

A
TAXONOMIC REVISION
OF THE GENUS
ASPARAGUS
IN
SOUTH AFRICA

BY
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degree of Master of Science
in accordance with the
regulations of the
University of Cape Town.

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INTRODUCTORY REMARKS:

In the Flora Capensis (1896), Baker described forty five species of Asparagus from the Cape Colony, Port Natal and neighbouring territories. Since then the number of species considered to be indigenous to South Africa has been increased by the inclusion of species previously not recorded from within this area and by new species. Phillips set the total number at about seventy in 1951. 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 of the species was found to be in need of considerable revision. Salter stressed this need in his treatment of Asparagus for 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. Collections have been made throughout the Western Cape, from the Kalahari Gemsbok Park to Springbok, in the north, and along the south coast from Cape Town as far as Pynsna. Further collecting in the eastern Cape, Natal and the Transvaal is needed to clarify several problems.

As a result of this work, many changes were found necessary, and in this treatment only thirty six species are recognised. Of these, four are new.

The species of Asparagus often have very large areas of distribution. Asparagus racemosus, for example, has been recorded from the southern Cape Province, up

the east coast of Africa, and according to Baker (1875) extends into Asia and Australia. The genus Asparagus occurs throughout Africa, in parts of Europe and Asia, and in northern Australia.

ACKNOWLEDGMENTS:

The assistance of Dr E.A.C.T.B. Schelpe, who supervised this work and provided much valuable advice, is very gratefully acknowledged. Several other people have collected material or given help in other ways. In particular, Dr A.V. Hall must be thanked for his advice on cytological techniques, and Capt. T.M. Salter for his help with latin diagnoses. While the great majority of the work was carried out in the Bolus Herbarium, facilities were also provided by the Curators of the Compton and South African Museum Herbaria at Kirstenbosch. Specimens have been loaned from the following Herbaria: The National Herbarium, Pretoria; The Natal Herbarium; The Albany Museum, Grahamstown; The Royal Botanic Gardens, Kew; The Botanic Gardens and Museum, Uppsala; and The Botanische Garten und Museum der Universität, Zurich. The Department of Agricultural Technical Services must also be thanked for releasing the present author from his other duties so as to undertake this revision.

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 floral characters, most of

the species must be defined on vegetative characters which are often extremely susceptible to environmental factors.

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 borders are sometimes slightly ciliated. 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 had not been used until Salter's treatment in the Flora of the Cape Peninsula, but is probably of value. The anthers vary from greenish through yellow to orange and black. Work on fresh material may show 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.



Fig. 1. Raceme of Asparagus
aethiopicus.

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 useful. 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 bracts and pedicels occur. (Fig. 1.) However, in species producing racemes, cladodes sometimes appear at the bases of the pedicels. In some species, both terminal and axillary flowers occur as in A. africanus, but in others terminal, as in A. capensis, 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 section STRIATI and in A. plumosus. The peduncles may be solitary, paired or more 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. (Discussed

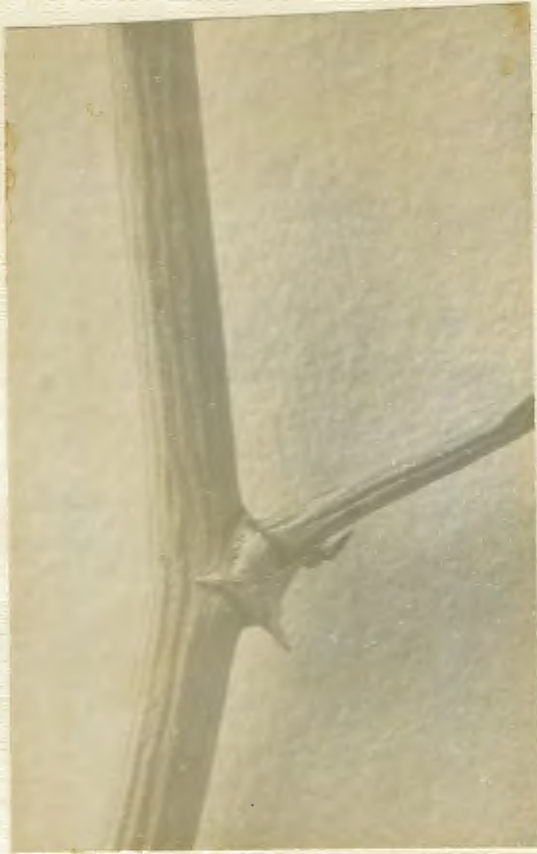


Fig. 2. Wrinkled surface
of aerial stem
of Asparagus denudatus.



Fig. 3. Grooved surface of
aerial stem of
Asparagus compactus.



Fig. 4. Ridged surface
of aerial stem of Asparagus aethiopicus.



Fig. 5. Peeling outer layers
of aerial stem of Asparagus exuvialis.

in more detail under A. asparagoides.) In most species there is a single root-stock bearing lateral tubers, but in several species of the section RACEMOSI, as in A. aethiopicus, there are several lateral roots each bearing lateral tubers.

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 are 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. 2.), grooved (Fig. 3.); ridged (Fig. 4.) or hispid surface. These characters are sometimes useful. In A. exuvialis and possibly other species, the outer layers of the aerial stems and their branches peel. (Fig. 5.) 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. namaensis which has a green aerial stem.

g) Branchlets

Branchlets, which are ultimate, specialised branches bearing cladodes and flowers, occur in some species. (Especially the section CAPENSES, where they are fascicled.) (Fig. 6.)



Fig. 6. Branchlets
of Asparagus capensis.



Fig. 7. Fascicled
spines of Asparagus capensis.

h) Cladodes

For a discussion of the use of the term cladode see a later section.

The cladodes may be single, 3-nate or variable. These three characters are generally reliable. In many species they 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 MYRSIPHYLLI 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 more or less papery and scarious.

k) Spines

Spines are formed from branches in the section CAPENSES, (one in A. glaucus, three or more in the others). (Fig. 7.) In all other species where spines are present, 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.

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, however, 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 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 & 1896) as a subgeneric group, and will be treated as a section in this work.

Baker (1896) included all species in one genus, 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 CAPESENSIS includes all the species he included.

Baker's section DECLINATI has been selected for detailed discussion as it shows several of the faults which occur in his treatment.

DECLINATI. This section was defined as follows:

Spur of the leaves of the main stem only small and deltoid, not spreading and pungent. Cladodia terete. Pedicels axillary, mostly 2-nate. The species included were:- A. denudatus, A. eckloni, A. exuvialis, A. crispus, A. virgatus, A. nodosus, A. plumosus, A. consanguineus and A. macowanii.

This section was described as differing from the section THUNBERGI only in lacking spines. Spines have been found to be rather variable, even at specific level, both in regard to shape and size, so that at section level this character is likely to be worthless, unless supported by other characters. No correlated characters have been found to support this differentiation. In the section DECLINATI there are at least three species which sometimes have spines. A. eckloni will be treated in this work as a synonym for A. africanus which sometimes has spines. Both A. exuvialis and A. crispus have tubers, unlike any other member of this section. Among the characters which these two have separating them from the other species in the section DECLINATI are several floral and fruiting characters. Details of these differences will be given in the definitions of the proposed sections.

Each of Baker's sections could be broken down in this way. Even if all he was trying to do was to provide groups, so as to simplify the identification of species, he failed, as there are far too many exceptions.

PROPOSED SECTIONS:

These sections were defined on the basis of major morphological differences, coupled with the maximum number of subsidiary characters based on quantity rather than quality. The characters of greatest use in the delimitation of these sections are underlined.

1. CAPENSES.

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

This section contains the same plants as Baker's section CAPENSES.

2. ASIATICI.

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. consanguineus. 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.

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.

4. RACEMOSI.

Roots tuberous. **Aerial** stems woody or softly woody. Branchlets 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 and FALCATI and A. juniperoides from his section MYRSIPHYLLUM.

5. STRIATI.

Roots not known. 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 includes part of Baker's sections STRIATI and UMBELLATI.

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.

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.

8. MYRSPHYLLI.

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 section MYRSIPHYLLI, except that A. juniperoides has been removed.

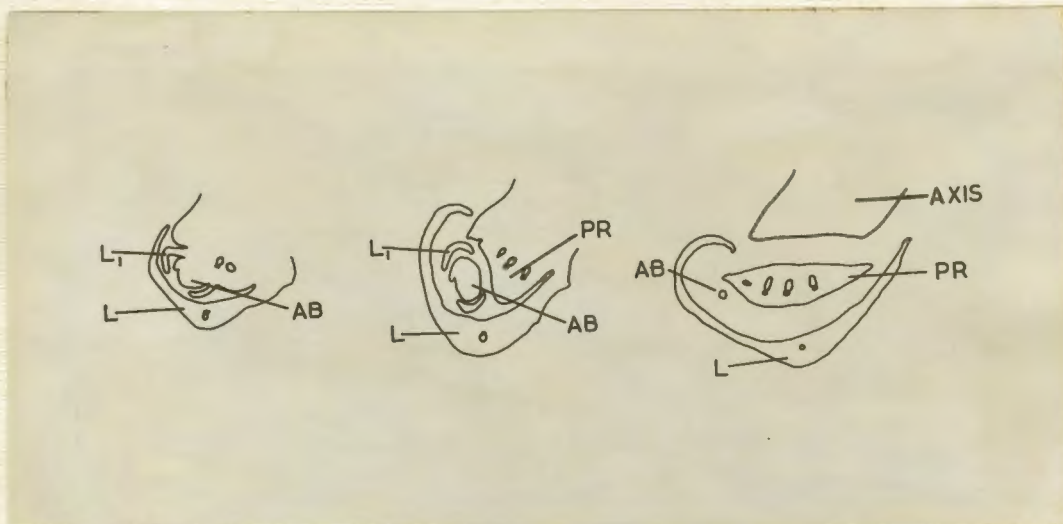


Fig. 8. Transverse sections through the tip of a plumule of Asparagus asparagoides to illustrate Arber's theory on the assimilatory organs.

AB = Axillary bud. L = axillant bud.
 Li = Leaf on axillary bud. PR = Prophyll
 of axillary bud. (Redrawn from Arber 1924)

THE MORPHOLOGY OF THE PHOTOSYNTHETIC ORGANS
OF ASPARAGUS:

Upto the beginning of the nineteenth century, the photosynthetic organs of Asparagus were regarded as leaves. Schlittler (1953) expressed the view that it was largely as a result of Goebel's work at the beginning of this century, however, that they are now almost universally considered to be modified axillary shoots. There are, however, other theories, although none of these seems to have won much favour. The three most important theories, which have been propounded in this century, are reviewed here.

THEORY OF A. ARBER:

A. Arber (1924 & 1925). Arber divides the genus Asparagus (sensu lato) into Myrsiphyllum containing species with solitary, many-veined, flattened photosynthetic organs and annual aerial stems, namely A. asparagoides and A. undulatus, and Asparagus for all the remaining species.

In Myrsiphyllum, Arber regards the assimilatory organs as the prophylls of aborted shoots, arising the axils of scale leaves. She cut serial sections through the tip of the plumule, and found what was believed to be an axillary shoot. (Fig. 8) The prophyll was considered to be an appendage of this shoot. Arber says, herself, that the sections are puzzling at first glance. In the present author's view, it is possible that they could be interpreted in other ways, and it is also felt that in such a modified structure, there is no guarantee that axillary shoots will form at all.

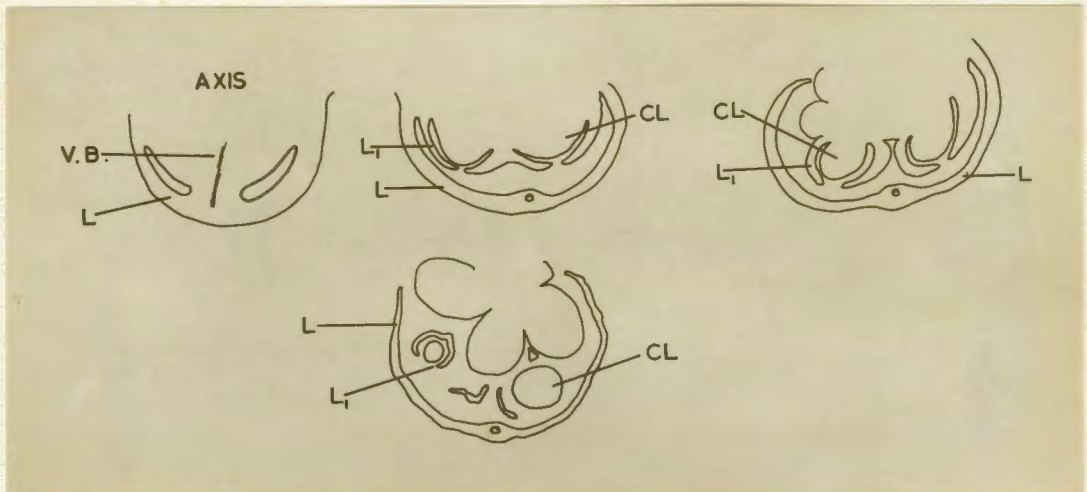


Fig. 9. Transverse sections of young shoots of Asparagus sprengeri Reg. (Treated here as A. sarmentosus.) to illustrate Arber's theory on Asparagus assimilatory organs.

CL = Cladode; L = Axillant leaf;

Li = Leaves borne on cladodes;

V.B. = Vascular bundle.

(Redrawn from Arber 1924)

Her other evidence is that the vascular bundles of the prophyll face towards the axillary leaf. She does not explain why this is not equally likely if the assimilatory organ is a modified shoot.

In Asparagus, Arber accepts the conventional interpretation. Her evidence is again based on transverse sections of young shoots. In A. sprengeri Reg., treated here as A. sarmentosus L., structures considered to be leaves borne on the cladodes were found. (Fig. 9.) As she considers that the flowers of Ruscus are adnate to the leaf, these leaves which she found on the cladodes could, similarly, be adnate and not true appendages.

THEORY OF J. SCHLITTLER:

J. Schlittler (1953 & 1959). Schlittler considers that all assimilatory organs in Asparagus (sensu lato) are leaves. He feels, and this seems a valid point, that there are too many similarities between the section MYRSIPHYLLI and the rest of the genus to interpret the structures differently. Although he claims to be well-acquainted with the work of the anatomists and developmental morphologists, his own method of research was to examine overall similarities between groups. As opposed to Arber, Schlittler feels that the "leaves" are the final leaves on the axillary shoots. He disagrees with Arber that there are leaves on the assimilatory organs of A. sprengeri. Basing his opinions on her drawings, he considers that the leaves are produced below the photosynthetic organs, that is, on the main axis.

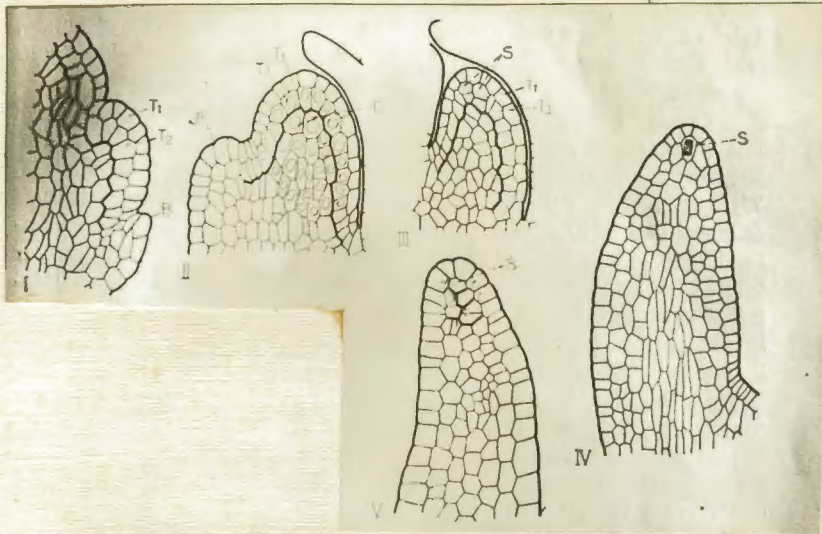


Fig. 10. Longitudinal sections through the young shoot of Asparagus asparagoides to show the early development of the assimilatory organ.

B = Axillant leaf; C = Corpus region;
 J.F. = Initial field; P = Assimilatory organ;
 S = Apical initial; T1 and T2 = Tunica cells.

(After Kausmann 1955)

THEORY OF B. KAUSSMANN:

B. Kausmann (1955). Kausmann agrees that it is necessary to take the genus as a single unit, but considers all the assimilatory organs are modified shoots. He claims to have found leaves on the "phylloclades" of A. falcatus. Kausmann's work was mainly based on ontogeny. He found that the "phylloclade" develops almost simultaneously with the leaf primordium, but it first appears in the axil of the scale leaf. (Fig. 10) The further development of the phylloclade is initiated by the division of cells which occur in the corpus derivatives of the apical meristems. He considers that the two anticlinally dividing layers, which grow uniformly over the young shoot primordia must be regarded as genuine tunica layers. While Kausmann takes this as evidence for a tunica-corporis type of development of the phylloclade primordia, Schlittler disagrees. Schlittler claims that the diagnosis of a tunica-corporis development is correct, but that it applies to the vestigial axis which bears the leaf. This development, it is true, is followed by a typical leaf-type development, namely a single apical meristem. Kausmann feels that there is no reason why the initial, primitive development should not be followed by a type of development dictated by the necessities of the highly specialised structure. Schlittler considers that the change in developmental pattern is caused by a conversion from axis to leaf development.



Fig.11. A portion of a shoot of Asparagus striatus to show the basal region of a branch and of the assimilatory organ. The branch is to the right, and the assimilatory organ is to the top left.

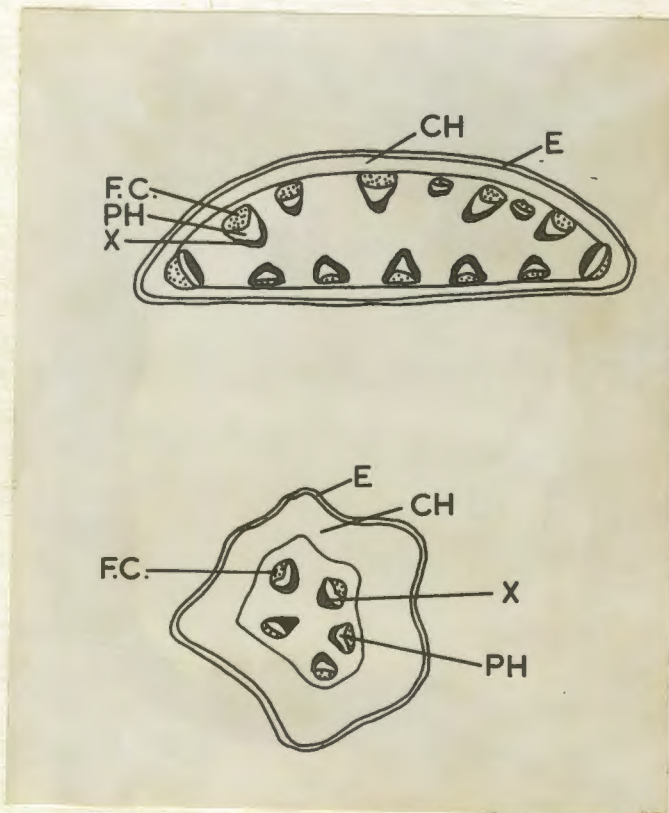


Fig.12. Transverse sections of the assimilatory organs of Asparagus striatus (above), and of Asparagus subulatus.

CH = Chlorenchyma; E = Epidermis; F.C. = Fibre cap; PH = Phloem; X = Xylem.

Kaussmann cited work by Zweigelt, who found several-nerved bundles in the basal region of the photosynthetic organs of A. undulatus. This he regarded as important evidence for the shoot nature of the organ. Schlittler, on the other hand, could not find any such arrangement and regarded the irregular massing in the base as the remains of a central cylinder, which he held up as evidence for a petiole structure.

These three workers have not been able to find any common ground on which to discuss the problem. One could take those points on which any two agree, such as the leaves on the cladodes of A. sprengeri and A. falcatus, and try to obtain a picture which would be compatible to as much of the evidence as possible. What seems to be necessary, however, is a completely new approach, or a species showing some of the intermediate stages.

Asparagus striatus provides interesting material. In this species, it is not always possible to distinguish between the base of the photosynthetic organs or of a branch. Both have a groove running round their base. (Fig. 11) Both are striated, and of a similar colour and texture. A transverse section of a photosynthetic organ of this species shows a structure which could be taken for that of a branch. (Fig. 12) It would be difficult to be sure whether this extraordinary similarity to the branches externally, and branch structure internally is primary or secondary. There does seem to be a case, however, for considering it unlikely

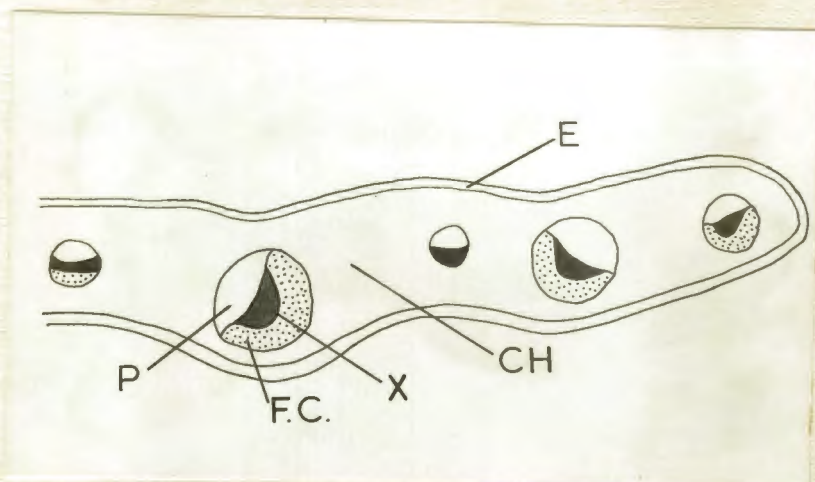


Fig. 13. Transverse section through part of a cladode of Asparagus asparagoides to show the arrangement of the vascular tissues.

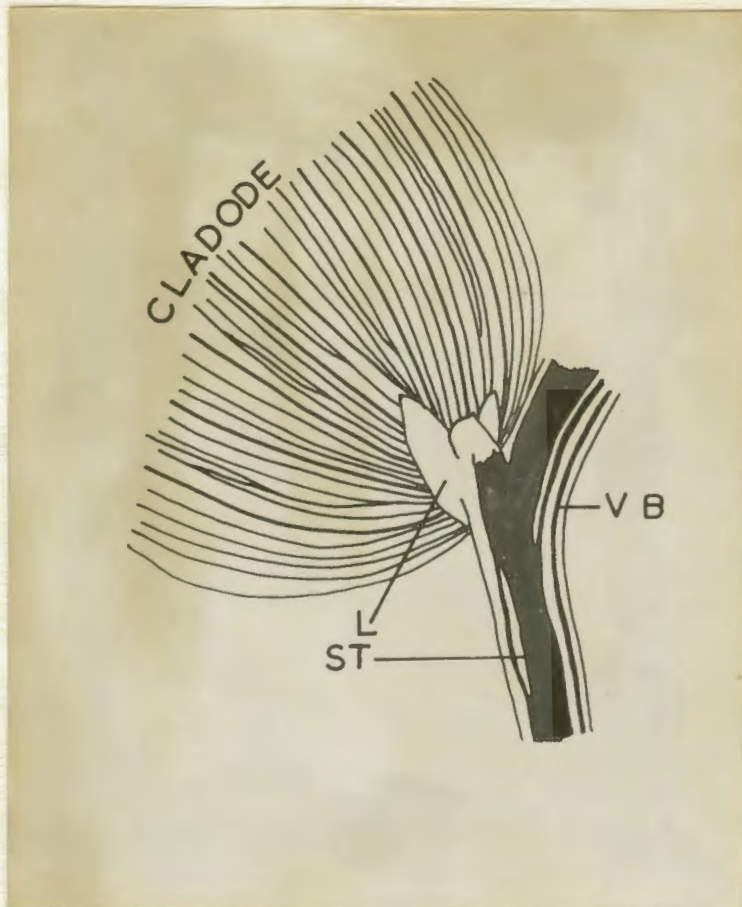


Fig. 14. External features of the stem and basal region of the assimilatory organ of a specimen of Asparagus asparagoides (Leighton 640) with the vascular tissue included to show the arrangement of vascular bundles in the winged part of the stem.

L = Axillary leaf; ST = Central stele;
VB = Vascular bundle in the winged part of
the stem.

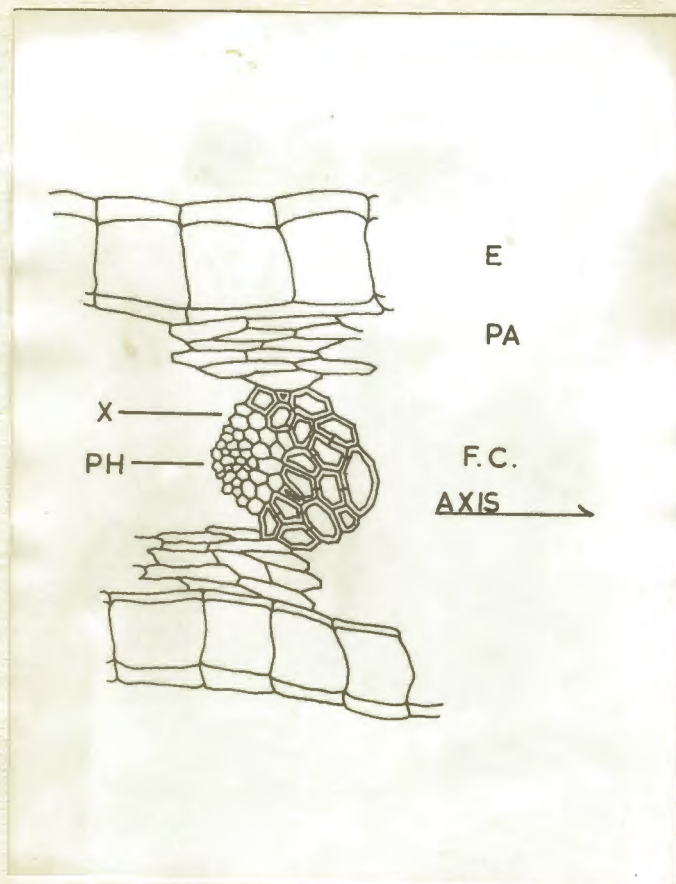


Fig. 15. Transverse section through the winged part of the stem of a specimen of Asparagus asparagoides (Leighton 640), to show the arrangement of the vascular tissue.

E = Epidermis; F.C. = Fibre cap; PA = Parenchyma; PH = Phloem; X = Xylem.

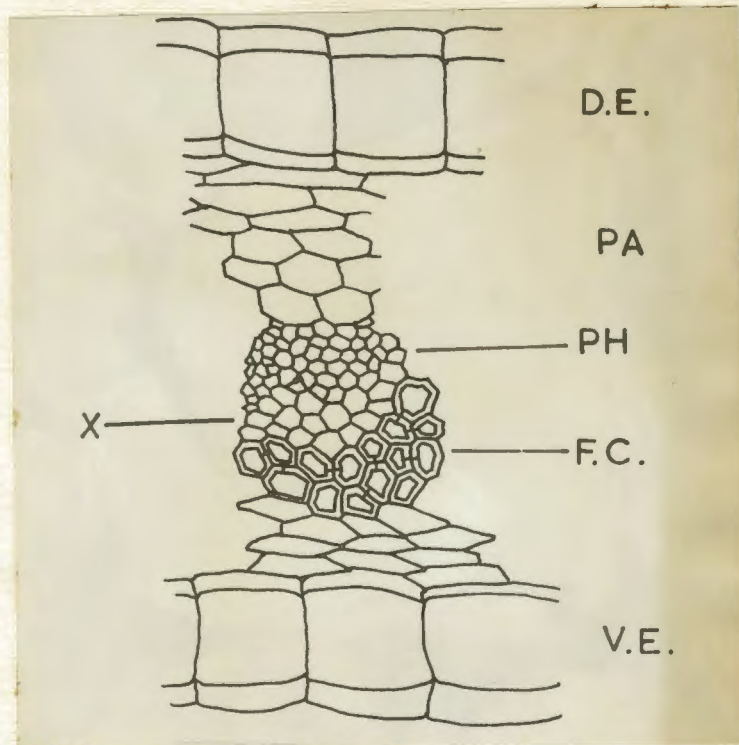


Fig. 16. Transverse section through an assimilatory organ of Asparagus asparagoides, to show the arrangement of tissues in a vascular bundle.

D.E. = Dorsal epidermis; F.C. = Fibre cap;
 PA = Parenchyma; PH = Phloem; V.E. =
 Ventral epidermis; X = Xylem.

that the ring of vascular bundles would in fact have arisen other than in an axis.

That there is a link between this arrangement and that in the rest of the genus, can be seen from a transverse section through a photosynthetic organ of A. subulatus, which appears from a morphological examination to be the nearest relative of A. striatus. The arrangement of tissues in the two is basically the same, differing in the more condensed arrangement and greater lignification of the central area of A. striatus.

Other than the members of the section MYRSIPHYLLI, A. striatus is the only species with several superficially observable veins. It is quite possible to derive the arrangement in the section MYRSIPHYLLI (Fig. 13) from A. striatus by the loss of one row of bundles. Despite the variation of the axis of the vascular bundles of A. asparagoides, as seen in the transverse section, the phloem is always dorsal. This makes it unlikely that the arrangement was derived simply by the compression of a cladode of the A. striatus type, as in that case half the bundles might be expected to have the xylem dorsal.

Another line of investigation was suggested by the discovery of a specimen of A. asparagoides (Leighton 640) in which the normally terete stem is winged in parts. In this wing, one or more veins were found. (Fig. 14) The similarity between the transverse section (Fig. 15) of the winged part of the stem and (Fig. 16) of the photosynthetic

organ seems to be too great to be ignored. It suggests very strongly that the two organs are derived from the same origin; only a slight change in the orientation of the bundle in the stem is required to make the two virtually identical, and it can be seen from figure 13 that the orientation of bundles in the photosynthetic organs is rather variable.

Several ideas have been discussed, and in the present author's opinion, there is a slightly stronger case for the cladode theory of the nature of Asparagus assimilatory organs. The term cladode is therefore used in this treatment. This matter is clearly not settled and it is not obvious in what direction research will have to be directed to obtain a satisfactory interpretation.

CYTOLOGICAL INVESTIGATIONS:

The roots of Asparagus do not readily lend themselves to cytological work, as the main growth is restricted to a very few thick main roots, with few lateral ones. On the other hand, the shoots grow very quickly, and have the advantage that they are visible above ground, so that there is no difficulty about what stage to fix the material. Furthermore, the shoots can be removed without damaging the roots, and other shoots as well as branches on the same stems will provide additional material if this is required. The only disadvantage is that there are bodies such as plastids which may interfere with the definition of the chromosomes.

Another source of **meristematic** material which was used was germinating seed radicles. Seeds of both A. krebsianus and A. capensis were germinated. The testas were removed from half the seeds and allowed to remain intact on the other half. Both samples were placed in petri dishes with moist blotting paper. Specimens from each sample were stored at room temperature, while the **remainder were incubated at 20 degrees centigrade**. These experiments were performed in cold weather during early August, but seeds germinated in about a fortnight in each dish, showing that it is not necessary to damage the testa or to use an incubator. Material obtained in this way was little if any better than that from shoots.

The count for A. consanguineus was made on root material collected in the natural habitat.

Of the three stains employed in squash techniques, Feulgen did not provide adequate staining. Aceto-



Fig. 17. Chromosomes of Asparagus sarmentosus "sprengeri" form above, A. krebsianus left, and A. thunbergianus.

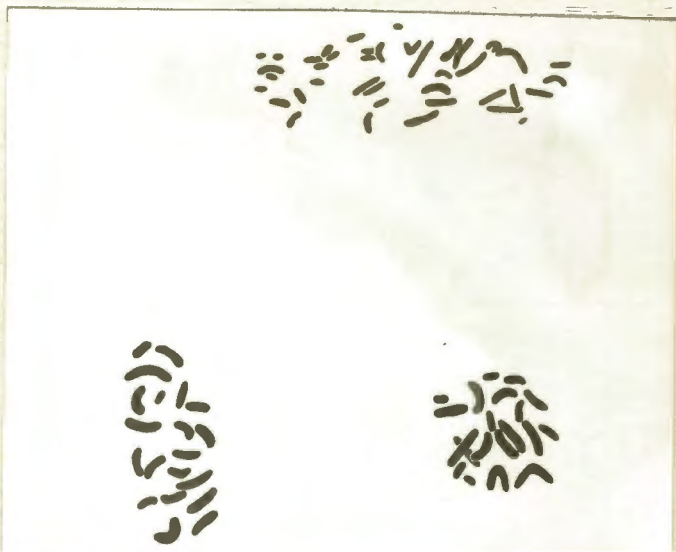


Fig. 18. Chromosomes of Asparagus capensis above, A. retrofractus left, and A. consanguineus.

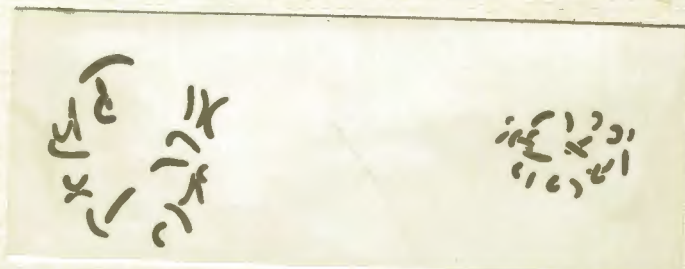


Fig. 19a. Chromosomes of Asparagus asparagoides: Narrow-cladode form left and pubescent, broad-cladode form.

carmine was applied to both shoots and anthers. The examination of the anthers showed that it would be difficult to obtain pollen mother cells, as even the smallest buds examined were too old. Neither of these sources of material stained satisfactorarily in Aceto-carmine. 2% Acetic Acid was found to be completely satisfactory. The following procedure was developed:

Shoot tips were placed in 0.01% 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 hydrolised in 20% 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 Aceto-Orcein.

A Zeiss microscope with 100X oil immersion objective and 8X binocular eye-pieces was used. It was found necessary to do all the scanning with the oil immersion objective because of the small size of the chromosomes. Phase-contrast was essential for the counting.

In making the counts, the chromosomes were recorded by free-hand drawing. (Figs 17 to 19.) In each case estimates were made on several (5 or more) compliments of chromosomes, and where possible more than one accurate count was made, but this was not always possible. There was considerable difficulty finding groups in which the chromosomes were not too long, and in which they were sufficiently spread out.

<u>Section</u>	<u>Species</u>	<u>2N</u>	<u>Reference</u>
MYRSIPHYLLI	<u>A. asparagoides</u>		
	Typical form	20	(Nagao (1938)) and verified by the present author.
	Narrow cladode Form	20	
	Pubescent form	20	
RACEMOSI	<u>A. krebsianus</u>	20	
	<u>A. sarmentosus</u>		
	"myriocladus" form	20	(Nagao (1938))
	"sprengeri" form	60	(Sato (1942)) and verified by the present author.
CRISPI	<u>A. crispus</u>	20	(Nagao (1938))
SCANDENTES	<u>A. scandens</u>	20	(Gardé & Gardé (1953))
CAPENSES	<u>A. capensis</u>	40	
	<u>A. stipulaceus</u>		Several estimates suggest about 80.
ASIATICI	<u>A. retrofractus</u>	20	
	<u>A. thunbergianus</u>	20	
	<u>A. consanguineus</u>	20	
	<u>A. plumosus</u>	20	(Nagao (1938))

Table 1. Chromosome counts for South African species of Asparagus. The reference given in brackets is to the publication in which the count was reported. These were taken from Darlington and Wylie (1955). The counts for which there is no reference cited were made in the course of this work.

In A. asparagoides, there is considerable variation in cladode size, which it was thought might be related to polyploidy. Counts on representatives of the extremes in the range have, however, been found to have identical chromosome numbers.

In the A. capensis - A. stipulaceus complex, the latter species is separated from the former by larger cladodes and flowers, and condensed aerial parts. Material of A. stipulaceus stained with Aceto-orcein or Feulgen stain did not give clear enough preparations for accurate counting. Approximate counts indicate that it has double the **chromosome** number of A. capensis. In view of the "cat-tail" habit of A. stipulaceus as compared with A. capensis, and the possibility that this is related to polyploidy, it was also thought possible that the "cat-tail" specimens of A. sarmentosus, known in horticulture as A. sprengeri might indicate polyploidy. A. sprengeri has, in fact, been found to have **sixty** chromosomes. A. myriocladus, also treated **here** as a synonym for A. sarmentosus has only twenty. No material of more widely branching specimens of A. sarmentosus was available for cytological work. Similar "cat-tail" forms have been found in A. suaveolens and it will be interesting to investigate these cytologically as well.

THE RECORDED HISTORY OF THE STUDY OF ASPARAGUS
IN SOUTH AFRICA:

1685. The earliest record of Asparagus, which can be authenticated, is that of an artist 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 members of the party, which travelled to near the present site of Springbok, was Hendrik Claudius, and it is to him that the paintings accompanying Van der Stel's official journal are ascribed. One of them is of Asparagus capensis.

Prior to this, a seaman had reported Asparagus from an island in Saldanha Bay in October 1652, and Van Riebeeck himself, (October 1655) recorded that wild Asparagus was eaten. If this was an Asparagus and not, as has been suggested Anthericum, the most probable species was A. retrofractus.

1687. In 1687, Paul Hermann published his "Horti Academici Lugduno-Batavi Catalogus" in Leiden. In this work he described a number of plants which he had collected at the Cape in 1672. Among the species was the first printed description of a South African Asparagus. This "Asparagus aculeatus Africanus" he had collected at the Cape of Good Hope on the bank of a river. From its locality, it was probably either A. aethiopicus or A. africanus.

1691. The specimen illustrated by Leonard Plukenet in his "Phytographia" is the holotype of a Linnean species, A. capensis, which was cultivated at the time in gardens in Europe.

1704. In the supplement to John Ray's "Historia

Plantarum", five species, described as coming from Africa, are included. It is likely that only Plukenet's species, a species regarded by Linneaus as his A. aethiopicus, and one other came from South Africa. This last mentioned one was described as: "Asparagus foliis falcatis Zeylanicus D. Sherard: Corruca Guinieensis, foliis aduncis Mus. Pet. 169." This is A. falcatus, and is found in the warmer coastal areas of South Africa.

1705. In 1705, Plukenet figured an additional two specimens, one of which was to become the iconotype of a Linnean species, A. retrofractus.

1720. Boerhaave included two species of Asparagus from South Africa in his "Index alter Plantarum quae in Horto Academico Lugduno-Batavo aluntur." One of these was Plukenet's A. retrofractus, and the other he regarded as the same as the Asian A. asiaticus. A third, from Ceylon, is the widely distributed A. sarmentosus which also apparently occurs in South Africa.

1723. It might have been expected that a plant as different from A. officinalis as A. asparagoides would have been put into a different genus by the early authors. In 1723, however, Tillius in his "Catalogus Plantarum Horti Pisani", described two forms of A. asparagoides as being Asparagus species. These were illustrated, and are the **iconotypes for** A. asparagoides.

1737. Although Hermann had published some of the specimens he had collected at the Cape, he did not publish all. In 1737, Johannes Burmann described four species collected by Hermann. One of these

was Hermann's species, but the others do not seem to correspond with any specimens already described, and their identity is obscure.

In the main part of the same volume, Burmann described some species from Ceylon. Two of the Asparagus species, A. falcatus and A. sarmentosus, occur in South Africa.

In his Hortus Cliffortianus, Linnaeus described three species. One of these was what is now known as A. asparagoides, which in 1753 he was to name Medeola asparagoides.

1753. Besides its importance as the starting point of our binomial system of classification, the Species Plantarum is also important because of its stabilizing influence on plant names. Six South African species of Asparagus were included in the work, namely A. sarmentosus, A. capensis, A. declinatus, A. retrofractus, A. falcatus and Medeola asparagoides. Unfortunately, there are only two specimens which could have been the types of Linnean names. The others were based on descriptions or figures published by earlier authors.

1768. Another species of South African Asparagus was described by P. Miller in his "Gardeners' Dictionary". This was Medeola angustifolia, which was based on the assumption that Tilli's two figures were not of the same species.

In his "Prodromus Florae Capensis", N.L. Burmann included four species of Asparagus, already named, namely: A. declinatus, A. retrofractus, A. capensis and A. triacanthus. Burmann's A. capensis is not the same as Linnaeus', but is

now known as A. africanus. His A. triacanthus is synonymous with A. capensis L. Burmann also regarded another Plukenet plant, which Linnaeus called A. aphyllus as South African. This is not now considered to be correct. Three new species: A. lignosus, A. ruber and A. planiusculus can not be identified from the descriptions beyond the fact that they belong to the section AFRICANI.

Medeola asparagoides was also retained.

1771. The name A. aethiopicus was applied by Linnaeus in his "Mantissa" to material from the Cape, which he regarded as the same as one of Ray's.

1781. While no new names were added to the genus Asparagus by Linnaeus the younger, he did introduce the generic name Dracaena. In this genus he included D. erecta, D. striata, D. volubilis, D. undulata and D. medecoloides (Medeola asparagoides). Specimens of all the new species described by the younger Linnaeus had been collected at the Cape by Thunberg.

1783. Lamarck's "Encyclopédie Methodique, . . ." included two new species. One of these, A. crispus, was growing in the Royal Gardens in Paris, allegedly originating in Mauritius, and the other, A. stipulaceus, was collected by Peter Sonnerat at the Cape. Another species, although omitted by Linnaeus, was probably the same as one of Plukenet's species. Four other species were included that were probably South African species. Medeola was excluded, and A. asparagoides does not seem to be mentioned in

the work. In the fourth volume of the "Supplement", Medeola was inserted by Desrousseaux as given by Linnaeus. In 1797 a plate of Medeola asparagoides was published in the "Recueil de planches de botanique de l'Encyclopédie".

1794. Thunberg, in his "Prodromus Plantarum Capensium", listed thirteen species, including the South African species of Medeola and Dracaena. Thunberg used the names of both Linnaeus and his son, but ignored Lamarck, Miller and N.L. Burmann's species. The full list, which was retained in the "Flora Capensis" edited by I.A. Schultes in 1823, was then the following (all under Asparagus): A. medeoloides, A. volubilis, A. undulatus, A. erectus, A. striatus, A. capensis, A. albus, A. scandens, A. flexuosus, A. retrofractus, A. declinatus, A. lanceus and A. dependens.

1799. In C.L. Willdenow's fourth edition of "Linne's Species Plantarum", thirteen species were included in Asparagus, including A. falcatus and A. racemosus which were still unrecorded from South Africa, as well as A. subulatus and A. decumbens, the first of which was a new species. A. aethiopicus was also retained, despite Thunberg's omission of it. Both Medeola and Dracaena were used to include species now belonging to Asparagus.

1800 - 1850. During this time developments were rather confused, but the main authors were J.A. and J.H. Schultes, H. Bresler and Kunth.

Bresler wrote his "Generis Asparagi

Historia naturalis atque medica" in 1826, and included seventeen species which are now recognised as being South African species. He did not, however, include either Dracaena or Medeola, nor did he mention those species previously included in them.

Schultes' "Systema Vegetabilium" of 1829 increased the list of species now considered to be South African to twenty seven, including four species of Dracaena and a new genus Myrsiphyllum for Medeola asparagoides.

In 1850, Kunth published his "Enumeratio Plantarum". In this, he divided the genus into three genera, Myrsiphyllum, as used by Schultes, for seven Cape species, Asparagus, all supposedly with dicecious flowers, with eight species, and Asparagopsis, with twenty three Cape species, making a total of thirty eight species - including several new names.

1875 - 1896. Baker, in his monograph on the genus as a whole, (the most recent complete work on Asparagus), included forty South African species, of which eleven were new. He used only one generic name.

Twenty one years later he revised the genus for the Flora Capensis, and added four more species.

Several authors had added an occasional species upto this time, but most of the names were given by people who were revising all the species, at least for the Cape. After this time,

however, several new names have been added, but never by anyone who had made a particular study of the subject. The most important contributions were the work of Salter for "The Flora of the Cape Peninsula" (1950), and Kies who revised part of the section AFRICANI in 1951. The following is a list of authors and the number of species each has added since 1896:

Schinz, H. (1); Kuntze, O. (1); Hooker, J.D. (1); Baker, J.G. (1); Brown, N.E. (1); MacBride (1 comb. nov.); Salter, T.M. (2); Kies, P. (4); Dyer, R.A. (1).

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flowering plants and ferns of Griqualand West.

INTRODUCTION TO TAXANOMIC TREATMENT:

As it will be necessary to revise the genus over a much wider area before any finality can be attained for species occurring in South Africa as well as in other countries, the literature on the species from other areas has not been investigated for possible synonyms.

In the distribution lists, and notes following them, all specimens have been examined by the present author.

The provinces have been divided into magisterial districts for the distribution lists, and have been taken from the vegetation maps accompanying J.P.H. Acocks' "Veld types of South Africa (1953).

KEY TO THE SPECIES OF ASPARAGUS IN SOUTH AFRICA:

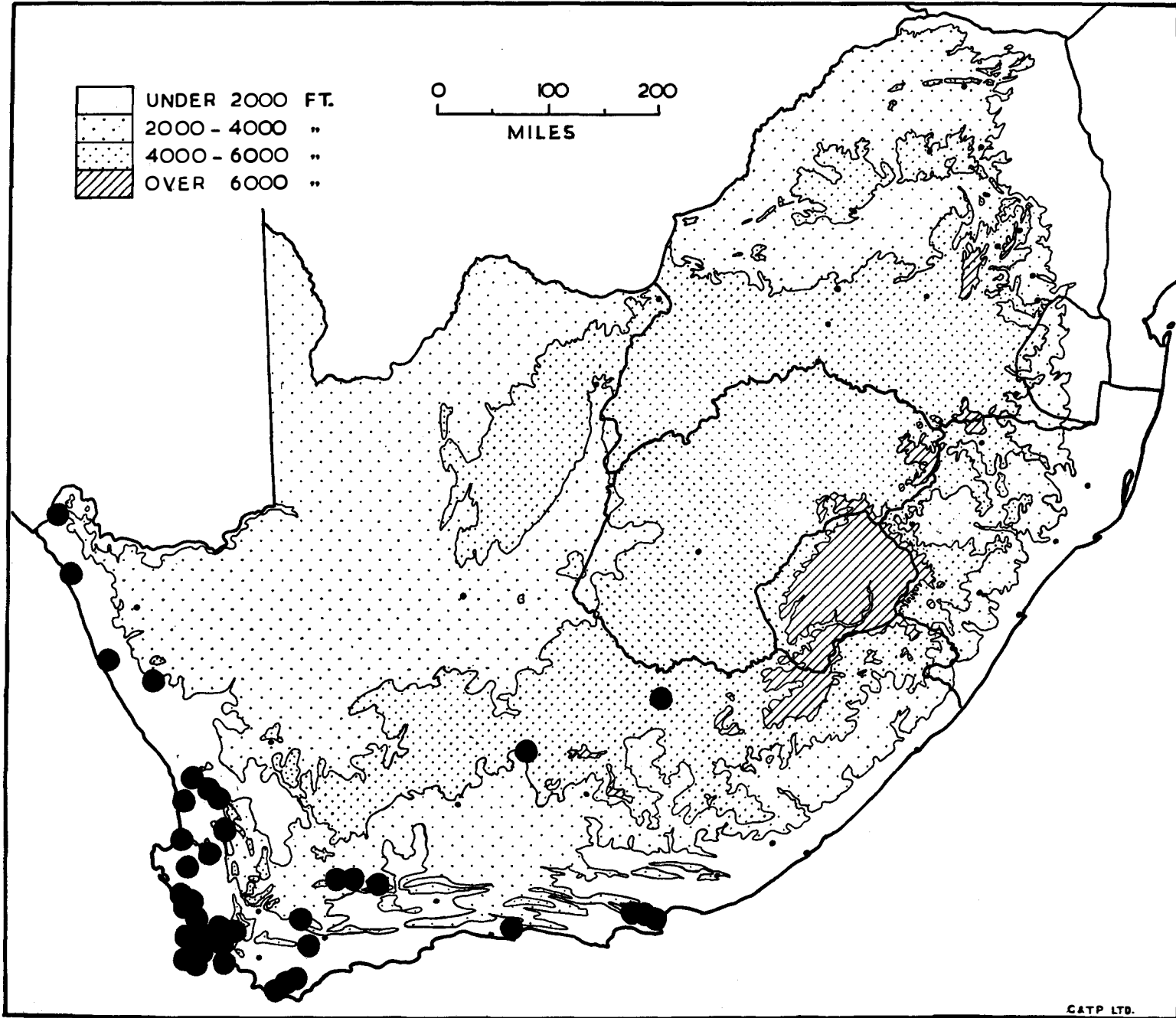
1. Cladodes conspicuously flattened.
 2. Cladodes more than one-veined.
 3. Flowers axillary.
 4. Stem smooth, usually climbing .. asparagoides
 - 4a Stem rough, erect. Cladodes somewhat firm undulatus
 - 3a Flowers terminal striatus
 - 2a Cladodes one-veined.
 5. Plants herbaceous. Flowers axillary or terminal.
 6. Cladodes all in one plane scandens
 - 6a Cladodes not all in one plane ramosissimus
 - 5a Plants woody. Flowers usually racemose. (Fig. 1.).
 7. Cladodes solitary.
 8. Stems pubescent oxyacanthus
 - 8a Stems glabrous.
 9. Spur of the leaves spine-shaped. (Fig. 5.) Tepals and cladodes without a ciliated margin. Stems well lignified sarmentosus
 - 9a Spur of the leaves not spine-shaped. Tepals and usually the cladodes with a ciliated margin. Stems softly woody juniperoides
 - 7a Cladodes several at a node.
 10. Stems erect sarmentosus
 - 10a Stems climbing.

- 11. Cladodes more than 35 mm.
long falcatus
- 11a Cladodes less than 35 mm.
long aethiopicus
- 1a Cladodes terete, angled or absent
during the flowering period.
- 12. Flowers in racemes. (Fig. 1.)
- 13. Cladodes solitary.
- 14. Spur of the leaves spine-shaped.
Tepals and cladodes without a
ciliated margin. Stems woody .. sarmentosus
- 14a Spur of the leaves not spine-
shaped. Tepals and usually the
cladodes with a ciliated margin.
Stems softly woody juniperoides
- 13a Cladodes several at a node.
- 15. Cladodes terete, thick (0.8 mm.
or more thick) kougaensis
- 15a Cladodes angled, or if terete
then less than 0.8 mm. thick.
- 16. Stems erect.
- 17. Branches, at least the younger
ones, densely pubescent.
Peduncles grey to brown.
Flowers white pubescens
- 17a Branches glabrous or slightly
pubescent. Peduncles pale grey
to yellowish. Flowers yellowish
to greenish yellow nelsii
- 16a Stems twining.
- 18. Spines present on all
branches krebsianus

- 18a Spines absent on ultimate branches.
- 19. Stems usually grooved.
Branchlets differentiated.
Cladodes more than 0.5 mm. thick, angled. Perianth segments 2.5 to 3.0 mm. long racemosus
- 19a Stems smooth. Branchlets not generally differentiated.
Cladodes very narrow, less than 0.5 mm. thick.
Perianth segments usually 1.5 to 2.0 mm. long saundersiae
- 12a Flowers not in racemes. (Fig. 1.).
- 20. Spines produced from branches.
- 21. Spines solitary glaucus
- 21a Spines three or more at a node.
- 22. Flowers sessile.
- 23. Average cladode length less than 5.5 mm. Plant widely branched .. capensis
- 23a Average cladode length more than 5.5 mm. Plants of a "cat-tail" form. (Fig. 33). stipulaceus
- 22a Flowers not sessile suaveolens
- 20a Spines, when present, foliar in origin.
- 24. Cladodes three at a node.
- 25. Cladodes 1 mm. or more broad.
Fruit globose ramosissimus
- 25a Cladodes less than 1 mm. broad.
Fruit ovoid crispus
- 24a Cladodes solitary, paired or numerous at a node.

- 26. Young branches never both white and grooved.
- 27. Branches not frond-like. Cladodes not all in one plane.
- 28. Climbers or scramblers. Stems tortuous.
- 29. Aerial stems annual,
herbaceous consanguineus
- 29a Aerial stems woody, perennial.
- 30. Stems smooth or regularly grooved,
sometimes pubescent. Spines often
present africanus
- 30a Stems irregularly wrinkled, glabrous.
Stems zigzag rather than tortuous.
Final branches often reflexed.
Spineless.. .. . denudatus
- 28a Stems erect, straight or zigzagging with
straight internodes.
- 31. Flowers subtended by bracts on the ends
of specialised branches bracteolata
- 31a Flowers not borne on specialised branches.
- 32. Stems green, grooved.. .. . subulatus
- 32a Stems smooth, or if grooved than
not green.
- 33. Plant completely glabrous.
- 34. Spines absent.
- 35. Branches green, softly woody,
ascending. Perianth segments
3 mm. or more long virgatus
- 35a Branches woody, usually spreading.
Perianth segments less than 3 mm.
long macowanii
- 34a Spines present, at least on the
stems.. .. . thunbergianus

- 33a Ultimate branches pubescent . mucronatus
- 27a Branches frond-like. Cladodes all in
one plane plumosus
- 26a Young branches, and often all the aerial
stems and branches, white and grooved.
36. Cladodes ascending, straight. Plant
shrubby laricinus
- 36a Cladodes spreading, often arcuate.
Stems shortly erect or tortuous.
37. Spines present on the ultimate
branches compactus
- 37a Spines absent from the ultimate branches.
38. Cladodes 4 mm. or less long . microrhaphis
- 38a Cladodes 5 mm. or more long.
39. Stems climbing or scrambling,
zigzagging.. .. . retrofractus
- 39a Stems erect, straight.. .. macowanii



Map 1. *Asparagus capensis*.

SECTION CAPENSES:

The section CAPENSES is a distinct one, characterised by the fact that the spines are produced from modified branches instead of from reduced leaves as in other species. Baker (1896) misinterpreted the nature of the spines, being under the misapprehension that they were produced from modified leaves. Nevertheless, he did recognise the group as such. Besides the spine character, which is the most important feature of the section CAPENSES, several unusual characters occur in one or more species. The species are erect, except for a form included here under A. suaveolens, lack tubers, usually have more than one branchlet at a node, and have fascicled, more or less terete cladodes. The presence of such well differentiated branchlets is found in only a few species in other groups. Two of the species are peculiar in having sessile flowers, and in another the perianth forms a tough, persistent sheath round the fruit.

As is usual for the genus, there is great variation in the quantitative characters of the vegetative parts, and there are few qualitative characters of any use in delimiting species.

The section seems to be confined to Southern Africa south of the Zambezi River.

1. Asparagus capensis L.

Asparagus capensis Linnaeus, Species Plantarum
: 314 (1753).

Asparagus triacanthus N. Burmann, Prodrumus
Florae Capensis : 10 (1768).

Asparagopsis passerinoides Kunth, Enumeratio
Plantarum, 5 : 90 (1850).

Asparagus nelsoni Baker, J. Linn. Soc.,
14 : 617 (1875).

An erect shrub, usually with several wide-spreading branches, upto 1 metre high. Stems brown or green, zigzagging, terete, pubescent when young, terminating in a spine. Branches spine-tipped, 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 are replaced by normal branches. Cladodes terete, usually slightly recurved, 1.5 to 6 mm. long or more, 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, white with a green or purple median streak, margin serrate, 2 to 4.5 mm. long. 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.

Linnaeus, in his Species Plantarum, wrote
"Asparagus aculeatus, triplici spina, surrectus. Pluk.



Fig. 19b. The figure on which Linnaeus based
Asparagus capensis. Plukenet, L.,
"Almagestum" t.78 f.3.

alm. 54. t. 15. f. 4." Figure four, on plate fifteen of Plukenet's *Phytographia* does not show a plant with ternate spines, and on page 54 of his *Almagestum*, Plukenet wrote "*Asparagus aculeatus, triplice spinâ surrectus, Prom. Bon. Spei. Phytogr. Tab. 78. fig. 3.*" Figure three on plate 78 of the *Phytographia* does show a plant with ternate spines. (Fig. 19.) 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 in the Linnaean Herbarium, labelled *A. capensis*, do not have ternate spines and therefore do not fit Linnaeus' description, they can not be regarded as the type. As the Plukenet figure does, however, match the description in having ternate spines, it must be regarded as the iconotype in the absence of the specimen from which the illustration was prepared. If such a specimen does exist, it would probably be in Herb. Sloane at the British Museum (Natural History). The figure also shows the fascicled branches characteristic of this species. Unfortunately, there are no flowers shown and the figure could possibly be of the plant known as *A. suaveolens*. As *A. capensis* is quite common on the Cape Peninsula, and *A. suaveolens* occurs only at some distance, it is more likely that the figure, published in 1691, is of *A. capensis* as construed here.

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 type

of A. capensis L. A. triacanthus Burmann is, therefore, a synonym of A. capensis L.

Asparagopsis passerinoides Kunth was proposed as a new name (superfluous) for A. capensis of Linnaeus. Kunth cited both Linnaeus' description and the correct Plukenet figure.

Asparagus nelsoni was described by Baker from a specimen in the British Museum collected at the Cape by Nelson. Baker wrote that this plant was much-branched, had fascicled branchlets and very short peduncles. Baker mentioned that this plant combined the branching of A. stipulaceus (the name he used for A. suaveolens Burch.) and the sessile flowers of A. capensis. In the key, Baker separated A. nelsoni 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, and the only other species with sessile flowers is A. stipulaceus Lam., which has larger cladodes and flowers than given by Baker for A. nelsoni.

This species occurs from sea-level to about 1000 feet, especially in sandy soils. Among shore vegetation, it may form dense bushes about one meter high, with thick branches and short, thick cladodes, while at higher altitudes, it is generally more sparsely branched and smaller with narrower branches and cladodes. It is one of the commonest species in the winter rainfall area.

Occasionally an atypical form occurs under trees. This form has longer cladodes - upto 8 mm. long - and

has a more lax habit. It also often has more numerous spines at a node than is usual in the species. This seems to be the plant Baker named A. nelsoni, but no difference was found between this and the typical form after they had been cultivated near one another for two years. Nor is it possible to separate these forms in the field because of intermediate forms.

A variety has been named A. capensis var litoralis Suess. & J. Karl. in Mitt. Bot. Staatssam. Munchen, 2 : 50 (1950). This seems to be the extreme of the form described above as occurring in coastal vegetation. Its cladodes are so reduced as to give a granular appearance to the branchlets. A specimen, intermediate between this variety and the typical form, was grown near a specimen of the typical form for about five years. During this period, the difference was maintained. This may indicate that a genetic difference is involved, but this is not of sufficient magnitude to raise the variety to specific level. There is, however, sufficient difference to warrant the retention of this variety. The holotype is Dinter 6367 (BOL) from Pomona, South West Africa.

Flowering is affected by, but not dependant on fires. Flowers have been recorded in February and from April to August. The flowers are sweet scented.

DISTRIBUTION OF A. CAPENSIS VAR CAPENSIS.

CAPE.

Bellville. Bellville, fl. June, Bolus s.n. (BOL 15190); Melkbosch, fl. April, Wasserfall 159 (NBG).

Bredasdorp. Betw. Bredasdorp and Elim, fl. April, Bolus s.n. (BOL 20579), fr. Sept., Leighton s.n. (BOL 21115); near Elim, fl. April, Schlechter 10476 (BOL); near Pearly Beach, fl. June, Martin 376 (NBG).

Caledon. Rivier Sonder End, fl. June, Heginbotham 143 (NBG); Hangklip Estates, fl. June, Stokoe s.n. (SAM 64697).

Calvinia. Calvinia, fl. April, Compton 19484 (NBG).

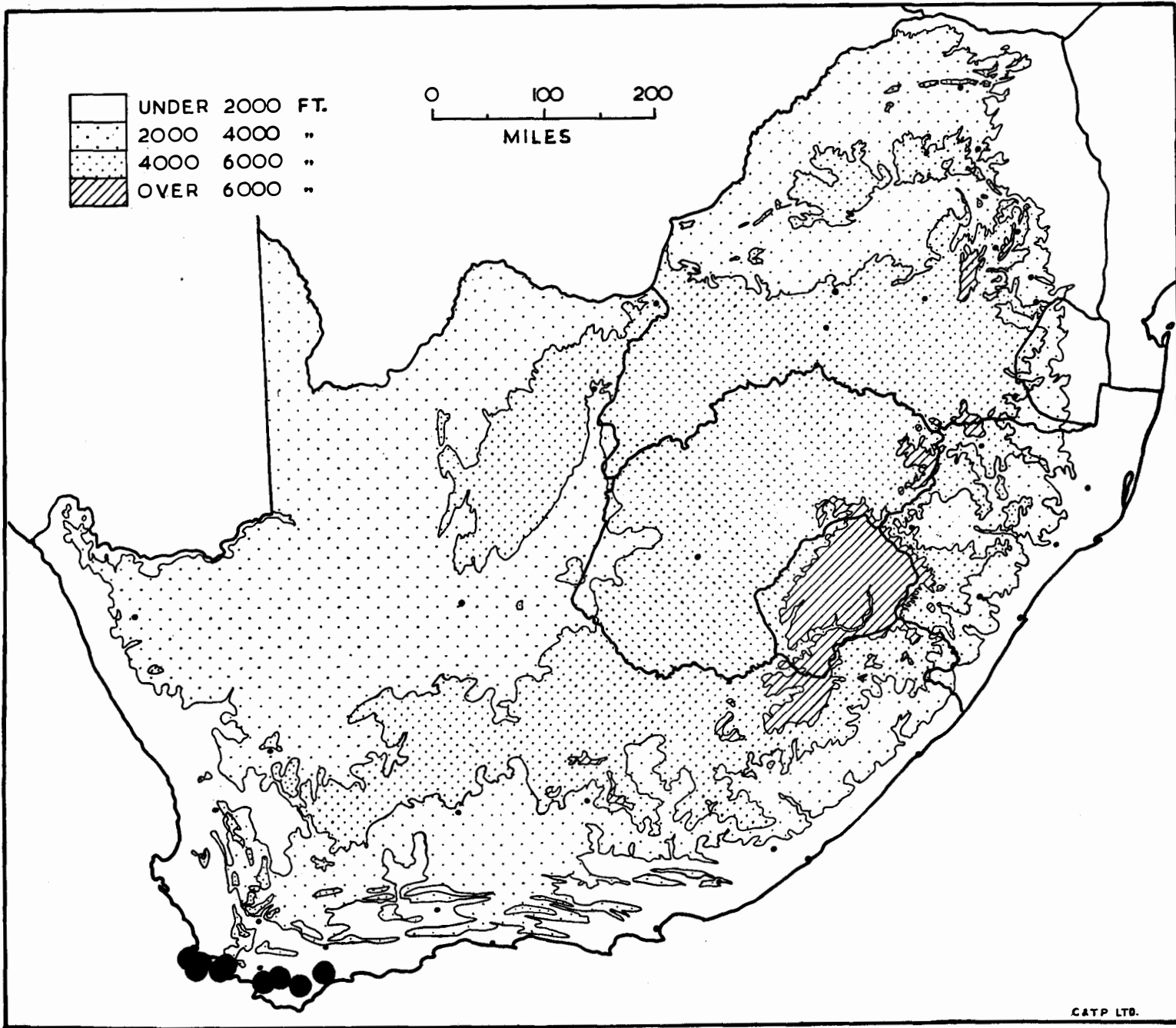
Cape Town. Robben Island, Walgate 509 (NBG); Oranjezicht, fl. May, Barnard s.n. (SAM 66960); Lions Head, fl. May, MacOwan 1977 (GRA & SAM), fl. May, MacOwan 3174 (GRA), Compton 21950 (NBG); Signal Hill, fl. April, Jessop 25 (BOL), fr. July, Phillips 12 (SAM); Rugby, Jessop 30 & 31 (BOL); near Cape Town, fl. June, Zeyher 76 (STE).

Knysna. Keurbooms River at Postpad, fl. May, Fourcade 207 (BOL).

Laingsburg. Seven Weeks Poort, fl. Feb., Thorne s.n. (SAM 50149); Witteberg, fl. May, Walgate 254 (NBG); Ngaapkop, fl. June, Compton 14591 (BOL & NBG).

Malmesbury. Darling Flora Reserve, fl. June, Winkler 88 (BOL & NBG); Geelbek, fl. Aug., Barker 4608 (NBG); Darling, fr. Sept., Eames s.n. (BOL); Hopefield, Jessop 455 (BOL); Malmesbury, Marloth s.n. (STE); Moorreesburg,

- fl. June, Jordaan 582 (STE).
- Montagu. Fonteinkloof, fl. July, Lewis s.n. (NBG);
betw. Montagu and Triangle, Barnard 762 (SAM).
- Murraysburg. Murraysburg, Tyson 38 (BOL).
- Namaqualand. Betw. Port Nolloth and Holgat, Pillans
5710 (BOL); Garies, fl. June, Thorne s.n. (SAM
49798); Doornpoort, Pillans 5368 (BOL).
- Piquetberg. Lower slopes of the Rest Mountain, fl.
Sept., Gillett 3664 (BOL); The Rest, fl. Aug.,
Barker 3590 (NBG); 11 miles N.E. of Velddrif,
fl. Aug., Barker 9715 (NBG).
- Port Elizabeth. Red House, fl. July, Paterson
1109 (BOL); Swartkops, fl. June, fr. Jan.,
Zeyher 4159 (BOL); New Brighton, fl. June,
Southey s.n. (GRA).
- Simonstown. Partridge Point, fl. May, Salter
8080 (BOL); Olifantsbosch, fr. Sept., Oliver
s.n. (BOL), fr. Oct., Jessop 126 (BOL); The
Boulders, Jessop 32 (BOL); Fish Hoek, fl. April,
Penfold s.n. (BOL 22526); Kommetjie, Salter
8256 (BOL).
- Somerset West. Somerset West, fl. May, Parker
3497 (BOL & NBG); Strand, fl. June, Parker
3806 (BOL & NBG).
- Stellenbosch. Stellenbosch, fl. May, Bond s.n.
(NBG 67047), Van der Riet s.n. (STE), fl. May,
Jordaan 525 (STE); near Papagaaisberg, Dissel
s.n. (STE).
- Steynsburg. Steynsburg, fl. Sept., Thode 5636
(STE).
- Tulbagh. Saron, fr. June, Schlechter 7886 (BOL
& GRA).



Map 2. *Asparagus stipulaceus*.

- Uitenhage. Uitenhage, Cooper 1573 (BOL).
Van Rhynsdorp. Klaver, fl. Aug., Pillans 7092
(BOL), fr. July, Andreae 410 (STE); Knersvlakte,
fr. Aug., Esterhusen 5981 (BOL).
Wynberg. Hout Bay, Jessop 301 (BOL); Karbonkel-
berg, Oliver s.n. (BOL); Bergvliet, Salter
8272 (BOL); Plumstead, fl. May, Barwick s.n.
(SAM 22543); Kenilworth, fr. Jan., Jessop 16
(BOL), fr. Aug., Jessop 17, 18 & 37 (BOL);
Rondebosch, fl. June, Oliver s.n. (BOL), fl.
June, Heginbotham 3 (NBG), fl. June, Wolley Dod
1143 (BOL); Raapenberg, Guthrie 495 (CTH);
Rosebank, fl. June, Bolus s.n. (BOL 26849);
Observatory, fl. July, Davis s.n. (SAM), fl.
Sept., Leighton 641 (BOL); Cape Flats, Kensit
s.n. (CTH).

DISTRIBUTION OF *A. CAPENSIS* VAR *LITORALIS*.

CAPE.

- Clanwilliam. Lambert's Bay, fl. May, Muir
s.n. (SAM 49420).
Namaqualand. South of Hondeklip Bay, Pillans
s.n. (BOL 18246).

2. Asparagus stipulaceus Lam.

Asparagus stipulaceus Lamarck, Encyclopedié
Methodique, 1 : 297 (1783).

Asparagopsis stipulacea (Lam.) Kunth,
Enumeratio Plantarum, 5 : 91 (1850).

Asparagus densus Baker, J. Linn. Soc.,
14 : 616 (1875).

An erect, densely pubescent shrublet, upto 50 cm. high, rarely more, not usually producing branches. Stems grey-green or 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, upto 2 cm. long. Branchlets fascicled, spineless or sometimes terminating in a spine, grooved. Cladodes firm, terete or angled, slightly mucronate, sometimes scabrid, 5 to 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 to 6 mm. long, spreading, the margin serrated. Stamens almost as long as the perianth; anthers 0.7 to 0.8 mm. long, yellow-green. Ovary 1 to 1.5 mm. long; style 1 mm. long. Berry fleshy, globose, red, 1- or 2-seeded.

Lamarck's description leaves no doubt as to the correct application of the name among South African species. His description mentions that the plant is lightly hispid, has fascicled branches, spines more than 1-nate and cladodes 8 to 10 mm. long. The specimen, which Lamarck obtained from Sonnerat from the Cape, had no flowers. It is now likely to be in the Lamarck Herbarium in Paris.

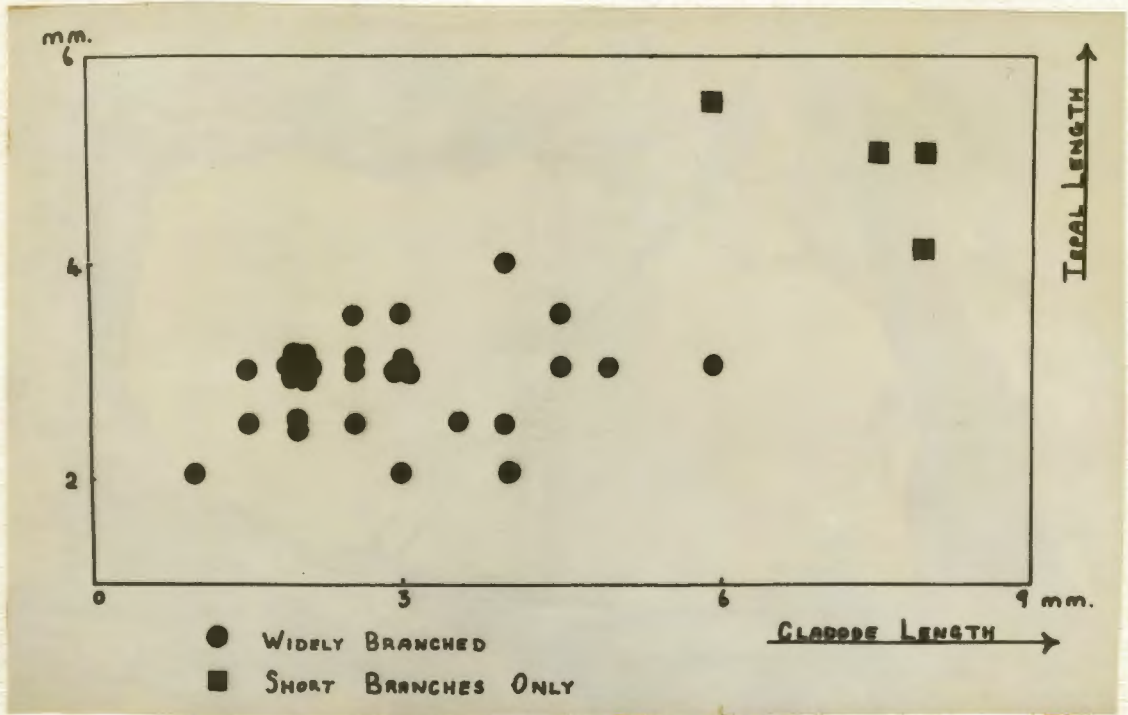


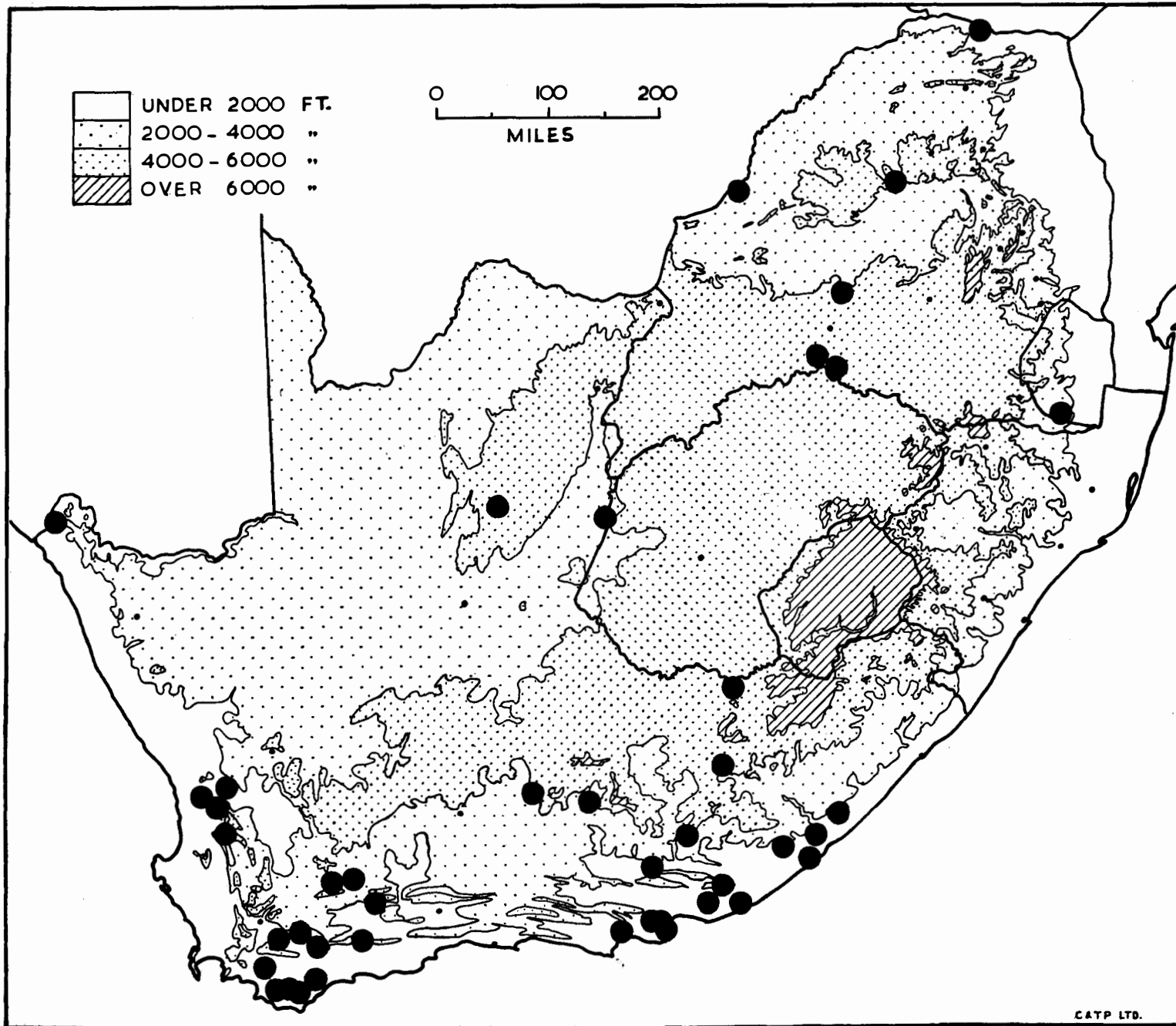
Fig. 20. Scatter diagram to show the relationship between cladode length and perianth length of Asparagus capensis and A. stipulaceus.

A. densus Soland ex Baker was described from an Auge specimen collected at the Cape. The flowers were described as terminally, very shortly pedicellate; the final branches as densely fascicled; the stems as puberulous; and the cladodes as 3 - 6 lin long, and seems to be synonymous with A. stipulaceus.

This species is particularly affected by fires and rarely flowers except after a fire. 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 not usually possible to find fruits. This is possibly associated with polyploidy.

It grows in sandy soils, often in vegetation with a high proportion of Restionaceae, and usually within sight of the sea.

A. capensis and A. stipulaceus are very similar, and their separation is sometimes difficult. A. capensis plants are larger and considerably more branched, while A. stipulaceus is usually more pubescent, 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. A scatter diagram has been produced, which shows the relative differences in cladode and perianth segment length. (Fig. 20.) This diagram shows a very small difference between the two species, but this, coupled with the dense habit of A. stipulaceus is,



Map 3. *Asparagus suaveolens*.

CATP LTD.

in the opinion of the present author, adequate to maintain the separation of these species.

DISTRIBUTION.

CAPE.

Bredasdorp. Mierkraal, Schlechter 10536 (BOL & GRA); De Hoop, fl. April, Barker 8731 (NBG); Baardskeerdersbos, 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, fl. May, Guthrie s.n. (BOL 16526), Oliver s.n. (BOL); Miller's Point, fl. May, Pillans 8532 (BOL); Clovelly, fl. July, Salter 8210 (BOL & SAM); Kalk Bay, Jessop 47 (BOL), Oliver s.n. (BOL); St James, Mitchell s.n. (BOL 17246).

3. Asparagus suaveolens Burch.

Asparagus suaveolens Burchell, Travels in the interior of Southern Africa, 2 : 226 (1822).

Asparagus spinescens Steudel, in Schultes, Systema Vegetabilium, 7 : 334 (1829).

Asparagus triacanthus Willdenow, in Schultes, Systema Vegetabilium, 7 : 334 (1829).

Asparagopsis triacantha (Willd.) Kunth, Enumeratio Plantarum, 5 : 91 (1850).



Fig. 21. Spines of Asparagus suaveolens
to show the lateral nodes.

Asparagopsis zeyheri Kunth, Enumeratio
Plantarum, 5 : 92 (1850).

Asparagopsis spinescens (Steudel) Kunth,
Enumeratio Plantarum, 5 : 93 (1850).

Asparagus burchellii Baker, J. Linn. Soc.,
14 : 618 (1875).

Asparagus spinosissimus Kuntze, Rev. Gen.
Plant., 3 : 315 (1893).

Asparagus stipulaceus auct. non Lam.; Baker,
Flora Capensis, 6 : 264 (1896).

An erect, glabrous or pubescent, much-branched shrublet, upto 100 cm. high, but usually 30 to 50 cm. high; occasionally climbing or scrambling upto 150 cm. high. Stems and branches pale cream coloured, grey or brown, zigzagging, spine-tipped, smooth; branches usually spreading or ascending but occasionally reflexed. Lateral spines 3-, 5- or 7- nate, at least the lateral ones in each group usually bearing sterile nodes (Fig. 21), pungent, well-developed, straight or arcuate, spreading or reflexed. Branchlets fascicled, paired to numerous, herbaceous, arcuate or straight, upto 3 cm. long. Cladodes borne on branchlets, fascicled, subulate, spreading or ascending, 3- to 6- nate, 1 to 10 mm. or more long. Peduncles solitary, terminal on branchlets, 1 to 4 mm. long, articulated near the base. Perianth segments obovate, 1.5 to 3.5 mm. long, the outer whorl frequently, perhaps always, with a purple streak. Stamens nearly as long as the perianth segments, narrow; anthers



Fig. 22. Burchell 1956 (K).
The holotype of Asparagus suaveolens Burch.

about 1/3 mm. long, orange to yellow. Style divided for less than half its length; ovary sessile, 12- to 14- ovuled. Berry one-seeded, globose, 3 to 3.5 mm. diameter, red; perianth persistent.

The holotype of A. suaveolens Burch. is Burchell 1956, collected at Griquatown and now at Kew. It has been examined on loan at the Bolus Herbarium. (Fig. 22.) It shows the typical fascicled branchlets and ternate spines with lateral nodes.

Baker, in the Flora Capensis, misidentified this species as A. stipulaceus Lam. Its correct identity was pointed out by Dyer in the Flowering Plants of South Africa, 11 : 419 (1931).

The identity of Asparagus spinescens Steud. is confirmed by the mention of the presence of ternate spines and pedunculate flowers in the type description.

Willdenow described A. triacanthus from a specimen which was collected by Lichtenstein at the Cape, in Herb. Willdenow (No. 6693). The characters given by Willdenow include ternate spines and pedunculate flowers, which establishes its identity.

A specimen, collected by Zeyher, which was destroyed in Berlin, was the type of Asparagopsis zeyheri Kunth. There may be an isotype elsewhere, but the collector's number is unknown. It was described as having fascicled branchlets, and peduncles.

Asparagus burchellii Baker was based on Burchell 2962 and it has fascicled branchlets and pedunculate flowers; presumably the type is at Kew, but has not been seen by the present author. Baker separated A. burchellii and A. suaveolens (A. stipulaceus of Baker) on the presence or absence of terminal spines, but this must have been due to his using damaged specimens, as the spines are frequently broken off in this species.

The present author has seen a photograph of the specimen collected at Cathcart, now in the O. Kuntze Herbarium, which is the type of Asparagus spinosissimus O.K. The specimen shows all the characters of this species.

This species is one of the commoner species of Asparagus in the summer rainfall area, but is also found in winter and non-seasonal rainfall areas. It occurs in coastal vegetation, low bush, open forest, and Karroid vegetation. In the south western Karroo and Little Karroo, there are two forms. One of these is erect, and the other is a climber or scrambler with reflexed branches and spines. Intermediates between these two forms occur in the Uitenhage and surrounding districts.

Flowers have been recorded in most months. Flowers are sweetly scented.

DISTRIBUTION.

CAPE.

Albany. Salem road at junction with Grahamstown road, Britten 1509 (GRA); Penrock Farm near

- Grahamstown, fl. Jan., Dyer 1194 (GRA); Botha's Hill, fl. April, Rogers 3417 (BOL); west of Grahamstown, fl. April, Compton 23396 (NEG); Grahamstown, fr. July, Black s.n. (GRA), fl. April, Pym s.n. (GRA), fl. April, Hill 1778 (GRA).
- Alexandria. Debeqa Valley, fl. May, Galpin s.n. (BOL 27051).
- Aliwal North. Aliwal North, Stephany s.n. (BOL 16146).
- Bathurst. Port Alfred, fr. July, Salisbury s.n. (GRA).
- Bedford. Witmos, fl. Dec., Galpin 3081 (GRA).
- Bredasdorp. Mierkraal, fl. April, Schlechter 10527 (BOL); betw. Bredasdorp and Elim, fl. April, Bolus s.n. (BOL 20580 & 20581); Botebok Park, fl. Feb., Johnson 14 (NBG); Wydgelegen, fl. May, Compton 19508 (NBG); Napier, fl. Sept., Van Niekerk 311 (NBG).
- Caledon. Caledon, fl. Aug., Esterhuysen s.n. (BOL 26848); near the hot springs, fl. Sept., Pillans s.n. (BOL 17145); near Caledon, fl. Aug., Bond 178 (NBG).
- Clanwilliam. Langkloof, fl. July, Schlechter 8050 (BOL & GRA); north of Citrusdal, fl. May, Salter 7240 (BOL); Brandewyn River, fl. April, Compton 19473 (NBG); Clanwilliam, Rogers 11270 (GRA).
- East London. Betw. Quinera and Gonubi Rivers, fl. April, Rycroft 1899 (BOL & NBG); East London, fl. July, Gane 319 (GRA), fl., Thode 6653 (STE), Bokelmann 4-28 (NBG).

Fraserburg. Fraserburg, fr. Feb., Nel s.n. (STE 15818).

Graaff Reinet. Graaff Reinet, fl. March, Bolus 411 (BOL).

Hay Floradale, fl. April, Esterhuysen 2318 (BOL).

Humansdorp. Hankey, fr. April, Barker 7853 (NBG).

Kentani. Columbia Mission Station, fl. Aug., Pegler 1451 (BOL, GRA & SAM).

Kimberley. Kimberley, Moran s.n. (BOL 16176 & 16177), Fogarty 31 (SAM); Sekretaris, fl. Jan., Wilman s.n. (BOL); Warrenton, fl. June, Adams 66 (GRA).

King Williams Town. King Williams Town, fr. Nov., Sim 1060 (BOL).

Komgha. Komgha, fl. June, Flanagan 1793 (BOL & SAM); Kei River mouth, fl. July, Flanagan 263 (SAM & PRE).

Ladismith. Ladismith, Jessop 127 (BOL); Prins Poort, fl. May, Bond 306 (NBG).

Laingsburg. Pieter Meintjies, fr. Nov., Rogers s.n. (BOL 16322); Skeiding, Jessop 356 (BOL); north of Laingsburg, Jessop 130 & 309 (BOL); Witteberg, fl. June, Compton 8524 (NBG), fl. March, Compton 20487 (NBG), Lewis 1216 (SAM), fl. May, Compton 8727 (NBG); Ngaapkop, fl. Feb., Compton 14424 (NBG).

Montagu. Cogman's Kloof, fl. May, Barker 998 (NBG), fl. July, Barker 8625 (NBG); Fontein-kloof, fl. July, Lewis 4390 (SAM); betw. Montagu and Triangle, Barnard s.n. (SAM).

Murraysburg. Roads Poort, fl. Sept., Tyson 212 (GRA).

Namaqualand. Doornpoort, Pillans 5466 (BOL).

Port Elizabeth. Red House, fl. July, Paterson 401 (BOL), fr. June, Paterson 961 (BOL), .. Swartkops River, fl. Nov., Zeyher 4160 (BOL), fl. July, Zeyher 4163 (BOL); Perseverance, fl. Aug., Long 681 (GRA); Port Elizabeth, Drege s.n. (GRA); Cradock Place, Galpin 6439 (GRA); Gem Cliff, Galpin 6440 (GRA).

Queenstown. Long Hill, fl. Aug., Galpin 2095 (BOL); Intaba, fl. March, Galpin 2135 (GRA); Umbombola Mts, fr. March, Galpin 2095 (GRA).

Riversdale. On Langeberg, fl. April, Muir 2529 (BOL); near Riversdale, fl. July, Van Niekerk 448 (BOL).

Robertson. Above road, fr. June, Van Niekerk 372 & 373 (BOL); Klaasvoogds, fr. July, Van Niekerk 749 (BOL).

Somerset East. Somerset East, fl. June/July, Van Niekerk 435 (BOL); National Bontebok Park, fl. Sept., Liebenberg 6536 (STE).

Uitenhage. Uitenhage, fr. July, Ecklon and Zeyher s.n. (GRA); near Uitenhage, fl. April, Schlechter 2573 (GRA); Hill Poort, Grahamstown - Cradock road, Britten 2142 (GRA).

Worcester. Karroo Garden, fl. May, Barker 4533 (NBG).

TRANSVAAL.

Barberton. Barberton, Thorncroft 844 (NH).

Heidelberg. The Kloof, fl. Nov., Thode 3435 (STE).

Louis Trichardt. Messina, fl. Nov., Rogers 19297 (BOL).

Marico. Derdepoort, fr. July, Leendertz 189
(GRA).

Middelburg. Loskop Dam, Mauve 4090 (PRE), fl.
Oct., Prosser 1891 (PRE), fl. Oct., Mogg
23904 (PRE); Slanghoek in the Olifant's River
Gorge, Mogg 22407 (PRE); Buffelsvlei, fl. Nov.,
Rudatis 69 (STE).

Pietersburg. Reebok Vlei, Mauve 4295 (PRE).

Potchefstroom. Losberg, Theron 693 (NH).

Potgietersrust. Naboomspruit, Galpin 342 & 344
(BOL & SAM).

Pretoria. Pretoria Koppies, fl. June, Leendertz
184 (BOL & GRA), fl. Sept., Leendertz 252 (BOL),
fl. May, Leendertz 161 (GRA); Premier Mine,
fl. Oct., Rogers 18973 (BOL); Lyttleton, fr.
Dec., Gillett s.n. (BOL 18504); near Pretoria,
fl. Oct., Schlechter 3584 (BOL).

Roodenpoort. Maraisburg, fr. July, Archibald
3195 (GRA), fr. June, Archibald 2705 (GRA);
Spitskop, fl. March, Archibald 2829 (GRA);
Uiehoek, fr. July, Archibald 3305 (GRA).

Vereeniging. Klipriviersberg, fl. June, H.B.G.
s.n. (BOL).

Transvaal without locality, fl. June, Gerstner
3400 (NH).

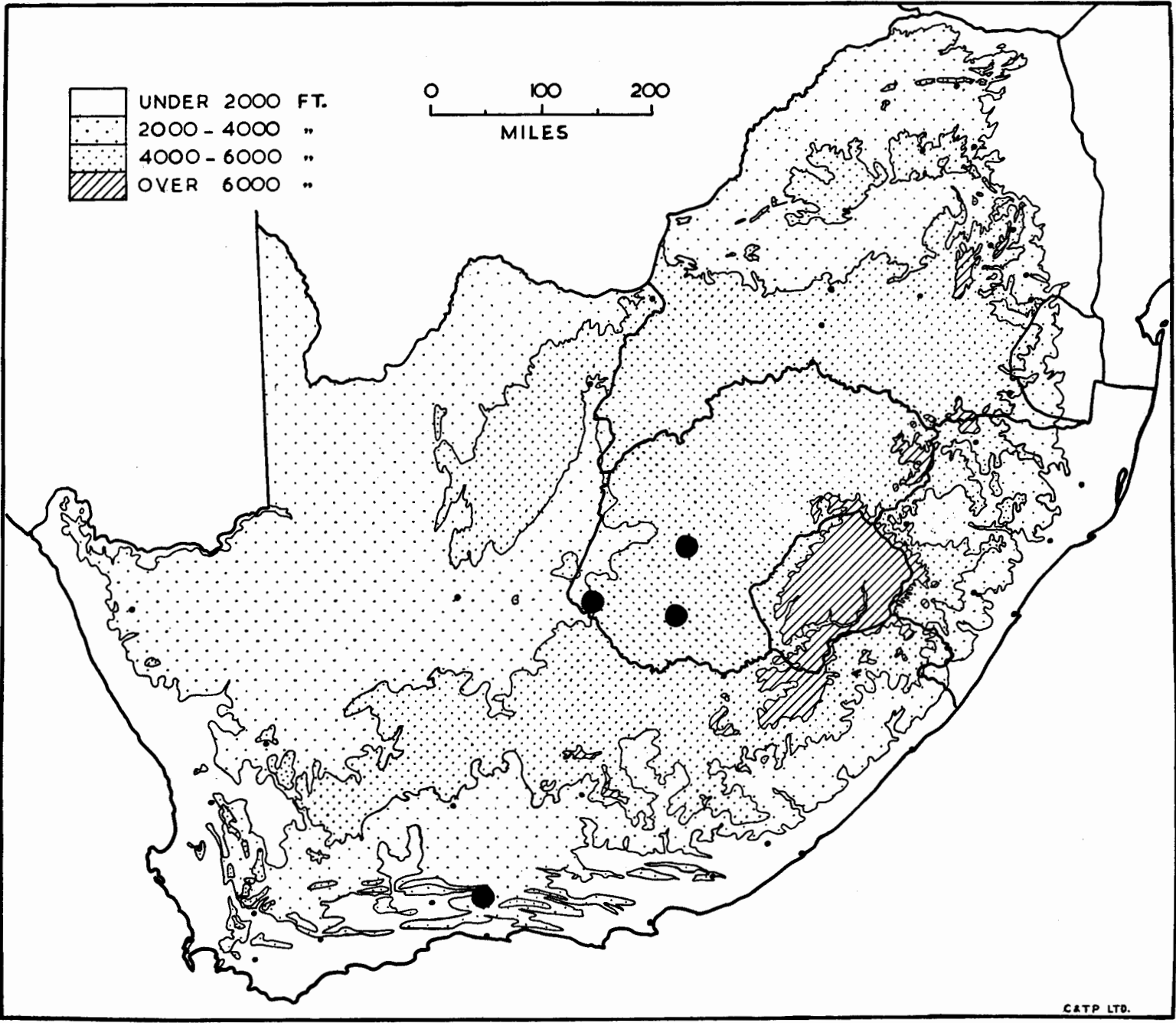
NATAL.

Ingwavuma. Ubombo, fl. June, Gerstner 3400 (NH).

SWAZILAND.

Hlatikulu. Ingwavuma Poort, fl. June, Ben
Dlamini s.n. (BOL).

Also recorded from Lobatsi, Molepolole and Mochudi
districts of Bechuanaland, and from the Sabi



Map 4. *Asparagus glaucus*.

River in Southern Rhodesia.

4. Asparagus glaucus Kies.

Asparagus glaucus Kies, Bothalia, 6
: 229 - 230, fig. 5 (1954).

Stems erect, upto 50 cm. high, smooth, glabrous, woody, slightly zigzagging. Branches spreading or 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, terminated by a spine. Lateral spines mostly less than 1 cm. long, occasionally upto 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 upto 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 the bud, becoming greenish-white with a green keel and 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.

The 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.

Kies described A. glaucus as differing from A. suaveolens in the glaucous appearance, and the larger perianth which persists and encloses the ripe fruit. The figure shows the solitary spines. The type was cited as Kies 340 (PRE). It has been examined at the Bolus Herbarium by the present author.

Flowers are sweet scented and have been recorded in October and November.

DISTRIBUTION.

CAPE.

Cradock. Jakkalsfontein, fl. Oct., Acocks 17516
(PRE).

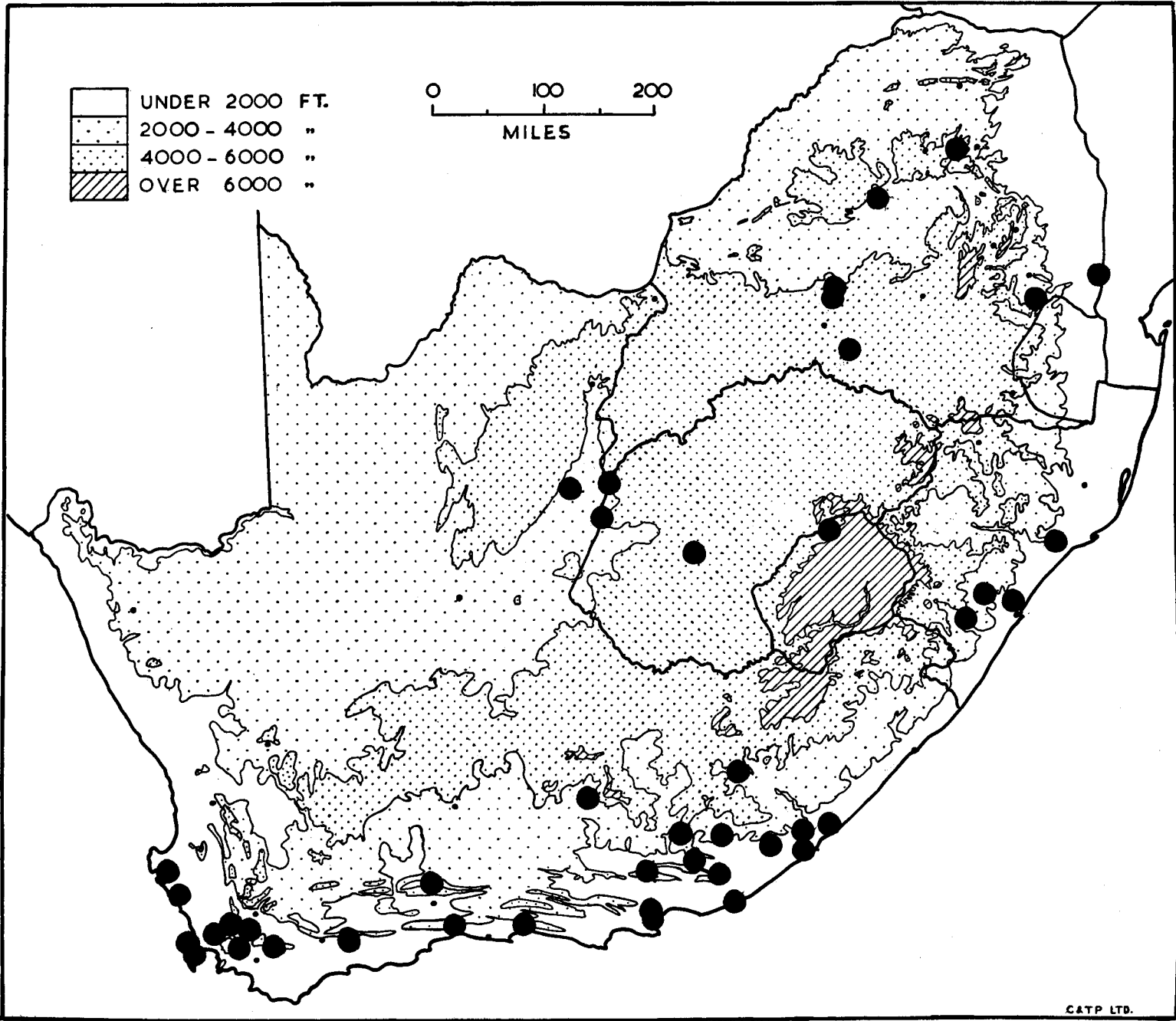
Oudtshoorn. Kruispad, fl. Nov., Compton 21779
(NBG).

Uniondale. Bank of the Olifants River, fl. Nov.,
Fourcade 6265 (BOL).

ORANGE FREE STATE.

Bloemfontein, De Brug, fr. Dec., Acocks 8464
(BOL).

Fauresmith. Luckhoff, fl. Oct., Verdoorn 1623



Map 5. Asparagus africanus.

(BOL); Groenvlei, Kies 340 (PRE).
Trompsburg. Ventersvlei, fl. Oct., Verdoorn 1153
(EOL).

SECTION AFRICANI:

The section AFRICANI comprises species with perennial aerial stems - except A. consanguineus - fibrous roots, numerous, fascicled, terete cladodes, and axillary or terminal flowers. Within these limits there is considerable variation. Some of the species are climbers, while others are erect shrublets. One group has species with white, grooved stems. In most of this group, the outer layers of the older stems and branches are lost, and they are left smooth and brown. The rest of the section includes glabrous or pubescent, smooth or grooved stemmed species.

In many ways there is a parallel range of habits and stem characters in the section RACEMOSI.

The name AFRICANI was chosen partly because this was the name of one of Baker's (1896) sections, and partly because A. africanus is the most widely spread species of the section South Africa. It seems likely that the section should include species from many parts of the area inhabited by the genus in the world.

5. Asparagus africanus Lam.

Asparagus africanus Lamarck, Encyclopedié

- Methodique, 1 : 295 (1783).
- Asparagus dependens Thunberg, Prodrumus
Plantarum Capensium : 66 (1794).
- Asparagus nivenianus Schultes, Systema
Vegetabilium, 7 (1) : 331 - 332 (1829).
- Asparagopsis minutiflora Kunth, Enumeratio
Plantarum, 5 : 89 (1850).
- Asparagopsis lamarckii Kunth, Enumeratio
Plantarum, 5 : 87 - 88 (1850).
- Asparagopsis juniperina Kunth, Enumeratio
Plantarum, 5 : 85 - 86 (1850).
- Asparagopsis niveniana (Schultes) Kunth,
Enumeratio Plantarum, 5 : 88 (1850).
- Asparagopsis schlechtendalii Kunth,
Enumeratio Plantarum, 5 : 90 (1850).
- Asparagus cooperi Baker, Gardeners
Chronicle, 1 : 818 (1874).
- Asparagus ecklonii Baker, J. Linn. Soc.,
14 : 615 (1875).
- Asparagus multiflorus Baker, J. Linn. Soc.,
14 : 610 (1875).
- Asparagus minutiflorus (Kunth) Baker, J.
Linn. Soc., 14 : 616 (1875).
- Asparagus asiaticus auct. non L.; Baker, in
Flora Capensis, 6 : 265 (1896).
- Asparagus rivalis Burchell ex Kies, Bothalia
6 (1) : 179 - 180 (1951).

Stems woody, twining, either climbing to about
3 metres or forming low bushes upto about 1 metre 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, upto 20- nate, but often only 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, and sometimes well-developed on all branches, spreading to reflexed, usually straight, pale in many specimens but frequently reddish brown, upto 1 cm., or more, long, usually with the rest of the leaf forming well-developed spurs. Peduncles axillary or terminal, upto 20- nate, but frequently 2- or 3- nate, upto 5 to 8 mm. long, articulated below the centre. Perianth segments similar, entire, oblong-obovate, 2.5 to 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.

Those South African Asparagi with fascicled, terete cladodes, stems not white and grooved and final branches and cladodes not horizontal as in A. plumosus have been included in this species. The variation within these limits, as can be seen from the description of the species above, is very great. It is possible that further collecting will reveal the limits of significant groupings within this definition, but there seems to be no

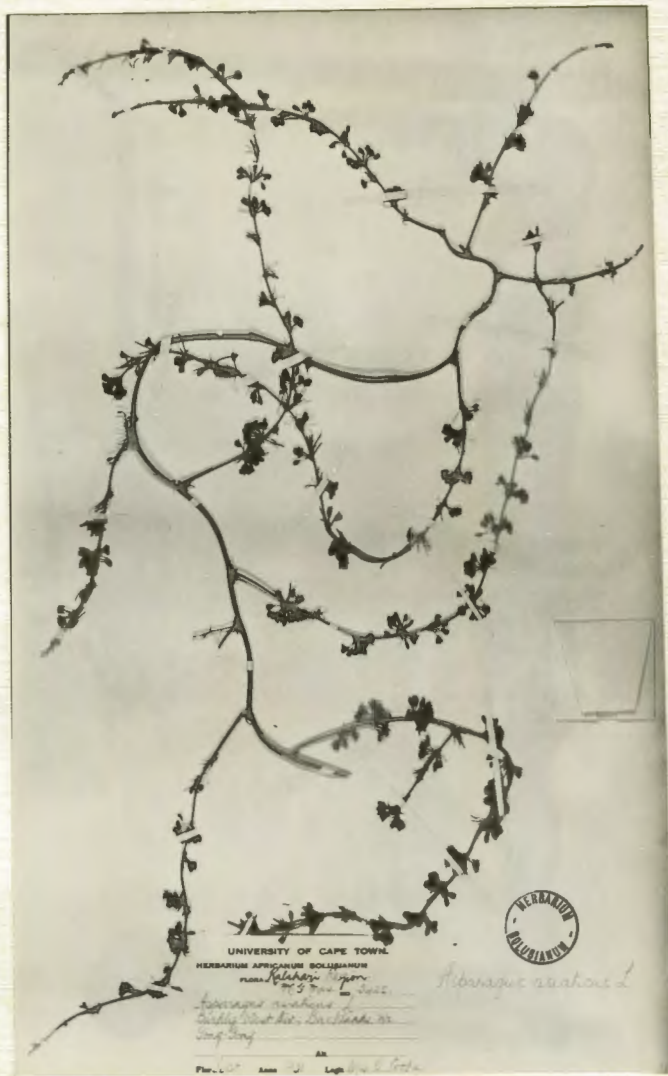


Fig. 23. Variation in *Asparagus africanus* Lam.

"A" A specimen from the Barkly West district to show the extremely slender, tortuous stems. Several of the branches are reflexed. There are only poorly developed spines.



Fig. 24. Variation in Asparagus africanus Lam.

"B" This specimen was collected near the Swartkops River. It is more branched than the specimen shown in Fig. 23. Spines are well-developed.

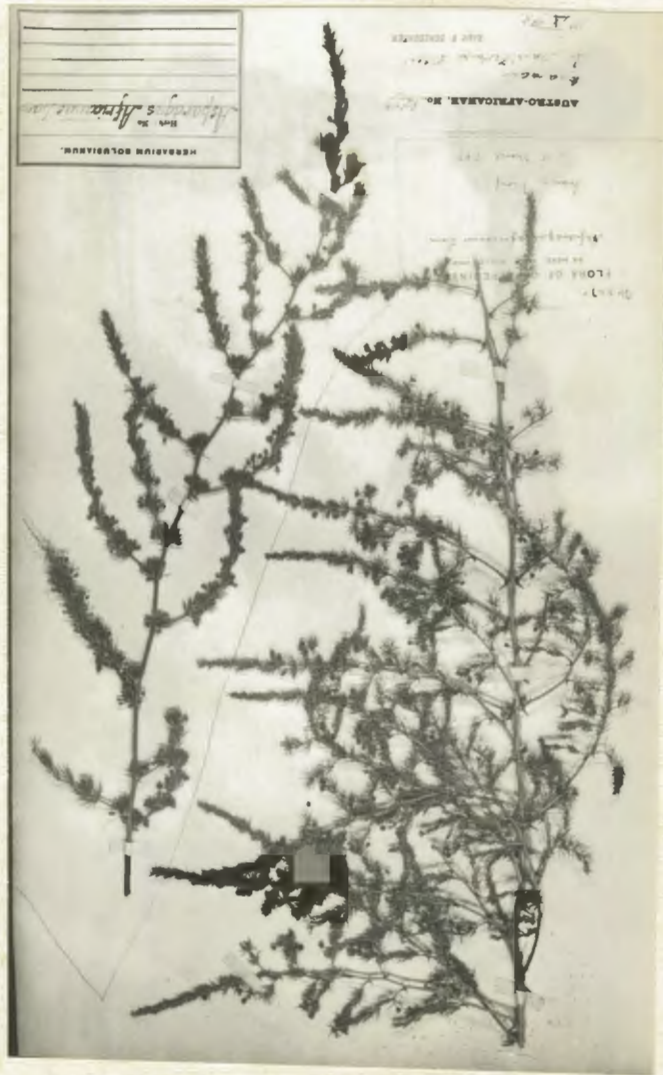


Fig. 25. Variation in *Asparagus africanus* Lam.

"C" The left hand specimen was collected in the Cape Peninsula, and the other near Pieter-Maritzburg. It is a more rigid form than shown in Fig. 24. The branches are all ascending, and spines are well-developed.



Fig. 26. Variation in *Asparagus africanus* Lam.

"D" This specimen was collected near Kentani,
and shows an extremely rigid stem, and
large spines.



Fig. 27. Variation in *Asparagus africanus* Lam.

"E" This specimen was collected in the King Williams Town district. It is similar to the specimen in Fig. 24, but has thicker, more strongly reflexed branches, and no spines.



Fig. 28. Variation in *Asparagus africanus* Lam.

"F" This specimen was collected in the Albany district. It has very strongly reflexed branches, and no spines.

possible way of correlating any of the variable characters in order to subdivide the group, judging from the available material and data. Baker included the following species, which are treated here as synonyms for A. africanus, in the Flora Capensis: A. ecklonii, A. multiflorus, A. minutiflorus, A. cooperi, A. asiaticus and A. africanus. These he separated in his key on the presence or absence of spines, and the number of flowers in a fascicle, characters which have been found by the present author to be very variable in the genus as a whole and particularly in this group.

The form in the south west Cape, A. africanus of Baker, has well-developed, reddish spines, and tends to be less sarmentose. (Fig. 25.) 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. (Fig. 27.) More generally over most of the summer rainfall area there is a less spiny, more sarmentose form with narrower stems, branches and cladodes, which was referred to A. asiaticus by Baker. (Fig. 23.)

It is difficult to distinguish A. africanus from A. plumosus. 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 area of Southern Africa, but are not always readily recognisable on herbarium material. There are several specimens in which it is difficult to decide in which species to place them. The only character which may be of

assistance is that the flowers of A. plumosus are always terminal, while most specimens of A. africanus have axillary flowers.

Lamarck described A. africanus from a specimen which was sent from the Cape by Sonnerat. This is probably Peter Sonnerat (b. 1745), who called at the Cape several times, including one visit of several weeks in 1781. 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. There is likely to be a holotype in the Lamarck Herbarium in Paris. Lamarck also cited Plukenet's Phytographia, t. 374 f. 4. This figure shows a slightly sarmentose 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.

Thunberg's description of A. dependens reads as follows: "A. fruticosus aculeatus, ramis reflexis, foliis subulatis." The specimen in the Thunberg Herbarium, labelled A. dependens, fits this description in every point. It is a specimen of the pubescent form with reflexed branches. It has been examined by the present author at the Bolus Herbarium.

Schultes described Asparagus nivenianus as "fruticosus", the branches as flexuose, woody and glabrous, the cladodes as fascicled and setaceous, and the flowers as axillary. He considered it to be close to both A. asiaticus and A. africanus, "sed ab utroque satis distinctus" without explanation. The locality is given as "Caput Bonaë Spei". It is very probable that this species belongs here, but on these characters one can not be certain. While J.A. Schultes' specimens are, according to De Candolle (1880), in Munich and Leiden, Niven's are mainly at the British Museum. The holotype is therefore likely to be in one of these herbaria. Kunth cited this reference as the source for his Asparagopsis niveniana, which is, therefore, a synonym.

Kunth described Asparagopsis minutiflora from a single specimen collected by Forbes at Delagoa Bay. The branches are described as "levissime flexuosis" and the final branches as "striatis hirtellis". The plant had well-developed spines, and fascicled, needle-like cladodes. These are characters, which occur in A. africanus, but there are not sufficient details to be certain of the identity of the species. Baker cited the Forbes specimen and Kunth's description. An isotype may be at Kew, but Kunth's specimens were in the Royal Herbarium, Berlin.

Asparagopsis lamarckii was proposed as a new name (superfluous) for A. africanus Lam. 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" is very characteristic. Asparagopsis schlechtendalii is also likely to be a synonym for this species. The type was collected along the Olifants River by Krebs, 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, again, there is not enough information to be absolutely certain. According to De Candolle (1880), Krebs' specimens were in the Herbarium de l'Univ. de Kiel.

The plant, described by Baker under the name A. cooperi, is typical of the summer rainfall area form of A. africanus. The normal characters, woody, twining stem, fascicled, terete cladodes, and axillary flowers, are all mentioned by Baker. Baker cited his type material as being "Cooper in hort. Saunders". If a Cooper specimen is extant, it is likely to be at Kew. If, as seems more likely, there is not, the figure accompanying the type description must be regarded as an iconotype.

Baker described A. ecklonii as having sarmentose, glabrous stems, spineless, curved, slender, moderately rigid branches, subulate, 1- to 6-nate, straight, very slender cladodes, and axillary flowers. The holotype was collected by Ecklon and Zeyher, and was reported by Baker to

be in the herbarium of Trinity College, Dublin. These characters apply to A. africanus. Baker separated A. ecklonii from A. asiaticus on the absence of spines and on having fewer flowers in a fascicle. Neither of these characters can be regarded as significant.

Baker described A. multiflorus as having woody, sarmentose, spineless stems; subulate, fascicled cladodes; and terminal flowers. He separated it from A. asiaticus and A. africanus in not having spines. This character is not of sufficient significance to maintain the separation of A. multiflorus. The holotype is cited by Baker as having been collected in the Somerset division by Bowker. This specimen is likely to be at Kew.

Kies published a description of A. rivalis in order to validate Burchell's name, which was published without a description, for the plants which had upto then been known as A. asiaticus. She cited Burchell 2587, collected at Kosiefontein (Kuruman District) as the holotype of A. rivalis. From her description, in which she mentions the stem, cladode and inflorescence characters typical of specimens of this species from the northern Cape, there can be no doubt as to its identity.

Because various authors have used the name A. asiaticus for the species treated here as A. africanus, it is desirable to discuss the typification 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. Linnaeus' description describes the stem as erect, and the Plukenet figure agrees with this. The figure also does not match the South African *A. africanus* as it appears to have spines on the final branches. Plukenet cited his species as "e Maderaspatans"; that is, from the eastern coast of peninsular India. It is, therefore, possible, but unlikely, that the South African specimens should be placed in the same species as an Asian species with straight branches and spines on the final branches. It is better, however, to regard this name as not applicable to the South African species until work can be done on the genus in a wider geographical context. This name was used by Baker, and several authors before him for the South African species. Kies was the first person to question the conspecificity of the African and Asian plants.

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 such as in the Kimberley district.

Flowers have been recorded from August to May.

DISTRIBUTION.

CAPE.

Albany. Glen Boyd, fl. Nov., Lindstedt 18 (PRE);
Grahamstown, Cherry 969 (NH); Carlisle Bridge,
Bowker 38 (GRA).

Barkly West. Bucklands, near Gong-Gong, fl. Sept.,
Cooke s.n. (BOL); Newlands, fl. Oct., Ferrar
s.n. (BOL 26842).

Bathurst. Port Alfred, fl. Aug., Rogers 16623
(BOL).

Bedford. Bedford, fl. Nov., Gane 118 (GRA).

Bellville Tigerberg, Pillans 8659 (BCL).

Caledon. Baviaans Kloof, Genadendal, fl. March,
Gillett 855 (BOL); near Grabouw, Jessop 69
(BOL).

Cape Town. Porcupine Buttress, fr. Jan.,
Jessop 12, 13, 14 & 15 (BOL).

East London. East London, fl. Oct., Bokelmann
5-28 (NBG).

Fort Beaufort. Beaufort, fr., Cooper 523 (BOL).

George. Near George, fl. Nov., Barker 6856
(NBG).

Graaff Reinet. Spandouw Kop, fl. May, Francis
6 (BOL); near Graaff Reinet, fl. Nov.,
Bolus 132 (BOL).

Humansdorp. Ratelsbosch, Foucade 552 (BOL);
Mistkraal, fl. April, Compton 23444 (NBG).

Kentani. Kentani, fl. Oct., Pegler 9 (BOL);
Kobongubo Hills, fr. Sept., Pegler 1463 (BOL).

Kimberley. Rock Garden, fl. Oct., Ferrar 73
(BOL, GRA & NH); Kimberley, fl. Oct., Moran

s.n. (BOL 26844); Warrenton, fr. Jan., Wilman
s.n. (BOL 16355), fr. Aug., Wilman s.n. (BOL),
fl., Oliver 59 (SAM).

King Williams Town. King Williams Town, fl. Dec.,
Sim 1063 (BOL).

Knysna. Groot Rivier Pass, Jessop s.n. (BOL);

The Craggs, fl. Nov., Morris 410 (NBG);

Leisure Island, fl. Nov., Taylor 1019 (NBG).

Komgha. Komgha, fl. Sept., Flanagan 299 (GRA &
PRE), fl. Nov., Flanagan 2378 (BOL), fl. June,
Flanagan 1792 (BOL), fl. Aug., Flanagan 255 (BOL).

Malmesbury. Langebaan, Jessop 101; Ysterfontein,
Jessop 365 (BOL).

Oudtshoorn. Near Cango, fl. Dec., Bolus 12369
(BOL).

Paarl. Klein Drakenstein at Salem, fl. March,
Bolus s.n. (BOL 26843).

Port Elizabeth. Swartkops Riv3r, fl. Oct.,
Zeyher 4158 (BOL & SAM), Zeyher 236 (BOL & SAM),
fl. Oct., Zeyher 178 (SAM), fr. Jan., Archibald
4913 (GRA); Cradock Place, fr. May, Galpin
6408 (GRA); Red House, Paterson 964 (BOL);
Frames Drift, fl. Nov., Paterson 853 (SAM); 12
miles N.E. of Port Elizabeth, fr. Nov., Maguire
587 (NBG).

Queenstown. Queenstown, fl. Oct., Galpin 2152
(BOL).

Somerset East. Zuurberg, fl. Nov., Compton
20284 (NBG).

Stellenbosch. Franschhoek, fl. Nov.,
Schlechter 9218 (BOL).

Swellendam. Heidelberg, fl. Nov., Van Niekerk
241 (BOL).

Wynberg. Wynberg Hill, fl. April, Salter 7167
(BOL); Orange Kloof, fl. March, Wolley Dod
2470 (BOL); Nursery Buttress, Jessop 5 (BOL);
Constantia Nek, fl. April, Compton 16977 (NBG).

District? Kabongoba, Transkei, Taylor 3698 (NBG).

NATAL.

Eshowe. Eshowe, Forbes 679 (NH).

Estcourt. Dalton Bridge, fl. Oct., Acocks 10626
(BOL); Greenford, Frere, fl. Oct., Acocks
10648 (BOL); Giants Castle, fl. Oct., Symons
44 (SAM).

Inanda. Inanda, fl. Sept., Wood 989 (SAM).

Pietermaritzburg. Pietermaritzburg, fl. Sept.,
Schlechter 3297 (BOL); Scottsville, fr. Oct.,
Fairall 167 (NBG).

Richmond. Richmond, fl. Feb., Schlechter 6717
(BOL & GRA); Umkomanzi, fr. Feb., Schlechter
6693 (GRA).

District? N'Tondweni, fl. Dec., Wood 9215 (SAM).

ORANGE FREE STATE.

Bloemfontein. Bloemfontein, fl. Nov., Potts s.n.
(BOL).

Orange Free State without locality, Cooper 850 (BOL).

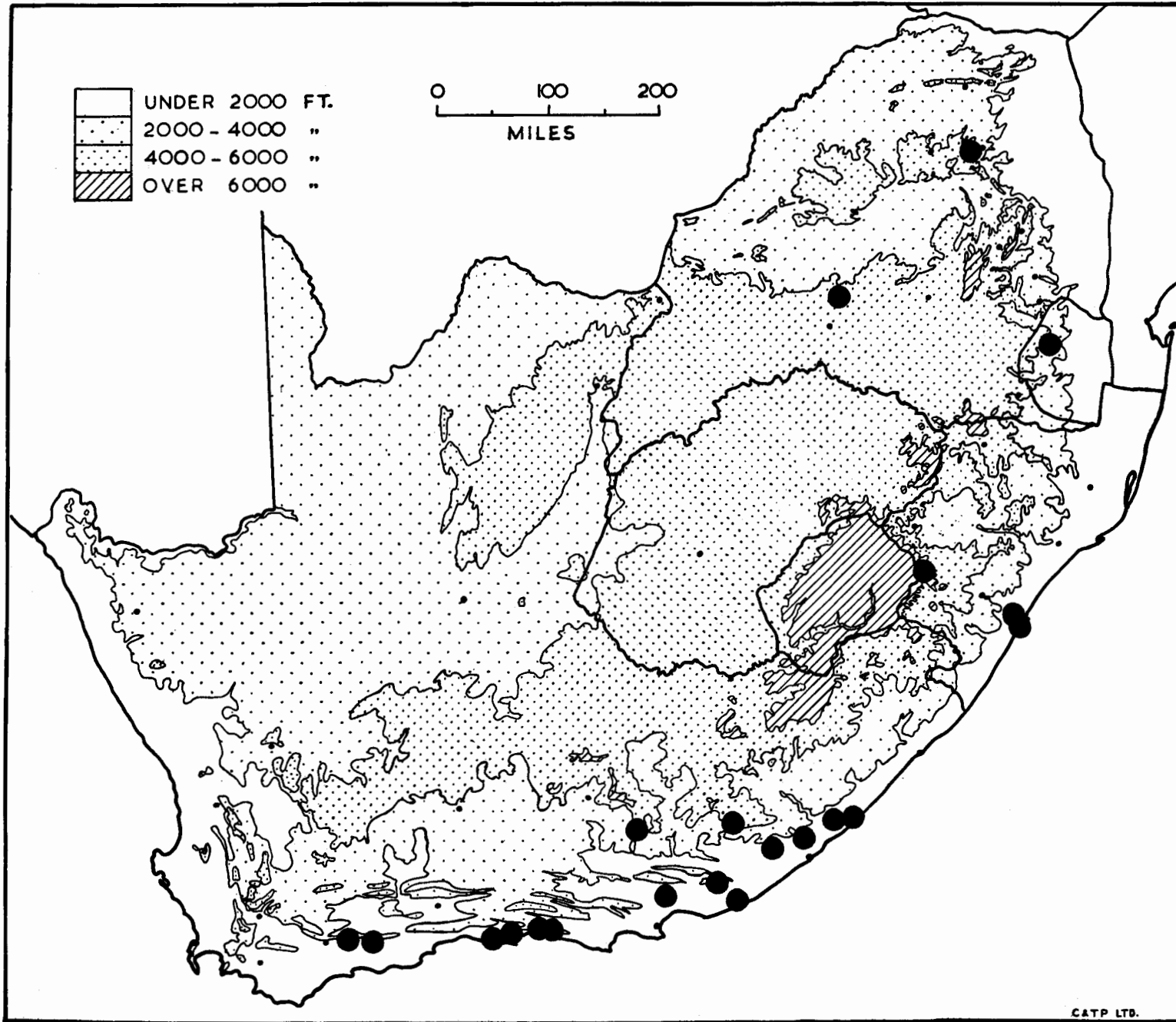
TRANSVAAL.

Barberton. Komati Poort, fr. Dec., Schlechter
11775 (BOL); Barberton, Thorncroft 840 (NH);

Berea Hill, fl. Oct., Galpin 622 (SAM).

Heidelberg. Heidelberg Kloof, fr. Jan., Mogg
20423 (BOL), fl. Sept., Elffers s.n. (NBG 67106).

Map 6. Asparagus plumosus.



Pietersburg. Haenertsberg, fl. Nov., Rogers
19041 (BOL).

Potgietersrust. Near Naboomspruit, Galpin M345 &
M346 (SAM).

Pretoria. Doornkloof, fl. Jan., Gillett 3294
(BOL); Pretoria, fl. Nov., Schlechter 3603 (BOL
& SAM); Irene, fl. Oct., Leendertz 927 (BOL).

Waterberg. Banks of the Limpopo, fl. Sept.,
Leipoldt 7L (BOL); Warm Baths, fl. Oct., Burt-
Davy 7051 (BOL).

BASUTOLAND.

Leribe. Leribe, Dieterlen 302 (GRA & SAM), fl.,
Dieterlen 346 (SAM).

Also recorded from Kazungula and Bulawayo, Southern
Rhodesia; Gobabis and Otjiwarongo, South West
Africa; Pemba, Northern Rhodesia; and between
Lourenco Marques and Puzeen's, Mozambique.

6. Asparagus plumosus Baker.

Asparagus plumosus Baker, J. Linn. Soc., 14
: 613 (1875).

Stems twining, smooth or grooved, glabrous,
greenish to reddish-brown. Branches similar to the
stems, solitary. Roots fibrous. Cladodes linear,
fine, arcuate, terete, upto 10- nate, upto 10 mm.
long. Final branches and cladodes all in the same
plane, horizontal (homalotropic). Spines not
usually present, reflexed. Peduncles terminal,
usually solitary, rarely upto 3- nate, 2 - 5 mm.
long, articulated near the middle, pendant. Perianth

segments cream-white, oblong-obovate, entire, similar, about 3 mm. long. Stamens slightly shorter than the perianth segments; anthers 1/4 to 1/3 mm. long. Styles shortly divided, about 1 mm. long; ovary about 1 mm. long. Berry red, fleshy, upto 3-seeded, about 6 mm. diameter.

Baker described A. plumosus as "ramis et ramulis multis gracillimus patentibus", and he also mentioned the terminal flowers. None of the specimens cited has been seen by the present author. However, in the Flora Capensis (1896), Baker described the branches as "spreading horizontally, with the branchlets and cladodia in one plane." While it is not possible to be certain about the 1875 description, the 1896 one can apply only to this species. With nothing in the type description which does not apply to this species, it is extremely likely that the name is correctly applied here.

Asparagus declinatus was described by Linnaeus in his Species Plantarum (1753) p. 313, as being spineless, with declinate branches, and setaceous cladodes, and as coming from Africa. MacOwan 1917 and Thunberg s.n., which are cited under this name by Baker (1896), are included here in A. plumosus, and it is possible that A. declinatus L. should be regarded as a synonym. The true identity of A. declinatus, however, is obscure. There is no specimen with this name in the Linnaean Herbarium, and the type description, "Asparagus caule inermi, ramis declinatis, foliis setaceis", could apply

to almost any member of the section ASIATICI or to A. crispus. There is not even any evidence that the plant came from the Cape.

A. plumosus occurs in forests from the Riversdale and Swellendam districts in the south west, through the eastern Cape Province and Natal, and into the Transvaal.

Flowers have been recorded in September to December, February and April.

DISTRIBUTION.

CAPE.

Albany. Sandy Drift near Grahamstown, fl. April, Daly 6 & 7 (GRA).

Alexandria. Addo Woods, Ecklon and Zeyher 762 (BOL).

Bathurst. Horseshoe, Kowie River, Port Alfred, Barker 9267 (NBG).

Humansdorp. Ratelsbos, fl. Oct., Fourcade 377 (BOL & GRA); Coldstream, Daly and Sole 251 (GRA).

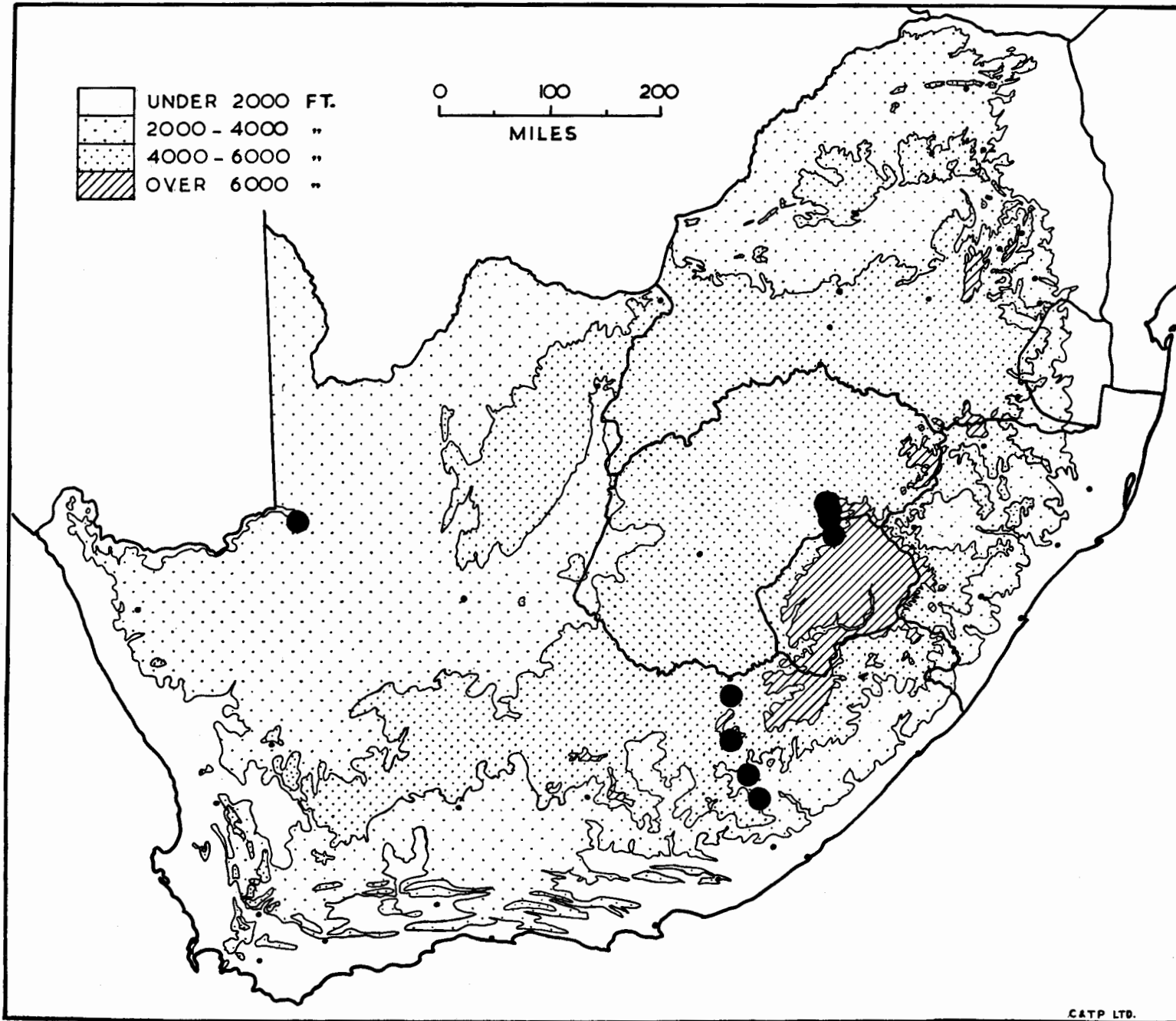
Kentani Woods near Kentani, fl. Feb., Pegler 345 (BOL).

King Williams Town. King Williams Town, Sim 1043 (BOL).

Knysna. Keurbooms River mouth, Jessop s.n. (BOL); Brenton, Duthie 956 (BOL); Blaauwkrantz, Britten 854 (GRA).

Riversdale. Near foot of the Langeberg, Muir 1806 (BOL); Above Novo, fl. Sept., Muir 2837 (GRA).

Somerset East. Boschberg, fl. Nov., MacOwan



Map 7. Asparagus denudatus.

- 1917 (SAM), fl. May, MacOwan 1810 (SAM).
Stockenstroom. Katberg near Sanatorium, Schönland
4307 (GRA).
Swellendam. Strawberry Hill, fl. Oct., Van der
Merwe s.n. (STE 10198); Grootvadersbos, Zeyher
4167 (BOL), fl. Sept., Taylor 331 (NBG).
Willowvale. Qora River mouth, fl. Dec., Hilner
443 (GRA).

NATAL.

- Durban. Isipingo, Forbes s.n. (STE); Woods near
Durban, fl., Wood 437 (BOL & SAM).
Inanda. Inanda, Wood 1649 (BOL).

TRANSVAAL.

- Pietersburg. Near Woodbush, fl. Dec., Gillett
3192 (BOL).
Pretoria. Waterkloof, fl. Nov., Verdoorn 52 (BOL).

SWAZILAND.

- Mbabane. Dalriach, fl. Nov., Compton 27235 (NBG);
Malagwane Hills, fl. & fr. May, Ben Dlamini s.n.
(NBG), fl. Dec., Ben Dlamini s.n. (NBG); Mbabane
Power Station, fl. Dec., Ben Dlamini s.n. (NBG).
District? Makwongwa Forest, Galpin 906 (BOL).
Also recorded from Chirinda Forest, Jazengula and
Mount Selinda in Southern Rhodesia; near Lourenco
Marques and in Nyasaland.

7. Asparagus denudatus (Kunth) Baker.

Asparagopsis denudata Kunth, Enumeratio
Plantarum, 6 : 82 (1850).

Asparagus denudata (Kunth) Baker, J. Linn.
Soc., 14 : 606 (1875).

Asparagus namaensis Schinz, Bull. Herb.

Boiss. Series 1, IV, app. III : 44 (1896).

Stems erect to about 1 metre or scrambling to nearly 2 metres, zigzagging, glabrous, smooth or wrinkled but never regularly grooved, pale 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. Roots not known. Cladodes terete, straight or slightly arcuate, upto 30 mm. long, upto 5- nate laterally but usually 2- or 3- nate terminally (rarely upto 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, upto 3 mm. long. Peduncles often only terminal and upto 4- nate or rarely more, axillarily only 2- or 4- nate, 2 to 6 mm. long, articulated near or below the centre. Perianth segments entire, similar, oblong to oblong-obovate, greenish white to yellowish white, 2.5 to 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. Fruit not known.

Kunth based his description of the species on Drege 3533. The specimen in the Bolus Herbarium

bearing this number matches this description in not having cladodes, and in the erect habit, which make it very likely that this is an isotype. This could serve as a lectotype since Kunth's holotype was probably destroyed in Berlin. Asparagus denudatus is characterised mainly by the absence of cladodes, but several specimens have been found in which a few cladodes are present, and in non-flowering specimens from the same locality as flowering, cladodeless specimens, cladodes are invariably present. 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 of A. denudatus and of A. namaensis from which it was formerly separated on the absence of cladodes. As it has been shown that this is not as significant a character as previously thought, and as a single character is not generally regarded as adequate for separating species, it is more satisfactory to combine these species.

The holotype of Asparagus namaensis Schinz was collected in Great Namaqualand in April 1892. It is in the Zurich Botanic Garden Herbarium, and has been examined on loan at the Bolus Herbarium by the present author. It shows the typical characters of the outer layers of the stems and branches, which are a wrinkled appearance, being easily separable from the stem, and the pale green colour.

In South Africa it occurs mainly in Basutoland and the neighbouring areas of the Cape and Orange

Free State, but also in the dry areas of the northern Cape.

Flowers have been recorded from October to January and in March and April.

DISTRIBUTION.

CAPE.

Aliwal North. Elandshoek, fl. Oct., Bolus 151
(BOL, PRE & SAM); Aliwal North, Story 2052 (PRE);
De Wet's Farm, fl. Dec., Gerstner 121 (PRE), fl.
Dec., Gerstner 203 (PRE).

Cathcart. Cathcart, fl. Dec., Comins 1741 (PRE).

Gordonia. Aughrabies Falls, fl. April, Leipoldt
4437 (BOL).

Queenstown. Queenstown, fl. Nov., Galpin 2092
(PRE); Long Hill, fl. March, Galpin 2092 (BOL);
Umbombola Mountain, Galpin 2092 (PRE).

Sterkstroom. Stormberg, fl., Drege 3533 (BOL).

Wodehouse. Buffelsfontein, Stretton 66 (PRE).

ORANGE FREE STATE.

Ficksburg. Westburg, fl. Oct., Galpin 13881 (BOL
& PRE); Berwyn, Gemmell s.n. (PRE ex BLFU 6024).

Paul Roux. Rexford, fl. Nov., Acocks 13174 (PRE).

BASUTOLAND.

Leribe. Mountain slopes, fl. summer, Dieterlen
828 (BOL, PRE & SAM).

Mafeteng. Tatai River, fl. Oct., Dieterlen s.n.
(PRE 29577).

Mamathes. Mamathes, fl. Nov., Jacot Guillarmod
s.n. (PRE 29578).

Also recorded from Luderitz and Keetmanshoop in

Map 8. Asparagus virgatus.

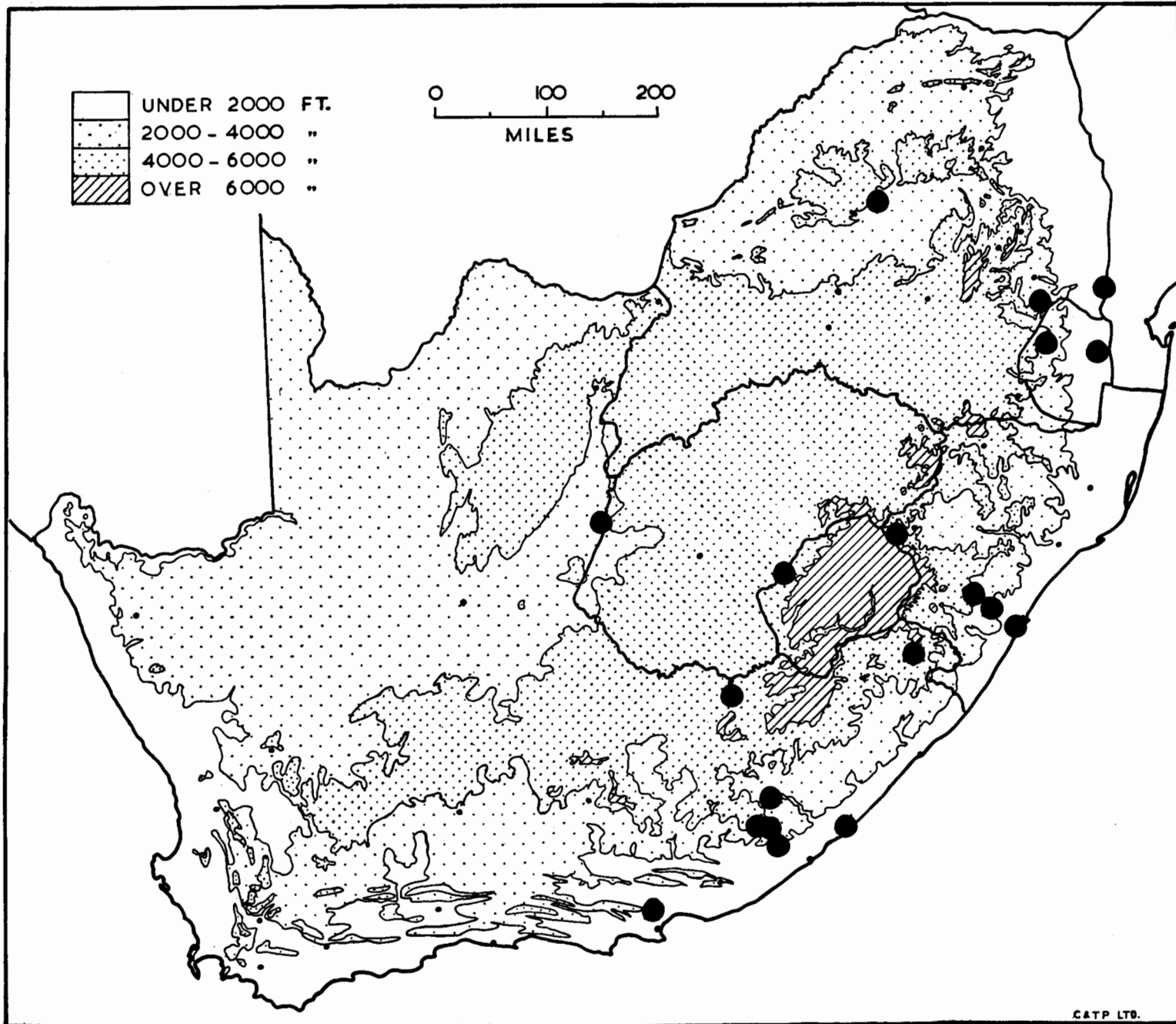




Fig. 28a. Saunder's "Refugium botanicum"
t. 214. The iconotype of Asparagus virgatus.

South West Africa.

8. Asparagus virgatus Baker.

Asparagus virgatus Baker, Saund. Ref. Bot.,
t. 214 (1870).

Stems erect to 1 metre, straight, glabrous, smooth, slightly herbaceous. Branches similar to the stems, ascending, solitary, not bearing branchlets. Cladodes upto 7-nate, but frequently 3-nate, upto 25 mm. long, usually straight. Spines only represented by a blunt spur, never pungent. Peduncles terminal and axillary, upto 6-nate, 5 to 9 mm. long, usually articulated below the centre. Perianth segments oblong-obovate, similar, entire, 3 to 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.

An illustration accompanies the type description, and as it was drawn from a cultivated specimen, it is best to regard this figure as the iconotype. It shows the characteristic ascending branches and the colour of the flowers.

A. virgatus occurs in the eastern half of South Africa, particularly in Natal, Swaziland and the eastern Cape. It is reported to grow

along the margins of forests.

Flowers have been recorded from September to January.

DISTRIBUTION.

CAPE.

Alwal North. Elands Hoek near Aliwal North, fl.

Dec., Bolus 205 (BOL).

Cathcart. Inverthorn, fr. Jan., Barker 3513 (NBG).

Kentani. Kobongubo River, fl. Sept., Pegler 1462
(BOL).

Kimberley. Kimberley ex hort., fl. Dec. to Jan.,
Wilman s.n. (BOL 24981).

King Williams Town. King Williams Town, fr. Aug.,
Sim 1050 (BOL).

Mount Currie. Mount Currie, fr. summer, Philomena
s.n. (BOL); Kokstad, fl., Stephany 32 (GRA).

Stockenstrom. Katberg, Ecklon and Zeyher s.n.
(BOL); Hogsback Forest, Schirach 262 (BOL &
NBG); Hogsback, fr. Sept., Bokelmann 1-28 (NBG).

Uitenhage. Uitenhage, fr. May, Schmutz s.n.
(BOL ex NBG 91330).

NATAL.

Bergville. Cathedral Peak, Esterhuysen 12878 (BOL).

Camperdown. Cato Ridge, fl. Oct., Fairall 147
(NBG).

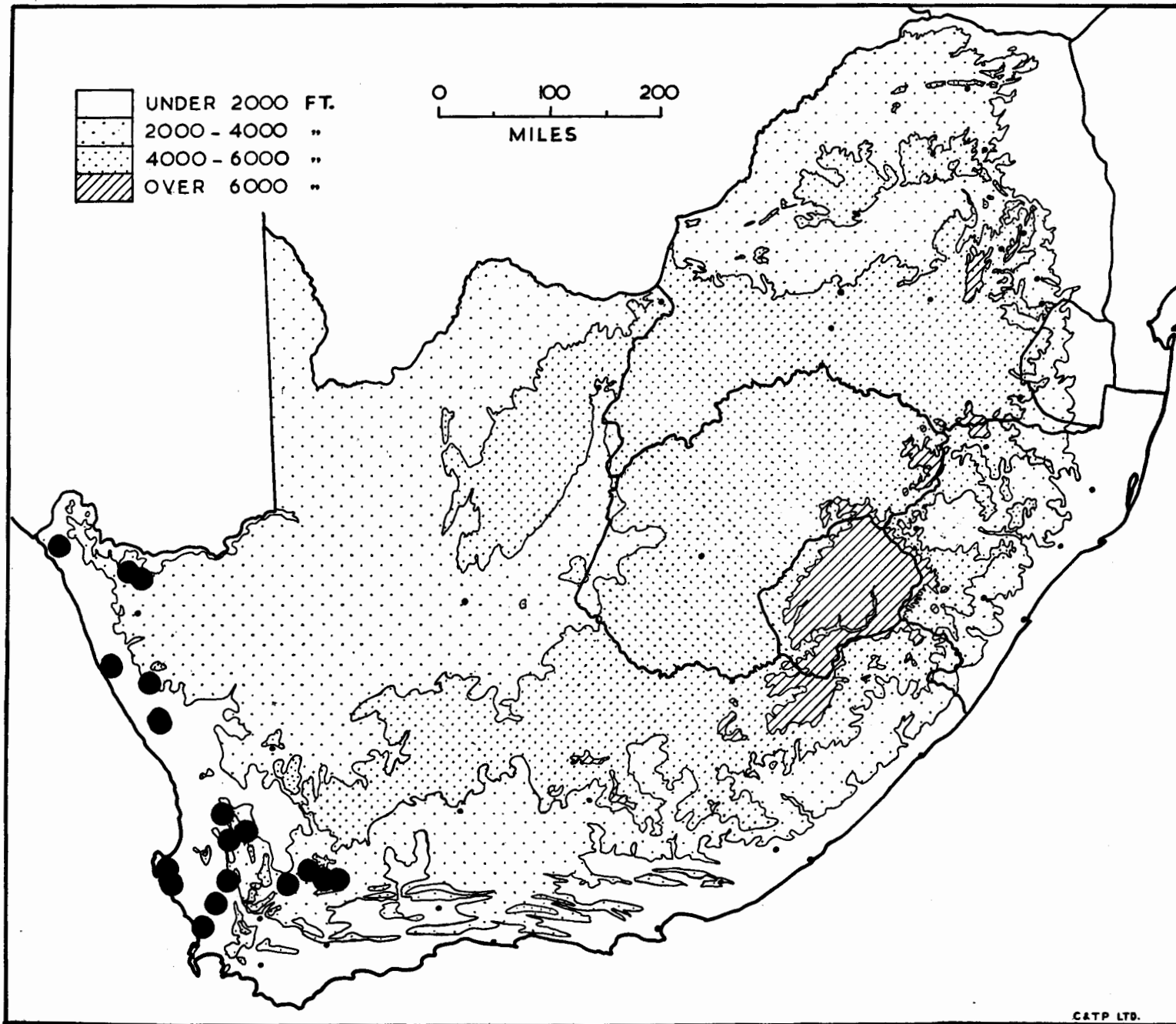
Durban. Isipingo, fl. July, Schlechter 2993
(BOL).

Lions River. Howick Falls, fr. July, Barker
3567 (NBG).

ORANGE FREE STATE.

District? Koolhoek, fl. Nov., Thode 3427 (STE).

TRANSVAAL.



Map 9. Asparagus consanguineus.

Barberton. Barberton, fl. Nov., Galpin 1155 (SAM);
Komati Poort, fr. Dec., Schlechter 11742 (BOI).
Pietersburg. Naboomspruit, Galpin 343 (SAM).

BASUTOLAND.

Maseru. Maseru, fr. Jan., Compton 22534 (NBG).

SWAZILAND.

Mbabane. Hill north-east of Mbabane, Compton 27552
(NBG); Fonteyn, Compton 25980 (NBG).

Stegi. Tambuti Ranch, fl. Oct., Kaister s.n.
(NBG 56 387); Isateki Beacon, fl. Dec., Compton
27313 (NBG).

Also recorded from Southern Rhodesia.

9. Asparagus consanguineus (Kunth) Baker.

Asparagopsis consanguinea Kunth, Enumeratio
Plantarum, 5 : 76 (1850).

Asparagus consanguineus (Kunth) Baker, J.
Linn. Soc., 14 : 615 (1875).

Stems prostrate or weakly climbing to about 1
metre, 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 inter-
nodes. Roots slightly thicker than normal for this
section, but not tuberous. Cladodes often extremely
fine, linear, arcuate, numerous in a fascicle,

15- to 30- nate or more, upto 7 mm. long, but often only about 4 to 5 mm. long; the cladodes in each fascicle usually do not overlap those of adjacent nodes. Spines may be present on the lower parts of the main stems, but they rarely exceed 2 or 3 mm. in length. Peduncles axillary or terminal, 1- to 3- nate, variable in length, upto 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.

Kunth based this species on a Drege specimen collected at the Cape. 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. Baker cited the Kunth description, showing that his was intended to be a synonym.

In several respects, A. consanguineus does not seem to belong to the section ASIATICI, but rather to the section CRISPI. It has numerous cladodes, fibrous roots and few-seeded fruits, characteristic of the section ASIATICI, 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 ASIATICI.

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

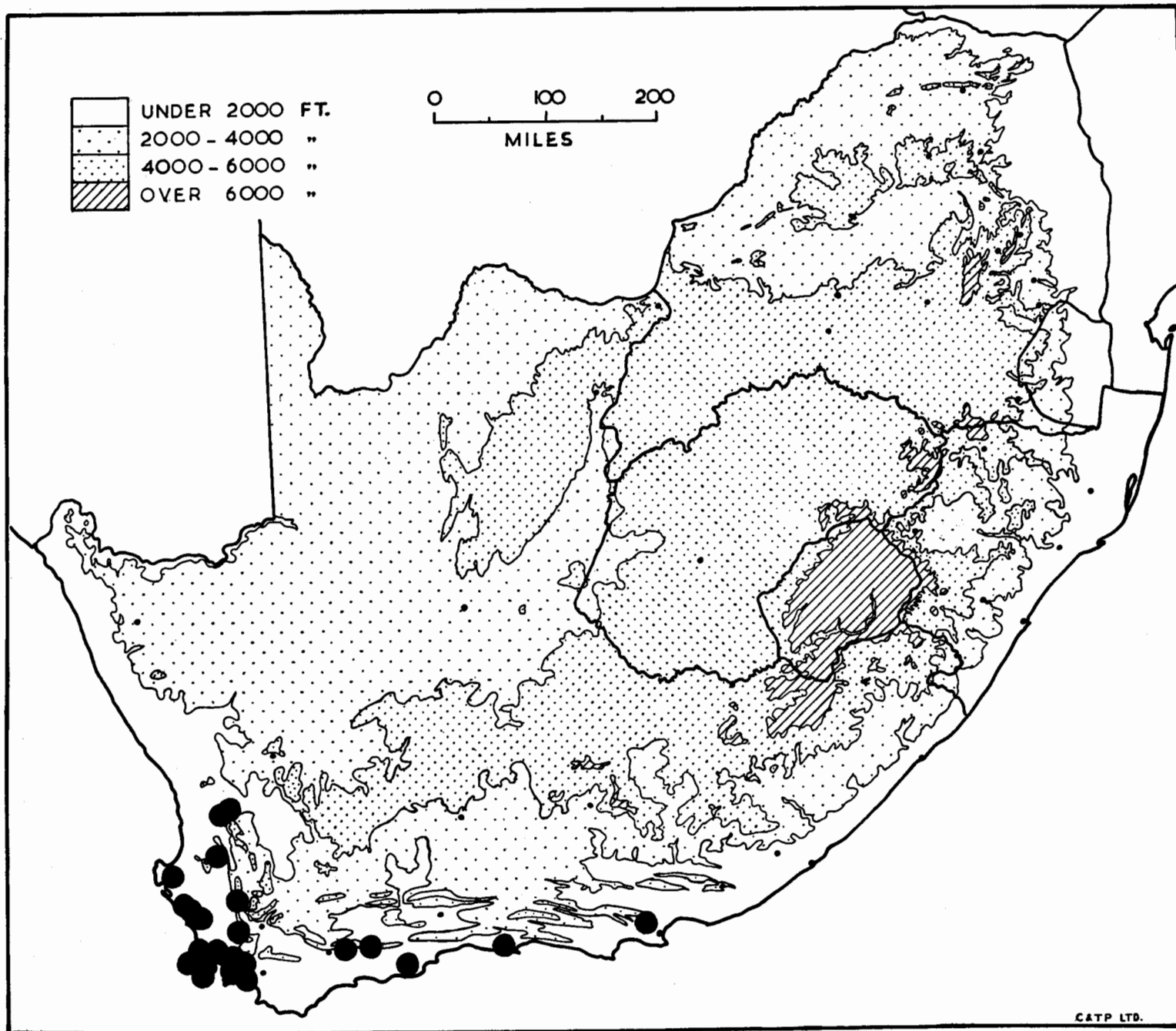
Flowers have been recorded from March to June.

DISTRIBUTION.

CAPE.

- Cape Town. Near Blaauwberg, Oliver s.n. (BOL).
- Ceres. Muishond River, fl. May, Esterhuysen 1805 (BOL), fl. May, Bond 335 (NBG); near Karroo Poort, fr. Aug., Marloth 9049 (STE).
- Clanwilliam. Citrusdal, Isaac s.n. (BOL); near Clanwilliam, fl. March, Leipoldt 440 (BOL), fl., Zeyher 1675 (STE); Matjesrivier, fr. Aug., Wagener 111 (NBG).
- Laingsburg. Matjiesfontein, fl. May, Bolus and Bolus s.n. (BOL 13882), fl. Oct., Thoday and Delft 1 (STE); Whitehill, fr. Aug., Compton 14645 (BOL & NBG), fl. Sept., Compton 7784 (NBG), fl. June, Compton 10851 (NBG); Tweedside, fl., Marloth 12072 (STE).
- Malmesbury. Langebaan, fr. June, Jessop 70 (BOL); south side of Paardeberg, Van Niekerk 358 (BOL); Schrywers Hoek, fl. April, MacNae 1036 (BOL); near Ysterfontein, Jessop 356 & 357 (BOL).
- Namaqualand. South slope of Witbank, Pillans 5113 (BOL); east of Hondeklip Bay, Pillans s.n. (BOL 18245); Klipfontein, fr. Aug., Bolus 6589 (BOL

Map 10. *Asparagus thunbergianus*.



& SAM); Steinkopf, sl. & fr. March, Meyer s.n. (PRE & STE); Garies, fl. June, Thorne s.n. (SAM 48784); Zabies, fl. May, Schlechter 74 (BOL & GRA).

Tulbagh. Saron, fl. June, Schlechter 7870 (BOL).

Van Rhynsdorp. Bitterfontein, fl. April, Ecklon and Zeyher 1675 (BOL & STE).

A specimen from "Durban Hills", Guthrie 1409 (NEG) probably came from Durbanville.

10. Asparagus thunbergianus Schultes.

Asparagus thunbergianus Schultes, Systema Vegetabilium, 7 : 333 (1829).

Asparagopsis dregii Kunth, Enumeratio Plantarum, 5 : 84 (1850).

Asparagopsis thunbergii (Schultes) Kunth, Enumeratio Plantarum, 5 : 85 (1850).

Asparagus albus auct. non L.; Thunberg, Prodrromus Plantarum Capensium : 66 (1794).

Stems erect to 1 metre or a dense bush upto 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 tot he stems. Roots fibrous. Cladodes fascicled, terete, slightly arcuate, 3 to 8 mm. long, rarely upto 20 mm., ascending or spreading. Peduncles axillary or terminal, usually solitary, 3 to 6 mm. long, articulated below the centre. Perianth segments

spreading, white, obovate, 2 to 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, upto 8 mm. diameter, with a single seed, red.

Thunberg included Asparagus albus L. in his *Prodromus plantarum Capen ium*. In his herbarium, there is a sheet, examined on loan at the Bolus Herbarium by the present author, labelled "Asparagus albus, p. Withering." On this sheet there is a specimen of A. thunbergianus Schultes, but there is also a specimen of another species - perhaps A. albus 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 upto two feet or more high with grooved stems and with solitary, recurved spines and fascicled cladodes.

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, which was a new name for Asparagus thunbergianus Schultes, but the description makes it very likely that these names were based on specimens of the same species.

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.

DISTRIBUTION.

CAPE.

Bellville. Tigerberg, Pillans 8658 (BOL), fl. June, Compton 17078 (NBG).

Caledon. Grabouw, Jessop s.n. (BOL); Botanic Reserve, Betty's Bay, Topper 68. (NBG).

Cape Town. Signal Hill, Jessop 75 (BOL); Porcupine Buttress, Jessop 7 & 8 (BOL); Lions Head, Jessop 82 (BOL); near Cape Town, Pappe s.n. (SAM 13170); above Camps Bay, fl. March, Marloth 9492 (STE).

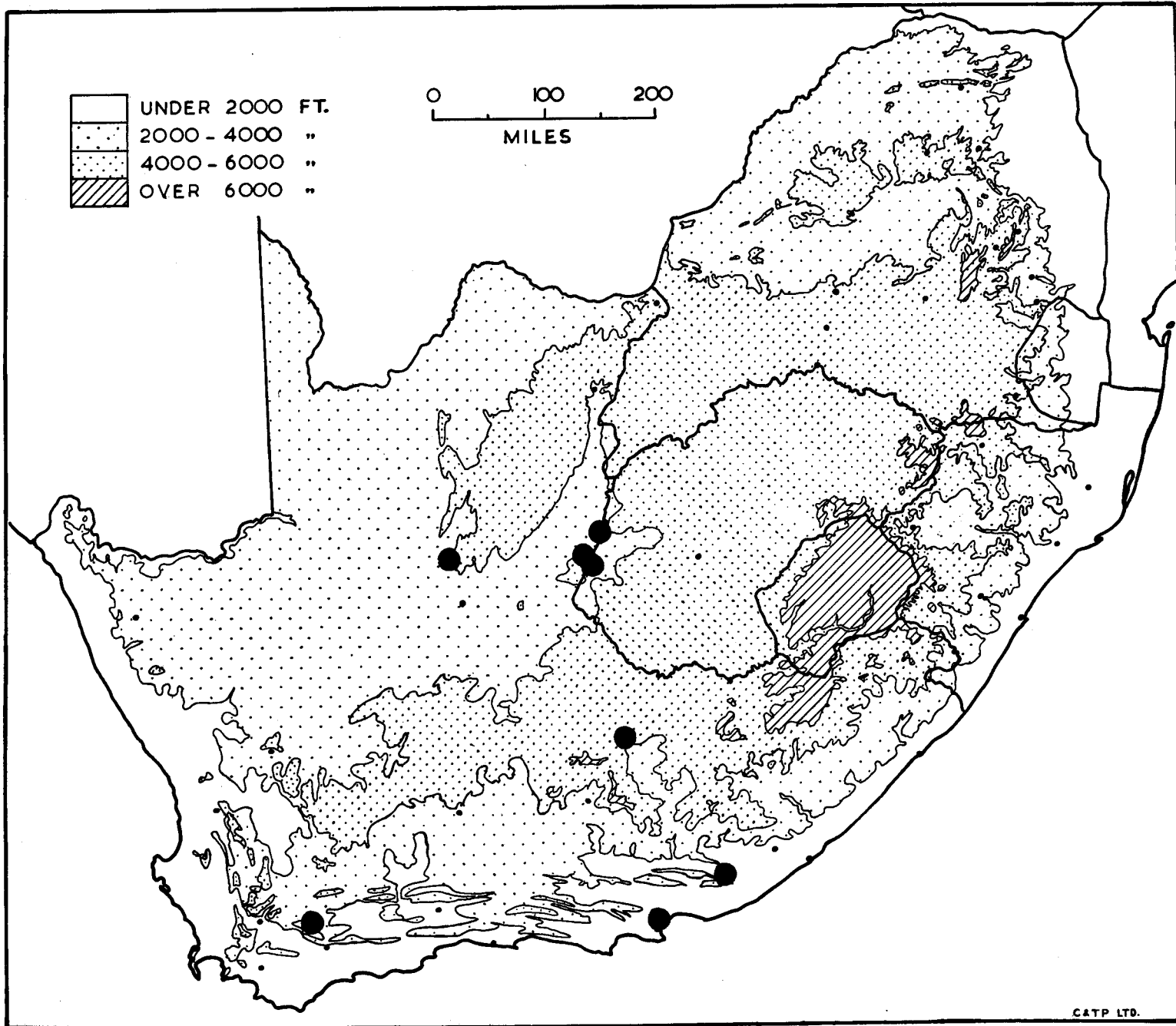
Clanwilliam. Top of Pakhuis Pass, Jessop 354 (BOL); Clanwilliam, fr., Leipoldt 408 (SAM).

Knysna. Belvidere, fl. Feb., Duthie 763 (BOL & GRA).

Malmesbury. Betw. Hopefield and Paternoster, fl. June, Leipoldt 3895 (BOL); Ysterfontein, Jessop 362 (BOL); Darling Flora Reserve, fl. May, Rycroft 1911 (BOL & NBG); Groenkloof, fl. June, Pappe s.n. (SAM 13179).

Paarl. Dal Josaphat, fl. April, Tyson 858 (BOL);

- Huguenot, Barber 1 (NBG).
- Piquetberg. Het Kruis, fr. Sept., Stephens and Glover s.n. (SAM 12064).
- Riversdale. Albertinia Division, Muir, 931 (BOL).
- Simonstown, Betw. entrance to Cape Point Reserve and Klipfontein, Jessop 137 (BOL); St James, Jessop 85 (BOL), Page s.n. (CTH); west of Red Hill, Jessop 22 (BOL); west of Simonstown, fr. April, Wolley Dod 933 (BOL); Clovelly, fl. May, Compton 13211 (NBG).
- Somerset West. Near Sir Lowrys Pass village, Jessop 76, 78, 80 & 103 (BOL); Knorhoek, Jessop 81 (BOL), fr. Jan., Jessop 77 (BOL).
- Swellendam. Grootvadersbos, fr. Dec., Taylor 1042 (NBG), Taylor 1036 (NBG); Tradouw Pass, Walgate s.n. (BOL).
- Tulbagh. Saron, Schlechter 7887 (BOL).
- Uitenhage. Theescomb, fl. May, Paterson 853 (BOL).
- Wynberg. Kirstenbosch, fl. April, Jessop 84 (BOL), fl. March, Middlemost 2008 (NBG); Sentinel near Hout Bay, Jessop 304 (BOL); east of Milner Road, Rondebosch, fl. Jan., Jessop 23 (BOL); Karbonkelberg, fr. Sept., Oliver s.n. (BOL); Lakeside Plateau, Oliver s.n. (BOL), Jessop 74 (BOL); Wynberg Hill, Bolus s.n. (BOL 13272), fl. May, Salter 7229 (BOL); Steenberg Reservoir Pipe Track, fl. Feb., Goulimis s.n. (BOL); Chapman's Peak Drive, Jessop 24 (BOL); Nursery Buttress, Jessop 2 & 3 (BOL); behind Kenilworth Race Course, Jessop 72 (BOL); Cape Flats, fr. Aug., Rogers 2498 ex parte (GRA); Bishop's Court, fl. March, Bond 281 (NBG); Orange Kloof, Jessop 83 (BOL).



Map 11. Asparagus mucronatus.

11. Asparagus mucronatus sp. nov.

Caulis erecti ad 200 cm., plerumque fere 100 cm., in baso bracteas manifestissime evolutas ad 2 cm. longas ferrentes, glabri, costis magnis, in baso recti, altiore sarmentosi, cani vel fusci. Rami similes partibus distalibus caulis; rami minores aliquando pubescentes vel scabridi. Ramuli fasciculati, ad 6- nati, pubescentes vel scabridi, recti, ad 6 cm. longi; ramuli parvi saepe bracteas manifesto evolutas ad 5 mm. longas ferrentes, et bracteis manifesto evolutis et persistentibus ad basam. Cladodia recta vel arcuata, teretes, mucrone non-spinoso et non-colorato, 3 - 8 mm. longa, in ramulis lato, ad 10- nata. Spinae magnae, recurvae. Radices non-tuberosi. Pedunculi in ramulis axillares, 1- vel 2- nati, 4 - 7 mm. longi, basin versus articulates. Perianthii segmenta oblonga-obovata, 3 - 4 mm. longa, margine integro, similia. Stamina paulum breviora quam perianthii segmenta; antherae 1/4 mm. longae, subglobosae. Ovarium fere 1 mm. longum; stylus breviter ramosus, prope 1 mm. longus. Bacca globosa, succulenta, deinde rugosa, rubra, fere 5 mm. diam., seminibus 1 vel saepe 2.

Stems erect to 2 metres, usually about 1 metre, bearing very pronounced, acute bracts upto 2 cm. long at the base, glabrous, smooth, with large ridges, straight at the base, becoming slightly zig-zag, grey to brown. Branches similar to the distal parts of the stems, the smaller ones sometimes



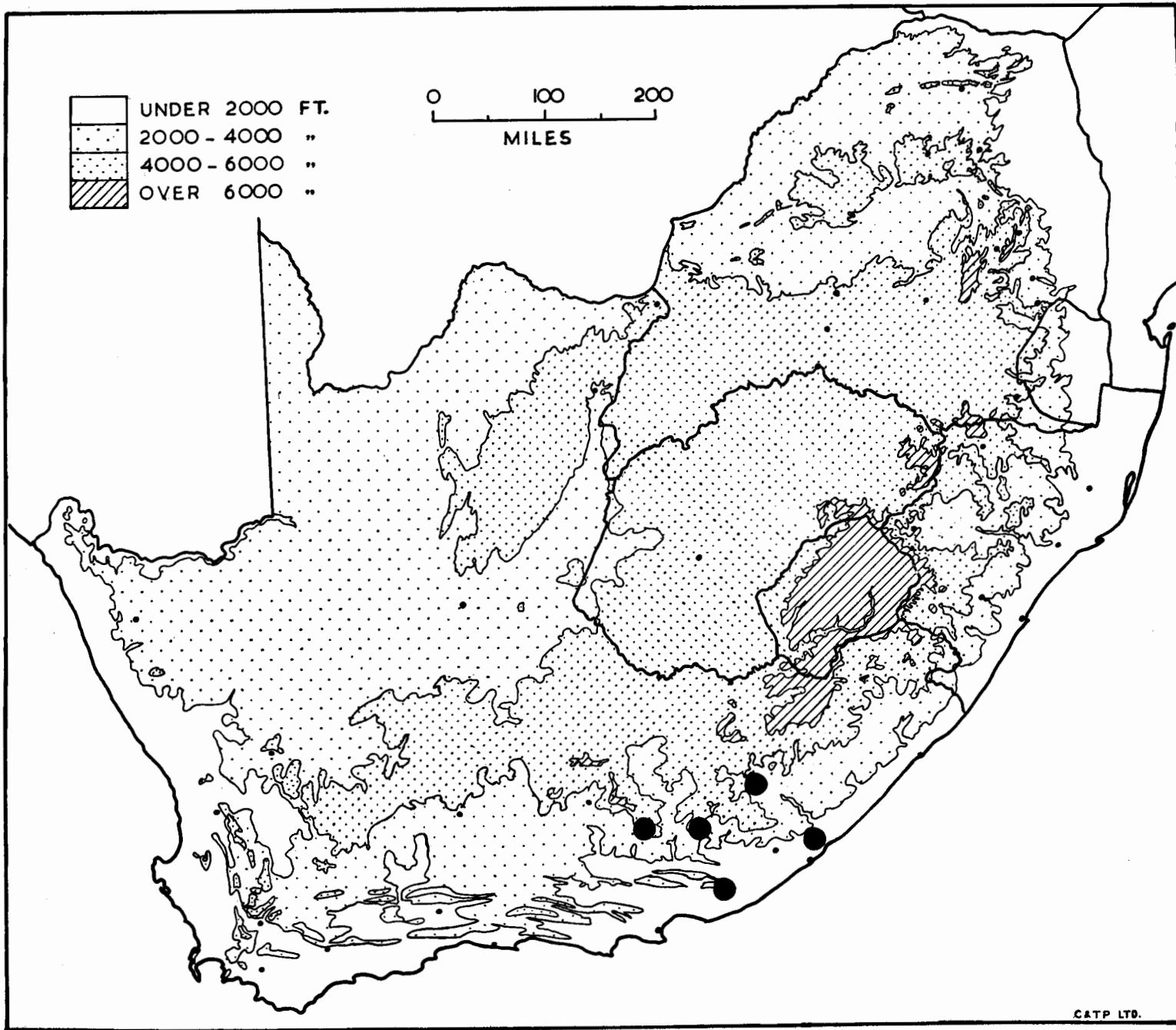
Fig. 28b. Theron 551 (PRE).
The holotype of Asparagus mucronatus.

pubescent or scabrid. Branchlets fascicled, upto 6-nate, pubescent or scabrid, straight, upto 6 cm. long, often bearing well-developed bracts upto 5 mm. long, when young, and with prominent bracts which persist 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 to 8 mm. long, borne on the branchlets, upto 10-nate. Roots fibrous. Peduncles axillary on the branchlets, 1- or 2-nate, 4 to 7 mm. long, articulated below the centre. Perianth segments oblong-ovate, 3 to 4 mm. long, entire, similar. Stamens slightly shorter than the perianth segments; anthers 1/4 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 strongly resembles A. thunbergianus in several characters. It is, however, a much larger and more robust plant. It also differs in having scale-leaves on the final branches. The holotype is Theron 551 (PRE) from Middelburg.

It is fairly common in at least some parts of the Karroo and Little Karroo.

Flowers have been recorded from October to



Map 12. Asparagus macowanii.

December.

DISTRIBUTION.

CAPE.

Albany. Bothas Hill, fl. Dec., Dyer 1124 (GRA);
Queens Road, Britten 5159 (GRA).

Calvinia. Calvinia, Schmidt 358 (PRE).

Graaff Reinet. Graaff Reinet, Henrici 4943 (PRE).

Hay. Blaauwbosput, Acocks 2011 (PRE).

Herbert. Valschfontein, Acocks 2598 (BOL & PRE);
Honey Nest Kloof, Moran s.n. (BOL 16175).

Kimberley. Mauretzfontein, fl. Oct., Acocks 2580
(PRE), fl. Oct., Acocks 4957 (BOL).

Laingsburg. Matjiesfontein, Foley 62 (PRE).

Middelburg. Grootfontein, fl. Nov., Theron 551
(PRE).

Montagu. Betw. Dobbelaarskloof and Montagu, fr.
May, Esterhuysen 1872 (BOL & PRE).

Port Elizabeth. Red House, fr. Feb., Denman 282
(PRE), fr. Dec., Paterson 977 (BOL), fr. June,
Paterson 960 (BOL).

Van Rhynsdorp. Langebergen, Marloth 12953 (PRE).

12. Asparagus macowanii Baker.

Asparagus macowanii Baker, J. Linn. Soc.,
14 : 609 (1875).

Stems erect, straight, softly woody, glabrous,
smooth and brown, or grooved and white, upto about
75 cm. long. Branches similar to the stems, solitary.

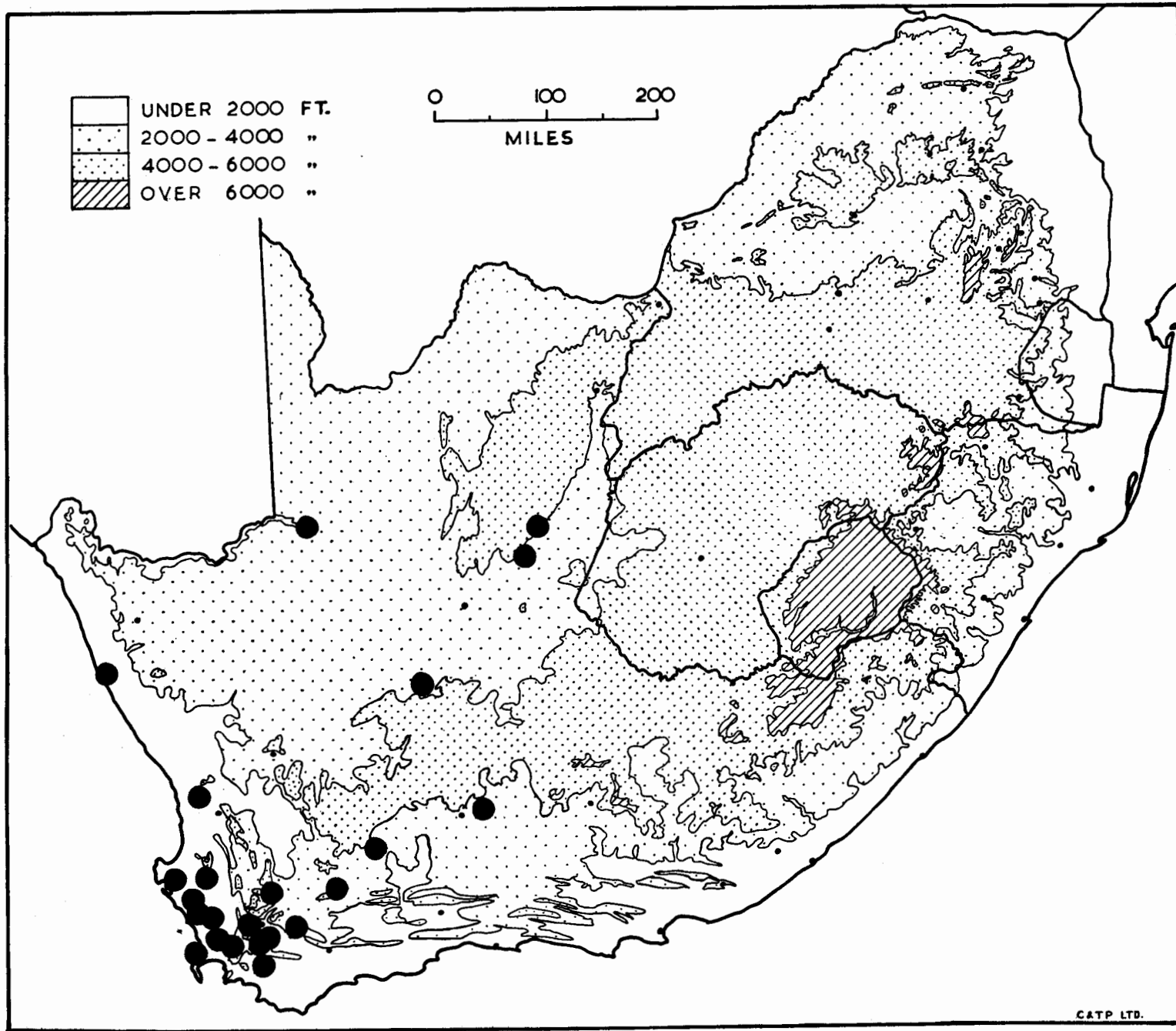


Fig. 29. Zeyher 879 (BOL). A specimen of the same collecting as one of two specimens cited by Baker in his type description of Asparagus macowanii.

Cladodes fascicled, numerous, terete, arcuate, upto about 12 mm. long. Spines absent. Peduncles terminal or axillary, sometimes solitary but usually upto 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. Style shortly divided, about 1 mm. long; ovary 1.5 to 2.0 mm. long, ovoid. Fruit not known.

Baker, in his type description, cited Zeyher 879 from Albany. If this is taken as the lectotype, it seems very likely that the specimen in the Bolus Herbarium, collected by Zeyher at Howieson's Poort, is an isotype. This specimen matches the Baker description in having erect stems, straight branches, in the cladode characters, and in having minute anthers. This species has the smallest anthers in the genus in South Africa. MacOwan 1917 is also cited, but is not cited by Baker in the *Flora Capensis* (1896). Zeyher 879 is preferred as the lectotype, because of the possibility that Baker later excluded the MacOwan specimen deliberately, because he no longer felt that it matched the Zeyher specimen and his species accurately enough. There is a specimen, collected by MacOwan, from the Boschberg, in the Bolus Herbarium, and as it certainly belongs to this species, it is quite possible that it belongs to the same collecting as the specimen cited by Baker.

Map 13. Asparagus retrofractus.



This species occurs in areas of high rainfall in the south-eastern Cape, and there is a single specimen recorded from Zululand.

Flowers have been recorded from September to November, and in April and May.

DISTRIBUTION.

CAPE.

Albany. Howieson's Poort, fl. April - May, Zeyher 879 (BOL).

Bedford, Bedford, fl. Nov., Gane 88 (GRA).

Glen Grey. White Kei Falls, fl. Oct., Galpin 2504 (GRA).

Komgha. Prospect Farm, fl. Sept., Flanagan 296 (GRA).

Somerset East. Somerset East, fl. Jan., Rogers 161 & 164 (GRA), MacOwan s.n. (BOL & SAM 22579);

Boschberg, fl., Tyson 1878 (BOL & GRA).

NATAL.

Eshowe. Entonjaneni, fl. Oct., Gerstner 3665 (NH).

13. Asparagus retrofractus L.

Asparagus retrofractus Linnaeus, Species Plantarum : 313 (1753).

Asparagopsis retrofracta (L.) Kunth, Enumeratio Plantarum, 5 : 78 (1850).

Stems scrambling or weakly climbing to 2 metres or more, or forming dense bushes upto 2 metres or more high, white and grooved at first, but becoming



Fig. 30. The holotype of Asparagus
retrofractus L. in the Linnaean Herbarium.

(Photograph from the International
Documentation Centre micro-fiche edition.)

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 to 30 mm. long, arcuate, terete, spreading or ascending, not all the same length. Roots fibrous. Spines sometimes present, strongly reflexed, occasionally pungent and upto 6 mm. long, never borne on the final branches. Peduncles axillary or terminal, usually 2- to 6- nate, 5 to 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- to 3- seeded, 5 mm. diameter, orange; perianth generally persistent.

Linnaeus, in his type description, cites a figure by Plukenet, t.375 f.3. The figure shows the fascicled linear cladodes, and swollen lateral buds, making it very likely that this is the species Plukenet intended. In his description, Linnaeus mentioned the fascicled, setaceous cladodes; the solitary reflexed spines, and reflexed branches. There is a specimen in the Linnaean Herbarium, labelled A. retrofractus. According to Jackson (1912) there was a specimen of A. retrofractus, mentioned in the first Enumeration of 1753. This specimen is therefore likely to be the holotype.

This species occurs mainly in the drier areas of the western Cape and South West Africa.

Flowers have been recorded in January and from April to June.

DISTRIBUTION.

CAPE.

Barkly West. Klipvlei, fr. April, Esterhuysen 2083 (BOL).

Beaufort West. Sunnyside, Esterhuysen 4357 (BOL).

Bellville. Tigerberg, Pillans 4753 (BOL);

Vissers Hok, Salter 8624 (BOL).

Caledon. 12 miles west of Caledon, fl. May,

Salter 7215 (BOL).

Calvinia. Glen Lyon, Nieuwoudtville, fr. Aug.,

Barker 9189 (NBG).

Cape Town. Porcupine Buttress, Jessop 11 & 95

(BOL), Salter 8201 & 8203 (BOL), fr. July,

Pillans 4327 (BOL).

Carnarvon. 12 miles from Carnarvon on Van Wyks Vlei

road, fl. Feb., Acocks 1741 (BOL).

Ceres. Michells Pass, fl. April, Dickson s.n.

(BOL 5576); Hottentot's Kloof, Jessop 129 &

131 (BOL).

Clanwilliam. Modderfontein, fr. Sept., Gillett

3695 (BOL); Citrusdal, Isaac s.n. (BOL).

Gordonia. Aughrabies Falls, Jessop 351 (BOL).

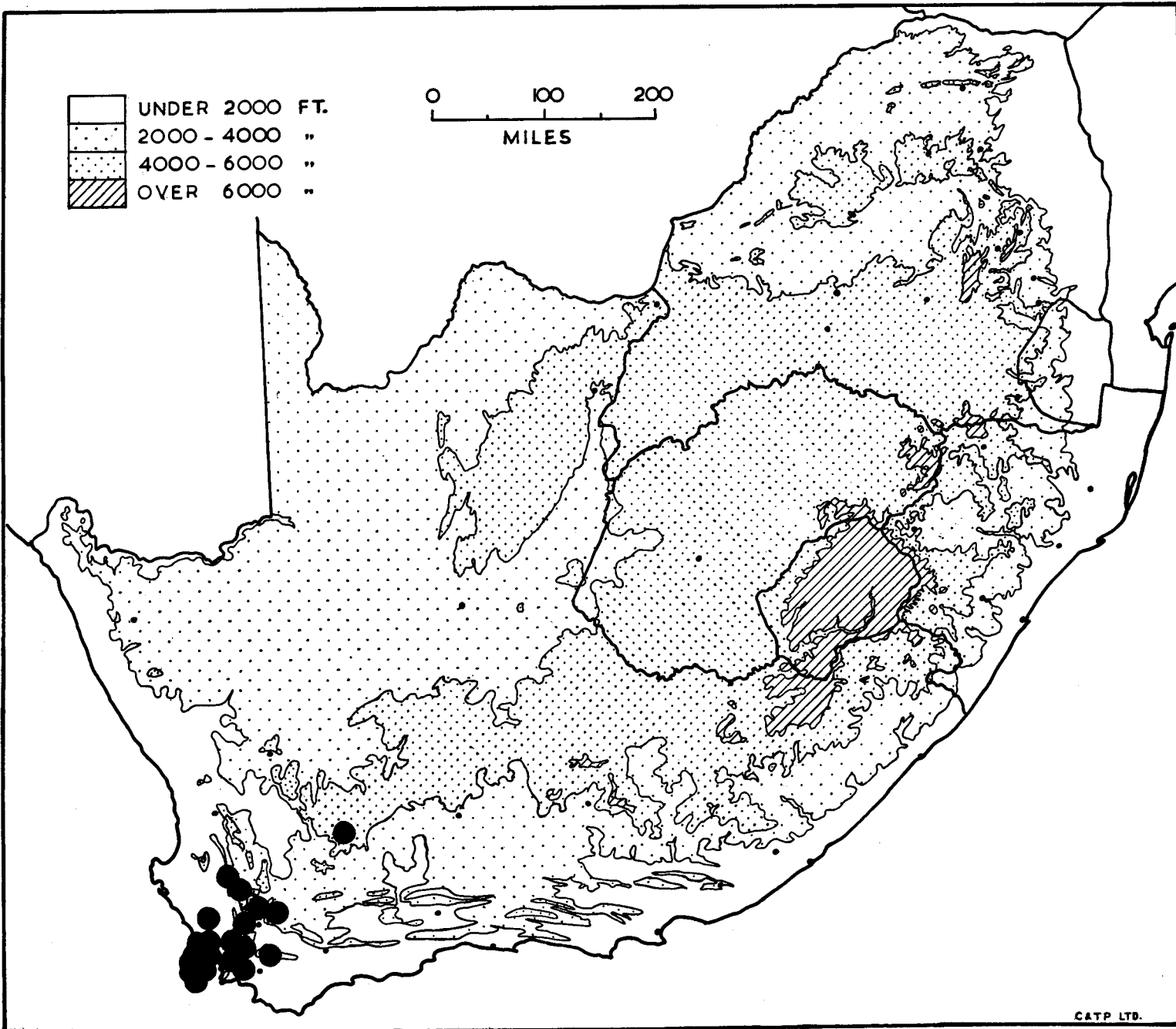
Herbert. Ina Gully near Mazelsfontein, fr. March,

Acocks 1919 (BOL); Campbell Kloof, fl. Feb.,

Wilman 4069 (BOL).

Laingsburg. Whitehill, fl. Feb., Compton 8523

Map 14. Asparagus compactus.



(BOL & NBG); Rooihoogte, fr. March, Bond
269 (NBG); 18 miles S.W. of Merweville, fl.
Jan., Zinn s.n. (SAM 61229).

Malmesbury. Mamre, Jessop 363 (BOL); Betw.
Klipheuwel and Malmesbury, Pillans s.n. (BOL
26841); Langebaan, Jessop 92 & 93 (BOL);
near Darling, fr. Sept., Bolus 12859 (BOL);
Moorreesburg, Swartberg, Jordaan 573 (STE).

Montagu. Cogman's Kloof, fl. May, Barker 959
(NBG).

Namaqualand. Hondeklip Bay, Pillans s.n. (BOL
18244).

Stellenbosch. Papegaaaisberg, fl. April, Duthie
452 (BOL & STE); Mulders Vlei, Penfold 155 (NBG).

Van Rhynsdorp. Heerenlogementsberg, fl. June,
Zeyher 1674 (BOL).

Worcester. Welgevonden, fl. June, Esterhuysen
1903 (BOL & NBG); Hammans Hof, fl. June, Bond
345 (NBG).

Also recorded from Kubib, between Hoffnungsfelde
and Haris and at Naruda ~~SW~~ in South West Africa.

14. Asparagus compactus Salter.

Asparagus africanus Lam. var wrightii

Baker, J. Linn. Soc., 14 : 619 (1875).

Asparagus compactus Salter, J. S. Afr.

Bot., 6 : 165 - 166 (1940).

Stems erect, normally about 50 cm. long,
zigzagging, woody, white, minutely pubescent,



Fig. 31. Wolley Dod 2521 (BOL). The holotype of *Asparagus compactus* Salter.

grooved; outer layers sometimes lost leaving the stems brown and smooth. Branches spreading to ascending, similar to the stems. Cladodes fascicled, commonly upto 10-nate terminally, and fewer laterally, more or less straight, ascending to spreading, 3-angled, rarely upto 1 mm. thick, rigid, 10 to 30 mm. long. Roots fibrous. Spines pungent, spreading, recurved or reflexed, present on the aerial stems and all branches. Peduncles axillary or terminal, 1- or 2-nate laterally, and upto 4- or 5-nate terminally, 5 to 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 3/4 mm. long. Style divided for nearly half its length, about 1 mm. long. Berry globose, fleshy, red, about 6 mm. diameter, 1- to 3-seeded.

The holotype of this species is cited by Salter as Wolley Dod 2521 (BOL). This specimen, seen by the present author, (Fig. 31) shows the grooved, white stems, spines on the final branches, and general habit distinguishing A. compactus. Flowers are also present. Salter regarded this species as very probably identical with A. africanus var wrightii. Baker's description of A. africanus var wrightii mentions grooved branches. The cladodes are 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 likely to be this species. According to Salter (1940), Professor Compton searched for the type in Europe, but was unable to find it. According to Article 60 of the 1961 edition of the International Code of Botanical Nomenclature, a name or an epithet does not have priority outside its own rank. There is, therefore, no need to use the epithet wrightii.

A. compactus is confined to the south western Cape, occurring from near sea level to 3,000 or more feet on well-drained mountain slopes.

Flowers have been recorded in October, December, January and from March to May.

DISTRIBUTION.

CAPE.

Bellville. Betw. Rietvlei and Tigerberg, Pillans s.n. (BOL); south side of Tigerberg, Pillans 8655 (BOL).

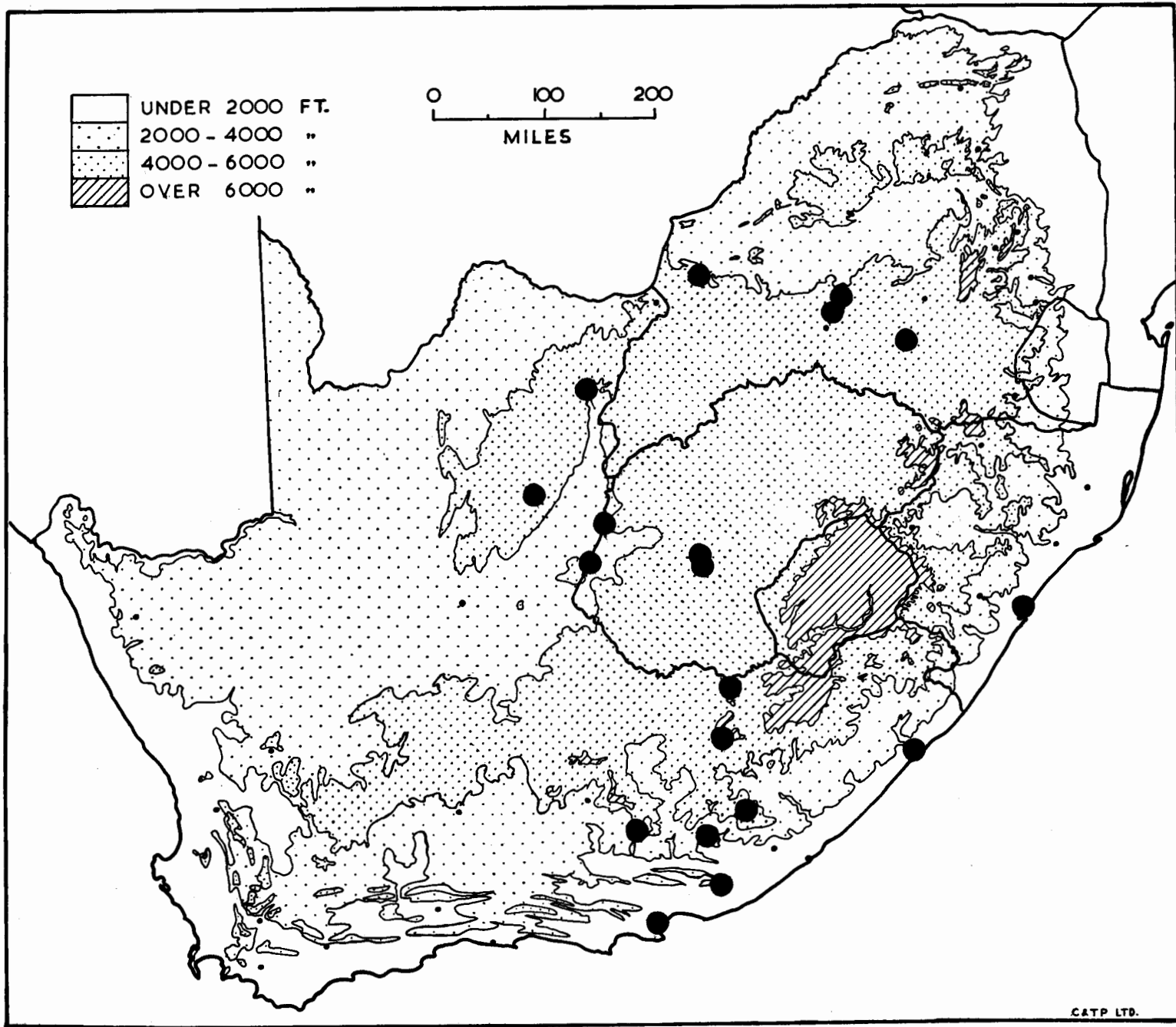
Caledon. Baviaanskloof near Genadendal, fl. March, Gillett 856 (BOL); Palmiet River, Jessop 94 (BOL); Swartberg near Caledon, fl. April, Schlechter 10364 (BOL).

Cape Town. Rugby, fl. Jan., Jessop 29 (BOL); slopes above Camps Bay, fl. March, Marloth 9491 (STE); Paarden Island, fl. Oct., Salter 8268 (BOL & NBG).

Ceres. Milner Peak, fl. April, Esterhuysen 7804 (BOL & NBG).

- Malmesbury. Near Kalabas Kraal, Salter 7198 & 8233
(BOL).
- Paarl. Above Franschhoek, Jessop 102 (BOL).
- Piquetberg. Porterville, fl. Dec., Loubser 810
(BOL).
- Simonstown. Clovelly, fr. July, Salter 8209 (BOL);
Red Hill west of Grootkop, fl. Jan., Wolley Dod
2521 (BOL); fl. Jan., Salter 8304 (BOL); near
Vasco da Gama Peak, Salter 8188 (BOL); Olifants-
bosch, Oliver s.n. (BOL); Cape Point, Jessop
134 (BOL); Kommetjie, fr. June, Davis s.n. (SAM
61228).
- Somerset West. Knorhoek, Sir Lowrys Pass, Jessop
89 (BOL).
- Stellenbosch. Swartboskloof, Van Rensburg 268
(STE), Van der Merwe 24-98 (STE).
- Sutherland. Near Sutherland, Du Toit s.n. (BOL).
- Tulbagh. Sneeuwgat Valley, Great Winterhoek,
Phillips 1880 (SAM).
- Wellington. Bains Kloof, Salter 7307 (BOL).
- Worcester. Hex River Valley, Rehmann s.n. (BOL);
near De Doorns, Bolus s.n. (BOL).
- Wynberg. Orange Kloof, fl. May, Wolley Dod 2521
(BOL); Jessop 90 & 91 (BOL); Nursery Buttress,
Jessop 6 & 21 (BOL); Wynberg Hill, fr. April,
Salter 7180 (BOL); Karbonkelberg, Oliver s.n.
(BOL); upper Tokai Forest, Salter 8303 (BOL);
Constantiaberg, fl. Dec., Salter 7953 (BOL);
Cape Flats near Duinefontein, fl. March, Leighton
3091 (BOL); Retreat, fl. Nov., Barker 3903
(NBG); near Princess Vlei, fl. Jan., Salter 8587

Map 15. Asparagus laricinus.



(NBG); Klipfontein Road, Oliver s.n. (BOL).
Also occurs in the Cedarberg in the Clanwilliam
district.

15. Asparagus laricinus Burchell.

Asparagus laricinus Burchell, Travels in the
interior of Southern Africa, 1: 537 (1822).

Stems erect, forming much-branched shrubs upto
2 metres high, but usually only about 150 cm. or
less, often zigzagging or sarmentose, woody, white,
pubescent and 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- to 60- nate
laterally, more numerous terminally, more or less
straight, ascending, teretè, fine but rigid, all
approximately the same length at each node, 8 to 30
mm. long. Spines pungent, ascending to recurved,
usually present on all branches. Peduncles axillary
or terminal, commonly upto 7 or 8 terminally and 3
or 4 laterally, upto 7 mm. long, articulated below
the centre. Perianth segments obovate, similar,
entire, white, 2.5 to 3.0 mm. long. Stamens
slightly shorter than the perianth segments, not
spurred; anthers about 3/4 mm. long. Style divided
for nearly half its length, about 1 m. long. Berry
globose, about 6 mm. diameter, fleshy, red, 1-
to 3- seeded.

In his description, Burchell wrote: "Erectus 4 - 6 pedalis. Rami ramulisque albidis." These characters, taken with the locality, between Griquatown and Witte Water, make it virtually certain that this is the species he was describing. The holotype, cited by Burchell as C.G. 1971, is probably at Kew.

This species is rather similar to both A. compactus and A. retrofractus. It can be separated from the former by its bushier habit and the way in which the cladodes tend to form neat fascicles of ascending cladodes all of approximately the same length, whereas in A. compactus the stems are less branched, erect and shorter, while the cladodes are spread in several directions at each node. A. retrofractus also has cladodes spreading in several directions, and is usually a climber. A. retrofractus usually has a smaller proportion of its aerial stems and branches white and grooved at maturity.

A. laricinus has a wide distribution from the south eastern Cape to Bechuanaland and the Transvaal.

Flowers have been recorded from September to December.

DISTRIBUTION.

CAPE.

Albany. Mountain Drive, Grahamstown, Britten
2805 (GRA).

Aliwal North. Elandshoek, near Grahamstown, fl.
Dec., Bolus 204 (BOL).

Barkly West. Daniels Kuil, Asbestos Hills, fr.
March, Esterhuysen 1153 (BOL & GRA).

Cathcart. Fairford, fl. Dec., Cotterell 126 (GRA).

Fort Beaufort. Fort Beaufort, fl., Zeyher s.n.
(BOL).

Herbert. Honey Nest Kloof, Moran s.n. (BOL).

Kimberley. Kimberley, fl. Sept., Moran s.n. (BOL);
Kimberley Commonage, fl. Oct., Levey 6331 (GRA).

Port Elizabeth. Swartkops Estuary, Archibald 4914
(GRA).

Port St Johns. Eagles Nest, fr. Jan., Schönland
4077 (GRA).

Somerset East. Somerset East, fl., Bowker s.n.
(BOL).

Sterkstroom. Andriesberg, fl. Oct., Galpin 2168
(BOL & GRA).

Vryburg. Armoedsvlakte, fr. Nov., (STE 12739).

ORANGE FREE STATE.

Bloemfontein. Leeuwkop, fl. Dec., Potts s.n.
(BOL ex BLFU 848); Ironstone koppie beyond
Arboretum, fl. Nov., Potts s.n. (BOL ex BLFU
1479).

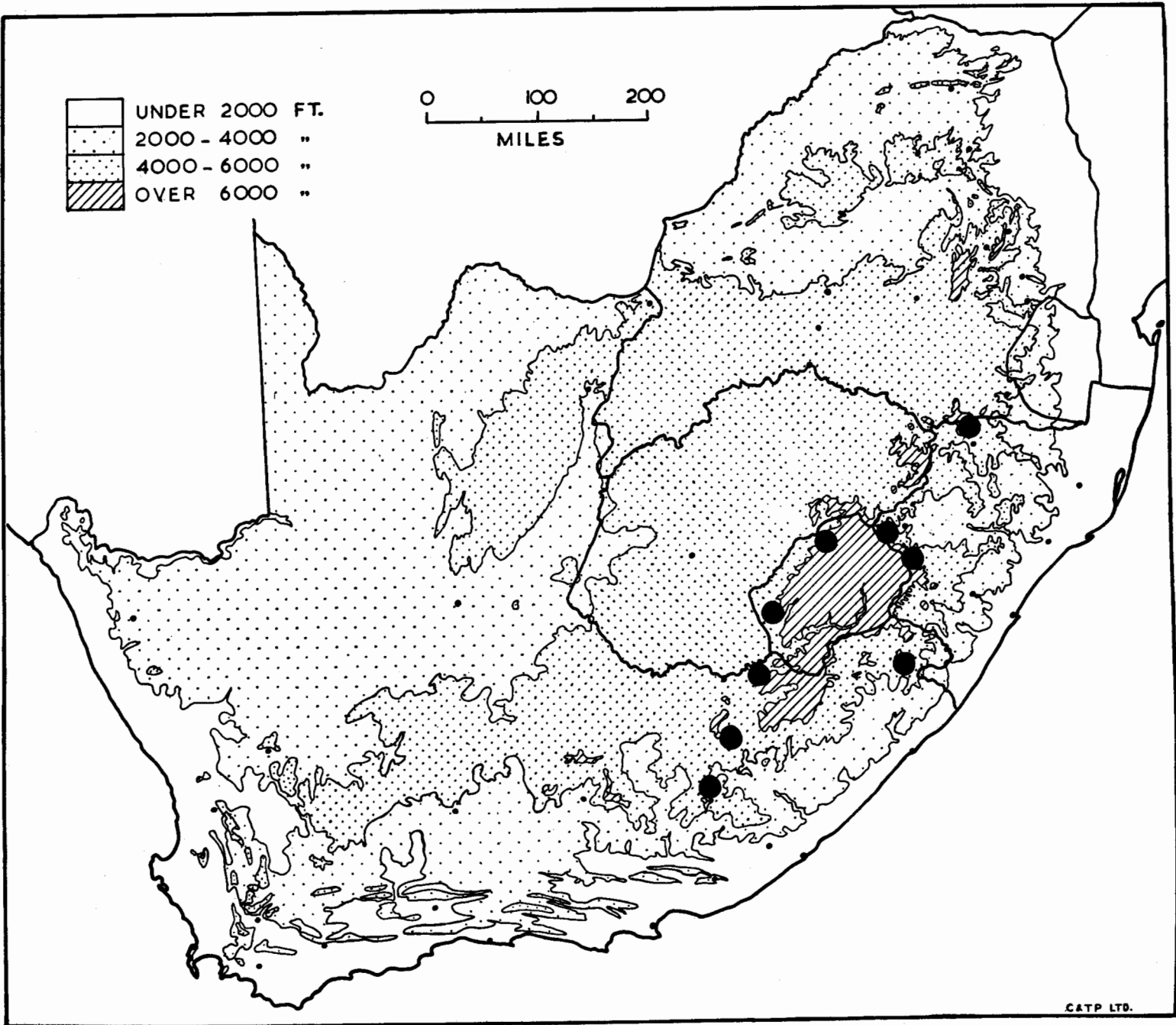
NATAL.

District ? Kronsberg, Umgeni, fl. Nov.?, Thode
5196 (STE).

TRANSVAAL.

Bethal. Steenkool River, fr. May, Weintraub s.n.
(BOL).

Marico. Near Zeerust, fr. Jan., Van der Merwe



Map 16. *Asparagus microhaphis*.

128 (BOL).

Pretoria. Irene, fl. Oct., Rogers 11406 (BOL);
near Irene, fl. Nov., Prosser 1317 (NBG); near
Pretoria, fl. Oct., Schlechter 3502 (BOL); 14
miles S.E. of Pretoria, Codd 2213 (NBG).

Also recorded from near Serowe, Bechuanaland.

16. Asparagus microrhaphis (Kunth) Baker.

Asparagopsis microrhaphis Kunth,

Enumeratio Plantarum, 5 : 83 (1850).

Asparagus microrhaphis (Kunth) Baker, J.

Linn. Soc., 14 : 612 (1875).

Asparagus stellatus Baker, J. Linn. Soc.,

14 : 612 (1875).

Stems erect, 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 upto about 8-nate but occasionally upto 25-nate, 1 to 4 mm. long. Spines usually well-developed on aerial stems and main branches. Peduncles axillary, 1- or 2-nate, 5 to 6 mm. long, articulated below the centre. Perianth segments oblong-obovate, entire, similar, spreading, white, 3 to 4 mm. long. Stamens almost as long as the perianth segments. Styles shortly divided, about 1 mm. long. Fruit not known.



Fig. 32. Drege 3534 (BOL). An isotype of Asparagus microrhaphis (Kunth) Baker.

Kunth, in his description of Asparagopsis microrhaphis, cites Drege 3534. There is a specimen from Queenstown with this number in the Bolus Herbarium, and as it matches Kunth's description in every detail, this is probably an isotype. (Fig. 32.) As the holotype is likely to have been in Berlin, and therefore destroyed, it is advisable to take the specimen in the Bolus Herbarium as the lectotype.

Dieterlen 1374, Gerstner 18 and Staples 36 may be representatives of a group deserving varietal status. They have extremely small and very numerous cladodes. Baker described A. stellatus as having minute elliptic cladodes arranged in a dense rosette, as opposed to A. microrhaphis which had rigid, cylindrical cladodes. This description of Baker's closely matches these three specimens. Baker had not seen any flowers of A. stellatus, and these specimens are also sterile. It does not seem justified, at the moment, to separate these specimens in view of the lack of flowers, and the fact that they come from the same area as the typical form, and could just represent a seasonal form.

A. microrhaphis occurs in the eastern Cape, Basutoland and Natal, but no information on the habitat of this species is available to the present author.

Flowers have been recorded in October and December.

DISTRIBUTION.

CAPE.

Herschel. Herschel, Gerstner 18 (PRE).

Mount Ayliff. Kokstad, Mogg 1912 (PRE).

Queenstown. Table Mountain, fl., Drege 3534 (BOL).

Sterkstroom. Andriesberg, fl. Oct., Galpin 2169
(BOL).

NATAL.

Bergville. Ndedema River Valley, fl. Dec., Killick
1861 (PRE).

Estcourt. Giants Castle, fl. Oct., Symons 38 (BOL,
PRE & SAM).

Wakkerstroom. Seven miles N.E. of Wakkerstroom,
Acocks 11525 (NH).

BASUTOLAND.

Leribe. Malavaneng, Dieterlen 944 (PRE & SAM);

Leribe, fl. summer, Dieterlen 301a (BOL),

Dieterlen 301 (SAM); Phillips 757 (SAM).

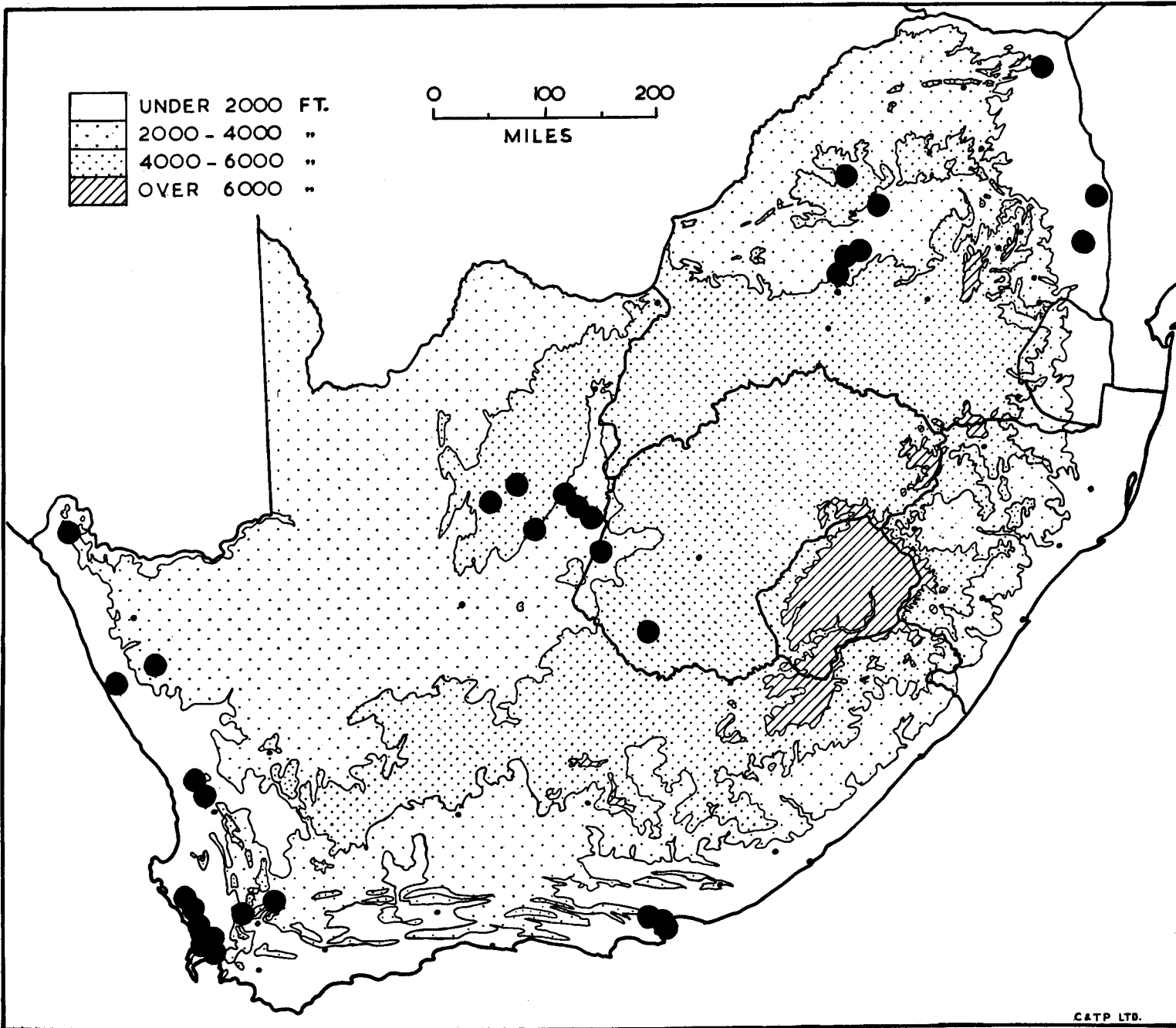
Mafateng. Thababa - Morena, Dieterlen 1374 (PRE).

Basutoland without locality, Staples 36 (PRE).

SECTION EXUVIALI:

The section EXUVIALI is identified by the combination of perennial aerial stems, fascicled terete cladodes and tuberous roots. The majority of its characteristics resemble those of the section ASIATICI, but it is felt that tubers, the dry fruit, and the way in which the flowers open in a racemose order along the branches are of sufficient importance to separate these sections.

Map 17. Asparagus exuvialis.



CATP LTD.

The section is monotypic. Asparagus exuvialis is also characterised by the way in which the outer layers of the aerial stems and branches peel.

17. Asparagus exuvialis Burch.

Asparagus exuvialis Burchell, Travels in the interior of Southern Africa, 1 : 432 (1822).

Stems erect or twining, usually about 50 cm. high, but occasionally upto about 2 metres, woody, glabrous, smooth, the outer layers of the young stems pale, and peeling to leave the stem darker, sometimes almost black, straight or zigzagging. Branches similar to the stems, often spreading. Cladodes fine, terete, fascicled, from 5 to 30 mm. long, deciduous at least in parts of the Cape. Roots tuberous; the tubers almost sessile, about 5 to 10 cm. long. Spines absent or poorly developed, and reflexed; the leaf firm and deltoid, of a rather characteristic shape. (Fig. 5.) Peduncles axillary, generally paired but upto about 5-nate, articulated near or below the middle, 3 to 5 mm. long; the flowers opening in a racemose sequence along the branches. Perianth segments oblong-obovate, entire, similar, about 3.5 to 4.0 mm. long, with a brown or purplish streak, spreading. Stamens not spurred, nearly as long as the perianth segments; anthers yellow, about 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.

In his description, Burchell wrote: "Tecti epidermis tenui albida, cito exuta" and "Flores axillares bini". These characters apply only to this species. The holotype, cited by Burchell, is C.G. 1768 and was collected near the Vaal River. It is probably at Kew.

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. (Codd 6197, Obermeyer, Schweikerdt and Verdoorn 97, Lang s.n. and Van der Schijff 911, all at the National Herbarium, Pretoria.) This form does not seem to be sufficiently different to warrant a distinct taxon.

A. exuvialis is generally found in the Karroo and Kalahari, but does occur in more moist areas as well.

Flowers have been recorded from October to January and in April. In the Cape Peninsula, the flowers open in the morning, close at mid-day, and the following morning the next flower on the branch opens.

DISTRIBUTION.

CAPE.

Barkly West. Wolwefontein, fl. Dec., Acocks

- 1453 (PRE); Daniels Kuil, fr. March, Esterhusen
1149 & 1219 (BOL), fr. March, Lewis 583 (SAM);
Bucklands, fl. Nov., Wilman s.n. (BOL);
Newlands, fr. March., Esterhuysen s.n. (BOL).
Bellville. Kanonberg, fr. April, Compton 15622
(NBG).
Cape Town. Near Blaauwberg, Oliver s.n. (BOL);
Killarney, Oliver s.n. (BOL), fr. June, Lussem
20 (NBG); Raapenberg, Pillans s.n. (BOL), fr.
Aug., Salter 7454 (BOL); Paarden Island, fl.
Jan., Salter 8294 (BOL), fr. July, Salter 8200
(BOL), fl. Jan., Fairall 198 (NBG); Rugby, fl.
March, Salter 8353 (BOL).
Clanwilliam. Lange Kloof, Schlechter 8051 (BOL).
Craddock. West of Rayner's Koppie, fl. Oct.,
Acocks 11926 (PRE).
Hay. Postmasburg, fr. March, Esterhuysen 1153
(BOL & PRE).
Kimberley. Campbell Kloof, fl. Dec., Acocks 1424
(PRE); Dorstfontein, fl. Nov., Acocks 1404 (BOL
& PRE), Acocks 2570 (BOL).
Kuruman. Kaap Plateau, fl. Nov., Marloth 14070
(PRE & STE).
Malmesbury. East of Mamre Station, fr. Aug.,
Salter 8232 (BOL); Darling Flora Reserve, fr.
March, Barker 8670 (NBG); 18 miles north of
Cape Town on Melkbosch road, f. Sept., Lewis
s.n. (SAM 56701).
Namaqualand. Khamiesberg, fl. Jan., Pearson s.n.
(BOL); Doornpoort, Pillans 5467 (BOL); Walle
Kraal, Pillans s.n. (BOL); Dist.? Stopiesfontein,

fl. Dec., Pearson s.n. (BOL).

Port Elizabeth. Red House, fr. June, Paterson
963 (BOL).

Tulbagh. Wolseley, fl. Jan., Schlechter 9949 (BOL).

Uitenhage. Uitenhage, fl. Jan., Ecklon and Zeyher
607 (SAM & STE); Swartkops River, fl. Dec.,
Zeyher 4157 (BOL & PRE).

Van Rhynsdorp. Klaver, Andreae 411 (PRE).

Worcester. Near De Doorns, fl. April, Bolus
13201 (BOL).

Wynberg. Princess Vlei, fr. July, Jessop 88 (BOL).

ORANGE FREE STATE.

Fauresmith. Voëlfontein, fl. Nov., Kies 338 (NBG
& PRE); Fauresmith Reserve, fr. Jan., Smith
5582 (PRE).

Jacobsdal. Near Honey Nest Kloof Station, fl. Nov.,
Phillips 3480 (PRE).

TRANSVAAL.

Nelspruit. Skukuza, fl. Oct., Van der Schijff
911 (PRE).

Pilgrims Rest. Kruger National Park, 20 miles
west of Satara, fl. Nov., Codd 6197 (PRE).

Potgietersrust. Naboomspruit, fr. Feb., Galpin
347 (PRE); fl. Oct., Galpin 348 (SAM).

Pretoria. Rust der Winter, fr. Jan., Verdoorn
s.n. (PRE); 6 miles west of Hammanskraal, fr.,
Kies 371 (PRE); Pienaar's River, Godfrey and
Meeuse SH1581 (PRE).

Zoutpansberg. Farm Kromhoek, fr. Nov., Obermeyer,
Schweikerdt and Verdoorn 97 (PRE); Punda Maria,

fl. Oct., Lang s.n. (PRE).

Also recorded from the Bakhatla district in Bechuana-land, and from Karibib, Great Karasberg, Grootfontein and Nama Pan in South West Africa.

SECTION RACEMOSI:

The section RACEMOSI contains all species of Asparagus with racemose inflorescences, (Fig. 1), and many of the species with flattened, single-veined cladodes. The roots are tuberous in all the species in which the roots have been seen. The stems are distinctly woody except in A. juniperoides and A. bracteolatus where it is softly woody, frequently grooved or ridged. (Figs 3 & 4) The anther filaments are not spurred. This section is probably closest to the section AFRICANI, and in those species with subulate cladodes it is not always possible to put non-flowering material into its section. The only other section with woody stems, and tubers is the section EXUVIALI, which, however has several unique characters, and their separation is not difficult.

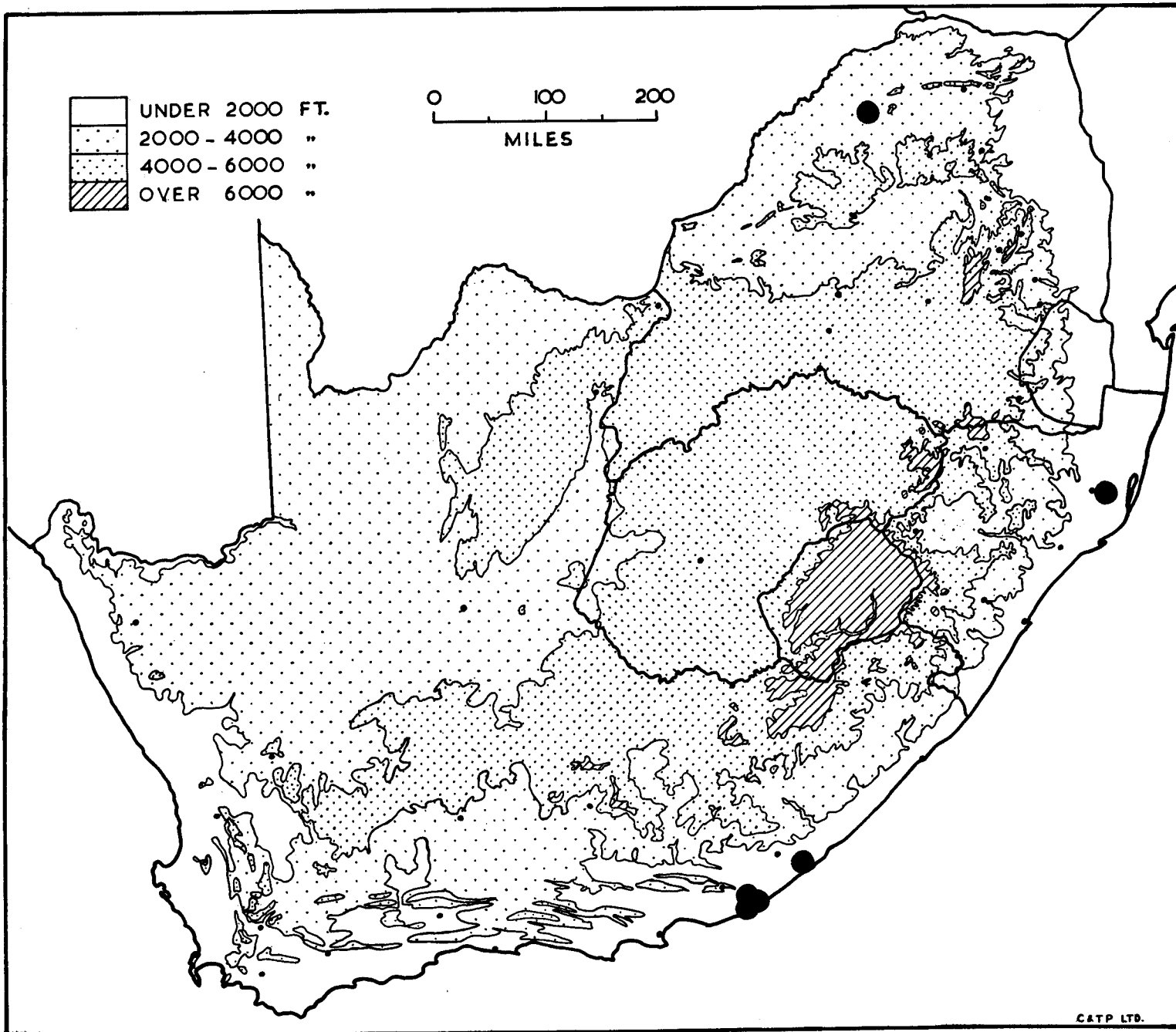
18. Asparagus oxyacanthus Baker.

Asparagus oxyacanthus Baker, J. Linn.

Soc., 14 : 625 (1875).

Stems often unbranched, erect, smooth, straight, upto about 50 cm. long, pubescent, with numerous narrow, softly spinous leaf spurs, grey to brown.

Map 18. Asparagus oxyacanthus.



Branches solitary, lacking branchlets, similar to the stems. Cladodes solitary, oblong, upto 4 cm. long, rarely upto 8 cm., with a median vein and thickened margin, mucronate. Tubers distant, about 6 cm. long. Peduncles solitary, upto 2.5 cm. long. Pedicels 2 mm. long, solitary in the axils of large bracts, articulated distally. Perianth segments obovate, obtuse, white, 2 to 3 mm. long, spreading to ascending, rather variable in width, but the inner whorl the broader. Anthers large, upto 0.7 mm. long. Style branches free, short; ovary globose. Fruit not known.

Baker based Asparagus oxyacanthus on a specimen collected by Bowker in the Somerset East division. He described it as having racemes, straight pubescent stems and solitary cladodes. These characters make it very likely that the name Asparagus oxyacanthus is correctly applied here. The holotype is likely to be at Kew.

Nothing has been recorded about its habitat.

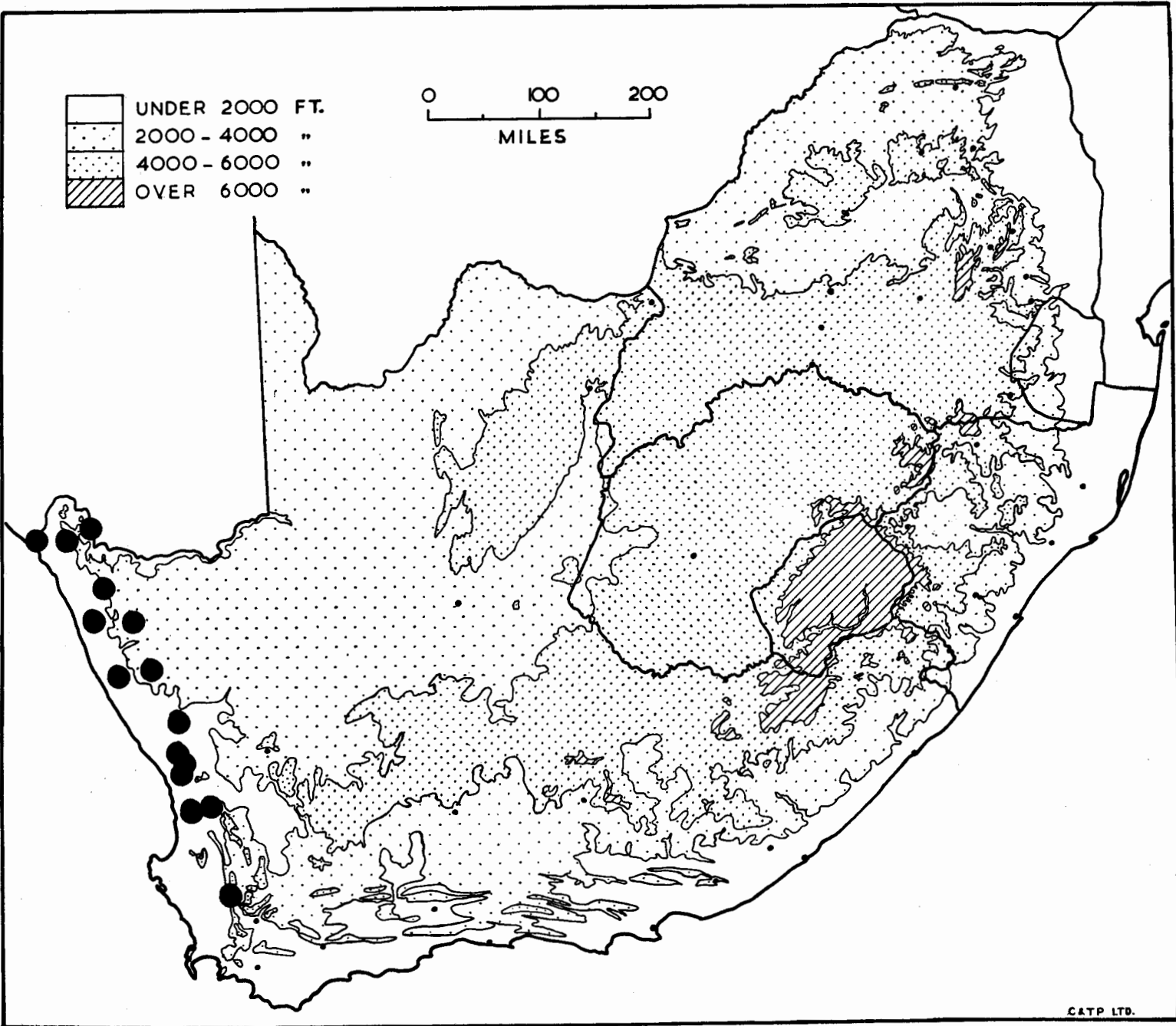
Flowers have been recorded from October to January.

DISTRIBUTION.

CAPE.

Albany. Fraser's Camp, fl. Nov., Maguire 632
(NBG).

Bathurst. Kleinemonde, White 952 (SAM); Fish
River, fl. Dec., Schlechter 6105 (BOL), fl. Jan.,



Map 19. *Asparagus juniperoides*.

Dyer 3375 (PRE).

East London. East London Park, fl. Nov., Wood
s.n. (PRE); Green Point, fl. Dec., Smith
3765 (PRE).

NATAL.

Hlabisa. Hluhluwe Game Reserve, fl. Oct., Ward
1535 (PRE).

TRANSVAAL.

Waterberg. Near Elmeston, fl. Jan., Meeuse
and Strey 10430 (PRE).

19. Asparagus juniperoides Engler

Asparagus juniperoides Engler, Bot. Jahr.,
10 : 3 (1889).

Stems erect, glabrous, grooved, straight, annual, upto 1 metre high. Branchlets narrow, numerous, upto 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 ciliated margins, upto 1 cm. long. Leaves not forming spines. Peduncles axillary, solitary, about 2 mm. long, articulated distally. Perianth segments similar, oblong, with ciliated 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 to 1.5 mm. long. Berry globose, with one to three seeds, about 5 mm. diameter, red.

Engler's description is based on a specimen collected at Aus, South West Africa, by Marloth. This specimen has not been seen by the present author, and it is not among the Marloth specimens either at the National Herbarium, Pretoria, or at Stellenbosch. The locality and description, however, fit this species exactly, this being the only "cat-tail" species in Namaqualand.

Asparagus juniperoides occurs from Tulbagh, up the west coast, and into South West Africa.

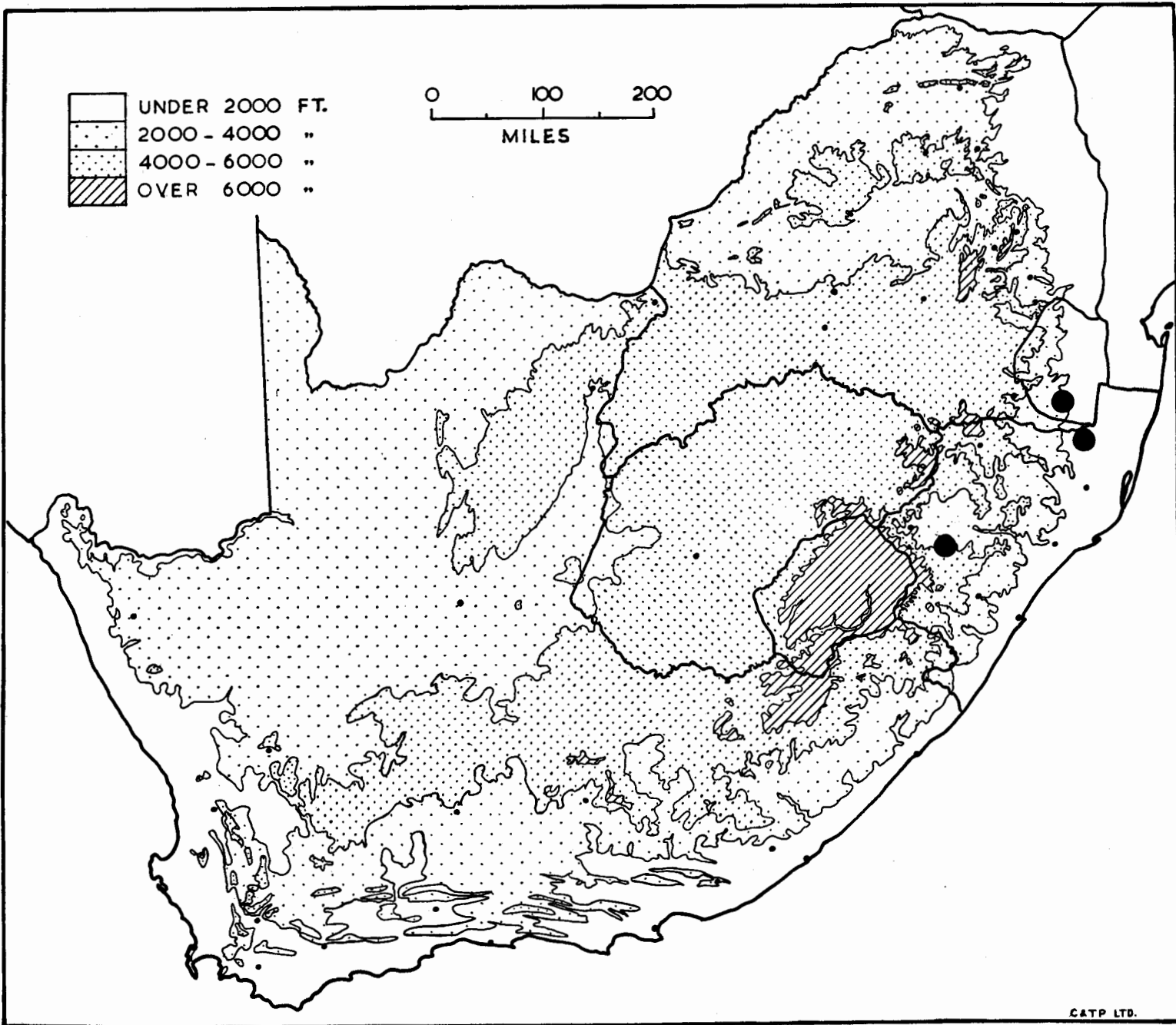
Flowers have been recorded from April to July.

DISTRIBUTION.

CAPE.

Clanwilliam. Clanwilliam, fl. July, Schlechter 8028 (BOL & NH), fl. June, Zeyher 4167 (STE); Graafwater, fr. Oct., Zinn s.n. (SAM 61231).
Namaqualand. Doornpoort, Pillans 5379 (BOL); Witbank, Pillans 5139 (BOL); four miles south of the Orange River mouth, Pillans 5612

Map 20. Asparagus bracteolatus.



(BOL); Wallekraal, Pillans s.n. (BOL 18248);
Spektakel, fr. Aug., Esterhuysen 5867 (BOL);
fourteen miles south of Springbok, fl. June,
Acocks 19268 (PRE); between Karrachab and
Kubus, Verdoorn 1835 (PRE); Viols Drift,
Middelmost s.n. (NBG); Darter's Grave, fl.
May, Middelmost 2084 (NBG); Kamieskroon,
Lewis 2146 (SAM); near Klipfontein, fr.
Aug., Bolus 9440 (BOL).

Tulbagh. Tulbaghkloof; Zeyher s.n. (BOL).

Van Rhynsdorp. Van Rhynsdorp, ex cult Mowbray,
fl. April, fr. Aug., Pillans s.n. (BOL 15459);
between Rietpoort and Klaver, fr. Sept.,
Kolbe s.n. (BOL 14295); Heerenlogementsberg,
fl. May, Zeyher 1676 (BOL), fr. July,
Barker 9895 (NBG); near Klaver station, fr.
Oct., Marloth 7794 (PRE); five miles north
of Nuwerus, fr. July., Compton 20571 (NBG);
between Van Rhynsdorp and Klaver, fr. July,
Lewis 3322 (SAM).

20. Asparagus bracteolatus sp. nov.

Caules erecti, fere recti, molliter lignei,

costis scabridis, pallidi, ad 50 cm. longi. Rami nulli. Ramuli recti, plerumque fasciculata ascendentes, ramulosi, gracilissimi, non-spinosi, costellati, scabridi, ad 5 cm. longi. Cladodia triangularia, fere 5 mm. longa, latere ad 8- nata, sed terminaliter crebriora, subarcuata. Tubera non-sessilia. Spinae in caulibus, teretes, pungentes, ad 6 mm. longae, fuscae. Pedunculi in axillis spinorum, plerumque in paribus, fere 3 mm. longi. Pedicelli plerumque terminales et 2- vel 7- nati, sed aliquando laterales et solitarii, prope medium articulati, in axillis bractorum magnorum lati, fere 1 mm. longi. Perianthii segmenta oblonga-obovata, fere 3 mm. longa. Apex segmentarum perianthii interioris dentatus. Stamina paulum breviora quam perianthii segmenta; antherae minimae. Stylus divisus breviter, fere 1 mm. longus; ovarium fere 1 mm. longum. Bacca laevis, monosperma, fere 7 mm. diam.

Stems erect, almost straight, softly woody, ridged, scabrid along the ridges, pale, upto about 50 cm. long. Branches absent. Branchlets straight, usually fascicled, ascending, branched, very narrow, spineless, ridged, scabrid, upto about 5 cm. long. Cladodes 3- angled, about 5 mm. long, upto about 8- nate laterally, but more numerous terminally, slightly arcuate. Tubers distant. Spines present on the stems, terete, pungent, upto about 6 mm. long, brown. Peduncles borne in the axils of spines, usually paired, about 3 mm. long.

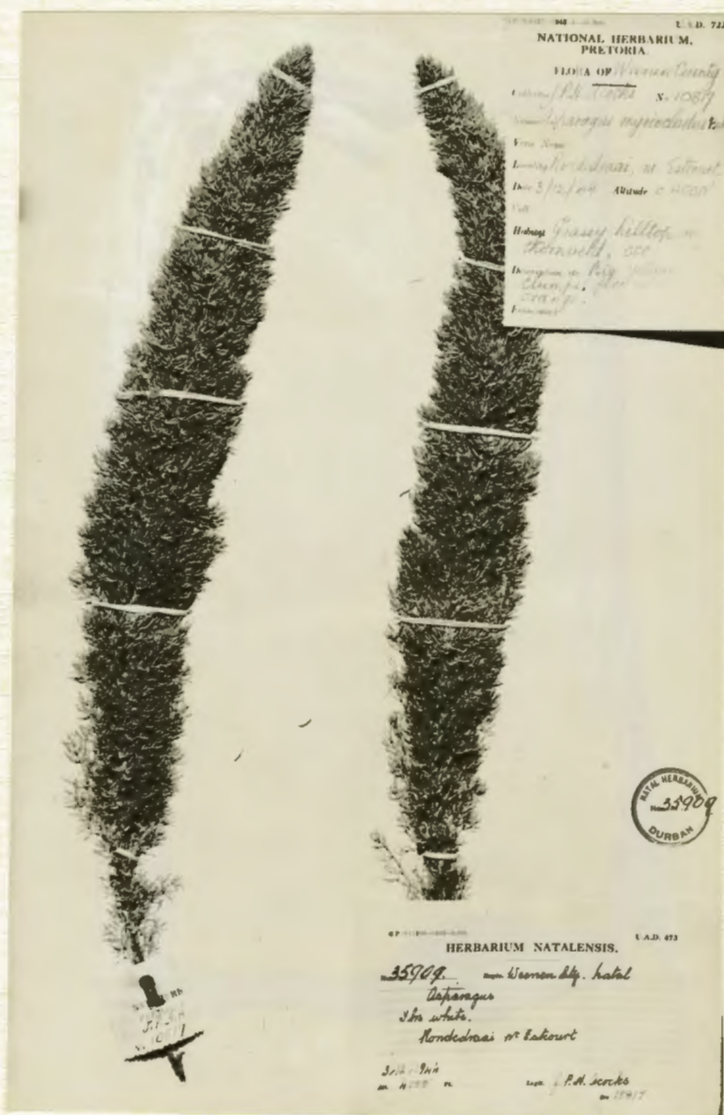


Fig. 33. Acocks 10817 (NH). The holotype of Asparagus bracteolatus sp. nov.

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, about 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, about 7 mm. diameter.

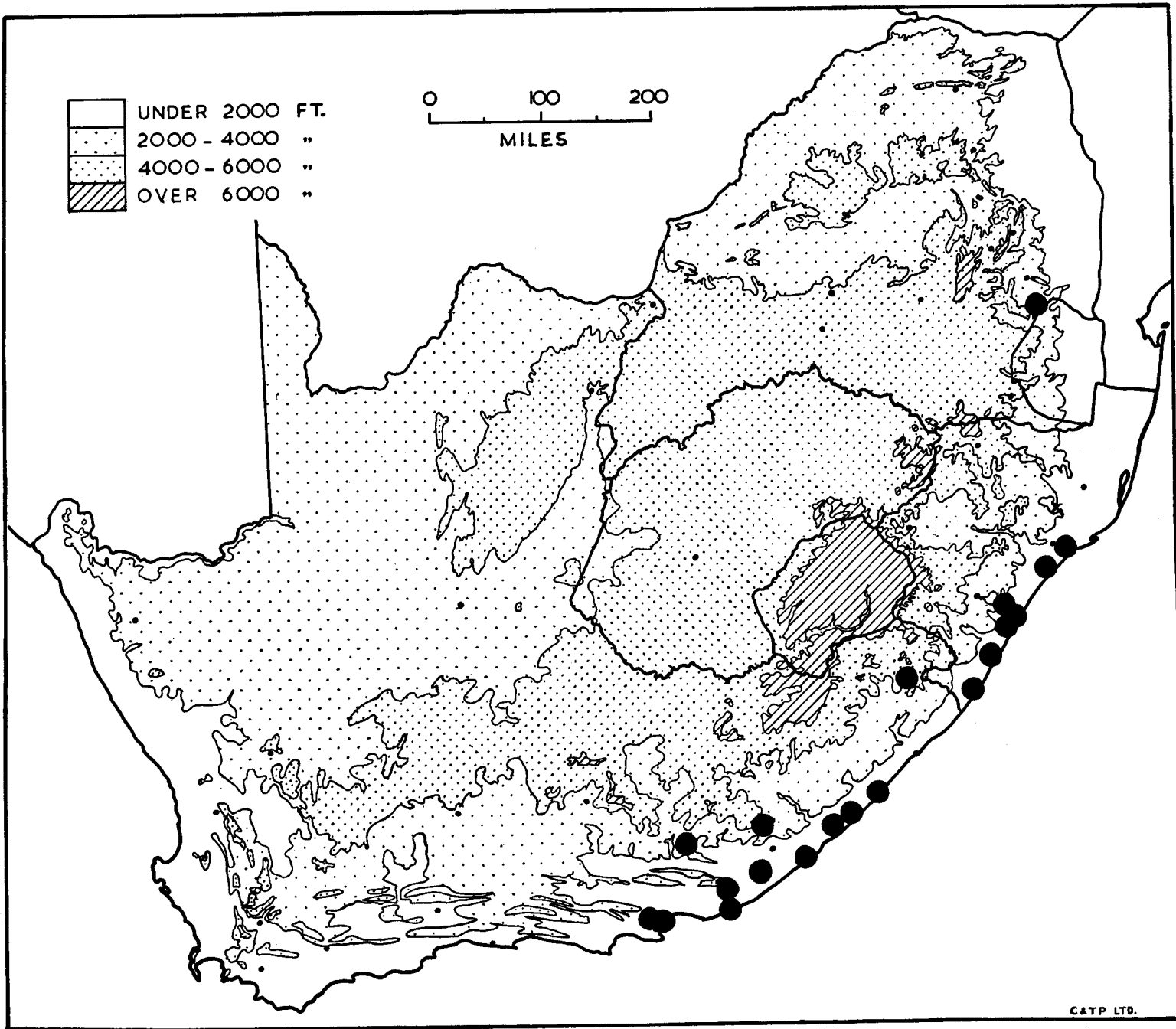
The inflorescence of this species is a reduced raceme in which there are frequently only terminal flowers, but in other cases either a flower or a sterile bract is present laterally. The relationship with the section RACEMOSI is further indicated by the tuberous roots, spurless stamens and fascicled branchlets.

Although superficially like the other "cat-tail" forms, it can be identified from the others in the section RACEMOSI by the reduced raceme, the terete cladodes and the scabrid, spiny stems.

The holotype is Acocks 10817 (EOL) from the Estcourt district.

According to Acocks 10651, this species has been found on a dolerite hillside. There is no other information available on the habitat of this species.

The only flowering material was collected in December.



Map 21. *Asparagus sarmmentosus*.

DISTRIBUTION.

NATAL.

Estcourt. Confluence of the Bushmans' and Little Bushmans' Rivers, Acocks 10651 (NH); Rondedraai, fl. Dec., Acocks 10817 (BOL & NH).

Nongoma. Bangonomo, Gerstner s.n. (NH).

Ngotsche. Ngotsche, Gerstner 2516 (BOL).

SWAZILAND.

St Phillips Mission Station, fr. May, Gerstner s.n. (NH).

21. Asparagus sarmentosus L.

Asparagus sarmentosus Linnaeus, Species Plantarum : 314 (1753).

Asparagopsis sarmentosa (L.) Kunth, Enumeratio Plantarum, 5 : 97 (1850).

Asparagopsis densiflora Kunth, Enumeratio Plantarum, 5 : 96 - 97 (1850).

Asparagus myriocladus Baker, J. Bot., XVIII : 43 (1889).

Asparagus myersii (or meyeri) Hort. nom. nud.

Stems erect or weakly decumbent, straight or slightly sarmentose, finely ridged, glabrous, 30 to 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 to 15 mm. long, weakly mucronate, commonly solitary, but sometimes



Fig. 34. The drawing on which Linnaeus
based Asparagus sarmentosus. Hermann, P.,
"Hortus Academici Lugduno-Batavus
catalogus" t.650.

ternate or numerous, with a distinct midrib. Spines usually well-developed, but not often pungent, 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 to obovate, obtuse, spreading, white or pale pink, about 2 to 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.

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. (Fig. 34.) Both description and figure fit this species as construed here. The specimen labelled A. sarmentosus in the Linnaean Herbarium is in fact A. capensis, and does not fit the description in having fascicled cladodes. The Hermann specimen is, therefore, taken to be the holotype, if it is extant.

A. myriocladus was described as differing from A. sarmentosus in having a terete, many-ribbed, instead of grooved, stem; cladodes only 1/4 instead of 1/2 to 3/4 inch long, and 5- to 8-nate instead of solitary. These characters have not been found to be reliable in this group. The



Fig. 35. Variation in Asparagus sarmentosus L.
"A" Flanagan 2211 (PRE) from the Komgha district.
Widely branched, with small spines only on
the stem, and several broad cladodes at a node.



Fig. 36. Variation in *Asparagus sarmentosus* L.

"B" Ex Hort. University of Cape Town.

Less widely branched than in Fig. 35, spineless,
and with ternate broad cladodes.

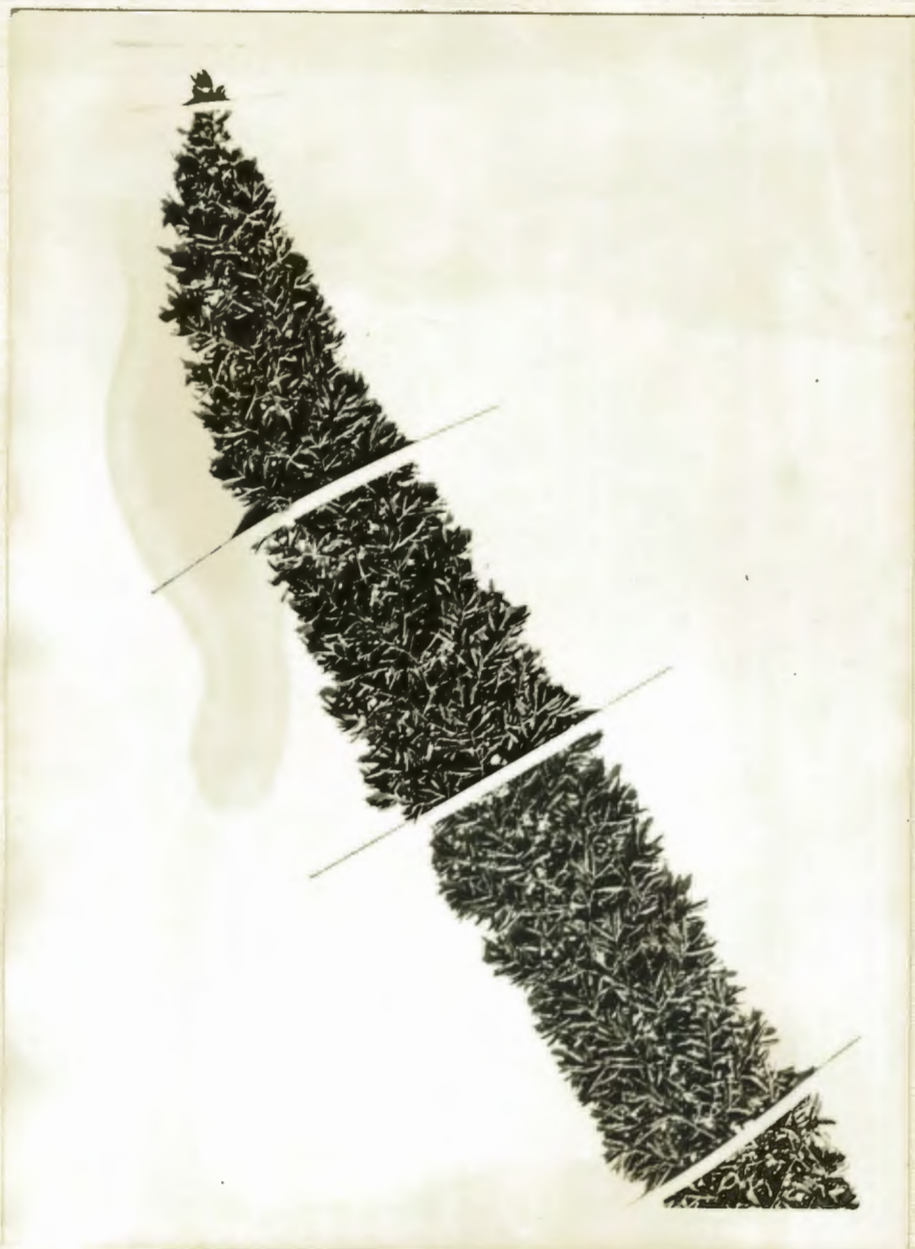


Fig. 37. Variation in Asparagus sarmentosus L.

"C" Bruins Lich Ex Hort. ex PRE 29270 (BOL).

An extremely densely branched specimen with
no spines, and ternate flattened cladodes.



Fig. 38. Variation in Asparagus sarmentosus L.
"D" Flanagan 2212 (BOL) from the Komgha district.

This specimen is rather similar to that in
Fig. 35, which is from the same area, but
has solitary cladodes.



Fig. 39. Variation in *Asparagus sarmentosus* L.
"E" Potts s.n. ex BLFU 1730 (BOL) from the Bedford
district. A rather compact plant with spines
on the stems, and solitary flattened cladodes.



Fig. 40. Variation in Asparagus sarmentosus L.

"F" Tyson 3158 (PRE) from the Mount Ayliff district. This, fairly densely branched specimen, has spines on the branchlets as well as on the stems. The cladodes are solitary and rather narrow.



Fig. 41. Variation in Asparagus sarmentosus L.
"G" Wood 355 (NH) from the Inanda district. This specimen is an isotype of Asparagus myriocladus Baker. It is densely branched, has spines only on the stems, and several three-angled cladodes at a node.

type was cited as Wood 355, and there is an isotype in the Natal Herbarium. (Fig. 41)

Kunth described Asparagopsis densiflora as having racemes, and solitary, linear-lanceolate cladodes. This species can be separated from the other species with racemes and solitary, flattened cladodes, by another of the characters he mentioned, namely that it was much-branched. A. sarmentosus as construed by the present author is the only species with racemes and solitary cladodes, which could be described as much-branched.

There are two cultivated forms of this species; one of these is known by the unpublished name A. myersii, after Myers, a horticulturist in the eastern Cape, and the other as A. sprengeri. The name A. sprengeri is discussed under A. aethiopicus, as it is a synonym for that species. "A. sprengeri" hort is a rather dense form with ternate cladodes, but does not show any characters which could be used to separate it from A. sarmentosus, as construed by the present author. (Fig. 36.) A. myersii, which is also known as A. meyeri, is an extremely densely "cat-tail" form with shorter branchlets, but otherwise normal characters for this species. (Fig. 37.) It is not separable on any character which could be regarded as reliable, as the degree of branching varies in a gradual series.

Figures 35 to 41 illustrate the variation in degree of branching, cladode number and spine development occurring in A. sarmentosus L. as treated here.

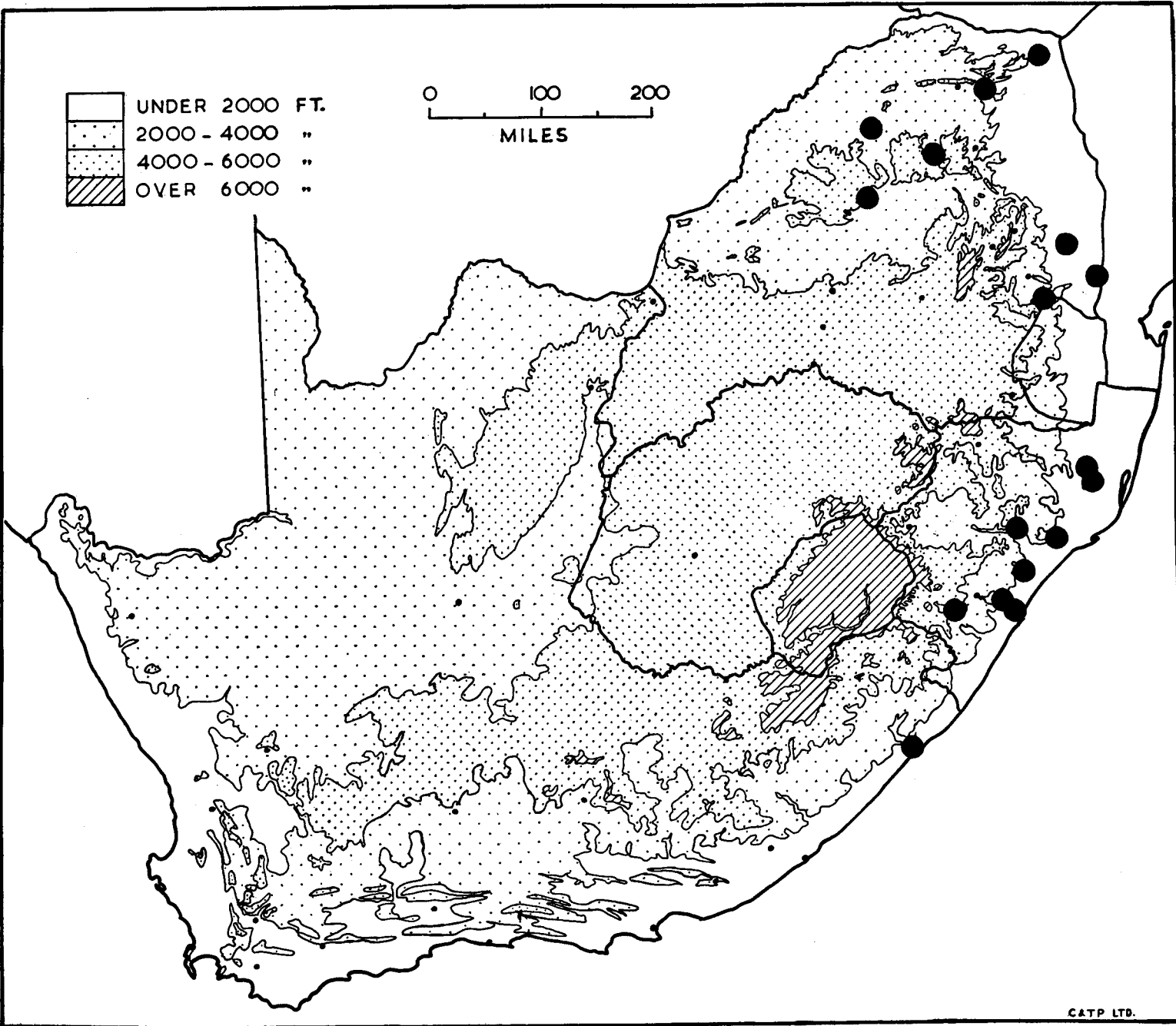
Asparagus sarmentosus has been reported to grow in a range of habitats, mainly in coastal areas, from coastal dunes to open rocky places or woods.

Flowers have been recorded from October to March and in July.

DISTRIBUTION.

CAPE.

- Albany. Coldspring, fl., Glass 741 (SAM);
Howieson's Poort Hills, fl. Dec., Galpin 3084
(PRE); Grahamstown, fl. Jan., Breijer s.n.
(PRE 16902).
- Bathurst. Port Alfred, fl. Dec., Galpin 2948
(PRE); fl. Dec., Pegler 1482 (PRE).
- Bedford. Bedford, fl. Dec., Potts 1730 (BOL).
- East London. East London beach, fl. Dec.,
Breijer s.n. (PRE 16559), fl. Jan., Bokelmann
3-28 (NBG), fl. Dec., Galpin 7352 (PRE).
- Kentani. Kentani, fl. Dec., Pegler 1482 (BOL).
- Kieskammahoek. Kieskammahoek, fl. Dec., Stayner
53 (GRA).
- Komgha. Komgha, fl. Jan., Flanagan 2212 (BOL, GRA
& PRE), Flanagan 2211 (BOL & PRE).
- Mount Ayliff. Kokstad, fr. Nov., Mogg 5235 (PRE),
fl. Oct., Tyson 3158 (BOL, PRE & SAM); E. Groom's
farm, fl. Nov., Haygarth s.n. (NH 19093).
- Mqanduli. Koffiebaai, fl. Dec., Van der Schijff
5447 (PRE).
- Peddie. Kaffir Drift, fl. Nov., Compton 17829
(NBG).
- Port Elizabeth. Red House, fl. Dec., Paterson



Map 22. Asparagus saundersiae.

531 (BOL).

Uitenhage. Swartkops River, fl. Dec., Zeyher 1061
(BOL & STE), Zeyher 4171 (BOL).

NATAL.

Durban. Ex cult., fl. & fr. March, Howlett s.n.
(NH 36459 & PRE); near Durban, fl. March, Wood
7559 (NH), fl. July, Wood 6323 (PRE), fl. Feb.,
Wood 9257 (NH); fl. Nov., Wood 9531 (NH);
Isipingo, Wood 12416 (PRE); Salisbury Island,
Forbes 341 (NH); on Durban Flat, Wood 4013 (PRE).

Eshowe. Eshowe, fr. June, Lawn 781 (NH).

Inanda. Inanda, fl. Feb., Wood 1626 (BOL, NH &
SAM); Groenberg, Dohse 271 (NH).

Lower Tugela. Tugela Beach, fl. Jan., Johnson
408 (NBG).

Lower Umfolozi. Umhlatuzi Valley, fr. June, Lawn
804 (NH).

Mahlabatini. Mahlabatini, fl. Sept., Gerstner
3525 (NH).

Port Elizabrth. Beach Terminus, fl. Nov., Thode
3429 (STE).

Ubombo. Betw. Ubombo and Ugaza, Gerstner 4549
(PRE).

Umzinto. Scottborough, Mauve 1002 (PRE), fl. Oct.,
Thode 3424 (STE).

TRANSVAAL.

Barberton. Sheba, fl. Feb., Thorncroft 14 (PRE).

22. Asparagus saundersiae Baker.

Asparagus saundersiae Baker, J. Bot., XVIII



Fig. 42. An isotype of Asparagus saundersiae,
in the Bolus Herbarium. This specimen
was collected by Mrs K. Saunders in Natal.

: 42 (1889).

Stems woody, suberect or usually climbing, rather zigzagging, usually glabrous, rarely pubescent, smooth, often pale coloured. Branches similar to the stems, wide spreading. Branchlets well-defined, usually paired, lacking spines, ascending or spreading. Cladodes fascicled, about 6- to 8- nate, less than 1/2 mm. broad, angled, terete or grooved, subulate, ascending or spreading, upto 1.5 cm. long, slightly arcuate. Spines well-developed, often large, upto 4 cm. or more long on the main stems, narrow, pungent, reflexed or spreading. Peduncles 1- to 4- nate, 2 to 4 cm. long. Pedicels solitary, 3 to 5 mm. long, articulation variable. Perianth segments serrated, obovate, usually 1.5 to 3.0 mm. long, white. Stamens nearly as long as the perianth segments; anthers minute, globose, yellow or black. Ovary stalked; style shortly divided. Berries fleshy, about 5 mm. diameter, one or two seeded, red.

The type of A. saundersiae is a specimen collected by Mrs K. Saunders in Natal, and the holotype should be at Kew. There is a specimen, collected by Mrs Saunders, matching Baker's description, in the Bolus Herbarium. (Fig. 42.) Baker mentioned the racemes, and the subterete cladodes, as well as the glabrous, sarmentose stems.

Asparagus saundersiae, as construed here, is



Fig. 43. A typical spine from one of the aerial stems of *Asparagus saundersiae*.

an extremely heterogenous species. The main characters common to all the specimens is the twining habit, smooth stems, spineless branchlets, and fine subulate cladodes. There are specimens with black anthers, and this is often associated with pubescence and larger perianth segments upto 3.5 mm. long. This correlation is not close enough to separate a taxon of any rank.

A. buchmanani Baker, Kew Bull. : 211 (1893) may be a synonym, but is based on material from Nyasaland. It was described as having very narrow, linear cladodes, racemes, and glabrous, sarmentose branches.

The spines (Fig. 43.) have a characteristic shape, which, however, occurs in a few specimens of A. aethiopicus, of the Transvaal form, as well.

A. saundersiae is a forest climber from the eastern parts of southern, and possibly central Africa.

Flowers have been recorded in September, November to February, and April to June.

DISTRIBUTION.

CAPE.

Uniondale. Kouga River, fl. May, Compton 5214 (NBG).

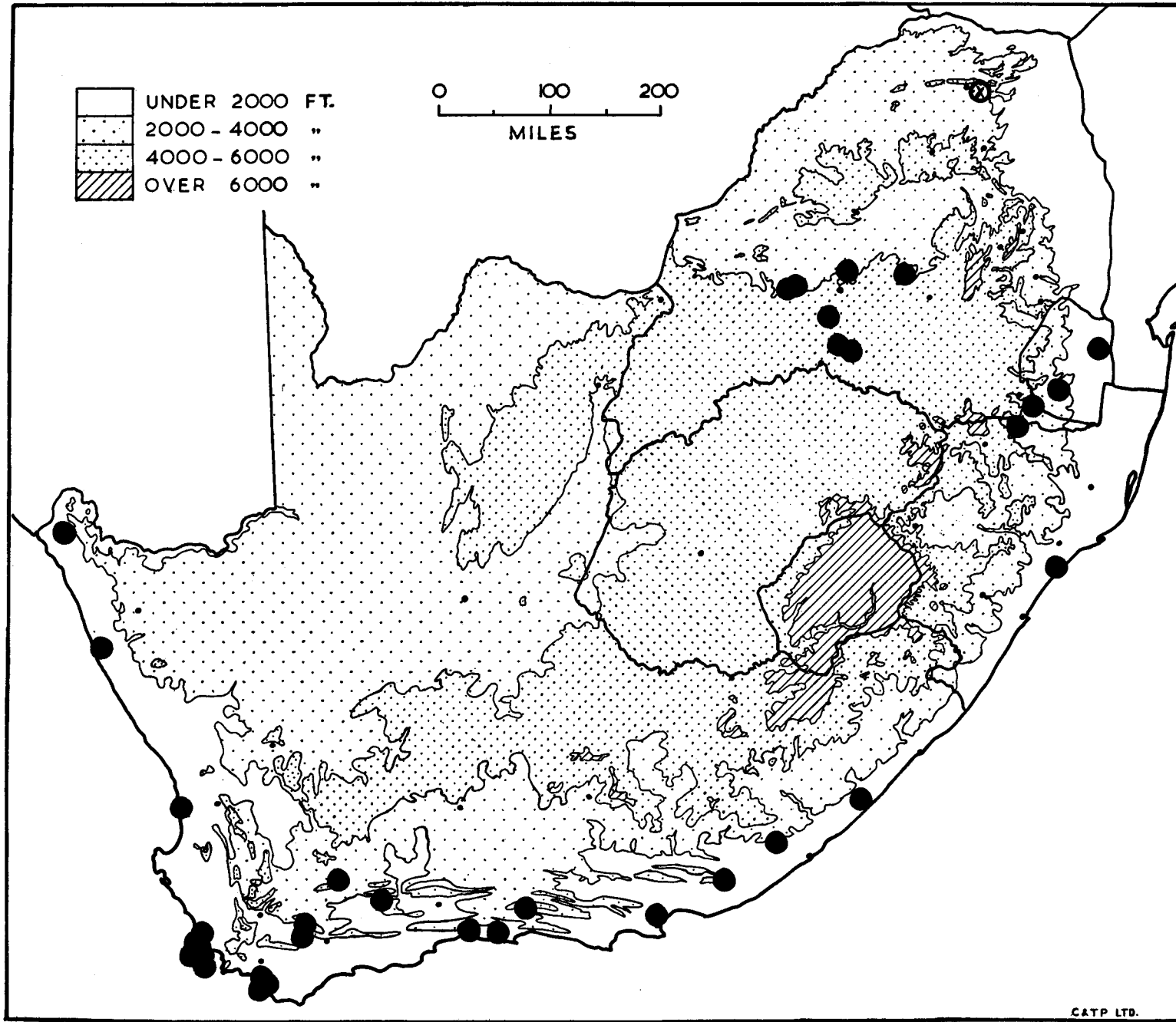
Lusikisiki. Betw. Port St John and Lusikisiki, fl. Dec., Hutchinson 1780 (PRE).

NATAL.

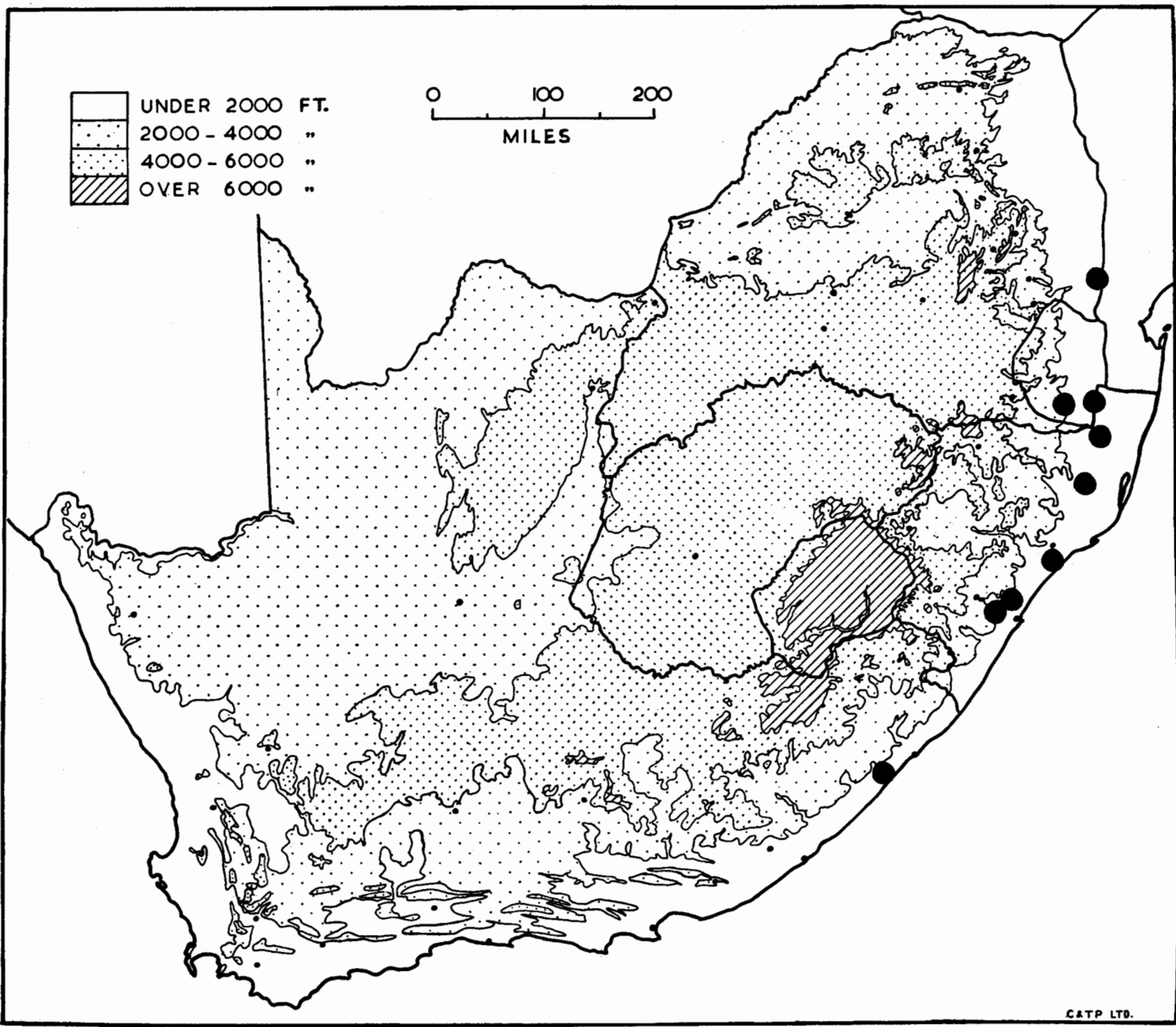
Camperdown. Camperdown, fl., Carnegie s.n. (NH)

- 21991), Franks s.n. (NH 12979); Bothas Hill, fl. Dec., Wood s.n. (NH 12404).
- Entonjaneni. Umhlatuzi Road, fl. March, Lawn 331 (NH).
- Eshowe. Eshowe, fl. Dec., Gerstner 2841 (BOL).
- Hlabisa. Near Hluhluwe, fl. Nov., Wells 2039 (PRE); Hlabisa, fl. Feb., Ward 2971 (PRE).
- Mapumulu. Near Thringspost, Mauve 4207 (PRE).
- Nongoma. Nongoma, fl. Dec., Gerstner 4423 (NH).
- Pinetown. Marionhill, fl. Feb., Kolbe s.n. (BOL).
- Richmond. Richmond Road, fl. Nov., Schlechter 6740 (BOL).
- Natal without locality, fl. Nov., Wood 12217 (BOL, PRE, SAM & STE), Saunders s.n. (BOL).
- District? Mganduli Valley, fl. June, Pegler 599 (PRE).
- TRANSVAAL.
- Barberton. Komatipoort, fl. June, Rogers 2573 (PRE); Avoca, fl. May, Thorncroft 3006 (PRE); Sheba Valley, fl. Jan., Thorncroft 3006 (NH & PRE).
- Letaba. Duivelskloof, fl. Nov., Scheepers 1059 (PRE); Mamaranga near Birthday Road, fl. June, Breijer s.n. (PRE 19063).
- Nelspruit. Numbi, Van der Schijff 29 (PRE).
- Pietersburg. Thabina, Schweikerdt 1019 (PRE); 18 miles east of Pietersburg, fl. April, Van Vuuren 1454 (PRE); Molopo Reserve, fl. May, Gerstner 5322 (PRE).
- Potgietersrust. Naboomspruit, near Sterkwater, fl. Jan., Ihlenfeldt 2067 (PRE).
- Waterberg. Near Elmeston, fl. Feb., Meeuse 10537

Map 23. Asparagus aethiopicus.



Map 23a Asparagus aethiopicus var natalensis.



C&P LTD.

(PRE).

Zeerust. Tokwe Farm, fl. June, Breijer s.n. (PRE 21592).

Zoutpansberg. Punda Maria, Codd 5292 (PRE);

Elim, Obermeyer s.n. (PRE 29330).

District? Tati area, Kruger National Park, fl. June, Van der Schijff 3856 (PRE).

SWAZILAND.

Stegi. Isateki Beacon, fl. Dec., Compton 27312 (NBG & PRE).

Manzini. Mpisi, fl. Sept., Compton 30112 (NBG).

Also recorded from the Sabi-Lundi area of Southern Rhodesia.

23. Asparagus aethiopicus L.

Asparagus aethiopicus Linnaeus, Mantissa : 32 (1767).

Asparagus lanceus Thunberg, Prodrum Plantarum Capesⁿium : 66 (1794).

Asparagopsis lancea (Thunb.) Kunth, Enumeratio Plantarum, 5 : 106 (1850).

Asparagopsis aethiopica (L.) Kunth, Enumeratio Plantarum, 5 : 95 (1850).

Asparagus sprengeri Regel, Acta. Horti Petropolitani, XI : 302 - 303 (1890).

Asparagus ternifolius (Baker) Hooker, J.D., Bot. Mag., t.7728 (1900).

Asparagus aethiopicus L. var ternifolius Baker, in Saunder's Ref. Bot., t.261 (1871).

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

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.



Fig. 44. The specimen of Asparagus
aethiopicus L. in the Linnaean Herbarium.

The specimen in the Linnaean Herbarium bears the letters "H.U.", indicating a cultivated plant from the Uppsala Gardens, as does the description in the Mantissa, and shows the typical cladodes and stem characters of this species. The Linnaean specimen is probably 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.

A. ternifolius Hooker, was described from a specimen sent to Saunders from Natal. Originally, it was named as a variety of A. aethiopicus L. by Baker. Both descriptions mention the climbing habit, the linear flattened cladodes, and racemes. From the illustration, it appears that there are no spines on the final branches.

A. lanceus was described by Thunberg as having solitary spines, lanceolate, subfalcate cladodes and solitary, axillary peduncles. The holotype, in the Thunberg Herbarium, shows racemes, grooved sarmentose stems, and fascicled cladodes, which are characteristic of A. aethiopicus as construed here.

Asparagus sprengeri Regel is normally applied to a form of A. sarmentosus L. Regel, however, differentiated in his type description of a plant collected at Port Nolloth. (Durban), between the flexuose branches and the branchlets, which although not conclusive, suggests that the cultivated plant, on which only one type of branch usually occurs, is

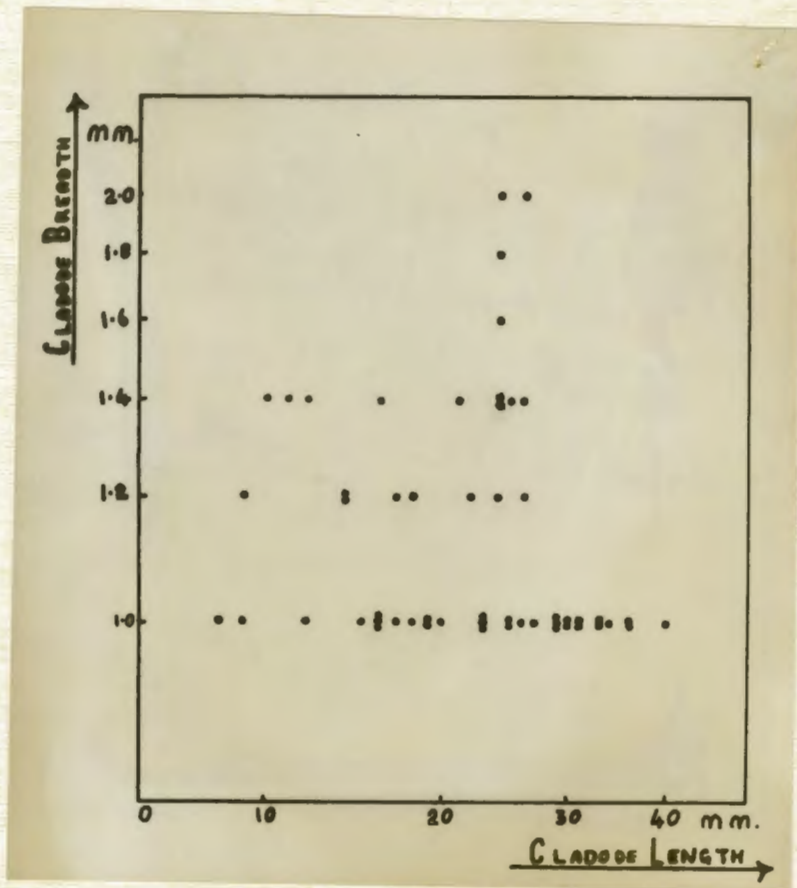


Fig. 45. Scatter diagram to show the relation between cladode length and breadth in Asparagus aethiopicus. There appears to be no justification for using cladode length or breadth in subdividing this species.

wrongly named. He also mentioned spines, and 1- to 4- nate cladodes, which makes it almost certain that the plant belongs to A. aethiopicus as construed here. The figure named A. sprengeri in the Botanical Magazine t.8052 (1906) seems to be correctly named.

Asparagus aethiopicus L. var natalensis Baker, Flora Capensis : 272 (1896) was described as having ungrooved stems, darker cladodes, and much branched inflorescences. The type is cited as Wood 1351 of which there is an isotype in the Natal Herbarium. This seems to be a distinct variety. It has several characters, however, which ally it with A. falcatus rather than with A. aethiopicus. Work in the field might show that it would be better to make this a variety of A. falcatus on the grounds of the smooth stem, and darker cladodes. The cladodes are almost black on herbarium material.

In plants from the Transvaal and surrounding areas, the cladodes are narrower and longer, and the appearance of the cladodes is generally less rigid. These forms, however, grade into one another to such an extent that it is not possible at the present to separate them. (Fig. 45.) An extreme of this gradation is shown by specimens with very narrow cladodes and stem characters similar to those of A. saundersiae

In the south west Karroo and in the Little Karroo, there are two slightly unusual forms. Both

have the grooved branches and the form of branching characteristic of the south western Cape specimens. In the Swellendam district (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, and the cladodes are three-angled. Another form occurs which is inseparable from the typical form except that the cladodes are three-angled (e.g. Compton 5214 from the Uniondale District).

Further field work is certainly needed on the forms from the eastern and northern regions.

Mainly a forest climber, A. aethiopicus also occurs in coastal vegetation and in parts of the Little Karroo, Karroo and Namaqualand.

Flowers have been recorded in all months except December.

DISTRIBUTION OF A. AETHIOPICUS VAR AETHIOPICUS.

CAPE.

Albany. Grahamstown, fl. Jan., Breijer s.n. (PRE).

Bredasdorp. Uilenkraal Forest, fr. Aug., Taylor 286 (NBG).

Caledon. Betw. Kelders and Franskraal, Taylor 1585 (SAM); Danger Point, fl. Jan., Pillans 9541 (BOL); Die Mond, fl. May, Jordaan s.n. (STE 18973); Hermanus opposite the lagoon, fl. May, Van der Merwe 1049 (PRE); betw. Stanford and Gansbaai, Jordaan 921 (STE).

- Cape Town. Camps Bay, fl. Feb., Pappe s.n. (SAM 13171); Milnerton, Kensit s.n. (CTH); Porcupine Buttress, Jessop 9 & 10 (BOL).
- Clanwilliam. Near Lambert's Bay, fl. May, Leipoldt 4244 (BOL).
- George. Wilderness, fr. Nov., Van Niekerk 211 (BOL); Kaaiman's River, fr. Nov., Wilman s.n. (BOL 24589).
- Humansdorp. Ratelsbosch, fl. June, Foucade 245 (BOL).
- Kentani. Kentani, fl. Aug., Pegler 840 (BOL & PRE).
- King Williams Town. King Williams Town, fl. Aug., Sim 1061 (BOL).
- Knysna. Keurboom's River, Leg.? s.n. (BOL); The Point, fr. June, Taylor 1331 (SAM); Knysna, fl. March, Breijer s.n. (PRE 22276).
- Ladismith. Anysberg Dam, fl. April, Stokoe 8520 (BOL & SAM).
- Montagu. Bonnievale, fl. April, Marloth 12007 (PRE); Kogman's Kloof, fl. Jan., Oliver s.n. (BOL).
- Namaqualand. Witbank, Pillans 5121 (BOL); Hondeklip Bay, Pillans s.n. (BOL 18247).
- Port Elizabeth. Cradock Place, fl. May, Galpin 6419 (PRE); Red House, fl. May, Rogers 2794 (BOL).
- Riversdale. Bottebersfontein, fl. Oct., Muir 1421 (BOL).
- Simonstown. Clovelly, fl. Feb., Walgate s.n. (BOL 26846); Sea Forth, Jessop 33 & 36 (BOL); St James, Jessop 68 (BOL); Kommetjie, Jessop

28 (BOL).

Uniondale. Kouga River, fl. May, Compton 5214
(BOL).

Wynberg. Hout Bay, fl. March, Compton 15598 (NBG);
betw. Hout Bay and Chapman's Peak, fl. March,
Wolley Dod 951 (BOL), fl. March, Leighton 401
(BOL); Karbonkelberg, Jessop 302 (BOL); Orange
Kloof, Jessop 67 (BOL); Kirstenbosch, Bolus
s.n. (CTH), Jessop 1 (BOL).

NATAL.

Mtunzini. Tugela Beach, Johnson 408 (NBG).

Utrecht. Kaffir Drift, fl. July, Thode A250 (NH
& PRE).

TRANSVAAL.

Brits. Weltevreden 61, 71 miles N.W. of Johannes-
burg, Mogg 20391 (PRE).

Carolina. Arnheemburg, fl. Sept., Roberts s.n.
(PRE 15839).

Heidelberg. 41 miles S.E. of Johannesburg, Mogg
25221 (PRE); Lagerspoort, Mogg 19523 (PRE);
Brakfontein, fr. May, Mogg 19574 (PRE); 27
miles S.S.E. of Johannesburg, fr. Dec., Mogg
24091 (PRE); Kuilfontein, fr. Jan., Mogg 20727
(PRE); 46 miles S.E. of Johannesburg, fr. March,
Mogg 25315 (PRE); Suikerbosrand, Mogg 18143
(PRE).

Johannesburg. 9 miles N.W. of Johannesburg, fr.
Nov., Mogg 19188 (PRE).

Krugersdorp. Jacksonstuin, Magaliesburg, Van
Vuuren 221 (PRE); Jack Scott Private Nature
Reserve, fr. Feb., Wells 2412 (PRE).

- Louis Trichardt. Elim, Obermeyer 592 (PRE).
Middelburg. Clifants River Gorge, fl. Oct., Mogg
22470 (PRE).
Nelspruit. Amajuba Mountain, fr. Dec., Liebenberg
3118 (PRE).
Piet Retief. 27 miles S.E. of Piet Retief, fr.
Jan., Codd 10268 (BOL & PRE).
Pretoria. Pienaar's River area, fr. Dec., Repton
3727 (PRE); near Zeekoegat, fr. March, Mogg
14069 (PRE); Fairy Glen, Leendertz 4955 (PRE);
Garsfontein, Repton 3024 (PRE).

SWAZILAND.

- Mbabane. Near Forbes Reef, fl. Sept., Compton
28002 (NBG & PRE); Dalriach, fl. Sept., Compton
30739 (NBG); near Umsindusi, fl. Sept., Ben
Dlamini s.n. (NBG); hills N.E. of Mbabane, fl.
Sept., Ben Dlamini s.n. (NBG).
Hlatikulu. Hlatikulu, Compton 28903 (NBG),
Murdoch 125 (NBG).
Stegi. Stegi, Compton 28020 (NBG); Isateki
Beacon, fr. Dec., Compton 27316 (NBG).

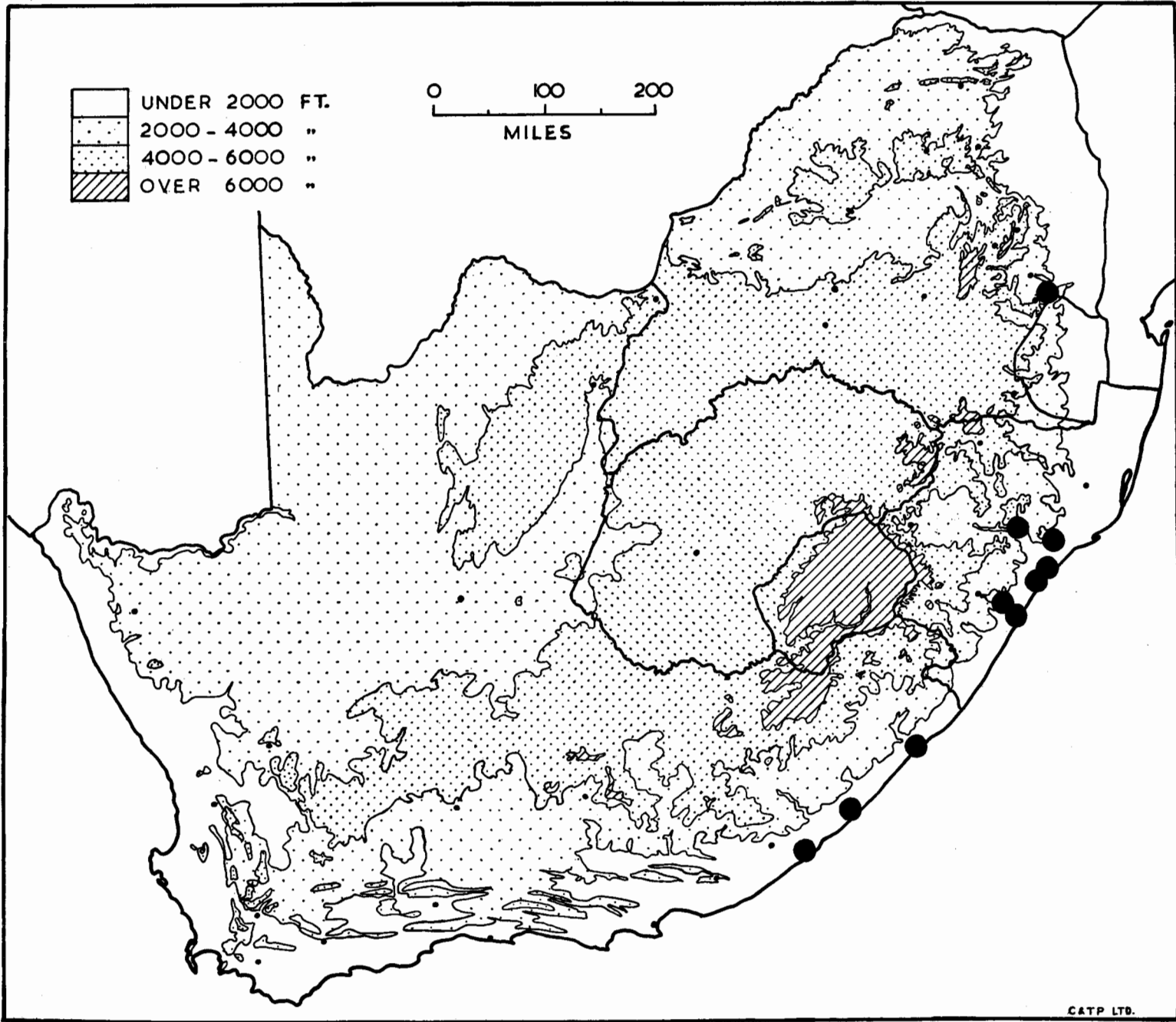
DISTRIBUTION OF A. AETHIOPICUS VAR NATALENSIS.

CAPE.

- Elliotdale. Mkumbaan Valley, fl. Oct., Acocks
12936 (PRE).

NATAL.

- Camperdown. Drummond, fl. Nov., Gerstner 2421
(NH & PRE).
Hlabisa. Near Hluhluwe Station, fl. Oct., Codd
2036 (PRE); Hluhluwe Game Reserve, fl. Oct.,



CATP LTD.

Map 24. Asparagus falcatius.

Ward 1535 (NH).

Inanda. Umzinyati Falls, fl. Sept., Wood 1357

(SAM); Inanda, fl. Sept., Wood 1351 (NH).

Mtunzini. Mandini, fl. Oct., Gerstner 2817 (NH).

Ubombo. Mkuzi, fl. Sept., Galpin 13649 (BOL & PRE).

Zululand without locality, fl. Sept., Gerstner
2412 (NH).

TRANSVAAL.

Barberton. Komatipoort, fl. Oct., Van der Schijff
1130 (PRE).

SWAZILAND.

Hlatikulu. Ingwavuma Poort, fr. June, Compton

28903 (NBG); Nsoko, fr. Nov., Compton 30323

(NBG); Sipopaneni, fr. Jan., Murdoch 125 (NBG).

Stegi. Blue Jay Ranch, fl. Dec., Compton 29570
(NBG).

24. Asparagus falcatus L.

Asparagus falcatus Linnaeus, Species
Plantarum : 313 (1753).

Stems climbing or scrambling, sarmentose,
smooth, glabrous, pale, much-branched. Branches
usually solitary, spreading, similar to the stems.
Cladodes flattened, straight or falcate, with a
prominent vein, upto 7 mm. broad, and 90 mm. long,
dark coloured. Spines well-developed, recurved,
pungent, strong, often borne on vegetative branchlets.
The rest of the leaf not usually developed. Peduncles
upto 4-nate laterally, more numerous terminally,



Fig. 45a. J. Burmann's "Thesaurus
Zeylanicus" t.13 f.2.

The iconotype of Asparagus falcatus.

usually about 3 to 5 cm. long, unbranched. Pedicels 4 to 8 mm. long, articulated proximally, 1- or 2-nate. Perianth segments oblong to obovate, the inner whorl slightly narrower than the outer, 2.5 to 4.0 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.

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" (1737) t.13 f.2. This figure must be regarded as an iconotype in the absence of a specimen from which it was drawn. This specimen could be in Paris according to Lanjouw and Stafleu (1954). According to Jackson (1912), a specimen did not appear in the Enumerations of the Linnaean Herbarium. Moreover, the specimen in the Linnaean Herbarium has short cladodes, and is, in fact, A. aethiopicus as construed in this treatment. A photograph of it has been seen by the present author. It can not be regarded as the type of A. falcatus. The Burmann figure shows cladodes matching Linnaeus' description and this species.

This species is most nearly related to A. aethiopicus var natalensis, from which it differs mainly in the much longer cladodes. More field work on this species is needed to establish its taxonomic

position in relation to A. aethiopicus.

This species is a forest climber, mainly in the coastal districts of Natal and the eastern Cape.

Flowers have been recorded in September, October and from December to February. They are scented.

DISTRIBUTION.

CAPE.

East London. East London, MacOwan 2413 (BOL & SAM).

Kentani. Kentani, fl. & fr. Feb., Pegler 1335 (BOL & PRE).

Port St Johns. Port St Johns, fl. Dec., Galpin 3491 (BOL & PRE).

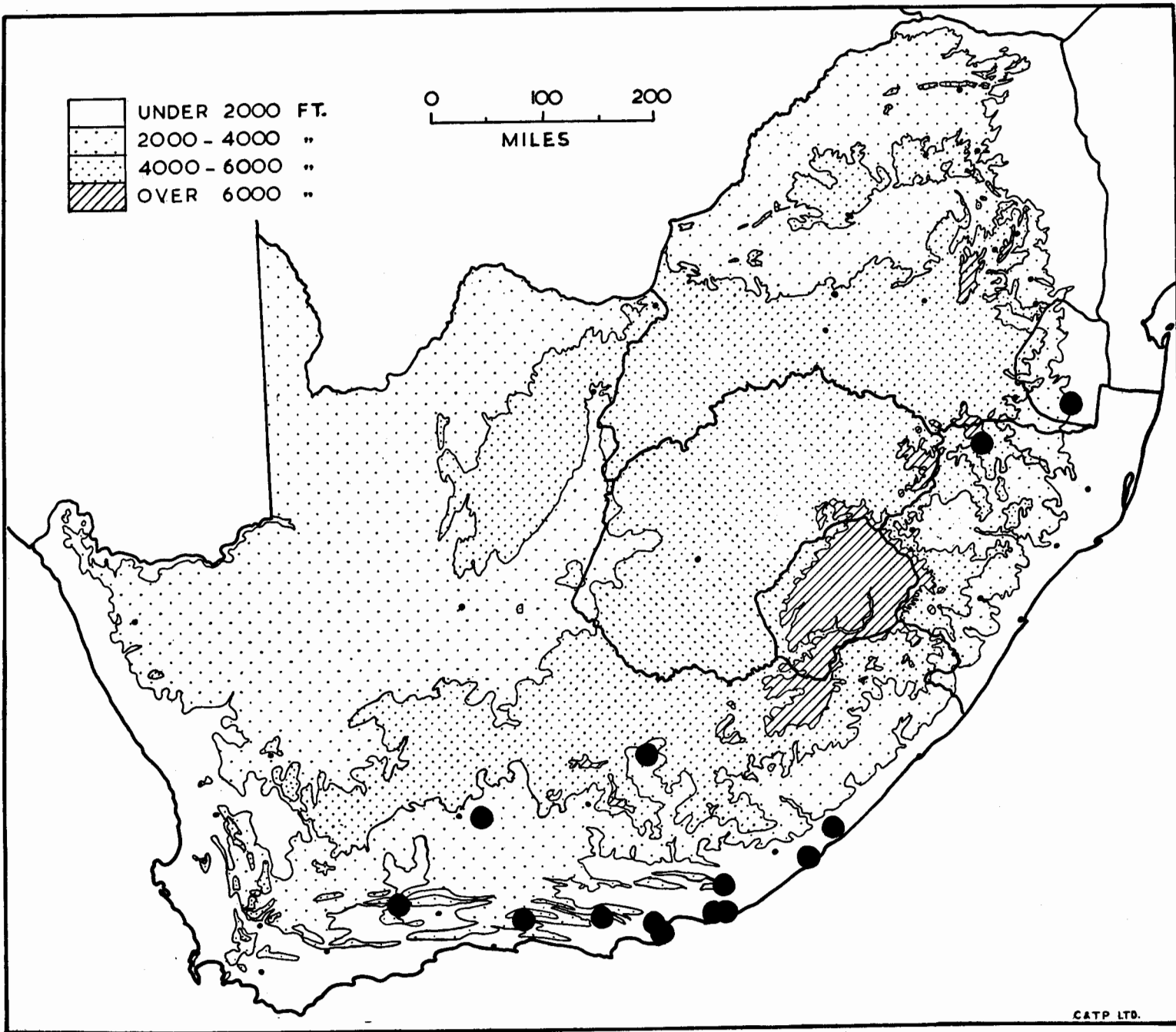
NATAL.

Durban. Durban, fl. Feb., Wood 227 (BOL), fl. Feb., Munro s.n. (PRE 29255); Botanic Station Gardens, fl. Jan., Wood 1472 (NH); coast north of Durban, Barker 5249 (NBG); Berea, fl. Feb., Wood s.n. (NBG & PRE 29254), fl. Jan., Forbes 369 (NH), fl. Jan., Wood 7643 (NH).

Eshowe. Eshowe, fl. Dec., Lawn 73 (NH), fl. Sept., Thode A1563 (NH).

Lower Tugela. Tugela mouth, fl. Feb., Edwards 1774 (PRE); Umhlali, fr. Jan., Godfrey s.n. (PRE); Tugela beach, fl. Jan., Johnson 607 (NBG); Chakaskraal, fl. Feb., Thode 3493 (STE), fr. Aug., Thode 3422 (STE).

Mtunzini. Ngoya Forest, fr. Feb., Wells and



Map 25. Asparagus racemosus.

Edwards 61 (NH).

Nkandhla. Qudeni Forest, fl. Feb., Davis 119 (NH).

Pinetown. Doonside, fl. Dec., Wylie s.n. (NH & PRE 34350); Umgababa, fl. Feb., Bayer 862 (PRE).

TRANSVAAL.

Barberton. Sheba Creek, fl. Feb., Thorncroft 13 (PRE).

Letaba. Grootbos Forest Reserve, fl. Oct., Scheepers 731 (PRE).

SWAZILAND.

Stegi. Umtintegwa, fl. Sept., Compton 28020 (NBG & PRE).

25. Asparagus racemosus Willd.

Asparagus racemosus Willdenow, Species Plantarum, 2 : 152 (1799).

Asparagus tetragonus Bresler, Dissertatio : 27. (1826).

Asparagopsis floribunda Kunth, Enumeratio Plantarum, 5 : 98 (1850).

Asparagopsis subquadrangularis Kunth, Enumeratio Plantarum, 5 : 94 (1850).

Asparagus racemosus Willd. var tetragonus Baker, J. Linn. Soc., XIV : 624.

Stems twining, climbing, woody, usually grooved. Branches similar to the stems, solitary, spreading to ascending. Branchlets usually 1- to 3-nate, spreading or ascending, straight, grooved, spineless. Cladodes fascicled, angled or flattened,

straight, upto 1 mm. broad, generally 1 to 2 cm. long, green at first but turning greyish. Spines pungent, usually about 3 to 4 mm. long, brownish to greyish. Peduncles 1- or 2- nate, more numerous terminally, upto 10 cm. long. Pedicels paired, 2 to 3 mm. long, articulated near or below the centre. Perianth segments similar, obovate-oblong, 2.5 to 3.0 mm. long. Stamens not appreciably shorter than the perianth segments; anthers about 1/4 mm. long. Style short, shortly divided. Berry globose, 1- seeded, about 6 mm. diameter, red, with a wrinkled pericarp.

Willdenow, in his description of A. racemosus, mentions that it has racemes, striated branches, linear-subulate cladodes, and that it comes from India. Drury's Handbook of the Indian flora (1869) describes a plant under this name as having paired racemes, and angled, fascicled cladodes. All these characters suggest that the Indian and South African plants are the same. Baker (1875) was the most recent author to have worked on the species from both areas, and he agreed that the two populations should be regarded as being conspecific, but he felt that the South African plant should be accorded the status of a variety. From those parts of Baker's work, which the present author has been able to investigate, it would appear that Baker had a tendency to separate taxa on insufficient grounds, and it is likely that the maintenance of this variety would not be supported by further study

on the African and Asiatic populations. The characters, he used to define the variety (var. tetragonus Baker), are shorter pedicels and cladodes, and narrower racemes. These are very variable characters, and do not suggest separation even at varietal rank.

Kunth used the name Asparagopsis floribunda as a superfluous name for A. racemosus Willd.

Asparagus tetragonus was described by Bresler from the Cape, as having racemes, grooved stems, reflexed spines and four-angled, fascicled cladodes. The type specimens of A. tetragonus were in the herbaria of Mundt and Maire. The Mundt collection has not been located, but according to De Candolle (1880), the Maire specimens were in the Royal Herbarium, Berlin. If the Mundt specimen was also in Berlin, it is unlikely that a type specimen is extant in view of the damage to that herbarium sustained during World War II. Although it is very likely that this is the same as Willdenow's species, the description is not sufficiently adequate to be certain of its identity.

Asparagopsis subquadrangularis was described from a specimen from the Cape as having setaceous cladodes, grey stems and pedicels 2.0 mm. long. The inflorescence was 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 are at Kiel. Again, it is not possible to be certain, but it is very likely, that this is referable to A. racemosus.

A. racemosus has been reported from dry localities, such as sandy river beds and stony koppies,

Flowers have been recorded from March to July and in September.

DISTRIBUTION.

CAPE.

Albany. Kowie West, Tyson s.n. (BOL 13306);

Grahamstown, Guthrie 3447 (NBG).

Alexandria. Bushman's River, fl. June, De Vos

s.n. (STE 18972); De Bega, fl. June, Archibald 5908 (PRE).

Beaufort West. Sunnyside, fr. July, Esterhuysen

4359 (BOL & NBG).

East London. Near East London, fl., Thode 6651

(STE); Bonza Bay, fl. June, Comins 1254 (PRE).

Humansdorp. Betw, Patentie and Mistkraal, fl. April,

Lewis 3602 (SAM); Gamtoos Gorge, fl. April,

Compton 23448 (NBG).

Komgha. Prospect Farm, fl. Sept., Flanagan 299

(SAM).

Ladismith. Sandberg west of Calitzdorp, fl. May,

Wurts 1371 (NBG).

Middelburg. Schoombie, fl. March, Southey s.n.

(PRE); Doornberghoek, fl. May, Acocks 8665 (PRE).

Port Elizabeth. Near Port Elizabeth, Rodin 1228

(BOL); Swartkops River, fl. March, Zeyher

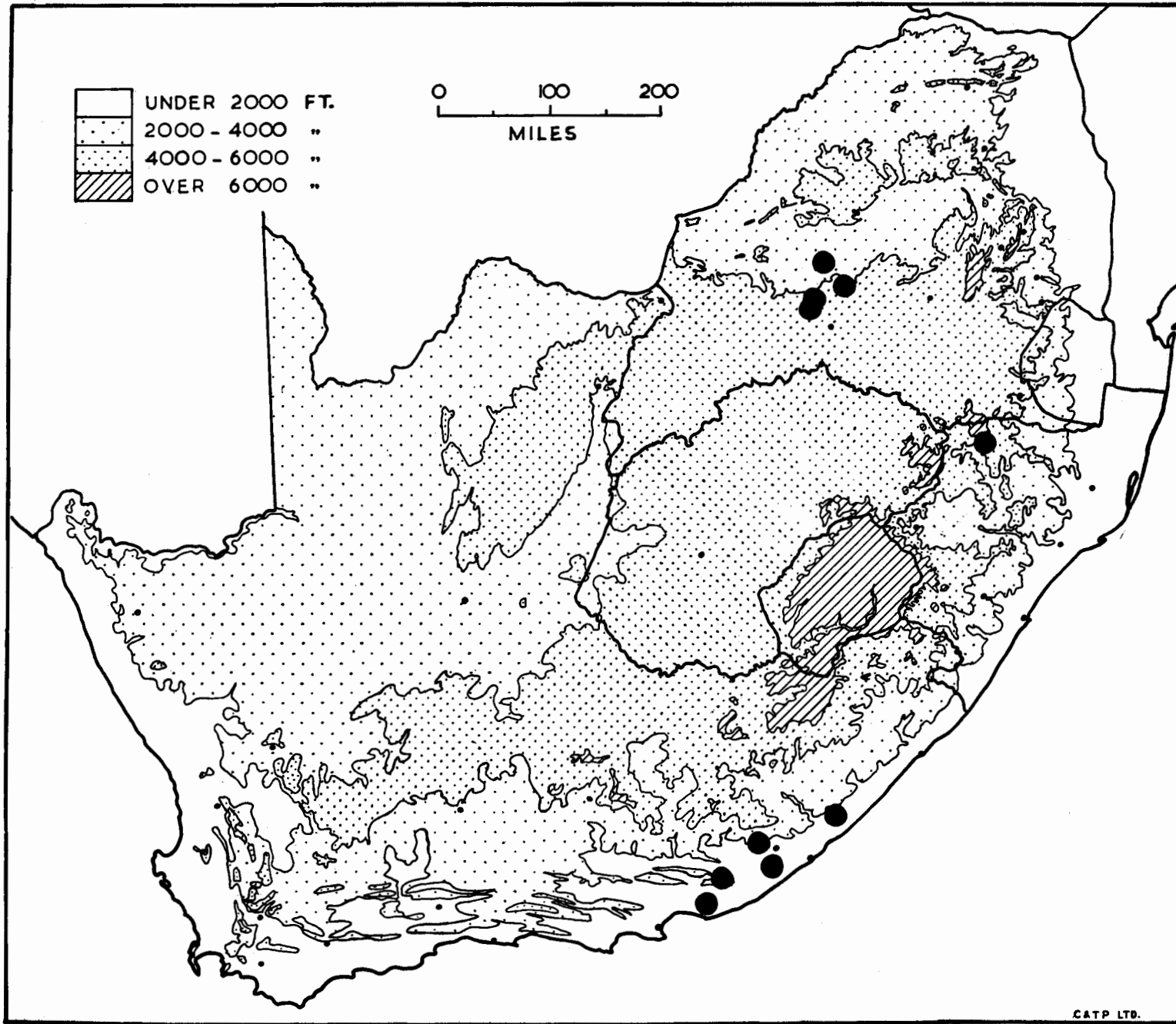
4165 (BOL).

Uitenhage. Red House, fl. March, Rogers 2793 (SAM);

Swartkops River near Uitenhage, fl. March, Ecklon

and Zeyher s.n. (PRE 29249), fl. April, Ecklon

Map 26. Asparagus krebsianus.



and Zeyher s.n. (PRE); Despatch, fl. May,
Holland s.n. (PRE ex GRA 365).

Uniondale. Kouga River, fl. May, Compton 5214
(NBG).

NATAL.

Utrecht. 4 Km. from Utrecht on Knight's Pass road,
fr. Jan., Story 1766 (PRE).

TRANSVAAL.

Lydenburg. 16 miles beyond Malips Drift, fl. May,
Obermeyer and Verdoorn 22 (PRE).

SWAZILAND.

Hlatikulu. Ingwavuma Poort, fr. March, Compton
28579 (NBG).

26. Asparagus krebsianus (Kunth) comb. nov.

Asparagopsis krebsiana Kunth, Enumeratio
Plantarum, 5 : 93 (1850).

Stems scrambling, slightly zigzagging, woody,
smooth or slightly ridged, grey-green, glabrous.
Branches solitary, almost always grooved, much-
branched, similar to the stems. Cladodes fasc-
icled, three-angled, rigid, mucronate, 15 to 20
mm. long or sometimes only 1 cm. or less, linear.
Tubers stalked, borne laterally on the main roots,
about 30 cm. long, fusiform. Spines present on
all stems and branches, pungent, slightly recurved,
brownish than the stems and branches; the rest of the
leaf not conspicuous. Peduncles 1- to 4- nate, with
or without spines, upto 10 cm. long, borne on main

branches. Pedicels solitary, 2.0 to 4.0 mm. long, articulated near the centre; the proximal half greatly thickened. Perianth segments oblong to obovate, the outer whorl narrower, 2.5 to 4.0 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.

Asparagus krebsianus is based on a specimen collected by Krebs at the Cape. The Krebs specimens are at Kiel, according to De Candolle (1880). It was described as having three-angled cladodes, spinous final branches, racemes, and pedicels 3 mm. long. These characters could apply to A. sarmentosus from which it can be separated, as Kunth mentioned that it had "rami" as well as "ramuli", but three-angled cladodes are unusual in A. sarmentosus. A. kougaensis differs in not having three-angled cladodes. The only other species in the section RACEMOSI with spines on the final branches is A. aethiopicus, and only one or two specimens of A. aethiopicus have been found with three-angled cladodes, and spines on the ultimate branches.

A. krebsianus scrambles on bushes and rocks and has usually been reported to occur on rocky slopes.

Flowers have been recorded in October,

December to February and April.

DISTRIBUTION.

CAPE.

Albany. Grahamstown, fl. Dec., Penther 1462 (BOL),
fl. July, Daly and Sole s.n. (PRE).

Alexandria. Alexandria, fl. Feb., Archibald 5488
(PRE).

Cathcart. Inverthorn, fl. Dec., Barker 3469 (NBG).

Komgha. Komgha, fl. Jan., Flanagan 2377 (BOL &
PRE), Flanagan 1895 (BOL).

Peddie. Peddie, fr. April, Barker 7821 (FBG).

Victoria East. Tukulu, fl. Jan., Acocks 11145
(PRE).

NATAL.

Hlabisa. Hluhluwe Game Reserve, fl. Jan., Ward
2941 (NH).

Utrecht. Utrecht, Thode A1298 (NH & PRE).

Weenen County, Griffins Hill, fl. Oct., Acocks
11413 (NH).

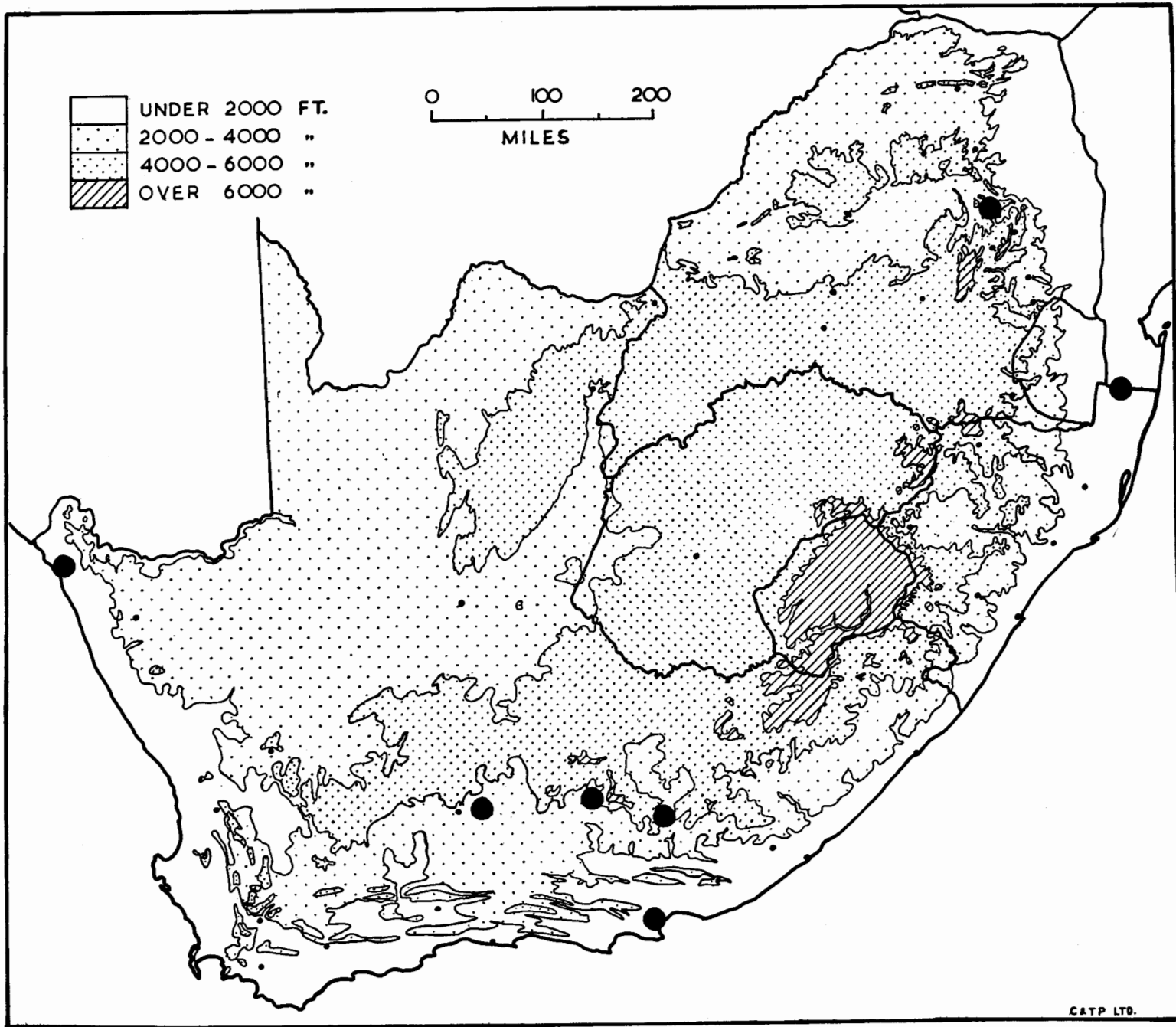
TRANSVAAL.

Brits. Jacksonstuin, fr. Feb., Codd 6805 (PRE);
near Hartebeespoort Dam, fr. Sept., Humbert and
Schweikerdt s.n. (PRE 22250).

Krugersdorp. Baviaanspoort, near Magaliesberg, fr.
July, Smith 351 (PRE); Wonderboom Reserve, fl.
Jan., Repton 1970 (PRE).

Lydenburg. Driekop, fl. Jan., Mogg and Barnard
s.n. (PRE).

Pretoria. Pretoria Koppies, fl. Jan., Leendertz
531 (BOL, GRA & PRE); Pretoria University Farm,



Map 27. Asparagus pubescens.

Robertson s.n. & 21 (PRE), fl. Feb., Codd 5914 (PRE); 30 miles along Malatlo road, fl. Jan., Repton 4915 (PRE); Derdepoort, fl. Nov., Robertson 123 (PRE).

27. Asparagus pubescens sp. nov.

Caules lignei, erecti vel scandentes, sarmentosi, teretes, pubescentes, laeves, cani. Rami divaricati vel ascendentes, recti vel leviter sarmentosi, 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 at ramulis vegetabilibus. Racemi in paribus, plerumque fere 3 cm. longi, aliquando spinosi. Pedicelli 1- ad 3- nati, 3 - 4 mm. longi, fere 1 mm. e ramo articulati. Perianthii segmenta similia, oblonga-obovata, fere 3 mm. longa, margine integra. Stamina leviter breviora quam perianthii segmenta; antherae fere 1 mm. longae. Stylus brevis, semi-divisus; ovarum fere sessile, ad fere 2 mm. longum. Bacca fere 6 mm. longa, semine solitario, laevigata.

Stems erect to scrambling, zigzagging, woody, terete, smooth, grey, densely pubescent. Branches spreading to ascending, straight or slightly zigzagging, usually solitary but sometimes upto 3-

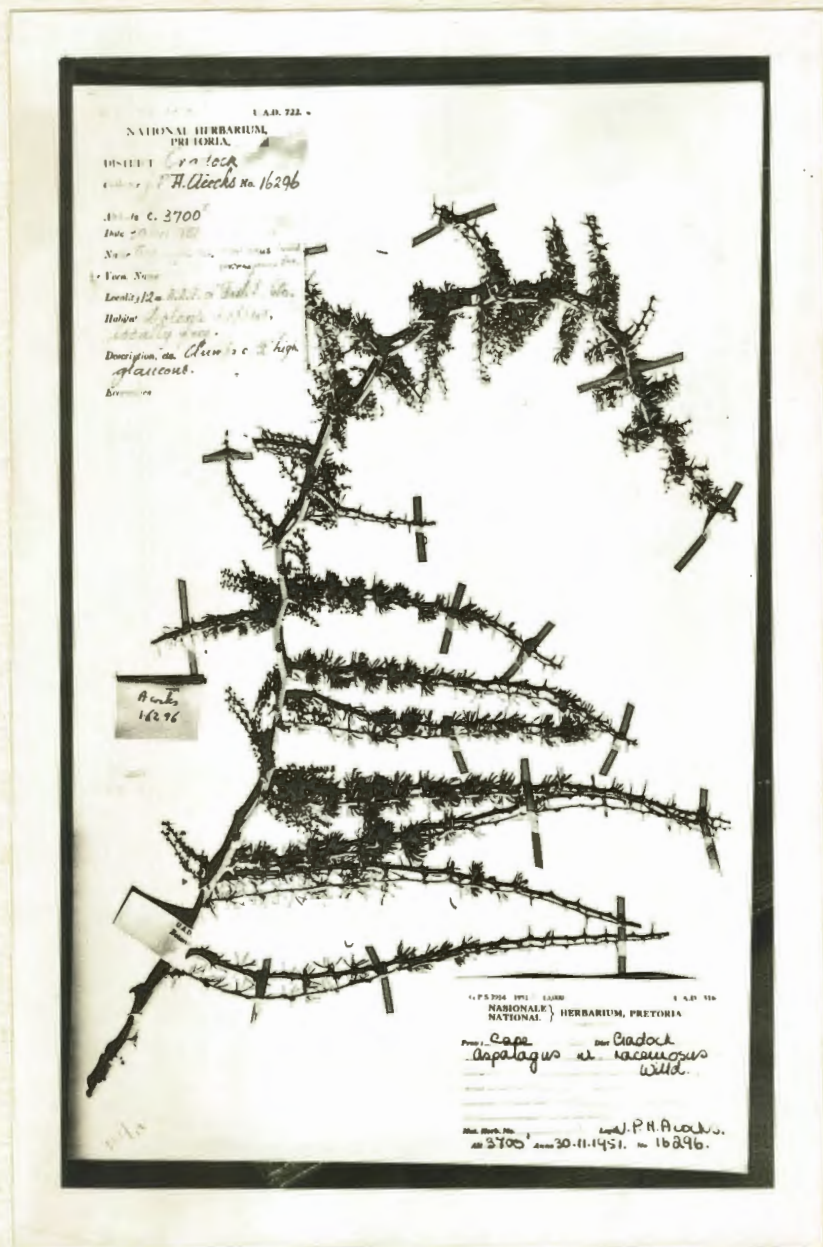


Fig. 46. Acocks 16296 (PRE).

The holotype of Asparagus pubescens sp. nov.

nate. Cladodes subulate, usually upto 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- to 3- nate, 3 to 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 1 mm. long. Style short, divided for about half its length; ovary almost sessile, upto about 2 mm. long. Fruit about 6 mm. diameter, 1-seeded, smooth.

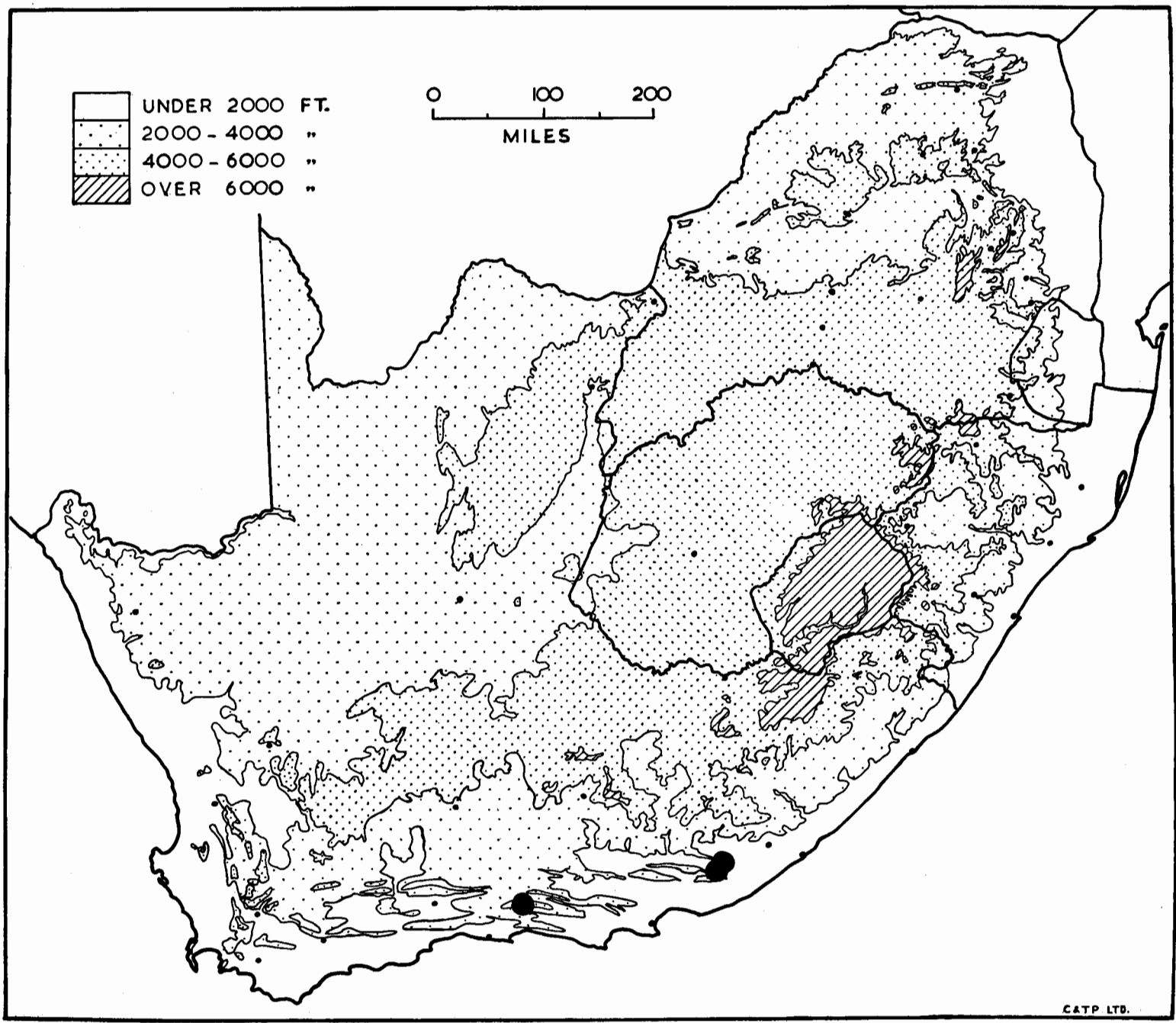
This species is one of the most densely pubescent species of Asparagus in South Africa. The normally strongly arcuate and recurved spines are also characteristic. The nearest species is A. racemosus from which it can be distinguished by the pubescence, the smooth stems, and more erect habit. Another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

The holotype is Acocks 16296 from the Cradock district. It is in the National Herbarium, Pretoria.

Nothing appears to have been recorded about its habitat.

Flowers have been recorded from October to January and in March.

Map 28. Asparagus kougaensis.



DISTRIBUTION.

CAPE.

Beaufort West. Sunnyside, fr. July, Esterhuysen
5036 (BOL).

Bedford. 13 miles N.N.E. of Cookhouse, fl. Oct.,
Acocks 11908 (PRE).

Craddock. 12 miles N.N.E. of Fish River Station,
fl. Nov., Acocks 16296 (PRE); Bergkwagga Park,
Barnard 513 (PRE).

Graaff Reinet. Humbledon ? Henrici 4964 (PRE).

Namagualand. Holgat, Pillans 5178 (BOL).

Port Elizabeth. Red House, fl. Dec., Paterson
978 (BOL), fr. June, Paterson 964 (BOL);
Addabas, fl. March, Brynard 455 (PRE).

Uitenhage. Aloes, fl. Dec., Drege s.n. (PRE).

NATAL.

Ingwavuma. Ndumu Game Reserve, fl. Jan., Ward
2034 (PRE).

TRANSVAAL.

Lydenburg. 2 miles north of Ohrigstad, fl. Nov.,
Young A616 (PRE).

28. Asparagus kougaensis sp. nov.

Caules lignei, sarmentosi, teretes, plerum-
que pubescentes, cani vel cano-fusci, aliquando
cortice cano exuviales. Rami divaricati vel
ascendentes, leviter sarmentosi, 1- vel 3- nati.
Cladodia per transversum secta ovalia, acuminata,
12 to 25 mm. longa, interdum scabrida, lateraliter

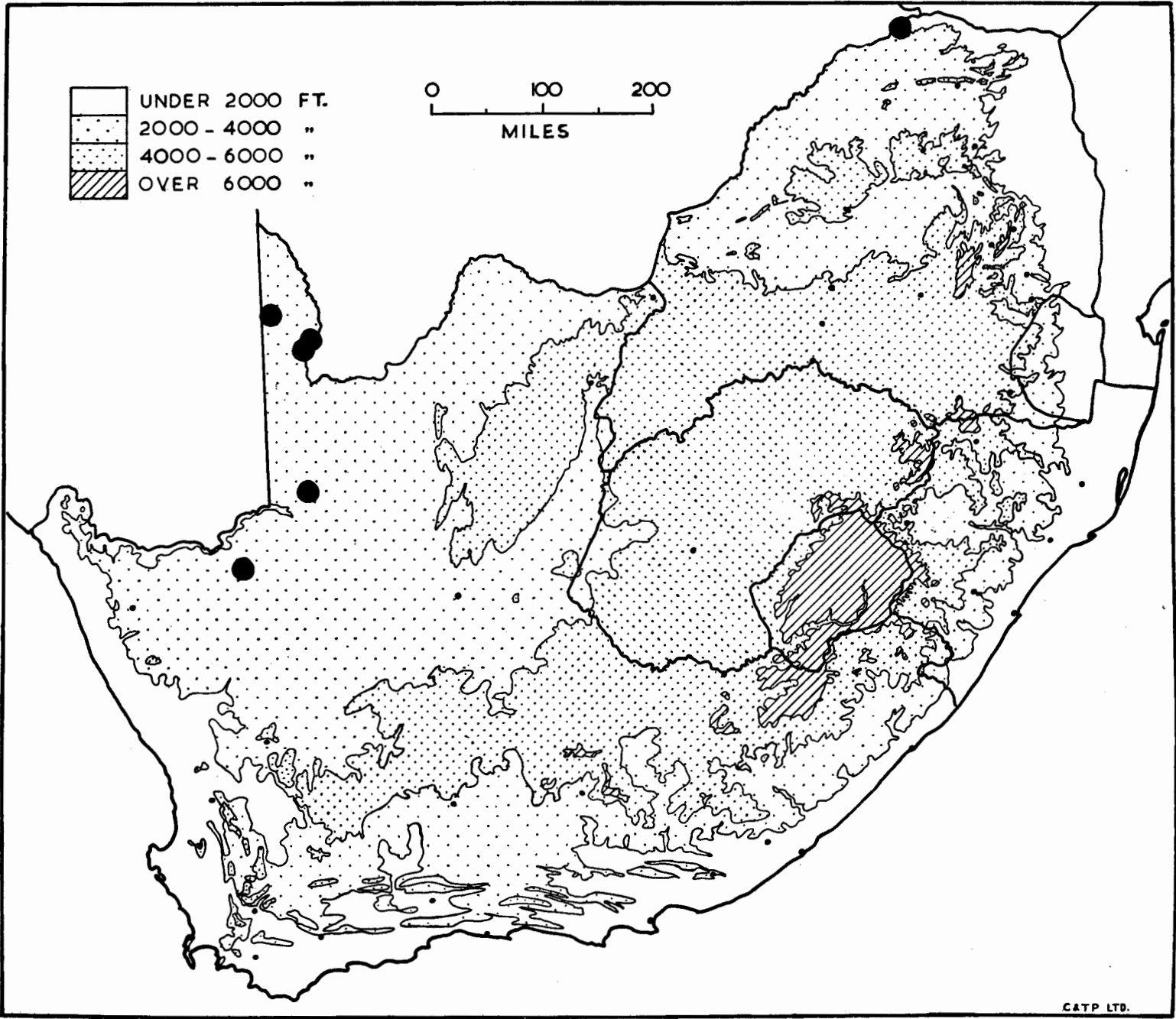
1- ad 3- nata, terminaliter as 12- nata. Spinae manifeste evolutae, reflexae, omnino in caulibus et ramulis vegetabilibus. Racemi in paribus, ad 6 cm. longi. Pedicelli 2 - 6 nati, 3 - 4 mm. longi, circa 1 mm. e ramo articulati. Perianthii segmenta similia, oblonga, aliquando leviter obovata, 3 mm. longa, lacticolorata. Stamina tertiae parti perianthii aequalia; antherae minutae. Ovarum 1 mm. longum, stipite brevi; stylus fere 0.5 mm. longus, semi-divisus.

Stems woody, sarmentose, terete, usually pubescent, grey or brownish grey, sometimes with the outer layers peeling. Branches spreading or ascending, slightly sarmentose, 1- or 3- nate. Cladodes oval in cross section, acuminate, 1- to 3- nate laterally, upto 12- nate terminally, sometimes scabrid, 12 - 25 mm. long. Spines well-developed, reflexed, present on all vegetative stems and branches. Racemes paired, upto 6 cm. long. Pedicels 2- to 6- nate, 3 - 4 mm. long, articulated about 1 mm. from the branch. Perianth segments similar, oblong, sometimes alightly 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 similar in general habit to A. racemosus, but has spines on the final branches.



Fig. 47. Esterhuysen 4670 (BOL).
The holotype of Asparagus kougaensis sp. nov.



Map 29. Asparagus nelsii.

It differs in its cladode shape in section, and in having shorter pedicels and racemes.

The holotype is Esterhuysen 4670 in the Bolus Herbarium.

The habitat has not been recorded.

Flowers have been recorded in January and February, which is earlier than for A. racemosus.

DISTRIBUTION.

CAPE.

Albany. Sushington Valley, Britten 2724 (GRA);
betw. Grahamstown and Fort Beaufort, Wiedermann
and Oberdieck 1045 (PRE); 13 miles from
Grahamstown towards Fort Brown, Britten 2003 (GRA);
Penrock Farm, fr. Jan., Dyer 1193 (GRA).
Uniondale. Kouga, fl. Jan., Esterhuysen 4670
(BOL), fl. Feb., Ecklon and Zeyher s.n. (BCI),
fl. Jan., Bond 909 (NBG).

29. Asparagus nelsii Schinz
Asparagus nelsii Schinz, Bull. Herb. Boiss.,
Series I, IV, app. iii : 44 (1896).

Stems erect, somewhat zigzagging, smooth, sometimes slightly pubescent, grey-white becoming brown as the outer layers disintegrate, generally upto about 50 mm. high. Branches spreading to ascending, solitary except on the older parts 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 plants, 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. Roots not known. 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 upto about 10 cm. long and branched, pale grey to yellowish, solitary or upto about 10-nate. Pedicels articulated once just below the centre, or sometimes twice, 2 - 5 mm. long, upto 4-nate. Perianth segments similar, free or fused for upto 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.

The holotype is Nels 20, and is in the Zurich Botanic Garden Herbarium. It has been examined on loan at the Bolus Herbarium, by the present author. It shows the typical characters of this species, namely the spines, and the form and colour of the racemes.

A. nelsii occurs mainly in the dry karroid and Kalahari areas of the northern Cape, Bechuanaland and South West Africa.

Flowering has been recorded from August to October.

DISTRIBUTION.

CAPE.

Gordonia. Near Mata Mata, Jessop 325 & 326 (BOL); near Twee Rivieren, Jessop 313 (BOL); 2 miles north of Twee Rivieren, Leistner 2236 (PRE); 11 miles north-east of Twee Rivieren, fl. Oct., Leistner 2899 (PRE); 40 miles north of Kakamas, Jessop 350 (BOL).

Hay. 8 miles east of Postmasberg, fl. Oct., Acocks s.n. (PRE).

Kenhardt. Near Pofadder, Jessop 352 (BOL).

Kuruman. Tellery Pan near the Kuruman River, Leistner 2167 (PRE).

TRANSVAAL.

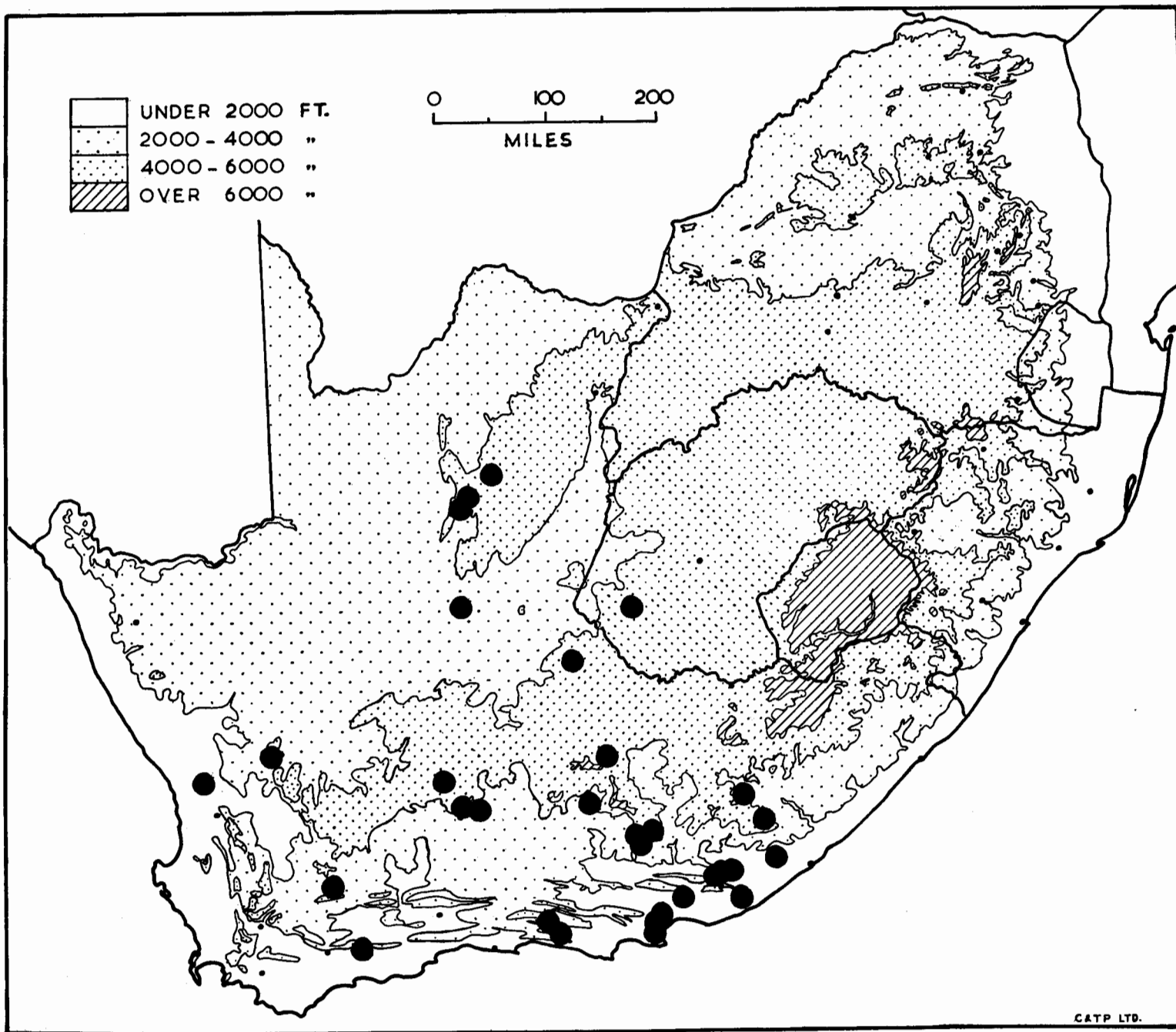
Zoutpansberg. Hackthorne Farm, fl. Aug., Codd 4336 (PRE).

Also recorded from Keetmanshoop, Otjiwarongo and Okavongoland in South West Africa, and from the Mahalapye district in Bechuanaland

SECTION STRIATI:

The section STRIATI is characterised by the erect, woody, greenish, grooved stems, the very rigid cladodes, and terminal flowers. In this

Map 30. Asparagus striatus.



section there is a range of form from plants in which the solitary, grooved flattened cladodes are identical in surface characters to the branches, to specimens with fascicled, terete cladodes. This latter form shows much in common with A. denudatus, vegetatively.

30. Asparagus striatus (Linn. f.) Thunb.

Dracaena striata Linnaeus fil., Supplementum Plantarum : 204 (1781).

Dracaena erecta Linnaeus fil., Supplementum Plantarum : 204 (1781).

Asparagus striatus (Linn. f.) Thunberg, Prodrum Plantarum Capenium : 65 (1794).

Asparagus erectus (Linn. f.) Thunberg, Prodrum Plantarum Capensium : 65 (1794).

Dracaena stricta Schultes, Systema Vegetabilium, 7 : 346 (1829).

Myrsiphyllum striatum (Linn. f.) Kunth, Enumeratio Plantarum, 5 : 110 (1850).

Myrsiphyllum erectum (Linn. f.) Kunth, Enumeratio Plantarum, 5 : 109 (1850).

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 to 5 mm. broad, rarely almost terete, very firm and



Fig. 48. The holotype of Asparagus striatus
in the Thunberg Herbarium, Uppsala.

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 one to two or about 15 or more, about 5 mm. long, articulated below the centre. Perianth segments 3 to 4 mm. long, oblong-obovate with a serrated apex or not, similar. Stamens not spurred, almost as long as the perianth segments; anthers about mm. long. Style branches very short; style about 1 mm. long. Berry fleshy, about 5 mm. diameter, generally 1- or 2- seeded, red.

The types of Dracaena striata and D. erecta are cited by Linnaeus the younger as having been collected at the Cape by Thunberg. There are two specimens labelled Asparagus erectus and one labelled A. striatus in the Thunberg Herbarium in Uppsala. These have been examined by the present author. Thunberg, in his "Prodromus", only cites the younger Linnaeus' name for A. erectus, but there can be no doubt that the omission of Dracaena striata was accidental, as all the other species collected at the Cape by Thunberg and regarded as Dracaena species by Linnaeus are cited. All three of these specimens show flattened, several veined cladodes and terminal flowers. Although Dracaena striata and D. erecta were described in the same work, the epithet striatus is preferred by the present author as it is probably in more common use. Linnaeus separated these two species on D. erecta being herb-

aceous 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.

Schultès cited both Asparagus striatus Thunb., and Dracaena striata Linn. fil. as synonyms for his D. stricta which is, therefore, very likely to have been an orthographic error.

This species occurs in dry areas, particularly on rocky hills, over much of the Cape Province east of Laingsburg.

Flowers have been recorded from August to January and in March.

DISTRIBUTION.

CAPE.

Albany. Betw. Committee's Drift and Brak River, fl. Oct., Acocks 11892 (PRE); Bothas Hill, Rogers 27559 (STE).

Alexandria. Bushman's River Poort, fl. Dec., Galpin 2976 (PRE).

Bathurst. Hopewell, fl. Jan., Acocks 11128 (PRE).

Beaufort West. Gamka Pass, fl. Nov., Hardy and Bayliss 990 (PRE); Sunnyside, Esterhuysen 4356 (BOL).

Calvinia. Calvinia, Schmidt 232 (PRE).

Clanwilliam. Brakfontein, Ecklon and Zeyher s.n.

(BOL).

Cradock. Cradock, Killick 796 (PRE).

De Aar. Near De Aar, fr. March, Schweikerdt 1206

(PRE).

Graaff Reinet. Graaff Reinet, Thode A619 (PRE);

near Graaff Reinet, fl. Nov. - Dec., Bolus 516

(BOL).

Hay. Floradale hills, fr. April, Esterhuysen s.n.

(BOL & PRE); Bergenaar's Pad, fl. Oct.,

Halfstrom and Acocks 1314 (BOL).

Kuruman. Lohatlha, fr. April, Esterhuysen 2414

(BOL).

Laingsburg. Ngaap Kop, Compton 3139 (BOL),

Compton 9242 & 13243 (NBG).

Middelburg. Middelburg, Theron 454 (PRE).

Peddie. 15 miles from Peddie towards East London,

Barker 3969 (NBG).

Port Elizabeth. Near Port Elizabeth, Fries,

Norlindh and Weimarck 80 (PRE); Swartkops River,

fl. Aug. & fr. Oct., Zeyher 480 (BOL, PRE, SAM &

STE), fl. Nov., Zeyher 4170 (SAM); Red House,

fr. June, Paterson 957 (BOL), fl. Oct., Paterson

957 (SAM).

Prieska. Prieska, fl. Nov., Bryant J330 (PRE).

Queenstown. Oxton Manor near Whittlesea, Galpin

7373 (BOL).

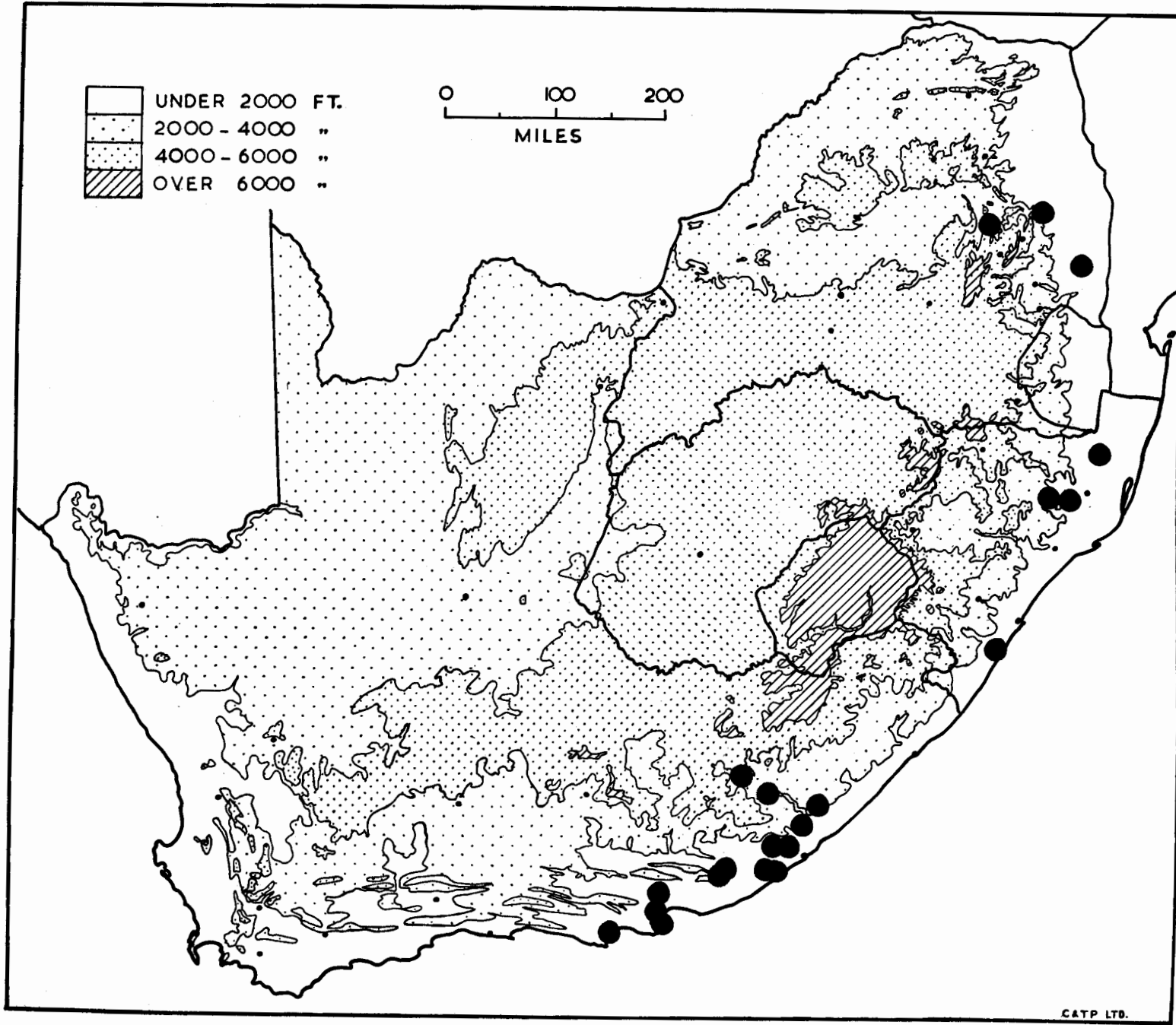
Riversdale. Riversdale, Smith 2778 (PRE), Bolus

s.n. (BOL).

Somerset East. Near Middleton, fl. Nov., Rogers

s.n. (BOL 12939); Boschberg, fl. March, MacOwan

Map 31. Asparagus subulatus.



1773 (SAM), fl. Nov., MacOwan 1772 (SAM); Fish River near Somerset East, fl. March, MacOwan 1808 (SAM).

Uniondale. Kouga near Joubertinia, fr. Jan., Bond 908 (NBG); Kouga near Misgund, Compton 7483 (NBG); Kouga, fr. Jan., Esterhuysen 4681 (BOL).

Uitenhage. 1 or 2 miles from Barkly Bridge and Alexandria railway line, Marais 147 (PRE).

Victoria East. Breakfast Vlei, fr. Dec., Barker 2834 (NBG).

Victoria West. Slypfontein, Rehm s.n. (PRE).

ORANGE FREE STATE.

Fauresmith. Fauresmith, Pole Evans 1601 (PRE).

TRANSVAAL.

Between Delagoa Bay and Pretoria, fl. Aug. - Oct., Bolus 9789 (BOL). In view of its distance from other recorded localities for this species, and the rather vague locality and date on the label, this record is open to doubt.

Also recorded from Kraai Kluit, South West Africa.

31. Asparagus subulatus Thunb.

Asparagus subulatus Thunberg, Prodrum Plantarum Capensium : 66 (1794).

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

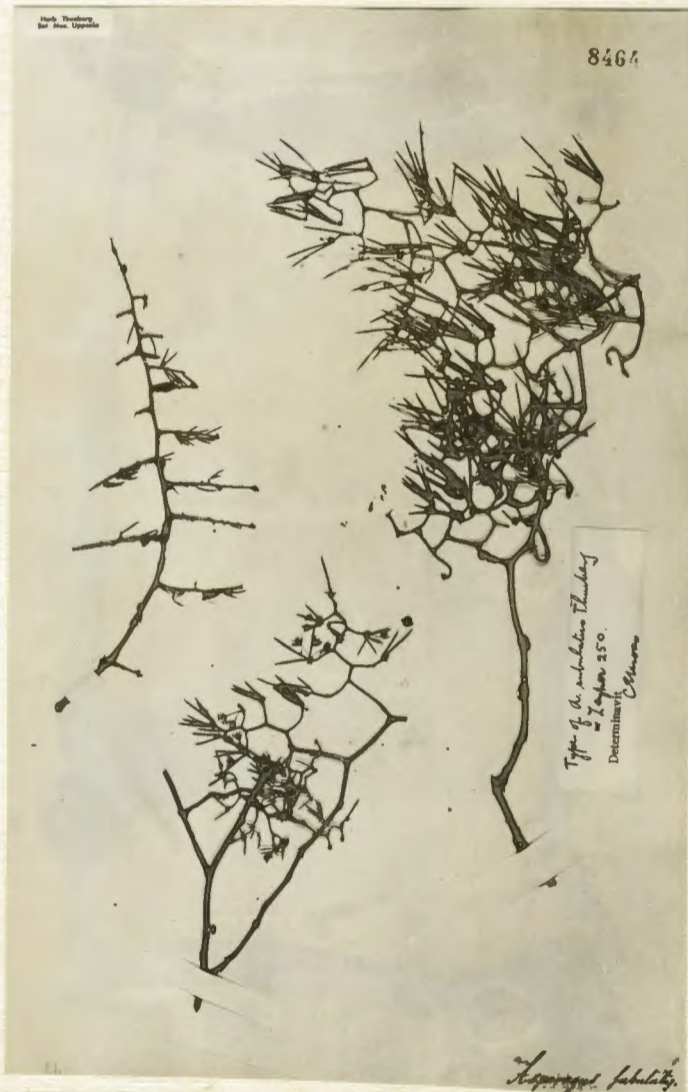


Fig. 49. The holotype of Asparagus subulatus in the Thunberg Herbarium, Uppsala. The specimen on the left probably belongs to Asparagus africanus.

sometimes upto ten or more terminally and paired laterally. terete, grooved, upto 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 one to about 15, 3 to 5 mm. long, articulated below the centre. Perianth segments 3 to 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 0.5 mm. long. Style branches rather short; style about 1 mm. long. Fruit about 5 mm. diameter, fleshy, 1- to 3-seeded; perianth persistent and conspicuous.

The holotype of this species is a specimen collected by Thunberg at the Cape and now in the Thunberg Herbarium in Uppsala. It has been examined on loan at the Bolus Herbarium by the present author. It shows the reflexed branches, firm cladodes and terminal flowers.

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 not been found sufficiently variable even to distinguish a variety.

A. subulatus occurs in dry areas, especially rocky slopes, mainly in the south eastern parts of

the Cape, but also in parts of the Transvaal and Natal.

Flowers have been recorded from September to November and in January.

DISTRIBUTION.

CAPE.

Albany. Betw. Committee's Drift and Brak River, fl.

Oct., Acocks 11893 (PRE); Farm Glen Boyd, fl.

Nov., Linstedt 18 (PRE); Sandy Drift near

Grahamstown, fl. Oct., Daly 70 (SAM).

Butterworth. Overlooking the Butterworth River,

Pegler 2078 (BOL).

Cathcart. Near the Swart Kei River, 15 miles north

of Cathcart, Roberts 1827A (PRE).

East London. Fort Jackson, fl. Oct., Adkins s.n.

(PRE); Chalumna Causeway, fr. Nov., Barker

6966 (NBG).

Humansdorp. Zeekoe River mouth, fl. Oct., Fourcade

5802 (NBG).

King Williams Town. King Williams Town, Sim 1047

(BOL).

Komgha. Kabousie River near Komgha, fl. Sept.,

Flanagan 2584 (BOL & SAM), fl. Feb., Flanagan

1293 (SAM).

Peddie. 15 miles from Peddie towards East London,

Barker 3969 (NBG).

Port Elizabeth. Swartkops River, fl. Nov.,

Ecklon and Zeyher 250 (BOL, PRE, STE & SAM);

Red House, fl. Nov., Paterson 3307 (BOL).

Queenstown. Bolotwa, fl. Oct., Thorns s.n. (NBG);

Newstead below Otterburn, fr. Nov., Acocks 12158
(PRE).

Uitenhage. Enon, fl. Nov., Thode A2768 (PRE);
Addo National Park, fl. Oct., Archibald 3781
(PRE).

Victoria East. Breakfast Vlei, fr. Dec., Barker
2834 (NBG).

NATAL.

Mahlabatini. Umfolosi Game Reserve, fr. Sept.,
Ward 4377 (PRE); Mahlabatini, fl. Oct.,
Gerstner 2825 (PRE).

Ubombo. Mkuzi Game Reserve, fl. Jan., Ward 3991
(PRE).

Umzinto. Impambanyon Valley, Sawoti, fl. Sept.,
King 98 (PRE); Umpambinyoni River, fl. Sept.,
Thode 3430 & 3431 (STE).

TRANSVAAL.

Lydenburg. Lulu Mountains, fr. Sept., Mogg 16890
(PRE); Driekop, fr. Jan., Barnard and Mogg
602A (PRE).

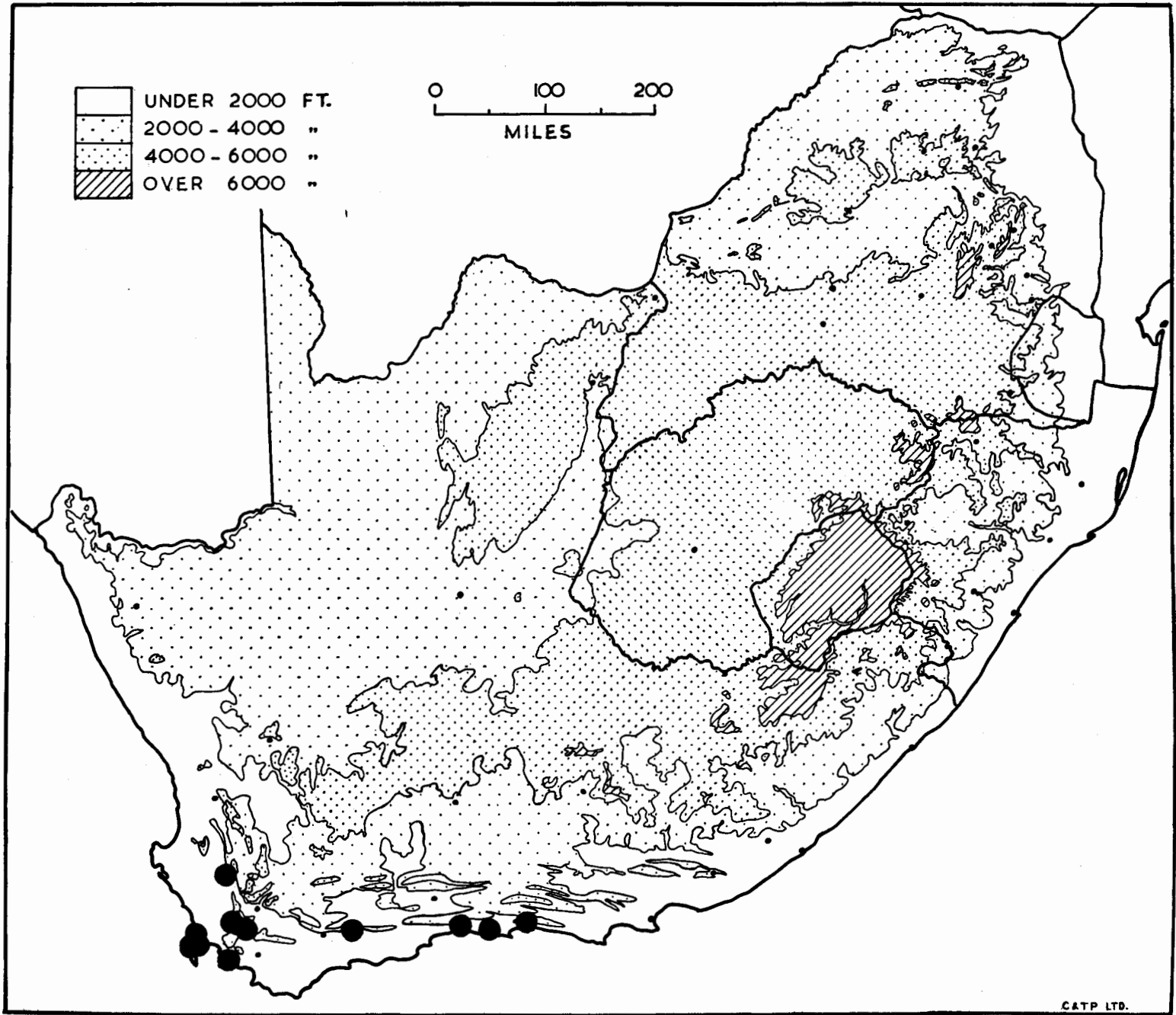
Pilgrims Rest. 1 mile N.E. of Skukuza, fr. Nov.,
Codd 5718 (PRE); Marieps Kop, fl. Nov., Killick
and Strey 2380 (PRE), fr. July, Van der Schyff
5589 (PRE).

Zoutpansberg. Ingwe Motel, fl. Nov., Jacobsen
1876 (PRE).

SECTION SCANDENTES:

The section SCANDENTES is very similar to the
section CRISPI, but has perennial stems. The main

Map 32. Asparagus scandens.



CATP LTD.

characters of the section CRISPI are the spurred filaments and the presence of many seeds in the fruit. It is felt that these characters are sufficient to separate these groups at section level, as reliable flower and fruit characters are rare in the genus, and when present, can be regarded as of particular importance.

32. Asparagus scandens Thunb.

Asparagus scandens Thunberg, Prodrum
Plantarum Capensium : 66 (1784).

Asparagus pectinatus Redouté, Liliacées,
7 : t.407 (1813).

Asparagopsis scandens (Thunb.) Kunth,
Enumeratio Plantarum, 5 : 78 (1850).

A weak shrublet, scrambling or climbing to 2 metres, glabrous. Stems perennial, 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 to 1.5 cm. long, 0.8 to 1.6 mm. broad. Leaves much-divided, scarious, not spine-forming. Roots tuberous; the tubers 2 to 3 cm. long, about 0.5 cm. broad, borne on long stalks. Peduncles axillary, usually solitary, occasionally 2- to 3- nate, 8 to 12 mm. long, articulated in the distal half. Perianth segments obovate, the outer whorl slightly



Fig. 50. The syntypes of Asparagus scandens
in the Thunberg Herbarium, Uppsala.

(Photograph made from the International
Documentation Centre micro-fiche edition.)

smaller; the margins entire or minutely toothed, spreading, 3 to 4 mm. long; white or rarely pinkish. Stamens nearly as long as the perianth segments; filaments not spurred; anthers yellow, 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.

Asparagus scandens was described from two specimens in the Thunberg Herbarium, marked "a" and "b". They are labelled: "A.s. e Cap. b. spei. Thunberg", and there is no significant difference between them. These specimens have been examined at the Bolus Herbarium by the present author.

Redouté's illustration, which accompanies the description, shows the floral, fruiting and vegetative characters of A. scandens Thunb. Redouté regarded it as possible that his figure was of A. scandens Thunb., and this is made virtually certain by the ternate, falcate cladodes, green, spineless stems, pendulous flowers, and general habit. Redouté obtained his specimen from "l'orangerie du jardin la Malmaison."

Asparagus scandens 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.

DISTRIBUTION.

CAPE.

Caledon. Betty's Bay, Oliver s.n. (BOL), Topper
88 (NBG).

George. Forest between Wilderness and George, fl.
Oct., Story 3561 (PRE).

Knysna. Blaaukrantz Pass, fl. Sept., Galpin 4738
(PRE); Knysna woods, Fries, Norlindh and
Weimarck 540 (PRE); near Knysna, Werdemann and
Oberdieck 355 (PRE).

Paarl. Franschhoek, Phillips 1345 (SAM).

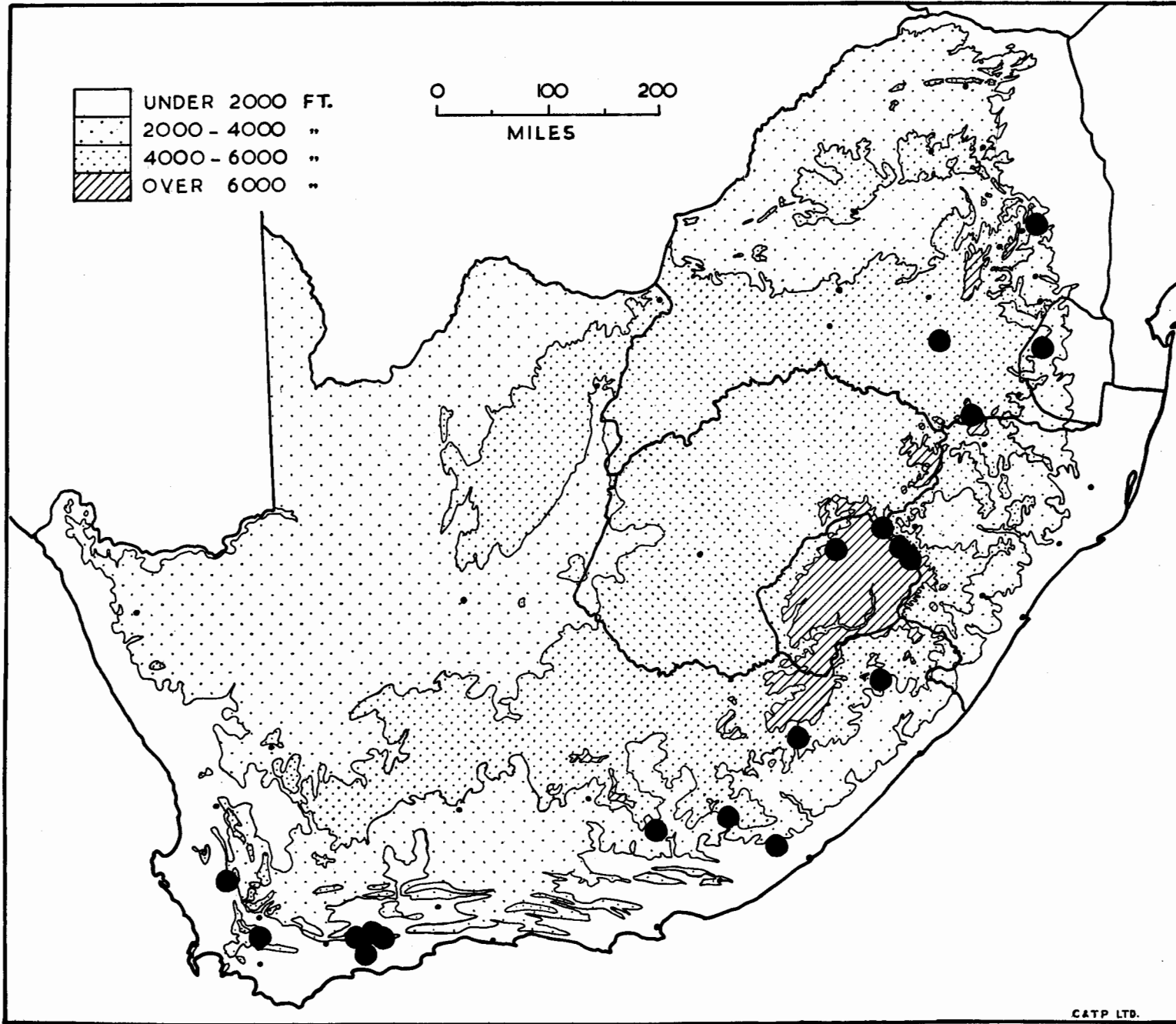
Riversdale. Garcias Pass, Thorne s.n. (SAM 38913);
Lorènte River, Muir 547 (PRE); Grootvadersbos,
Zeyher 4173 (BOL), fl. Sept., Zeyher 8570b (STE).

Stellenbosch. Jonkershoek, fr. Jan., Rodin 3233
(BOL & PRE), Werdemann and Oberdieck 355 (PRE),
fl., Duthie s.n. (STE); Swartboskloof, fl. Sept.,
Van der Merwe 23-48 (PRE & STE).

Swellendam. Strawberry Hill, fl. Oct., Van der
Merwe s.n. (STE 10200).

Tulbagh. Tulbaghkloof, Ecklon and Zeyher s.n.
(PRE).

Wynberg. Hout Bay, fl. Sept., Prior s.n. (PRE);
Karbonkelberg, Oliver s.n. (BOL); Devils Peak,
fl. Sept., Wolley Dod 1739 (BOL); behind
Rondebosch, fl. Sept., Bolus 3783 (BOL);
Slangolie, fl. Oct., Marloth 1764 (PRE);
Skelton Gorge, fl. Sept., Marloth 4517 (PRE);
Cecilia Ravine, fl. & fr. March, Marloth s.n.
(PRE); Disa Gorge, fr. March, Andreae 300 (PRE
& STE); Nursery Buttress, Jessop 132 (BOL).



Map 33. *Asparagus ramosissimus*.

33. Asparagus ramosissimus Baker.

Asparagus ramosissimus Baker, Gardeners
Chronicle : 6 (1874).

Asparagus scandens Thunb. var deflexus
Baker, J. Linn. Soc., 14 : 622 (1875).

Stems weak and scrambling or climbing, upto
1 metre 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
to 15 mm. long. Leaves not spine-forming. Peduncles
solitary, 2 to 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 upto 1 mm. long. Style sometimes at least,
unbranched, about 1 mm. long; ovary about 1.5 mm.
long. Berry globose, fleshy, upto nearly 1 cm.
diameter, 1- or 2- seeded, red.

Baker described A. ramosissimus as "Wide climbing,
leaves obscurely spurred at the base, cladodes 3- to
8- nate, flattened, linear, falcate, acute, 1/4
to 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 (M.S. 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.

Baker (1875) described A. scandens var deflexus from MacOwan 1771 (isotypes are in the Bolus and South African Museum Herbaria), as having very zigzag branchlets, firmer and smaller cladodes and smaller flowers than in the typical variety of A. scandens.

This species occurs in moist shady places from the Worcester district through the southern Cape and Natal upto the eastern Transvaal.

Flowers have been recorded from September to January and in June.

DISTRIBUTION.

CAPE.

Heidelberg. Grootvadersbos, Zeyher 4168 (PRE);
betw. Port Beaufort and Riversdale, Lewis 5941
(NBG).

Keeskama Hoek. Cala Forest Reserve, fl. Jan.,
Story 3269 (NBG).

King Williams Town. Pirie, fl. Nov., Flanagan
2235 (PRE & SAM).

Mount Ayliff. Insiswa Mountains, Schlechter 6439
(BOL).

Riversdale. Langeberg above Novo, Muir 2793 (PRE);
Garcias Pass, fl. Oct., Thorne s.n. (SAM 38913);
Kampsche Berg near Garcias Pass, fl. Oct., Galpin
4737 (PRE), fl. Sept., Muir 2977 (BOL).

Somerset East. Boschberg, fl. Dec., MacOwan 1771
(BOL & SAM).

Stockenstroom. Hogsback, fl. Dec., Barker 1901
(NBG), Bokelmann 7-28 (NBG); Katberg, fl. Dec.,
Galpin 1735 (PRE).

Swellendam. Tradouw Pass, fl. Sept., Walgate
914 (NBG).

Tulbagh. Saron, Schlechter 919 (PRE).

Worcester. Welgevonden, fl. June, Esterhuysen
1902 (BOL).

NATAL.

Bergville. Ndedena, fr. July, Esterhuysen 28502
(BOL); Mont Aux Sources, fr. May, Lewis 2147
(SAM); Cathedral Peak Forest Reserve, fl. Nov.,
Killick 1105 (PRE); Natal National Park, fl.
Dec., Galpin 10173 (PRE).

Estcourt. Cathkin Park, Howlett 47 (NH).

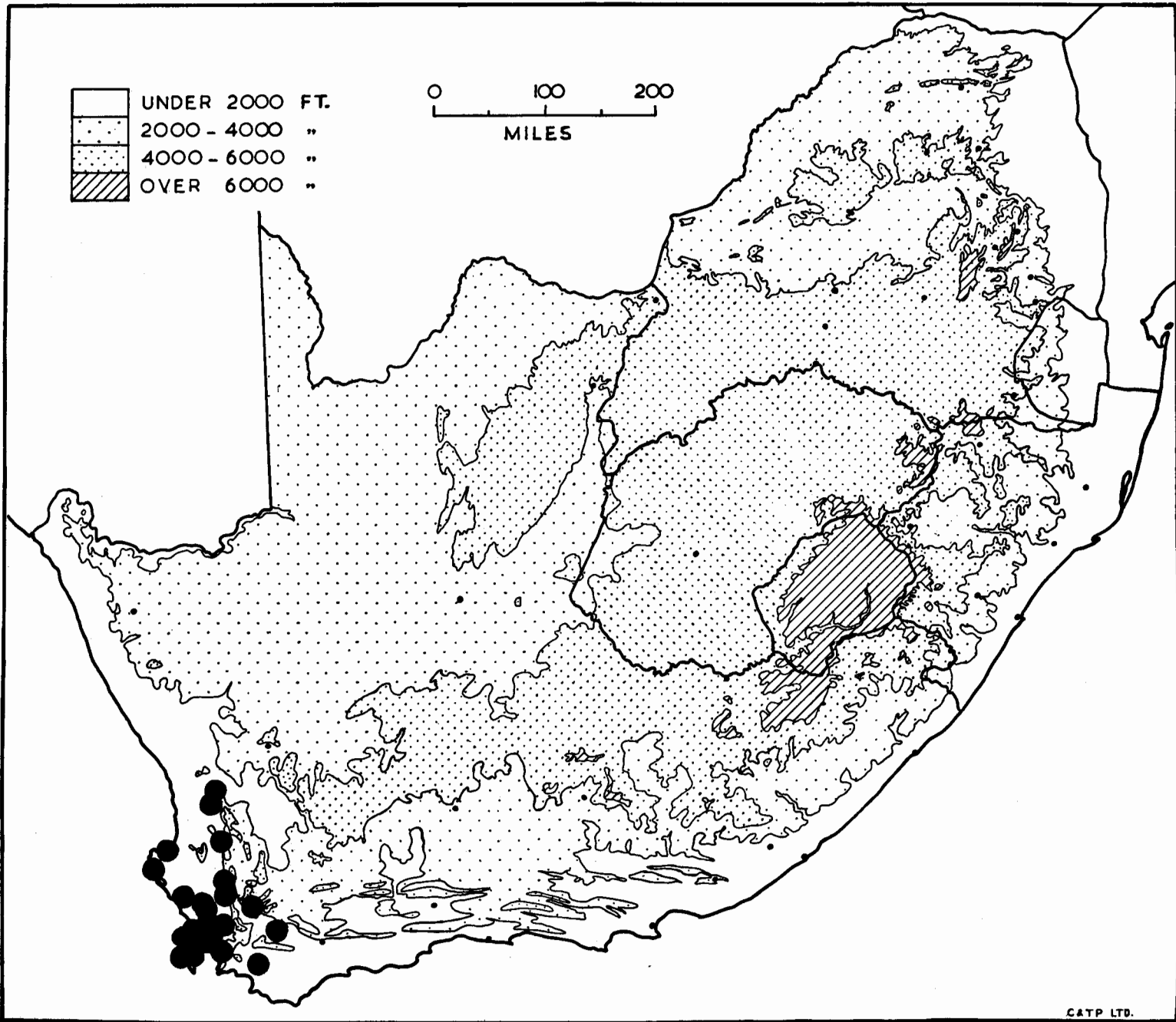
ORANGE FREE STATE.

District? Koolhoek, fl. Nov., Thode 3420 (STE).

TRANSVAAL.

Ermelo. Spitskop, Pott 15118 (PRE).

Pilgrims Rest. Graskop, fl. Nov., Galpin 14531
(BOL & PRE); Mariepskop, fl. Jan., Van der Schyff



Map 34. Asparagus crispus.

4534 (PRE).

Pretoria. Woderboomspruit, Mogg 14754 (PRE).

Wakkerstroom. Wakkerstroom, Devenish 206 (PRE).

SWAZILAND.

Mbabane. North of Mbabane, Compton 29119 (NBG);

N.W. of Mbabane, fr. Feb., Compton 30552 (NBG &

PRE); Bomon Ridge, Compton 31186 (NBG); Stroma,

fl. Oct., Compton 28084 (NBG & PRE).

BASUTOLAND.

Leribe. Pitzeng, Dieterlen 707 (PRE).

Locality not identified. Yorkshire Wolds, fl. Oct.,

Thode 3433 (STE).

SECTION CRISPI:

The section CRISPI is identified by the annual nature of the shoots, and the fact that the cladodes are ternate. These characters are shared with some plants in the section SCANDENTES, but this section can be separated from the section SCANDENTES by the spurred anther filaments and ovoid fruits containing several seeds.

34. Asparagus crispus Lam.

Asparagus crispus Lamarck, Encyclopedié
Methodique, 1 : 295 (1783).

Asparagus flexuosus Thunberg, Prodrum
Plantarum Capensium : 66 (1794).

Asparagus decumbens Jacquin, Hortus
Schönbrunnensis, 1 : 51 & t.97 (1797).

Asparagopsis decumbens (Jacq.) Kunth,

Enumeratio Plantarum, 5 : 77 (1850).

Stems annual, weak. straggling or climbing, usually upto 1 metre 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 to 9 mm. long, less than 1 mm. broad and usually less than 1/2 mm. broad. Leaves frequently forming soft spine-shaped processes, grey. Roots tuberous; the tubers borne on short stalks, 3 to 6 cm. long, 0.5 to 1.5 cm. broad. Peduncles solitary, axillary, 6 to 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 to 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 to 4 ovules in each chamber. Berry ovoid, 3 to 9 seeded, 8 - 15 mm. long, pale coloured; style persistent and conspicuous; perianth persistent.

Lamarck's description in his Encyclopedié agrees with the present author's concept of A. crispus in the nature of the stem, the shape and arrangement of the

cladodes, the form of the branches, the lack of spines, and in having solitary flowers, however, he cited the origin of the specimen as Mauritius ("L'Isle de France"). The only Mauritian species seems to be A. umbellulatus Bresler, which differs in having fascicled cladodes, flowers not solitary, peduncles articulated in the centre, and a globose fruit. The origin of the holotype, which should be in Herb. Lamarck in Paris, was probably erroneously given.

The illustration by Jacquin in his "Hortus Schönbrunnensis" includes an accurate drawing of the flower, which shows the truncate base and cylindrical proximal part characterising A. crispus Lam. as construed by the present author.

Thunberg's Asparagus flexuosus is represented by a specimen in Herb. Thunberg with the small cladodes characteristic of this species. This specimen has been examined by the present author.

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 west Cape from St Helena in the north, round the coast as far as Swellendam. It also grows inland as far as Worcester.

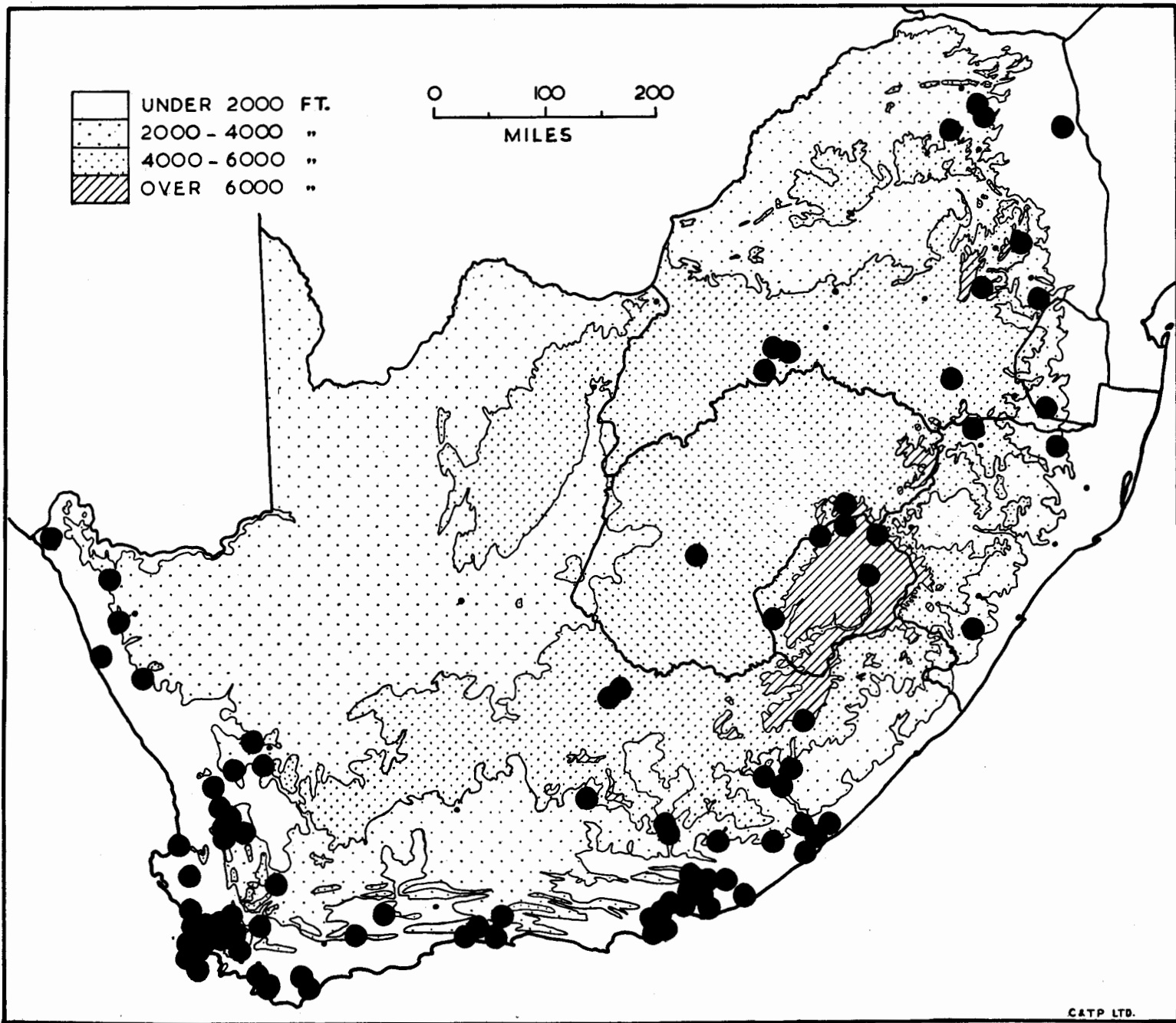
Flowers have been recorded from June to October.

DISTRIBUTION.

CAPE.

- Caledon. Caledon, Van Niekerk 739 (BOL).
- Cape Town. Robben Island, fr. Aug., Walgate 494 (NBG); Cape Town, Humbert 9501 (PRE); Signal Hill, fl. July, Dümmer 1600 (SAM); Blaauwberg, Oliver s.n. (BOL).
- Clanwilliam. Betw. the Olifants River and Brakfontein, Ecklon and Zeyher s.n. (PRE); north side of Grey's Pass, fl. June, Leipoldt s.n. (BOL 26837); Clanwilliam, fr. July, Esterhuysen 5533 (BOL), Leipoldt 440 (SAM).
- Humansdorp. Mouth of Klein River, fl. Aug., Zeyher 4155 (BOL).
- Malmesbury. St Helena Bay, Marloth 8034 (PRE); Saldanha Bay, Marloth 10186 (PRE); Malmesbury, fr. Sept., Esterhuysen 4358 (BOL); Darling Flora Reserve, fl. June, Rycroft 1931 (BOL & NBG), fr. Aug., Lussem 76 (NBG); betw. Klipheuvcl and Malmesbury, fr. July, Pillans s.n. (BOL 26839).
- Paarl. Tigerberg, Pillans 8657 (BOL); Paarlberg, fl. July, Van der Merwe 1142 (PRE); Huguenot, Barber 2 (BOL & NBG).
- Robertson. Robertson, fl. June, Van Niekerk 383 (BOL & PRE).
- Simonstown. Lakeside Plateau, Jessop 62 (BOL), Oliver s.n. (BOL); Muizenberg, leg.? (STE).
- Somerset West. Waterkloof, fr. July, Parker 3816 (BOL & NBG); Knorhoek, fl. July, Jessop 61 (BOL).
- Stellenbosch. Faure, fr. Aug., Parker 4484 (NBG, PRE & SAM); Jonkerhoek, fr. Aug. - Sept., Barnes s.n. (BOL 26838), fl. July, Duthie 527 (BOL & STE),

Map 35. Asparagus asparagoides.



- fl. July, Strey 520 (PRE); along Meulsloot and Eerste River, Van Rensburg s.n. (STE).
- Tulbagh. Nuwe Kloof, fl. Oct., MacOwan 3199 (SAM); Saron, Schlechter 7892 (BOI).
- Worcester. Karroo Garden, fl. July, Leighton 1037 (NBG).
- Wynberg. Karbonkelberg, Jessop 122 (BOL), fr. Sept., Oliver s.n. (BOL); Princess Vlei, Jessop 60 (BOL), Marloth 11050 (PRE); Kirstenbosch, fl. Aug., Compton 14640 (PRE), fr. July, Salter 7356 (BOL); Table Mountain, fl. Sept., Bolus 4753 (BOL).
- Without locality. fl. July, Prior s.n. (PRE).
- Locality not identified, Kamma Pass, fl. May, Zeyher 4166 (STE).

SECTION MYRSIPHYLLI:

The section MYRSIPHYLLI is identified by the solitary flattened cladodes with more than one vein. The roots are tuberous. The aerial stems are annual. Spines are absent. The anther filaments are spurred. Most species are climbers. The flowers are axillary and the perianth is reflexed from the centre. All the known species occur in South Africa.

35. Asparagus asparagoides (L.) Wight.
Medeola asparagoides Linnaeus, Species Plantarum : 339 (1753).
Medeola angustifolia Miller, Gardening

Dictionary (1768).

Dracaena medeoloides Linnaeus fil.,

Supplementum : 203 (1781).

Dracaena volubilis Linnaeus fil.,

Supplementum : 204 (1781).

Asparagus volubilis (L.f.) Thunberg,

Prodromus Plantarum Capensium : 66 (1794).

Asparagus medeoloides (L.f.) Thunberg,

Prodromus Plantarum Capensium : 66 (1794).

Ruscus volubilis Thunberg, Prodromus

Plantarum Capensium : 13 (1794).

Myrsiphyllum asparagoides (L.) Willdenow,

Ges. Naturf. Fr. Berl., Mag. 2 : 25 (1808).

Myrsiphyllum angustifolium (Miller) Willdenow,

Ges. Naturf. Fr. Berl., Mag. 2 : 25 (1808).

Myrsiphyllum falciforme Kunth, Enumeratio

Plantarum, 5 : 107 (1850).

Myrsiphyllum gramineum Kunth, Enumeratio

Plantarum, 5 : 108 (1850).

Myrsiphyllum krausianum Kunth, Enumeratio

Plantarum, 5 : 107 (1850). Ex errore

M. kraussianum.

Hecatrix asparagoides (L.) Salisbury, Genera

Plantarum : 66 (1866).

Asparagus krausii Baker, J. Linn. Soc.,

14 : 628 (1875). Ex errore A. kraussii.

Asparagus asparagoides (L.) Wight, in

Century Dictionary, 11 : 845 (1909).

Asparagus krausianum (Kunth) MacBride, Contrib.

to Gray Herb., 56 : 17 (1918). Ex errore

A. kraussianus.

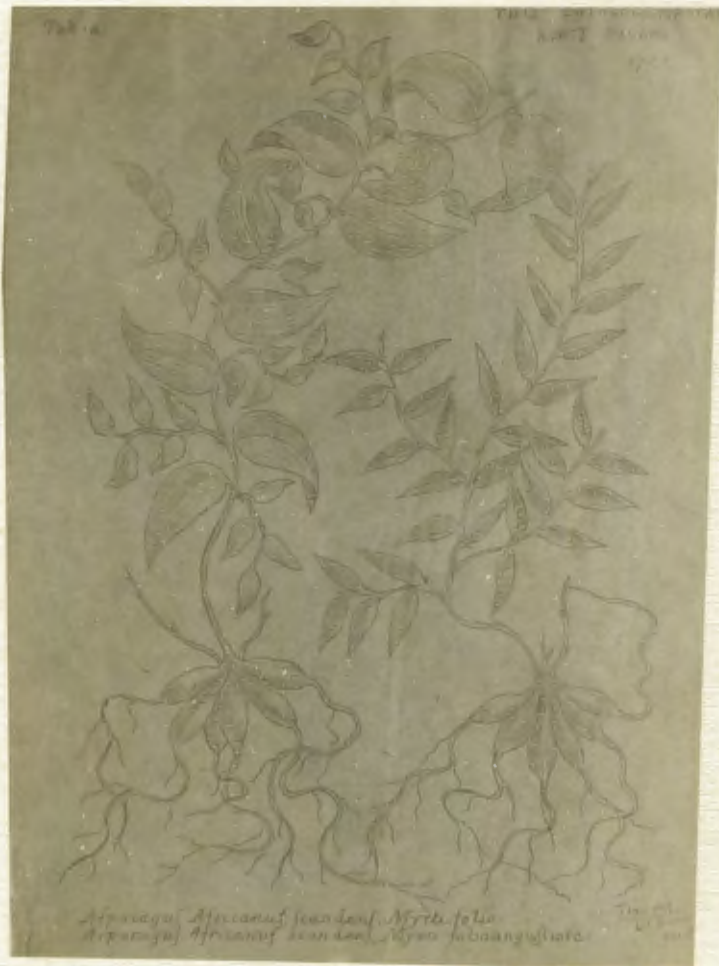


Fig. 51. Tillius, M.A. "Catalogus plantarum horti Pisani" t.12. This figure was cited by Linnaeus in his type description of Asparagus asparagoides. (From a tracing made by Miss W.F. Barker.)

Asparagus ovatus Salter, J. S. Afr. Bot.,
6 ; 167 (1940).

Asparagus multituberosus Dyer, Bothalia,
6 : 442 (1954).

Stems climbing to 3 metres, scrambling or rarely 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 to 7 cm. long, upto about 7 prominent veins and numerous smaller ones. Leaves scarious, not forming spines. Tubers varying from almost sessile to 7 cm. distant, 5 to 15 cm. long. Peduncles 1- or 2- nate, 3 to 8 mm. long, articulated near the flower. Perianth segments similar, entire, linear-oblong, 5 to 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 style branches sometimes only loosely fused; ovary chambers with 4 to 9 ovules. Berry globose, 6 to 10 mm. diameter, upto 8- seeded, red; perianth persistent.

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 (Fig. 51) 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. The younger Linnaeus described Dracaena medeoloides as being a climber with ovate cladodes. He also mentioned that Thunberg was the collector and that it came from the Cape. There is a specimen in the Thunberg Herbarium labelled Dracaena medeoloides which agrees with the type description and could be considered the type. This specimen belongs to A. asparagoides as construed by the present author, and Dracaena medeoloides is, therefore, regarded as synonymous with A. asparagoides (L.) Wight.

The younger Linnaeus also described Dracaena volubilis. This name was based on another Thunberg specimen from the Cape. Judging from the description, it only differed from Dracaena medeoloides in having lanceolate cladodes. This character has been found by the present author to be unreliable. The specimen in the Linnaean Herbarium, a photograph of which has been examined by the present author, has ternate cladodes as opposed to the alternate cladodes mentioned in the description, and according to Jackson (1912) it does not occur in the last Enumeration of the Linnaean Herbarium of 1767. It can, therefore, not be considered as a type. The sheet in the

Thunberg Herbarium, labelled Asparagus volubilis, which has been examined on loan at the Bolus Herbarium by the present author, has three specimens which agree with the younger Linnaeus' description of Dracaena volubilis, and with the present author's construction of Asparagus asparagoides. Thunberg's A. volubilis was described in the same words as Dracaena volubilis Linn. fil., and reference is made to "Linnaeus Syst. 334". What this "Systema" was is not known, but in several cases, the description of plants referred to as coming from the "Systema" are identical to those in the "Supplementum" of 1781. If these descriptions had been published prior to 1781, they would probably not have been included in the "Supplementum". The "Syst" is therefore likely to be the "Supplementum" itself or a later work. As Thunberg was well acquainted with the works of Linnaeus and his son, it is probable that he would have been aware of the existence of the "Supplementum", and he would almost certainly have cited the first work in which the descriptions appeared. There is, however, little likelihood that the "Syst" and "Supplementum" were synonymous because the page references in the "Prodromus" do not agree with those in the "Supplementum". The most likely solution is that the "Syst" was a manuscript edition of the "Supplementum" or of a later "Systema" from which the hitherto unpublished names were extracted for the "Supplementum".

Several names, treated here as synonyms for A. asparagoides were published by Kunth under

the generic name Myrsiphyllum. They were all described as climbers with flattened, solitary, many-veined cladodes, and are, therefore, in the present author's opinion, very probably referable to this species. The names he gave were: M. falciforme, which was based on a specimen in "Herb. Luc." collected at the Cape, Drege 2704a. According to De Candolle (1880), Luca's Herbarium was in Kiel. Under M. gramineum Kunth wrote "M. striatum Schlechtend. in Herb. reg. Berol., excl. synonym. (v.s.) M. angustifolium Bergius in Herb. reg. Berol. (v.s.) et ? Hort. Berol. 1847." These specimens were destroyed in Berlin. Krauss 1333 was the type of M. kraussianum Kunth. It was collected near Constantia. Kunth spelt the collector's name Krause, but the correct spelling is, Krauss and the correct spelling of the binomial should be M. kraussianum. The differences described by Kunth between these species were based on variations in cladode shape and the number of veins in the cladodes. These characters have been found by the present author to be unreliable.

Asparagus ovatus, which was described by Salter from a specimen, Salter 8214 (BOH), collected by himself at Rugby, Cape, is the psammophilous form of A. asparagoides. Salter separated it from A. asparagoides because it had distant tubers, and ovate cladodes. Neither of these characters has been found by the present author to be sufficiently distinct to maintain this species.

A. multituberosus Dyer, based on Marloth 9006

(PRE) from the Ceres district, was typified by its author by having tubers borne along elongated rhizomes instead of in a rosette on a short rhizome at the base of the aerial parts. Root characters are considered by the present author to be greatly influenced by soil conditions, and not of value in the delimitation of species in this group. Dyer also regarded the styles of his species as being separate from their base. An examination of his type specimen, and other material possessing similar characters, has shown that while there is variation in the ratio of fused part to free part of styles, completely free styles do not exist. There is, however, a stronger fusion in some specimens than in others, and it is often easy to tear the styles apart, giving the appearance of free styles. Specimens of A. multituberosus tend to be smaller than those of other forms of A. asparagoides, and to have smaller, rounder cladodes. These characters are also not considered to be sufficiently distinct to warrant the maintenance of this species.

There is considerable variation in the size and shape of the cladodes of A. asparagoides as construed by the present author. Both A. kraussianus (Kunth) MacBride and A. volubilis (L.f.) Thunb. were described from material of specimens with lanceolate cladodes, while A. ovatus Salter and A. multituberosus Dyer were described from specimens with ovate cladodes. A. asparagoides L. appears to have been described from an illustration showing

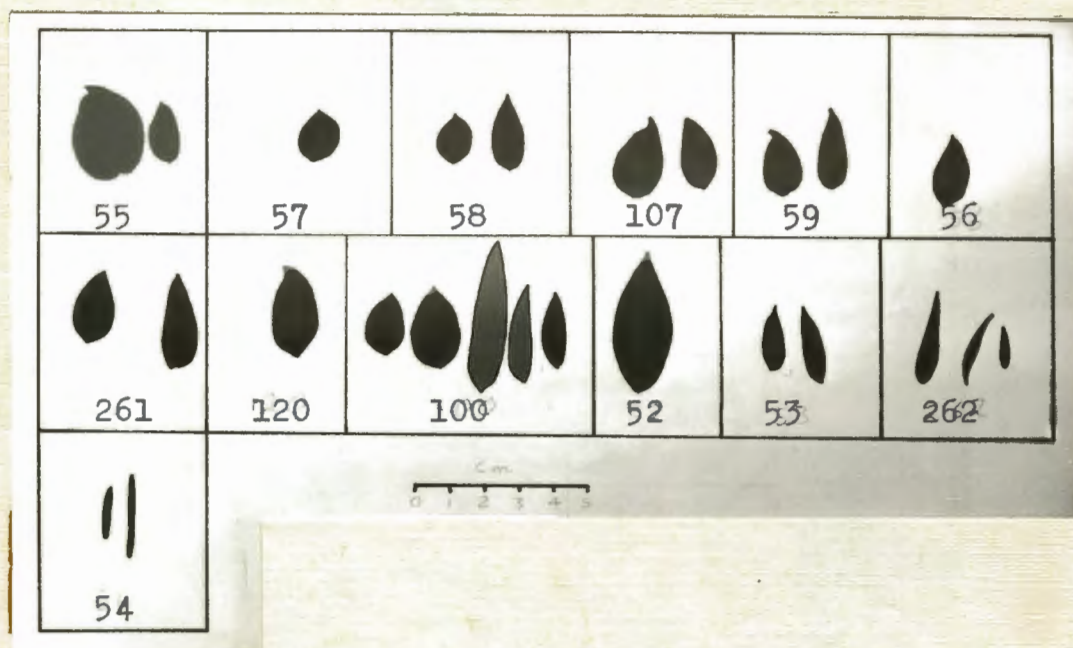
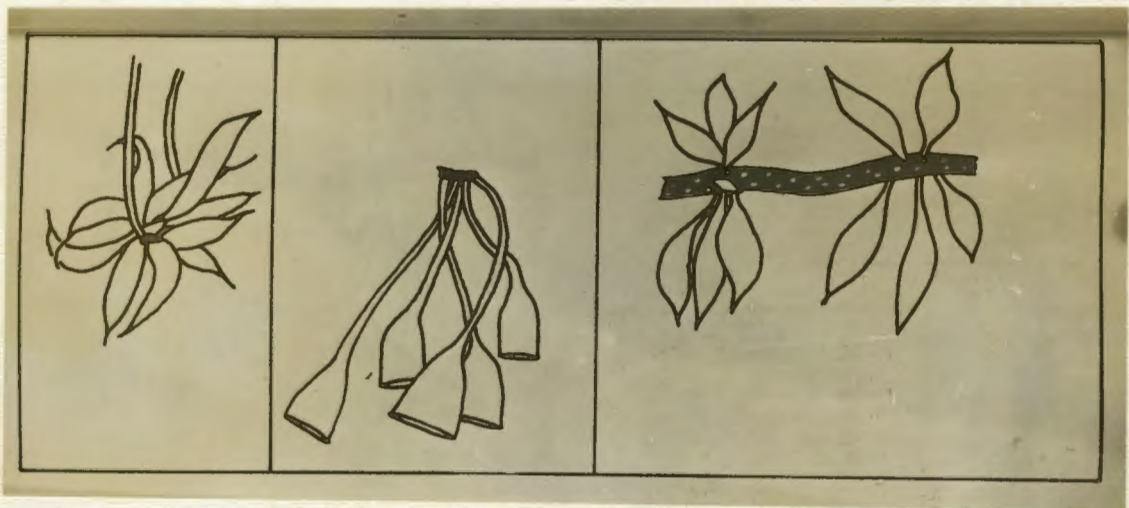


Fig. 53. Variation in *Asparagus asparagoides* cladodes. Each block contains a representative sample from a single specimen. The scale shows five centimetres. The numbers are the author's collecting numbers.



A

B

C

Fig. 54. Tuber types occurring in Asparagus asparagoides. A: sessile; B: distant, as occurs in A. ovatus Salter; C: "multituberosus", as occurs in A. multituberosus Dyer.

cladodes of an ovate-lanceolate form in the left hand figure and lanceolate cladodes in the right hand figure. As A. kraussianus sensu Salter (1950) and A. asparagoides sensu Salter (1950) are frequently found in similar environments, and sometimes near to one another, it seems likely that their difference is genotypic, and not merely the effect of different habitats. In order to determine the value of the use of cladode shapes in the taxonomy of the group in South Africa, the scatter diagram and histograms (Fig. 52) were drawn. These show that there is absolutely no justification for subdivision of A. asparagoides, as construed here, on cladode shape or size.

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 Salter were described as distant, as opposed to those of A. asparagoides sensu Salter which were sessile. (Fig. 54.) The tuber character of A. ovatus may be associated with the loose sand in which they occur. The typical form of A. asparagoides, with sessile tubers, generally occurs in soils of heavier textures. Parker collected a specimen, which he claimed had both sessile and distant tubers, and in the experience of the present author it is not possible to define the difference between distant and sessile tubers as there is a complete gradation between these two forms. There is also a gradation between the form of rooting system in A. multituberosus Dyer, where the tubers are very

numerous and only about five centimetres long, and that in A. asparagoides sensu Salter in which there are about twelve tubers, each about ten to fifteen centimetres long. An intermediate form is shown in figure 54C, in which there are many tubers, although most have not persisted and have left only a scar, borne in a "multituberous" manner along the rhizome, but each about twelve centimetres long. The specimens, which have been placed in A. multi-tuberosus, come from dry areas, with very hard soils such as occur on the Giftberg near Van Rhynsdorp.

Asparagus asparagoides grows in a wide range of habitats from forest to open vegetation, and from coastal sandy soils to hard dry soils.

The flowering period is mainly June to September, but varies according to the time of rainfall. In the Transvaal, flowering usually occurs in January to February.

DISTRIBUTION.

CAPE.

Albany. Betw. Fort Brown and Bothas Ridge, fl.

July, Acocks 12768 (PRE); Frasers Camp, fr.

Nov., Maguire 636 (NBG); Grahamstown, Penning
s.n. (PRE).

Alexandria. Road to Bushman's River mouth, Archibald
4557 (PRE); near Sandflats, fl. Sept., Burt-Davy
14249 (BOL); Alexandria, Heathcote s.n. (PRE).

Barkly East. Barkly Pass, fr. Jan., Rattray 7324

(PRE).

- Bathurst. Hopewell, Acocks 18388 (PRE); Kowie River, fl. Dec., MacOwan 1920 (SAM); Port Alfred, fl. Oct., Theron 1087 (PRE), fl. Sept., Hutton 1153 (PRE & SAM), Tyson s.n. (PRE); Kowie West, Tyson s.n. (BOL 13307).
- Bellville. De Grendel, Esterhuysen 23057 (BOL); Parow, Jessop 59 (BOL).
- Bredasdorp. Bredasdorp, fl. Aug., Compton 9204 (NBG); Nachtwacht, fl. Sept., Smith 3022 (PRE); Strandkloof, fl. Sept., Compton 14778 (NBG).
- Caledon. Uilenkraal, fl. Oct., Taylor 1584 (SAM); Mossel Riwer, fl. Sept., Compton 23612 (NBG); near Grabouw, Jessop 54 (BOL).
- Calvinia. Akkerendam, Acocks 17719 (PRE); near Middelpost, fl. Aug., Salter 3484 (BOL).
- Cape Town. Near Rugby, fr. Oct., fl. July, Salter 8214 (BOL & NBG), fl. July, Salter 8434 (BOL); Vissershok, fl. July, Salter 8435 (BOL); Milnerton, fr. Aug., Henderson 1145 (NBG); Robben Island, fr. Aug., Walgate 468 (NBG); Clifton, fr. Sept., Foley s.n. (SAM); Blaauwberg, fl. Aug., Oliver s.n. (BOL); Killarney, fl. July, Oliver s.n. (BOL).
- Ceres. Near Inverdoorn, fl. June, Taylor 1509 (SAM); Karroopoort, fl. Aug., Marloth 9006 (PRE & STE); Witzenberg, fl. Oct., Esterhuysen 23454 (BOL).
- Clanwilliam. Heuning Vlei, fl. Oct., Esterhuysen 12084 (BOL); Welbedacht, fr. Sept., Middlemost 1734 (BOL & NBG), fr. Sept., Lewis 2689 (SAM);

- near Clanwilliam Dam, fl. July, Lewis 3321 (SAM);
Brakfontein, fl. July, Schlechter 7974 (PRE);
Pakhuis Pass, fl. Sept., Compton 9570 (NBG);
Matjesrivier, fl. July, Wagener 82 (NBG);
Olifants River near Alpha, Compton 7766 (NBG);
Lamberts Bay, fr. Sept., Taylor 1610 (NBG & BOL);
Citrusdal, Isaac s.n. (BOL).
- Colesburg. Arundel, fl. & fr. March, Acocks
17992 (BOL & PRE).
- East London. Bonza Bay, fl. Sept., Dyer 5338 (BOL
& PRE); near Cove Rock, fl. Aug., Galpin 3102
(PRE); East London, fl. July, Bokelmann 6-28
(NBG).
- Fort Beaufort. Near Fort Beaufort, Story 2226 (PRE).
- George. Kaaiman's River, fl. Nov., Truter s.n.
(PRE); Wilderness, fl. Nov., Van Niekerk 199
(BOL), fr. Nov., Van Niekerk 251 (BOL).
- Graaff Reinet. Graaff Reinet, fr. Nov., Bolus
463 (BOL).
- Humansdorp. Ratelsbosch, fl. Aug., Fourcade 53
(BOL); Witte Els, Fourcade s.n. (BOL).
- Kentani. Kentani, fr. Sept., Pegler 1240 (BOL).
- King Williams Town. Amabele, De Vries 23 (PRE).
- Knysna. Knysna Village, fr. Dec., Fourcade 5885
(BOL).
- Komgha. Prospect Farm, fl. Sept., Flanagan
315 (PRE & SAM).
- Laingsburg. White Hill, fl. Aug., Compton 11200
(NBG), Compton 8056 (NBG), fl. Aug., Compton
2894 (BOL); Rietvleikloof, Bond 247 (NBG).
- Malmesbury. Langebaan, Jessop 55 (BOL); Darling

Flora Reserve, fl. July, Rycroft 1969 (NBG);
betw. Mamre and Darling, Bolus s.n. (BOL 26847);
Kalabaskraal, Zeyher 4171 (BOL), fl. July,
Salter 8436 (BOL); Malmesbury, fl. July, Salter
8440 (BOL).

Montagu. Montagu, Levyns s.n. (BOL).

Namaqualand. Groot Vlei, Lewis 1421 (SAM);
Garies, fr. Sept., Compton 17185 (NBG); Walle
Kraal, Pillans s.n. (BOL 18250); Witbank,
Pillans 5114 (BOL); Copperbank, Pillans 5677
(BOL); Kookfontein, fr. Aug., Bolus 6588 (BOL),
Burger s.n. (PRE); Hondeklip Bay, Pillans s.n.
(BOL 18251).

Peddie. Near Wooldridge, Acocks 11886 (PRE).

Piquetberg. Avontuur Mountain, fl. Nov., Pillans
7571 (BOL); near Moutons Vlei, fl. Nov.,
Pillans 7415 (BOL); De Hoek, fr. July, Compton
10906 (NBG).

Port Elizabeth. Swartkops River, fl. Jan., Zeyher
4175 (SAM); Perseverance, fr. Sept., Paterson
1176 & 1180 (PRE), fl. & fr. Aug., Rodin 1070
(BOL & PRE); Schoenmakers Kop, fl. Aug.,
Paterson s.n. (PRE).

Queenstown. Lesseyton Drift, fr. March, Galpin
2594 (PRE); Invana, Cooper 328 (BOL); near
Bailey, fl. Jan., Schönnburg s.n. (PRE).

Riversdale. Vet River, Muir 353 (PRE).

Simonstown. Klaver Valley, fl. Aug., Salter
7386 (BOL); Fish Hoeh, fr. Oct., Page s.n.
(BOL 16207); Westlake, Jessop 52 (BOL); Red
Hill, fr. Oct., Jessop 125 (BOL); Smitswinkel

- fl. Sept., Wolley Dod 3009 (BOL).
- Somerset East. Boschberg, fl. Nov. & fr. Dec.,
MacOwan s.n. (BOL & SAM).
- Somerset West. Fir Grove, fl. Aug., Parker 4485
(BOL, NBG & SAM).
- Stellenbosch. Guardian Peak, Esterhuysen 7823 (BOL
& NBG); Jonkershoek, Strey 521 (PRE); Swart-
boskraal, Van der Merwe 861 (STE); near Mill
Stream, fr., Duthie 1479 (STE), fl. Oct.,
Duthie 1573 (STE).
- Uitenhage. Addo Bush, Marloth 6429 (PRE); Addo
Park, Barnard 562 (PRE); Enon, fl. Nov., Thode
A2771 (PRE).
- Uniondale. Near Laudina Store, fl. July, Acocks
14643 (PRE).
- Van Rhynsdorp. Giftberg, Phillips 7619 (SAM).
- Wellington. Wellington, Thomson s.n. (PRE);
hill-sides, leg.? (STE).
- Worcester. 20 miles south of Worcester, Marloth
115 (PRE); De Doorns, fl. Sept., Geriche s.n.
(PRE); Louwshoek Mountains, fl. Nov., Stokoe
s.n. (SAM 60586); Keeromsberg, Esterhuysen
9279 (BOL).
- Wynberg. Kirstenbosch, Esterhuysen 27855 (BOL),
fl. Sept., Salter 7596 (BOL), fr. Oct., Compton
15141 (NBG); Observatory, fr. Sept., Compton
16043 (NBG), fr. Sept., Leighton s.n. (BOL),
Salter 8491 (BOL); Constantia, Wolley Dod 2453
(BOL); Bishops Court, fl. Aug., Salter 8256
(BOL); Wynberg, fl. Aug., Arbuthnot s.n. (BOL);
Window Stream, fr. Oct., Esterhuysen 6251 (NBG);

Hout Bay, fr. Sept., Bond 134 (NBG); Diep River,
fl. Oct., Marloth 7184 (NBG); Princess Vlei,
Jessop 56 (BOL); Karbonkelberg, fr. Sept.,
Oliver s.n. (BOL); Milner Road, Rondebosch, fr.
Sept., Jessop 124 (BOL), Jessop 53 (BOL); Keur-
boom Park, fl. Aug., Jessop 100 (BOL).
Cape Peninsula without locality, Fowler s.n. (SAM
9038).

NATAL.

Bergville. Cathedral Peak Forest Reserve, fl. July,
Killick 1723 (PRE).
Camperdown. Mid Illovo, fl. Oct., Thode 3432 (STE).
Kranskop. Kranskop, fl. Nov.?, Thode 3419 (STE).
Ngotshe. Ngome Forest, Gerstner 4396 (PRE).
Pietermaritzburg. Allerton, Mogg 6620 (PRE).

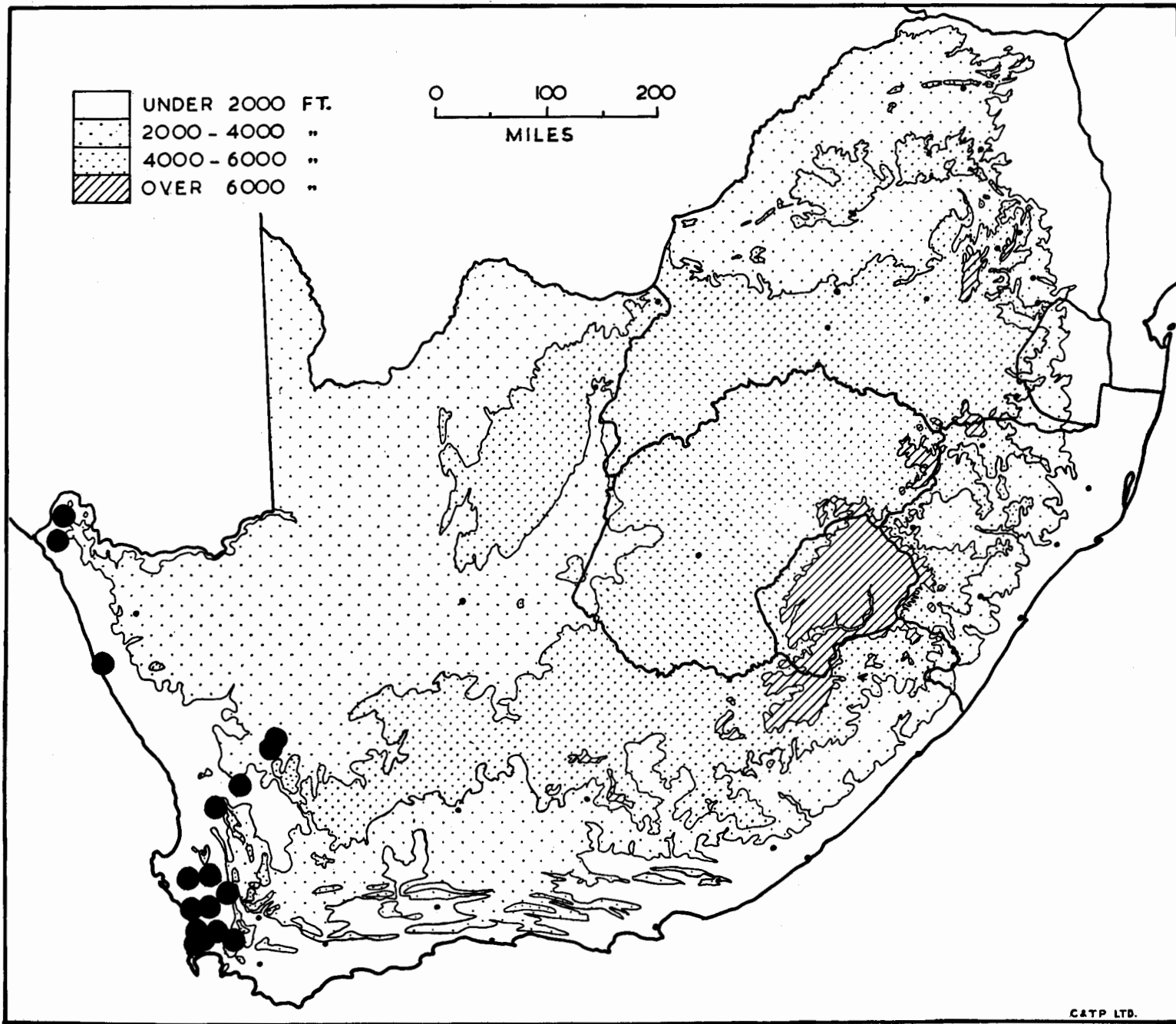
ORANGE FREE STATE.

Bethlehem. Clarence, Van Hoepen s.n. (PRE).
Bloemfontein. Glen, Mostert 363 (PRE).
Lindley. Near Lindley, Phillips s.n. (BOL 25267).
Locality not determined, Koolhoek, fr. Nov.?, Thode
3426 (STE).

TRANSVAAL.

Barberton. Umvoti Creek, Galpin 857 (PRE).
Belfast. Near Machadadorp, Bruce 481 (PRE).
Ermelo. Ermelo, Rogers 14782 (BOL).
Johannesburg. Jeppe, fl. Aug., Gilmore 520 (PRE).
Krugersdorp. Near Krugersdorp, fl. Feb., Mogg
23103 (PRE).
Letaba. Duiwelskloof, Scheepers s.n. (PRE); Letaba,
Junod 4172 (PRE); Shilovane, Junod s.n. (PRE);
Woodbush, Pott s.n. (PRE).

Map 36. Asparagus undulatus.



Lichtenburg. Grasfontein, fl. April, Sutton 581
(PRE).

Pietersburg. Plauwberg, fl. Jan., Dyer 9152 (PRE).

Pilgrims Rest. Mariepskop, Van der Schijff 4784
(PRE).

Potchefstroom. Nooitgedacht, Cohen s.n. (PRE).

Wakkerstroom. Wakkerstroom, fl. Jan., Beeton
124 (SAM); Oshoek, Devenish 189 (PRE).

BASUTOLAND.

Berea. Mamathes, Jacot-Guillarmod 2632 (PRE).

Leribe. Leribe, Dieterlen 102 (PRE & SAM),
Phillips 758 (SAM).

Mafeteng. Thabaneng, Watt & Brandwyk 2408 (PRE).

Qachas Nek. Mokhotlong, Dohse 314 (PRE).

District not determined. Phutha, Compton 21622
(NBG).

SWAZILAND.

Hlatikulu. Near Hlatikulu, Compton 26393 (NBG).

Also recorded from Otavi, South West Africa.

36. Asparagus undulatus (Linn. fil.) Thunb.

Dracaena undulata Linnaeus fil., Supplementum
: 203 (1781).

Asparagus undulatus (Linn. fil.) Thunberg,
Prodromus Plantarum Capensium : 66 (1794).

Myrsiphyllum undulatum (Linn. fil.) Kunth,
Enumeratio Plantarum, 5 : 109 (1850).

An erect shrublet, frequently with minute
obtuse processes giving it a rough surface. Stems



Fig. 55. The syntypes of Asparagus undulatus (L.f.) Th. in the Thunberg Herbarium.

(Photograph made from the International Documentation Centre micro-fiche edition.)

annual, upto 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 to 40 mm. long. Leaves deltoid, not forming spines. Tubers distant, 0.8 to 15 mm. broad, 25 to 50 mm. long. Peduncles 1- to 3- nate, 5 to 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 to 6 mm. diameter, 1 to 3 seeded, red; perianth persistent.

The younger Linnaeus, in his description of Dracaena undulata, mentions Thunberg as the collector. There is no specimen in the Linnaean Herbarium which matches the description, but in the Thunberg Herbarium at Uppsala there are two specimens which must be regarded as syntypes. These have been examined by the present author.

There is a certain amount of variation in the cladode breadth of specimens from different areas. The specimens from north of Citrusdal have particularly narrow cladodes, but there is a complete gradation

between the different cladode shapes.

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.

Flowers have been recorded from July to October.

DISTRIBUTION.

CAPE.

Bellville. Tigerberg, Pillans 8660 (BOL); near Blumendal, fl. July, Bolus 3690 (BOL).

Calvinia. Hills north of Calvinia, Marloth 10267 (PRE); Calvinia, Schmidt 294 (PRE); Nieuwoudtville, Glen Lyon, fr. Aug., Lewis 5726 (NBG); betw. Clanwilliam and Calvinia, fr. Oct., Zinn s.n. (SAM 61230).

Cape Town. Signal Hill, Jessop 50 (BOL), fl. July, Jessop 49 (BOL), fl. Aug., Compton 14682 (NBG), Treleaven s.n. (SAM 2970), fl. Aug., Levyms s.n. (SAM), fl. Sept., Thode 6079 (STE), fl. Oct., Marloth 5644 (STE); Blaauwberg, fl. Aug., Oliver s.n. (BOL); Killarney, fl. July, Oliver s.n. (BOL); Camps Bay side of the Peninsula, Penfold s.n. (NBG); Vissers Hok, fl./fr. Aug., Compton 13432 (NBG).

Clanwilliam. Clanwilliam, fl. July, Bond 1082 (NBG); Brandewyn River, fl. Aug., Barker 6582 (NBG).

Malmesbury. Mamre Hills, fl./fr. Sept., Compton

13743 (NBG), fl. Sept., Van Niekerk 271 (NBG);
Malmesbury, fl. Aug., Maguire 88 (NBG); Hope-
field, fl./fr. Oct., Compton 15131 (NBG); near
Hopefield, fl. Sept., Bolus 12858 (BOL), fl.
Sept., Salter 8636 (BOL), fl. Sept., Lewis
1420 (SAM); near Groenkloof, fl. Oct., Bolus
s.n. (BOL).

Namaqualand. Namaqualand, fl. July, Dominicus
s.n. (PRE); Kubus, Marloth 12518 (PRE);
Witbank, fr. Oct., Pillans 5222 (BOL);
Wallekraal, Pillans s.n. (BOL 18249).

Piquetberg. South of Piquetberg, fl. Sept.,
Barker 5775 (NBG).

Stellenbosch. Near Libertas, fl. July, Duthie
542 (BOL & STE); fl. Aug., Duthie s.n. (STE);
Golf Corse, fr. Oct., Van Rensburg 461 (STE);
near Education Building, fl. Aug., Duthie s.n.
(STE).

Tulbagh. Tulbagh New Kloof, fr. Sept., Compton
11708 (NBG).

Cape of Good Hope without locality, Thunberg s.n.
(UPS).

SUMMARY:

A preliminary revision of the taxonomy of the genus Asparagus in South Africa has been undertaken.

The usefulness, or otherwise, of the characters which have been used in separating species is discussed. In order to define the terms used, a review of the morphology of Asparagus assimilatory organs is presented, together with the results of investigations made by the present author into this problem.

Chromosome counts were made for ten taxa, using an Aceto-orcein squash technique, mainly on stem apices. This work established the presence of two polyploid series, and has suggested further work to be done in this field.

In the main part of this treatment, thirty six species, four of which are new, and two varieties are described. Each description is followed by a discussion of the species' nomenclature and synonymy. Finally there is a note on the habitat in which each species occurs, and a list of specimens examined by the author. Distribution maps have been prepared for each species.

INDEX TO BOTANICAL NAMES:

(The most important references are underlined.)

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