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A REVISION OF THE GROUP *VIROSAE* OF THE GENUS
EUPHORBIA AS FAR AS REPRESENTED IN SOUTH
AFRICA.

BY

R. MARLOTH, M.A., PH.D., D.Sc.

With Plates IV, V, VI.

Read 9 July, 1930.

Up to the appearance of the monograph of the genus *Euphorbia* (South Africa) by Mr. N. E. Brown at Kew in the "Flora Capensis" (Vol. V, sect. 2, 1925) only two representatives of the section *Virosae* were known from South Africa south of the tropics, or to put it more correctly, only two specific names were admitted, viz., *E. virosa* Willd. and *E. Cooperi* N.E. Br., but in both cases considerable confusion existed, and especially with regard to *E. virosa*. This species was established by Willdenow* in 1799, not on a type specimen, but on Paterson's figures and brief note in a few words, quoted by Sprengel in his "Systema," p. 786 as follows: "Caulis multangularis margine angulorum plano, aculeis geminis subulatis, floribus pedunculatis." As this description fits quite a number of South African species of *Euphorbia*, Paterson's figure remains the only authority on which to decide which of the species growing in Little Namaqualand should bear this name.

Bossier ("De Candolle's Prodrromus," XV, sect. 2, p. 8, 1862), not having any type specimen available, included in *E. virosa*, the plant which Haworth had named *E. coeruleacens*. The same course was followed by Berger in his book "Sukkulente Euphorbien," 1907, but in both cases the description is based more on the latter plant than on the real *E. virosa*.

When Mr. N. E. Brown prepared the account of the genus *Euphorbia* for the "Flora Capensis" (Vol. V, sect. 2, p. 367) he was right in accepting only one specimen of the material in the Kew Herbarium as representing the true *E. virosa*, viz., Rogers 3383 from Violsdrift, and he added: "The only other specimens seen which may or may not belong to *E. virosa* are Marloth 4687, collected in the Tsarris mountains of Great Namaqualand,

* Willdenow ("Spec. Plant.," vol. II, 1799) applies the name *Euphorbia virosa* to two species, viz., the plant named *E. canariensis* by Linnaeus (p. 882), and the plant figured by Paterson (p. 883). The latter is referred to as follows: "Euphorbia. Paterson, Itin." "Habitat in interioribus regionibus Cap. Bon spei." "Similis praecedenti, sed distincta: margine angulorum caulis plano, aculeis multo longioribus subulatis rectis et flore pedunculato. Convenit vero floris structura, ad basin floris sunt bracteae binae ellipticae obtusae, et petala sunt obtusissima."

It will be noted that this description is made entirely from Paterson's figure.

and Pearson 8022 and 8085, from the Karasbergen of the same province, but both differ in certain particulars, and I think it probable that they belong to two other distinct but closely allied species." His hesitation was justified, for Marloth 4687 is now the type plant of *E. venenata*, and the plant figured by Pearson in the "Annals of the Bolus Herbarium" as *E. virosa* is certainly not that species but may be the plant now named *E. avasmontana* or *E. kalaharica*. As there exists so much confusion concerning the true *E. virosa*, and as the plant forms one of the dominating features of the landscape over a large part of western South Africa, it will be advisable to describe it more fully before dealing with the other species.

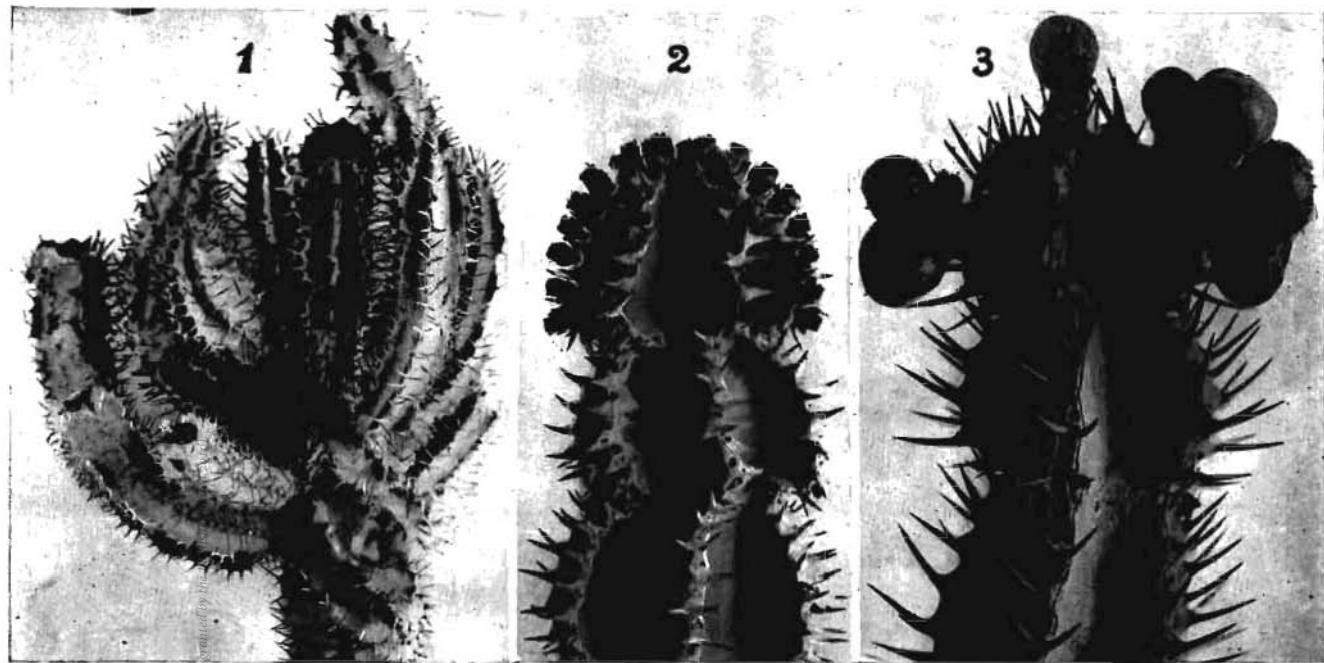
EUPHORBIA VIROSA Willd., non Boissier vel Berger.

Plate IV, Figs. 1-3.

A succulent leafless spiny bowl-shaped bush consisting of a short main stem and a large number of stout branches arising in close proximity to each other at the surface of the ground or more usually a few inches higher up, which at first spread at right angles and then assume a vertical position, all ending more or less in the same plane at a height of four to six feet, occasionally seven feet and, more rarely, eight feet high. The statement in Paterson taken over by later authors that the plant reaches a height of 15 feet is due to an error. The bushes are generally 4 to 5 feet in diameter, but older or more vigorous plants may reach 10 feet. The main stem is either entirely buried in the ground or protruding up to a foot or so, above it, the ridges on the stem running in a gentle spiral mostly to the left, but in a few cases I have seen them going to the right. On quite young unbranched plants the spiral was also to the left. On the branches arising from the main stem or the branches themselves the ridges are nearly always in straight lines.

In some parts of the country, nearly all the primary branches are simple but secondary branches also occur, although not as commonly as in *E. coerulescens*. Primary branches in most cases 7-angled, occasionally 6- or 8-angled, but the number varies on the same plant; the ridges divided by sharp-angled grooves up to 10 mm. deep. The branches, so-called stems, constricted at short but irregular intervals, thus consist of a series of joints of unequal length, the size depending upon the vigour of growth and this again upon the rainfall of the year. The average length of the joints is from 50 to 80 mm. and their diameter, measured from the edge of the ridges, 50 to 60 mm., the edge bearing a continuous hornband and a pair of stout spines on the summit of each lobe, there being 4 or more pairs to each joint. Spines in the adult plant spreading at more than a right angle, sometimes curved, mostly up to 10 mm. long, and as the edge of the ridges is wavy, the spines point in different directions, thus forming a formidable armour. The young spines are dark red and glossy, but the older ones grey and dull coloured.

Leaves on the young growth only, triangular ovate, up to 3 mm. long, their base with a minute red gland at each side.



EUPHORBIA VIROSA WILLD.

To face Page 332.

Flowering eyes on the apical joint only, each one bearing a solitary cyme, consisting of 3 cyathia on a short stout peduncle, usually not more than 1 mm. long, the central cyathium always male, 5- to 8-merous and up to 10 mm. in diameter, developing first, while the two lateral cyathia are still young buds. Later on, these cyathia, which are bisexual and fertile, also develop and as the central cyathium is withered at that time, cross-pollination from a plant in the earlier stage of development is secured. Each cyathium is supported by two concave, broadly ovate bracts immediately below the involucre.

The involucre of the bisexual cyathia is usually 5-merous, the segments twice as broad as long, fimbriate. Glands contiguous, crescent-shaped, concave, the rim thickened all round, raised at the inner side into a lower lip. Pistil pyriform, supported by a small denticulate cup, the styles connate for $\frac{1}{2}$ mm., the branches completely bifid. Capsule globose, 10 mm. in diameter; the seeds globose, 5 mm. in diam.; the surface finely rugose.

Paterson, figures 8 and 9.

Engler-Prantl, "Pflanzenfamilien," VII, plate at page 109.

Marloth, "Das Kapland," map but named *E. Dinteri*.

"Flora of S. Africa," II, plate 47.

Rogers 3383 at Violsdrift; Marloth 13361, Goodhouse at the Lower Orange river; Marloth 13603 from Bokspuits, halfway between Kenhardt and Prieska.

The confusion referred to earlier was considerably increased by the appearance of Berger's name, *E. Dinteri*, for the plant which is of frequent occurrence in South-West Africa, published originally in 1906, but with a scanty description only, viz., "ridges usually 7, those of the short main stem spiral, of the branches always straight, separated by deep grooves, sinuous or zigzag-shaped near the apex. Flowers not seen. Seeds large, the size of peas."

The first specimens of *E. Dinteri* received from Professor Dinter were without flowers and fruit, but agreed, as far as one could judge, with plants from the Orange river that I had always taken to represent the true *E. virosa*. Later on, Professor Dinter kindly induced a friend of his to forward a complete set of the plant from the original locality in the mountainous country along the Khan river in South West Africa, viz., a young plant apparently 35 years old, and flowering as well as fruiting branches from some older plants. As these agreed with Paterson's figures as far as comparison was possible, the identity became fairly certain. A few years later, I received a similar set of specimens from the Orange river through the kind assistance of Mr. J. C. Krapohl at Abbasas, which is in close proximity to the locality where Paterson must have observed the plant. Finally (1929), I had the opportunity of spending several days in the mountainous parts of the country just opposite Violsdrift and saw there several hundred bushes—all one and the same species, viz., Paterson's plant, that means the true *E. virosa*—and no other similar kind.

As this plant differs from all other species in several

characters but not from the so-called *E. Dinteri*, it is obvious that both names apply to the same species. These points are:— (1) The main stem is usually projecting a little from the ground and the ridges are running as spirals around it; (2) The secondary stems (upright branches) are generally 7-angled, occasionally 6-angled, constricted at short intervals, the margins sinuous and provided with stout spines; (3) The flowering eyes bear only one cyme each; (4) Capsule globose up to 10 mm. in diam.; (5) Seeds globose, up to 5 mm. in diam.

This species has a wide distribution, viz., from Little Bushmanland and the Prieska district on the south of the Orange river right on to the Swakop and Khan river country beyond the Tropic of Capricorn. It is frequent in the Fish river valley and other parts of South-West Africa and occurs probably also in the Karas mountains, where Pearson collected two species of this group, but the plant figured by him from that area as *E. virosa* is not the true species of that name. Flowering or fruiting specimens of the plant can always be identified with certainty, but pieces or branches without such organs may be easily mistaken for other species. One feature discussed by Pearson for his plant, viz. the transversely chambered pith, is found in all these species.

While in many cases the primary branches of a bush are simple, one finds others with a considerable number of secondary branches at irregular intervals, as Paterson's figure shows. An unusual occurrence of this feature was observed by the writer among plants of this species in the mountains around the Haub river, a small tributary, rarely carrying water, of the Orange river on its northern bank near Violsdrift. As usual, the plants are very scattered, being often several hundred yards apart. Most of the plants seen had none or only a few secondary branches, but on four of them, occurring among them and widely separated from each other, every primary branch carried a whorl of short secondary branches of equal length a short distance below the apex, viz., at the fourth joint, there being 4 to 6 branches in a whorl and from 20 to 30 primary branches in a bush. In seeking for the cause of such a condition I came to the conclusion that this sudden general production of laterals must be due to a specially large amount of food having suddenly become available, and as this general increased activity appeared to have taken place in the year 1925, it was probably due to the phenomenal rainfall of that year, which had exceeded all records during the last fifty years.

Another feature of interest is shown by *E. virosa* and its allied species. The plant is mentioned already by Paterson as one of the ingredients of the Bushmen's arrow poison, and every one who has come into contact with the latex of the plant is aware of the highly irritating properties of this substance. Yet it was not an uncommon occurrence to find a number of branches from which the end had been removed, apparently bitten off by some animal. Two residents in these parts of the country, both known to me as reliable observers, viz., Mr. J. C. Krapohl of

Abbasas on the Orange river, north of Steinkopf in Namaqualand, and Mr. E. G. Bryant of Prieska, have informed me that this decapitating of the young shoots is occasionally done by the baboons, probably when other food is not obtainable. In view of the virulent nature of the latex such an occurrence appeared at first improbable, hence Mr. Bryant decided to put the matter to the test. He experimented on a goat and kept it for three weeks without other food than a few slices of the shrubby *Euphorbia* growing in the neighbourhood. At the end of this period the animal had become rather thin but recovered completely when allowed to graze again. The species used for the experiment was *E. kalaharica* (Pl. V, Fig. 5; Pl. VI, Fig. 9).

Young barren plants or single branches of this species, especially in the cultivated state, are so similar to *E. coerulescens* that only the experienced eye would be able to distinguish them, and it is, consequently, not to be wondered at that botanists who had not seen the plants in their wild condition should have considered them to be conspecific, but as far as my experience with *E. coerulescens* goes, there is even in that condition one feature which enables one to distinguish them, viz., the nature of the horn band on the summit of the ridges. While this is always grey or even white in *E. virosa*, I found it dark or even black on the plants of *E. coerulescens* that have come under my notice. I am not sure, however, that this will be always the case, hence further observations on this point are necessary. In the case of wild plants no confusion between the two species can occur, for they inhabit different parts of the country. While *E. virosa* is a northwestern plant, *E. coerulescens* belongs to the Eastern Cape Province, e.g., district of Jansenville. Adult plants even when not in flower, can be distinguished by the scars at the flowering eyes, for while *E. virosa* produces only one cyme at each eye, the eyes of *E. coerulescens* bear three or four cymes each and have, consequently, the same number of scars later on.

The following key has been prepared for the convenience of the reader, but it should be remembered that the number of angles varies in every one of the species, and that particularly the younger twigs have nearly always a smaller number of angles than the older branches or stems. It is in many cases impossible to refer a dried piece of a branch to its proper place, unless cross sections of the stems as well as flowers and fruit are available, and even then one may not be able to make sure, and photographs of the whole plant should be secured whenever possible.

KEY TO THE SPECIES OF THE GROUP *Virosae* (S. AFRICA).

A.—Primary branches (so-called stems) of nearly uniform thickness, i.e., without more or less pronounced sudden constrictions.

(a) Primary branches usually 5-angled, occasionally 6-angled.
Spines small. 1. *E. hottentota* Marl.

(b) Primary branches mostly 7-angled.
2. *E. avasmontana* Dinter.

B.—Primary branches constricted at intervals.

- (a) Joints of primary branches unsymmetrical, the ridges bulging out at the base much further than at their upper end.

(i) Arboresecent.

3. *E. Cooperi* N.E. Br.

Eastern Tr. and Natal.

(ii) Shrubs urn-shaped, without aerial stem.

Western Great Namaqualand and Otavi. 4. *E. venenata* Marl.

- (b) Segments of primary branches symmetrical or nearly so.

(i) Main stem as far as exposed above the ground with spirally arranged ridges. Primary branches up to 70 mm. in diam., usually 7-, rarely 6-angled. Flowering eyes with 1 cyme each. Fruit globose, 10 mm. in diam.

Bushmanland, Great Nam.

5. *E. virosa* Willd.

(ii) No aerial stem or where exposed with straight ridges. Cymes 3 or more at each flowering eye.

(1) Primary branches branching repeatedly, 6- to 7-angled, the younger ones usually 5-angled, angles sinuous, hornband on the adult branches dark or black. Eastern Cape Province. 6. *E. coerulescens* Haw.

(2) Primary branches mostly simple, the ridges straight, their number less than 7. Pistil of bisexual cyathia with a conspicuous pedicel and a supporting cup.

* Primary branches usually 4-angled but in some shrubs the majority 5-angled.

7. *E. sagittaria* Marl.

** Primary branches 5-angled, occasionally 6-angled

8. *E. kalaharica* Marl.

EUPHORBIA HOTTENTOTA spec. nov. Pl. VI, Fig. 6.

Shape of bushes similar to that of *E. virosa* but smaller and the branches thinner. Main stem not projecting above the ground, the ridges inconspicuous and straight. Primary branches arising near or within the ground, curving outwards at the base, then straight and erect, usually 4 to 5 feet, occasionally 6 feet high, 5-angled, up to 40 mm. in diameter, not at all or slightly and gently narrowed at intervals, the valleys between the ridges shallow. Short secondary branches not rare in older plants, usually 4-angled with the valleys between the ridges quite flat, all distinctly glaucous green. Margin with narrow continuous hornband. Spines very short, 3 to 5 mm. long. Flowering eyes wedged in between two adjoining spine-shields, bearing 3 to 4 cymes each. Cymes shortly peduncled, each one consisting of one central male cyathium and two lateral bisexual cyathia, all 5-merous. Involucre of the bisexual cyathia campanulate, the lobes very short, rounded, finely ciliate, the glands crescent-shaped, contiguous thus forming a 5-angled cup, their outer margin concave, the flat upper end of the gland sloping inwards. Glands of male cyathium usually not so wide, being nearly hemispherical and erect.

Pistil of bisexual cyathia oblong, 1.5 mm. long, on a pedicel up to 3mm. long, the styles united for 1 mm., the branches 1 mm. Fruit not seen.

Marloth 12520. Kubus, district Richtersveld.

Marloth 13357. Lutzputs, 40 miles northwest of Upington (Gordonia).

Similar plants sent to the author from Nakop, the border railway station of Southwest Africa.

Usually recognisable by the nearly uniform thickness of its 5-angled branches (usually called the stems), the low ridges, the shallow or flat valleys between the ridges and the small spines.

EUPHORBIA VENENATA spec. nov. Pl. VI, Fig. 7.

Bushes of the habit of *E. virosa*, but without visible main stem, up to 6 feet high and 4 to 6 feet in diameter. Branches simple from the base and rarely with a secondary branch higher up, 6-angled, sharply constricted at intervals, the sections not symmetrical as the ridges are wider at the base than in the upper part of the section. The ridges flat and compressed, with deep grooves between them, the margin with a broad continuous hornband and stout spines, 5 mm. long. Cymes 3 at each flowering eye of the apical joint, the central cyathium of each cyme male, the lateral bisexual. Bracts supporting the cyathium two, concave, broader than long, mucronate. Involucre campanulate, the lobes nearly circular but with a cuneate base, deeply lacerate. Glands crescent-shaped, twice as broad as long, with a convex outer margin, the inner rim turned up. Pistil of the bisexual cyathium supported by a cup of 3 short bifid lobes, the ovary ovate, narrowed towards the apex: styles connate for 1.5 mm., the basal half of the connate portion swollen, the free branches 1.5 mm. long, shortly bifid. Fruit not seen.

Marloth 4687, collected in the Tsarris mountains, west of Maltahöhe in South-West Africa.

Plants of similar shape and structure of flowers occur further north near Auros in the Tsumeb district.

EUPHORBIA SAGITTARIA spec. nov. Pl. V, Fig. 4;

Pl. VI, Fig. 8.

Plant of the general habit of *E. virosa*, but usually smaller, 4 to 5 feet high, bushy from the ground with 20 to 30 branches arising at or near the surface of the ground, first curving outwards and then erect, constricted at short intervals, secondary branches rare, all more or less glaucous green. On most bushes all branches 4-angled, on some a few 5-angled and, in a few cases, the majority of branches 5-angled, up to 50 mm. in diameter, the valleys between the ridges shallow or flat. Margin with a continuous broad hornband. Spines stout about 5 mm. long, diverging from their base at an angle of 80-100°. Leaves on the young growth only, ovate acute, measuring 3.5 × 1.7 mm.

Cymes 2 to 4, usually 3, at each eye, on short stout peduncles,

the central cyathium of each cyme male and sessile, the two lateral cyathia bisexual, shortly pedicelled. Involucre of bisexual cyathia cylindrical, supported by two ciliate bracts. Segments rounded, finely fimbriate. Glands erect, fleshy, contiguous, a little wider than long, pale orange. Pistil oblong, inserted on a pedicel swollen at base for the length of 1 mm., then narrowed for 1 mm., then widening into a shallow cup with a narrow denticulate rim supporting the ovary. Styles connate for 1 mm., the branches 0.5 mm. high. Capsule glabrous, pedicelled, bluntly triangular, 4 to 5 mm. in diameter, not winged, only slightly grooved, often one fruit only of each cyme developed.

Marloth 14035, from hills south of Upington, about 12 miles towards Prieska. Also 13385, from Haramoep in Little Bushmanland, district Pella.

EUPHORBIA KALAHARICA spec. nov. Pl. V, Fig. 5;
Pl. VI, Fig. 9.

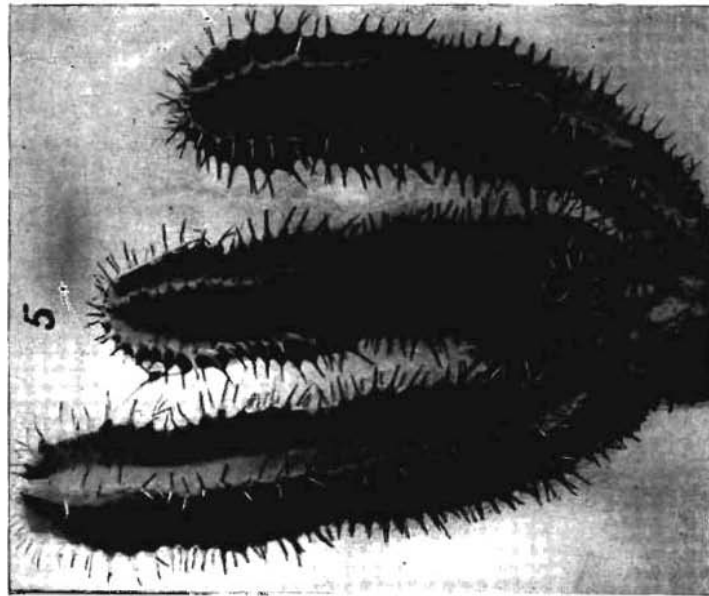
Bushes of the general habit *E. virosa*, but without a visible main stem, up to 5 or 6 feet in height and nearly as much in diameter. Full sized bushes consist of 50 to 60 erect primary branches which possess rarely any secondary branches. At one locality where I saw several hundred adult plants, I found only three of them with one or a few such laterals. Branches glaucous green, 5-angled, in a few cases one or more branches of a bush 6-angled, all about 45 to 50 mm. in diameter. Margin with a broad continuous hornband and stout spines 5 mm. long. Leaves only on the younger growth, broadly lanceolate or spatulate and acute, finely denticulate near the apex, convex on the upper side, the apex curving upwards with two rudimentary red glands at their base.

Cymes 2 or 3 at each flowering eye, on peduncles, about 2 mm. long, the central cyathium male and sessile, the two lateral cyathia bisexual and on short pedicels. Bracts 2 or 3 immediately below the involucre, broadly ovate, concave, the margin denticulate. Involucre cylindrical-campanulate, finely puberulous, the segments small, rounded, fimbriate. Glands sub-erect, yellow, fleshy, contiguous, oblong but cuneiform on the inner side, the outer margin straight or slightly concave.

Ovary of the bisexual cyathia oblong, 2 mm., exerted during the second stage of flowering, borne on a pedicel 4 mm. long and inserted in a cup with a narrow rim, the pedicel lengthening during the development of the fruit and finally up to 6 mm. long, the cup supporting the fruit also increasing in size.

Capsule bluntly 3-angular, up to 6 mm. in diameter, the seeds globose, smooth, 1.7 mm. in diameter.

Marloth 14039. From the Neusberg between Kakamas and Keimoes on the northern side of the Orange River, district Upington. Also 13555, from the Doornbergen near Prieska; 13503 from van Niekerkshoop in the Asbestos range opposite Prieska. Apparently also Marloth 6659, from the Klein Karas mountains in S.W. Africa.



EUPHORBIA SAGITTARIA sp.n. AND *E. KALAHARICA* sp.n.

EUPHORBIA AVASMONTANA Dinter.

Professor K. Dinter ("Sukkulenten Forschung," II, 96, 1928) figures and describes a species of this group with 7-angled branches occurring in the Auas mountains near Windhoek, under the name *E. avasmontana*. Unfortunately, there is no description of the flowers, but as far as the description goes, it is certain that this species cannot be *E. virosa* (called in the publication *E. Dinteri*). Dinter draws attention to the fact that the ridges on the stem where visible are not spiral and that the branches are not suddenly constricted into short joints, also that capsules and seeds are much smaller. It would be interesting to learn whether the cymes are solitary at the flowering eyes or not and what is the shape of the ovary and of the glands.

For *E. coerulescens* (Eastern Province plant), *E. Cooperi* (Eastern Transvaal), *E. Ledienii* (Uitenhage and Addo bush), as well as *E. Franckiana* (Grahamstown), a hybrid of *E. coerulescens* and *E. Ledienii*; see "Flora Capensis," vol. V, sect. 1, pp. 364, 365, 368.

It should be noted, however, that the figure marked *E. Cooperi* in Berger's book represents *E. ingens* and not *E. Cooperi*.

Figures of *E. coerulescens* and *E. Ledienii* are also given in Marloth, "Flora of South Africa," Vol. II, pp. 137, 140.

EUPHORBIA VIROSA Willd., non Boiss, non Berger.

Descriptio emendata. Planta fruticosa caulibus numerosis ascendentibus erectis heptagonis vix vel paullo ramosis, inter angulos profunde sulcatis et in articulos breves inaequales profunde strangulatis. Anguli articularum lobati sinuosi margine corneo et spinis geminis validis acuminatis muniti. Cymuli 3-cephali solitarii. Capsula globosa magnitudine cerasi, seminibus globosis magnitudine pisi.

E. HOTTENTOTA spec. nov.

Planta habitu *E. virosae*, sed caulibus gracilioribus brevioribusque, pentagonis, non vel haud articulatis, faciebus inter angulos plano-concavis. Anguli vix prominentes, non-undulati, margine spinis geminis parvis muniti. Cymuli 3-cephali ternati. Capsula trigona carinata 5 mm. diam.

E. VENENATA spec. nov.

Planta habitu *E. virosae* sed caulibus hexagonis in articulis inaequales 3- ad 4-pollicares strangulatis. Anguli recti complanati apicem articularum versus angustati. Cymuli 3-cephali ternati. Capsula 5 mm. diam.

E. SAGITTARIA spec. nov.

Planta habitu *E. virosae* sed caulibus tetragonis vel rarius pentagonis pauce articulatis, faciebus inter angulos plano-concavis. Cymuli 3-cephali ternati. Capsulae trigonae magnitudine pisi seminibus 2.5 mm. diam.

E. KALAHARICA spec. nov.

Planta habitu *E. virosae* sed caulibus pentagonis faciebus inter angulos paucè sulcatis et angulis paullo articulatis. Cymuli 3-cephali ternati. Ovarium stipitatum perianthio disciforme suffultum. Capsula stipitata trigona, 4 mm. diam. Planta variabilis, forsan hybrida inter *E. virosa* et *E. sagittaria* in eadem regione crescentes.

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EXPLANATION OF PLATES IV, V, VI.

Photographs by Author.

PLATE IV.

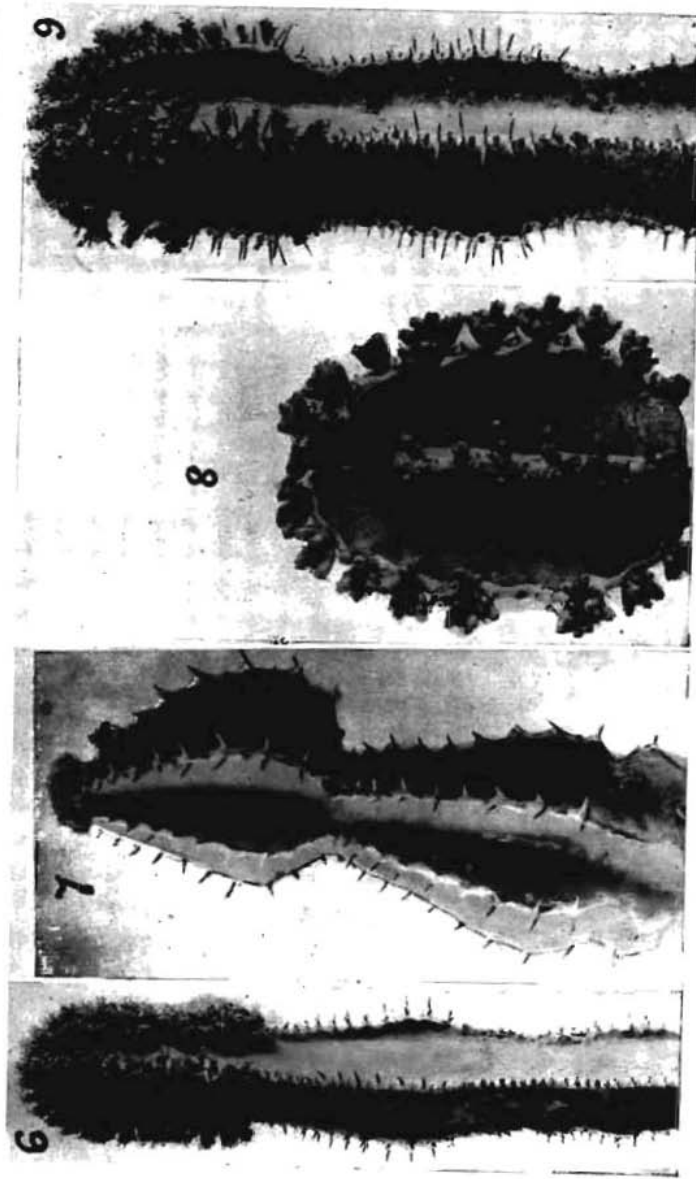
- Fig. 1.—*Euphorbia virosa* Willd. Young plant, about 30 to 40 years old. From Goodhouse on the Orange River. 1/7 nat. size.
 Fig. 2.—The same species. Twig in the first stage of flowering (male), the two female cyathia of each cyme present as small lateral buds. Piece of a plant growing near Goodhouse. 1/2 nat. size.
 Fig. 3.—*E. virosa*. Fruiting specimen showing 3 cymes with both bisexual cyathia fertile and 2 cymes with one fertile cyathium each. From a plant at the Khan River in S.W. Africa, the type locality of *E. Dinteri*.

PLATE V.

- Fig. 4.—*E. sagittaria* spec. nova. Hill near southern bank of Orange River, fifteen miles east of Upington drift.
 Fig. 5.—*E. kalaharica* spec. nova. Young plant from van Niekerkshoop, a village at the southern end of the Asbestos range, opposite Prieska.

PLATE VI.

- Fig. 6.—*E. hottentota* spec. nova. Flowering twig from a plant in the Little Karas mountains, S.W. Africa. Cymes 3 at each flowering eye, the central cyathium of each cyme withered, the two lateral ones in their male stage.
 Fig. 7.—*E. venenata* spec. nova. Flowering twig from a plant at the type locality, viz., Tsarris mountains in S.W. Africa. 4/7 nat. size.
 Fig. 8.—*E. sagittaria* spec. nova. Fruiting twig from a plant at the same locality as Fig. 4. 4/7 nat. size.
 Fig. 9.—*E. kalaharica* spec. nova. Flowering twig from the Neusberg, 40 miles west of Upington. Cymes 3 at each flowering eye, the central cyathium (male) of each cyme dropped off, the two lateral ones in their second stage (female).



EUPHORBIA HOTTENTOTA sp.n., *E. VENENATA* sp.n.,
E. SACITTARIA sp.n., *E. KALAHARICA* sp.n.