

EAST AFRICAN SUCCULENTS.

PART III.

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Continuing our descriptions in the sequence adopted in this paper we arrive at the important and interesting Order of *Euphorbiaceae*, which, with four Genera, is by far the most prolific group of East African Succulents. The succulent *Euphorbiaceae* are at present undergoing a thorough revision; this work being far from completed, an adequate account of the group can hardly been given at the moment.

The author, who is collaborating in this revision, intends to make the succulent *Euphorbiaceae* the subject of a separate paper in this Journal at a later date.

We now pass on to

N.O. MORACEAE.

This Order, or Family, (the terms are interchangeable) is widely spread in the Tropics, some genera being of great economic importance. The numerically large genus *Ficus* belongs here. Other representatives are the breadfruit tree, the jackfruit tree and the mulberry, all cultivated in East Africa, although their origin is in Asia.

One genus only, *Dorstenia*, has developed true succulents.

A few words may be said about the unusual arrangement of the flowers of *Moraceae*. The very numerous, inconspicuous and much reduced flowers are either crowded in heads (mulberry, breadfruit, jackfruit) or on the inner walls of an almost entirely closed receptacle (the "fruit" of the fig) or they are arranged on a flattened disc-shaped, open receptacle, as in *Dorstenia*.

The receptacles of the various species of *Dorstenia* vary considerably in shape: their outline may be circular, oval, star-shaped, oblong, rhomboid, triangular or irregularly angular; they bear bract-arms on their margins which are equally variable in length and shape.

Among the thirty-odd East African species of *Dorstenia* only a few can be classed as true succulents; the greater number are herbaceous plants, though often with fleshy rhizomes or with fleshy disc-like tubers.

Dorstenia crisper Engl.

This plant develops a solitary, unbranched,* fleshy stem, about 4½ inches high, erect from a slightly swollen base, which emits numerous very thin fibrous rootlets.

*Since going to press, larger specimens have been found up to 15" high and with branches up to 16 in number.—P.R.O.B.

The cylindrical stem may reach $1\frac{1}{2}$ inches in diameter, tapering upwards to $\frac{1}{2}$ inch. The surface of the stem is shiny and densely marked with rounded, tubercle-like leaf scars.

The few leaves are crowded at the apex; they are narrowly oblong, slightly fleshy, with a crisped and toothed margin. The inflorescences are solitary in the leaf-axils, on a stalk up to 4 inches long. The receptacle is rounded, up to $\frac{3}{4}$ inch in diameter, the margin is set with 6 to 10 spreading unequal bract-arms, $\frac{3}{4}$ to 1 inch long.

The plant is common in the arid country east of Garissa and at Tsavo, Kenya Colony; it is also known from the Galla Highlands and from Somaliland (Fig. 12).

Dorstenia crispa var. *lancifolia* Engl.

Resembles closely the former; it occurs in Ngomeni, Kenya Colony.

Dorstenia sp.

A small succulent plant with a stout, fleshy stem. The broad, sometimes nearly spherical, base is about 2 inches in diameter and loosely anchored in the soil by means of numerous thin fibrous rootlets. From the tapering main stem several fleshy branchlets are developed, up to 1 foot in length, but mostly much shorter. The surface of main-stem and branches is olive-green: smooth in the wet season when the tissues are turgid; but becoming somewhat wrinkled during drought.

The small, fleshy leaves are ovate, $\frac{1}{4}$ inch long by $\frac{3}{16}$ th of an inch wide, on very short petioles, arranged in whorls around the stems.

The receptacles are solitary in the leaf-axils, ovate, $\frac{1}{4}$ inch in diameter and surrounded by eight marginal bract-arms $\frac{1}{4}$ inch long alternating with much shorter ones which measure about $\frac{1}{16}$ th inch. The female flowers are spread evenly throughout the disk which is closely set with male flowers.

When cut, the plant exudes a yellowish latex which soon hardens to a brownish-yellow resin; it is often found cropped low by grazing game.

The plant is common in the dry areas of the Northern Frontier Province (Fig. 1).

N.O. ICACINACEAE.

In this Order the genus *Pyrenacantha* has alone produced xerophytic forms with much reduced leaves and—in some instances—with enormous development of water storing tissue.

Pyrenacantha malvifolia Engl.

Develops a huge irregularly shaped trunk which resembles a weather-worn rock in general appearance, a semblance which is increased by the grey, mottled, and smooth bark. It attains

5 feet and more in diameter, while rarely exceeding 4 to 5 feet in height.

Young specimens are more or less spherical (Fig. 6), but in the course of time the trunk assumes a more and more erratic outline, bulging and swelling in every direction (Fig. 7). The young plants begin by sending up one stout climbing branch, but as the plant ages, more branches are developed.

The deciduous leaves are rounded and flatly lobed. The inconspicuous flowers are arranged in small spikes. The plant is found in the dry savannahs round Mount Kilimanjaro, at the foot of the Pare Hills, and it reaches the Coast District in the Umba steppe in Tanganyika Territory.

Pyrenacantha Ruspoli Engl.

Is similar in appearance to the former species and occurs in the Ued Ruspoli in Somaliland.

Pyrenacantha vitifolia Engl.

"Kikalathé" in Kikamba, develops a large subterranean rhizome. The branches are slightly fleshy, semi-scandent and covered with a leathery-green bark. The leaves are rounded and deeply lobed; but the plant is leafless during a great part of the year. The flowers are minute, and arranged in a terminal spike. The plant is dioecious; the female plant develops a dense cluster of orange coloured, rhomboid fruits; the hard kernel is covered with soft fruit-flesh which is eaten by the Wakamba in times of famine.

The species occurs in the sandy soils of Witu (Coast District) on the plains near Kibwezi (Kenya Colony), in the savannahs of Usaramo, in the plains surrounding Mount Kilimanjaro and the Pare Hills in Tanganyika (Fig. 5).

N.O. AMPELIDACEAE.

This Order, to which the grape vine (*Vitis vinifera*) belongs, has evolved a number of interesting succulent species.

Most of them are tendrilled, climbing plants; some West African species of the genus *Cissus*, however, develop upright, thick, fleshy stems, which give the plant the appearance of stout small trees; their branches have lost their climbing faculties, and no tendrils are developed.

A species from Kenya Colony is noteworthy for holding an intermediate position; while developing a massive, upright, fleshy and perennial stem, its annual tendrilled branches climb into trees and shrubs.

The flowers of all species of *Cissus* are arranged in panicles; they are small and inconspicuous, greenish or yellowish-green in colour. The fruits are red, purple, or black berries, some said to be poisonous, others used medicinally by some native tribes.

PLATE 40.



FIG. 1. *Dorstenia* sp.

PLATE 41.

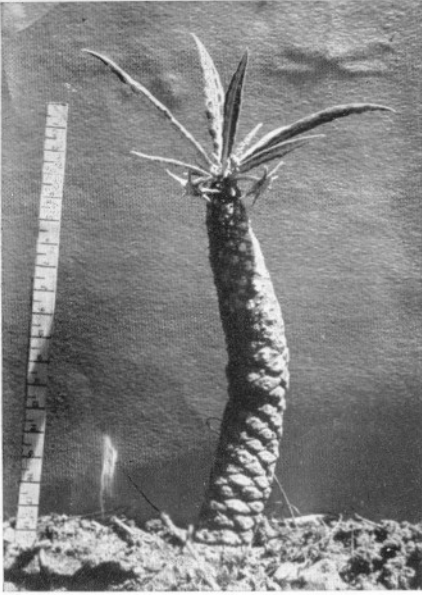


FIG. 2. *Dorstenia crisper* Engl.

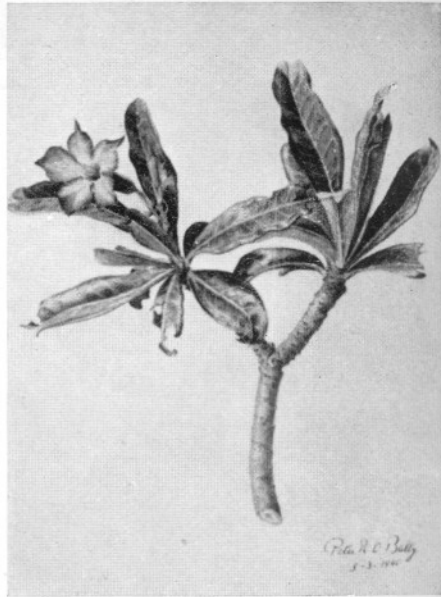


FIG. 3. *Adenium somalense* Balf.f.

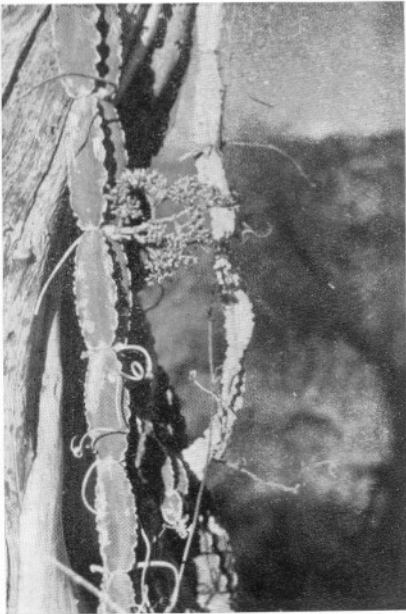


FIG. 4. *Cissus cactiformis* Gilg.



FIG. 5. *Pyrenacantha vitifolia* Engl.

PLATE 42.

FIG. 6.



FIG. 7.



FIGS. 6 & 7. *Pyrenacantha malvifolia* Engl.



FIG. 8. *Adenium obesum* Balf.f.

Cissus rotundifolia (Forsk.) Vahl.

A strong climber with a green quadrangular stem, edged with a sharp, corky margin.

The rounded, very fleshy leaves are perennial and of a rich glaucous-green colour. The young leaves and shoots are tinged with maroon. The leaf-margin is serrated and the leaves represent the main water-storing part of the plant. Owing to its attractive foliage, *Cissus rotundifolia* makes a very ornamental climber which needs little or no watering. It wants, however, strong supports in view of the considerable weight of its weak branches. The axillary flowers are arranged in panicles; they are green, small, and inconspicuous. The fruits are berries which turn red when ripe.

The plant is widely distributed; in Kenya Colony it is found from the high-water mark at the Coast through to Lake Victoria, but only at an altitude below 5,000 feet. It is common in all arid savannah areas.

In Tanganyika, the distribution is similarly wide: from the Coast Districts opposite Zanzibar it occurs throughout the steppes and savannah country around the Pare Hills, around Mount Kilimanjaro, and in the Rusisi Valley.

In the north of the Continent it reaches Yemen, and in the south it extends into Mozambique.

Cissus quadrangularis L.

This climbing plant is leafless during the greater part of the year; the leaves are not fleshy; their margins are deeply lobed and serrated. The stems are quadrangular in section, thickly fleshy and green, their edges lined with a thin more or less corky margin; the diameter of the stems measures up to $\frac{1}{2}$ inch. Leaves, flowers and tendrils—the latter being modified inflorescences—are produced from constrictions which are spaced at intervals of from 4 to 6 inches along the stems.

The ripe fruits are black berries.

The plant grows in profusion in all arid areas up to an altitude of 5,600 feet; sometimes smothering the supporting vegetation with its growth.

The distribution of *Cissus quadrangularis* is even wider than that of the preceding species: it occurs in all savannahs in Africa from Etbai Coast in the north of the Continent down to N.-W. Rhodesia, and from Senegambia down to Angola.

Cissus cactiformis Gilg.

This heavy climber develops massive fleshy stems up to 2 inches wide, quadrangular in cross section, winged, and constricted at the nodes. The edges are wavy, and they bear a continuous, sharp, horny margin. The young plants, while still growing erect, bear a superficial resemblance to a cactus plant. The deciduous leaves are absent during the greater part

of the year; they are developed from the nodes, as are the inflorescences and the strong tendrils. The inflorescence is similar to that of the other members of the genus; the berries are black when ripe.

Though much rarer than the two preceding species, the distribution of *Cissus cactiformis* is nearly as wide; it is found in dry savannah country from Somaliland in the north down to the Transvaal in the south. Localities in Kenya Colony are the plains around Voi and the arid bush country extending between the Ngong Hills and Lake Magadi. In Tanganyika, it is common in the "succulent steppe" between Kiurio and Mkomazi (Fig. 4).

Cissus sp. aff. *Cissus macropus* Welw.

This species differs from other East African *Cissus* spp. which are climbers, by developing a fleshy, upright stem, a foot or more in diameter at the base and tapering towards the apex, growing to a height of 6 to 8 feet. The trunk-like stem is covered with a grey bark. From the apex a few rapidly growing slender branches are developed twice a year; the branches are densely covered with short, reddish and slightly viscid hairs. By means of long tendrils they climb into the surrounding vegetation, or, should the plant happen to stand free, the branches form a drooping bunch, their tendrils intertwining. The triplicate leaves are slightly fleshy and have a glossy surface. After flowering (a panicle of inconspicuous, greenish flowers typical of the genus) and fruiting, the leaves shrivel, the branches dry up, and they are soon shed altogether, leaving the unbranched fleshy stem entirely bare. The plant has entered another resting, or dormant, period.

The nearest allies to this interesting species are found in Namaqualand and in Angola.

In Kenya Colony, the plant is found in various localities along the course of the Athi River, such as around the Mbagathi-Gorge near Nairobi, near Thika, and near Donyo Sabuk. Plate 7, Fig. 1 in the first part of this paper shows two plants of this species; one with fully developed branches (right) and another in its dormant stage (left).

N.O. APOCYNACEAE.

This Order is well-known to gardeners at home and in the Tropics through the periwinkle, the various species of *Allamanda*, the oleander, the climbing *Beaumontia*, to mention only a few. The African rubber vines also belong here, and the medicinally important *Strophanthus*.

Two of its genera can be ranged among the succulents; both are well worth cultivating, their brightly coloured flowers being very attractive.

The genus *Pachypodium* is almost confined to Madagascar; only a few species occur in South Africa.

The genus *Adenium* is represented in Africa by several species, two of which are known definitely to occur in East Africa.

Adenium obesum Balf. f. (syn. *Adenium coetaneum* Stapf.).

“Mock-Azalea” or “Desert Rose,” is a low shrub, attaining rarely more than 5 feet in height; it has a thick, fleshy, often contorted, trunk with short fleshy branches. The growth resembles that of a miniature baobab tree, and it is accordingly called *mbuyu* (=baobab) by some native tribes.

The stout, tuberous root frequently forms curious bulges above the ground (see Part I, Plate 7, Fig. 2). The obovate-cuneate leaves have a glossy, dark-green upper surface and a mat, pale-green underside. When young, they are often covered with a soft tomentum; they vary considerably in size and have been measured from $1\frac{1}{2}$ to 4 inches long by $\frac{3}{4}$ to $1\frac{1}{2}$ inches wide. They are arranged in spirals and terminal fascicles. The inflorescence is in cymes of two to ten flowers on short pedicles. The flowers are large, showy, with a tubular, five-lobed corolla. The tube measures up to $1\frac{1}{2}$ inches in length, the diameter across the pointed lobes being up to 2 inches. The colour varies from pale-pink to deep crimson, being most intense at the edges of the corolla.

In the main flowering season the plant is covered with hundreds of flowers which are the more conspicuous as no leaves are then developed; in the second, and less profuse, flowering season the plant is in leaf. The distribution of *Adenium obesum* is fairly wide throughout East Africa: it reaches from Uganda down to Portuguese East Africa. In Kenya Colony, it is common in the plains extending between Mount Kilimanjaro and the Coast.

In Tanganyika large stands are found in the Jipe basin between Lake Jipe and the Pare Hills (Fig. 8).

Adenium somalense Balf. f.

Very similar to *Adenium obesum* in general appearance, the distinctive feature of this species is the longer and narrower leaf with wavy edges and with a more glaucous-green colour. The flowers are slightly smaller and they vary in colour from almost pure white to pink (Fig. 3).

The species occurs from Somaliland in the north, through Kenya Colony along the Great Rift Valley (Lake Baringo and Lake Magadi) into Tanganyika, where it is found in Engaruka.

In the Western Pare Hills in Tanganyika, a variety with linear leaves occurs.

(To be continued)