branches* similar to the stems, ascending. *Cladodes* solitary, sessile, ovate to lanceolate, undulate and often folded towards the tips, acutely attenuate, with prominent veins which are sometimes produced into longitudinal wings or ridges, scabrid, 8–40 mm long. *Leaves* deltoid, not forming spines. *Peduncles* 1–3-nate, 5–10 mm long, articulated in the distal third. *Perianth segments* similar, entire, linear-oblong, the distal half spreading or reflexed, 6 mm long, purplish or greenish. *Stamens* almost as long as the perianth segments; filaments spurred; anthers 0.5 mm long. *Ovary* 2 mm long; styles 2.5 mm long. *Berry* 5–6 mm diameter, 1–3-seeded, red; perianth persistent.

This species is particularly abundant on the flat sandy area stretching from the Cape Peninsula north to near Citrusdal. It also occurs in the drier areas of Namaqualand and S.W.A. Flowers have been recorded from July to October.

CAPE.—Bellville: Tigerberg, *Pillans* 8660 (BOL). Calvinia: Glen Lyon, *Lewis* 5726 (NBG). Cape: Signal Hill, *Thode* 6079 (STE). Clanwilliam: Clanwilliam, *Schlechter* 8416. Hopefield: near Hopefield, *Bolus* 12858 (BOL). Malmesbury: near Groenkloof, *Bolus* 3690 (Z). Namakwaland: Witbank, *Pillans* 5222 (BOL). Piketberg: south of Piketberg, *Barker* 5775 (NBG). Stellenbosch: near Libertas, *Duthie* 542 (STE). Tulbagh: Tulbagh New Kloof, *Compton* 11708 (NBG).

SOUTH WEST AFRICA.—Grootfontein: Otavi, *Dinter* 5547 (Z). Luderitz: Klinghardtgebirge, *Dinter* 3998. "Ex reg.: Hereroland", *Dinter* 623 (Z).

There is a certain amount of variation in cladode breadth of specimens from different areas. For example, the specimens from north of Citrusdal have particularly narrow cladodes. There is, however, a complete gradation between the different cladode shapes.

#### DOUBTFUL SPECIES

*A. confertus* Krause in Bot. Jahrb. 51: 449 (1914); Sölch, Beitr. Fl. Südwest-Afr. 40 (1961). Type: Luderitz, Schakalskuppe, *Engler* 6764 (B, holo.!).

Material matching the type shows many similarities with *A. krebsianus*, but differs mainly in having shorter cladodes, which are about 10–15 mm long. These specimens have been collected only in the Luderitz district of South West Africa. *A. krebsianus* has not been recorded closer to this than the central districts of the Transvaal. In view of the paucity of material, the smaller cladodes and the considerable gap between this population and *A. krebsianus*, it is considered best not to refer these specimens to that species. Similarly it does not seem justified to uphold *A. confertus* without further material.

SOUTH WEST AFRICA.—Luderitz: Aus, *Dinter* 6155 (B); Schakalskuppe, *Engler* 6764 (B); Range 1715 (B, SAM).

*A. declinatus* L., Sp. Pl. 313 (1753). Type: No specimen or earlier description cited.

As there is no specimen in the Linnaean Herbarium, as Linnaeus did not cite any earlier work on which this binomial could have been based, and as the description, which does not even give the geographical area from which the plant came, is completely inadequate for identifying the species, the name must be regarded as a *nomen dubium*. Baker (1875) used the name for a form which is treated here as *A. setaceus*, and *A. declinatus* sensu Baker is therefore discussed under that species.

*A. nivenianus* Schult. in R. & S., Syst. Veg. 7: 331 (1829). Type: Cape without precise locality, *Niven* s.n.

The type specimen of this binomial has not been located. It may have been destroyed in Berlin. From the description it is not possible to tell whether the *Niven* specimen should be referred to *A. africanus* or *A. thunbergianus*, and the name must therefore be regarded as a *nomen dubium*. Kunth, when he made the combination in *Asparagopsis*, cited *Ecklon* 95b from the Cape. This specimen is referable to *A. thunbergianus*.

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PLATE 1.—*Asparagus mucronatus* Jessop (Theron 551, holotype).

7230691

NATIONAL HERBARIUM  
PRETORIA.

DATE: 1935  
 No. 2380  
 Date: 21 Nov 35.  
 Name: *Asparagus fibulatus*  
 Vern. Name:  
 Locality: Kariakaya top  
 Habitat: Open bushy  
 Woodland - 2 ft. high  
 Description: in fruit  
 white  
 Locality:

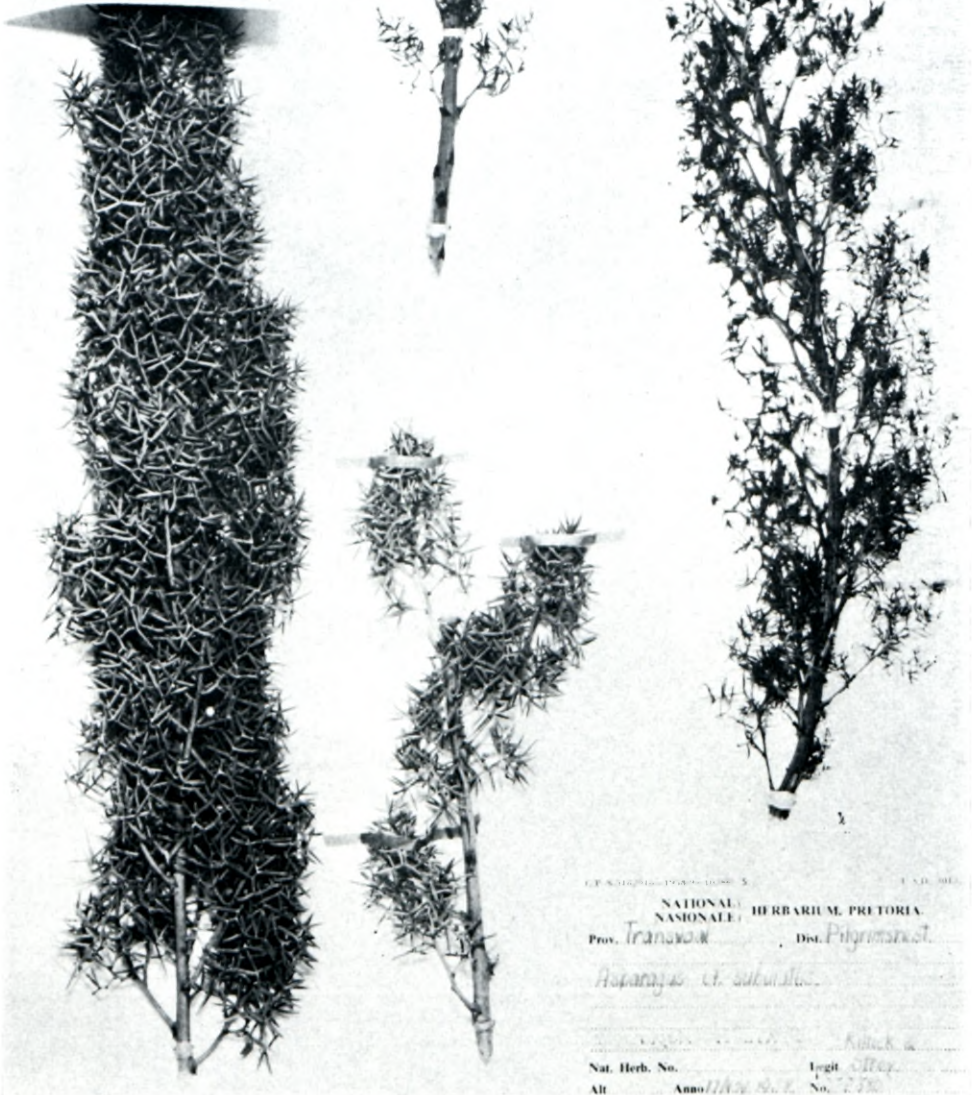


PLATE 2.—*Asparagus rigidus* Jessop (Killick & Strey 2380, holotype).



PLATE 3.—*Asparagus aethiopicus* L. var. *angusticladius* Jessop (Mogg 22470, holotype).



PLATE 4.—*Asparagus aspergillus* Jessop (Breyer in TRV 19063, holotype).

G.P.A. No. 10240/50/100 S. U.A.D. 722  
 BOTANICAL RESEARCH INSTITUTE,  
 NAYORINGSINSTITUUT VIR PLANTKUNDE  
 SOUTH AFRICA - SUID-AFRIKA

Prov. Transvaal Dist. Pieterburg  
 Name Asparagus obermeyeræ  
 No. 4442  
 Date 20.10.65  
 Locality Transvaal, near Boyne  
 Habitat roadside  
 Notes locally common



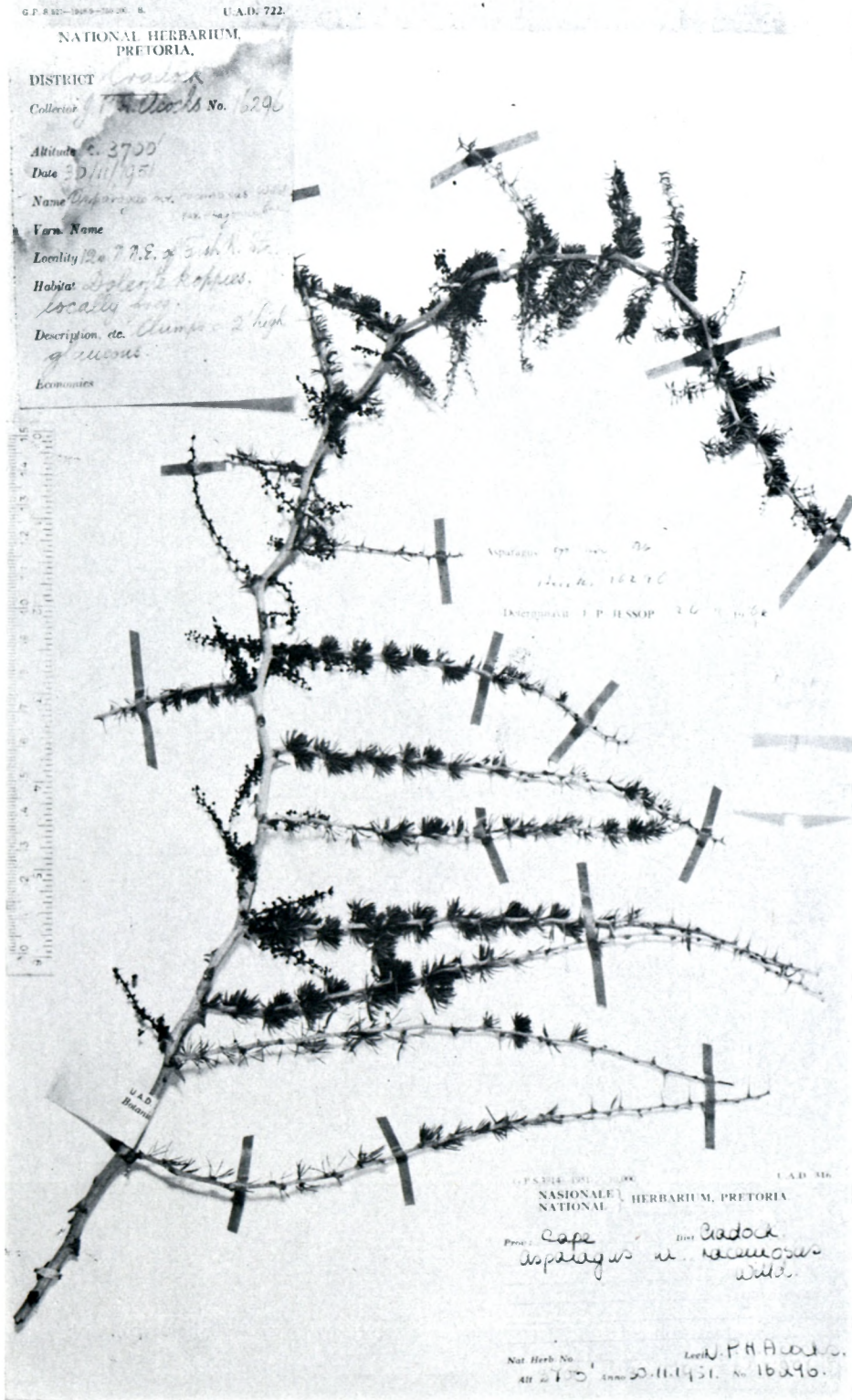
NATIONAL HERBARIUM, PRETORIA. L.T.D. 1513  
 PRE. No. 4442 Legit. A.A. Mauve  
 Date 20.10.65 No. 4442  
 G.P.S.

PLATE 5.—*Asparagus obermeyeræ* Jessop (Mauve 4442, holotype).



PLATE 6.—*Asparagus obermeyeriae* Jessop (Hafström & Acocks197).





G.P. 8.327-1949-750 26. B. U.A.D. 722  
 NATIONAL HERBARIUM,  
 PRETORIA,  
 DISTRICT *Cape*  
 Collector *J. A. Acocks No. 16296*  
 Altitude *2,3700*  
 Date *30/11/51*  
 Name *Asparagus acocksii*  
 Vern. Name  
 Locality *120778. x 3 m. h. w.*  
 Habitat *Scleroph. kopjes.*  
 Locality *map.*  
 Description, etc. *Clump 2 high*  
*glucous.*  
 Economics

*Asparagus* 197 1956 96  
*16296*  
 Determined by J. P. JESSOP 26 11 51

15  
14  
13  
12  
11  
10  
9  
8  
7  
6  
5  
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1  
0

G.P. 8.327-1949-750 U.A.D. 316  
 NATIONAL HERBARIUM, PRETORIA

Prov. *Cape* Dist. *Cape*  
*Asparagus acocksii* Willd.

Nat. Herb. No. *16296* Loc. *P.H.A. 16296*  
 Alt. *23700* Date *30-11-51* No. *16296*

PLATE 7.—*Asparagus acocksii* Jessop (*Acocks* 16296, holotype).

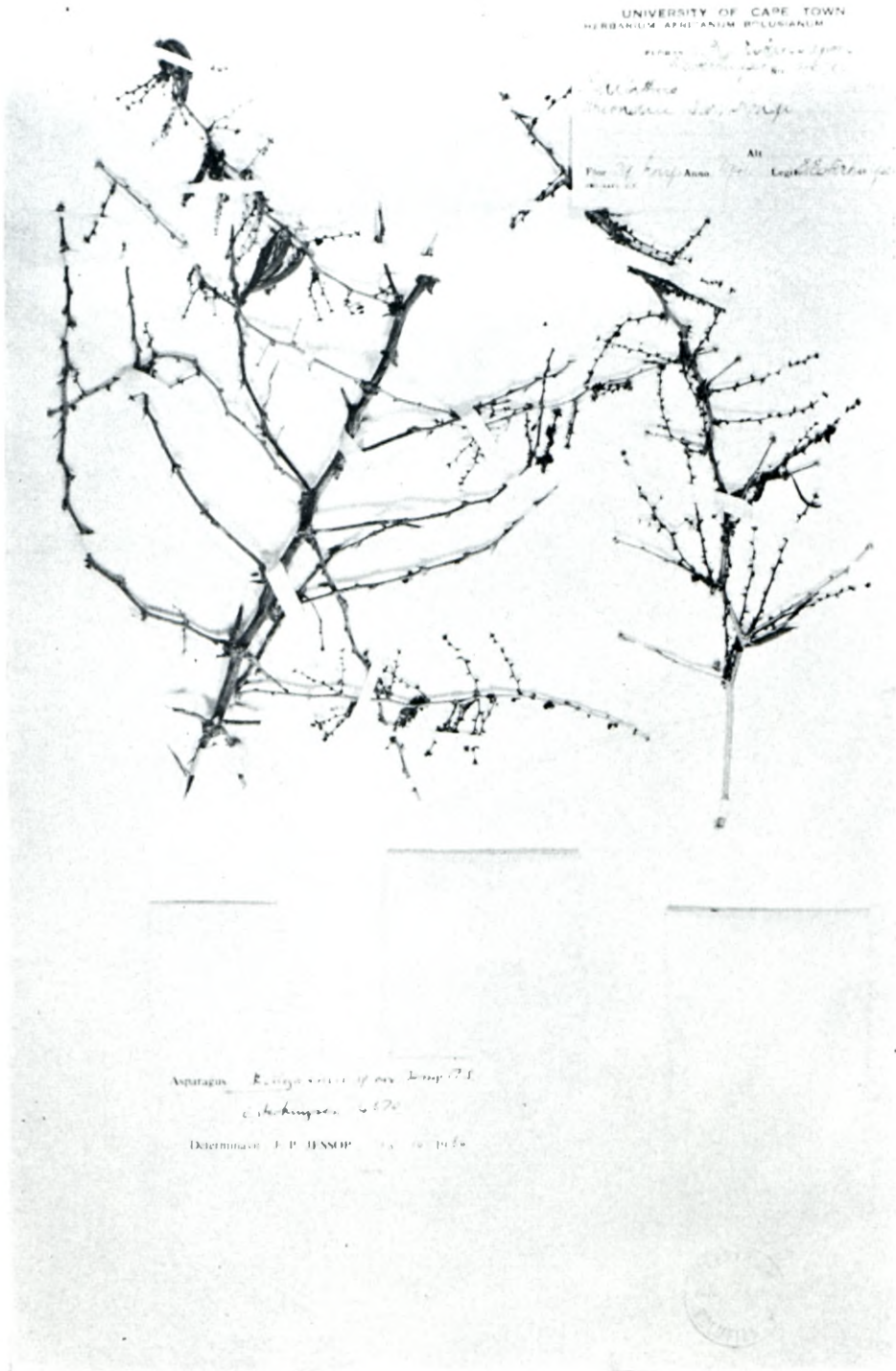


PLATE 8.—*Asparagus crassiclodus* Jessop (Esterhuysen 4670, holotype).