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SOME PHANEROGAMIC PARASITES OF MADAGASCAR

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Some parasitic phanerogams have already been reported in Madagascar.

Baillon, in 1886, about a *Hydnora* which had been sent to him from Réunion by MC Jacob de Cordemoy, spoke vaguely (1) of a similar species which would have been observed in Madagascar by M. Grandidier, and of which he did not see anything but live rhizomes.

The same year, M. W. Fawcett (2) described *Thonningia malagasica*, found in various regions of the islands by Cowan, Humblot and Parker. It was the plant considered by Baker in 1884 as the *Cephalophylon Parkeri* Hook. f.

In 1888 Baker (3) gave the characters of a *Cytinus Baroni*, collected in the Mandritsara region.

Finally, in 1907, M. Van Tieghern, in his general study on the Balanophoraceae, separated from the *Balanophora Hildebrandtii*, named in 1876 (4) by Reichenbach Jr., specimens which M. Fawcett had brought back of this species - and which, for M. Van Tieghém (5), must constitute a new species, *Balaniella distans*. Mr. Van Tieghem simultaneously named *Balaniella Hildebrandtii* the plant of Reichenbach Jr.

The notes that we gather here are a new contribution to the history of these curious plants of our African colony.

THONNINGIA AND ELEOCARPUS. – No author has indicated which plants *Thonningia malagasica* parasitizes.

The Tiliaceae, which one of us recently collected at Analamazaotra, is new; we will first give the diagnosis of this host tree, which is an *Eleocarpus*.

Recall that the fairly numerous species of Malagasy *Eleocarpus* can be clearly distributed into two groups according to the inflorescence, since, in some, the flowers are in clusters, while, in the others, these flowers are isolated. [There is one species for which we don't know the characters, it's the *Eleocarpus Bakeri* Vake.]

Our *Eleocarpus*, which is one of the *voanany* or *voanakana* of the natives, belongs to the second of these two groups, and is therefore already close, in this respect, to the five other species which, in Madagascar, among those currently known, present the same character. These are *Eleocarpus dasyandrus* Bak., *Eleocarpus quercifolius* Bak., *Eleocarpus rhodanthus* Bak., *Eleocarpus dalechampioides* Bak., and *Eleocarpus rhodanthoides* Bail.

Like these five species also, our *voanany* has many stamens, the anthers of which are surmounted by a long hairy point; but its spatuliform leaves resemble neither those of *Eleocarpus dasyandrus*, *rhodanihus* and *dalechampioides*, which are rounded at the base, nor those of *Eleocarpus quercifolius*, which are subacute at the top, any more than those of *Eleocarpus rhodanthoides* , which are lanceolate, and, according to Baillon, only obtuse at the apex.

It is a tree 15 to 25 meters tall, evergreen, and whose softwood can be used as sawn timber.

The leaves are leathery and quite long petioled (10 to 20 mm.). The blade, spatula-shaped, is very acute at the base and begins to narrow towards the middle of its length; its top is broad and very rounded, even often slightly emarginate. The average dimensions are 6 to 10 centimeters in length by 2 to 3 centimeters in width. The midrib, reddish when dry, is prominent on both sides,

but especially on the underside; the secondary ribs only protrude on this second face and are generally four or five in number, widely spaced, very oblique, very curved towards the end.

The flowers, of a beautiful red, except at the base of the petals, which is yellow, are carried on long pedicels (2 cm) very glabrous and are isolated in the axils of the upper leaves.

The sepals, 4 to 6 in number, are somewhat fused together at the base; they are oval (10 mm. out of 5), acute, leathery, black on the outside, dry, glabrescent or dotted with short hairs on this external face but covered inside with a russet down. There are usually four petals, but sometimes five, or even six. These petals, in the same flower, are quite variable in size and shape; most often, however, they are trapezoidal, 20 millimeters high, wider at the top (22 mm.) than at the base (13 mm.) and are quadrilobed to a depth of 8 mm. approximately, each lobe being denticulate or briefly lacinate. They are pubescent on both sides.

There are more than 50 stamens, about the same height as the calyx, with very short filaments (3/4 mm.), brown and hairy. The anthers are also very hairy, yellow, and surmounted by a point (ca. 1 mm. 5) which has the same villosity.

This velvety down also covers the surface of the ovary, which is angular, and has 4, or sometimes 5, pluriovulated locules. The long, conical, thick style is also hairy.

The fruit (fig. 1) is an oblong drupe, with a straight base and a rounded top, with a clearly tetragonal or pentagonal cross section depending on whether there are four or five locules, the most ordinary number being four. Some of these locules, during maturation, may only develop imperfectly; in those which fully develop are some ovoid, albuminous seeds, with brownish seed coat. The fruit we saw may not have reached full maturity, although the seeds appear to be roughly formed; they were 45 millimeters long by 35 millimeters wide.

And it is therefore this *Eleocarpus*, which we will call *Eleocarpus quadrilobus*, on which one of us found *Thonningia malagasica*.

By studying the three currently known species of the genus *Thonningia*, *Th. Sanguinea* Vahl., from Niger and Guinea, *Th. Malagasica* Faw., from Madagascar, and *Thonningia sessilis* Lec., from French Congo, Mr. Van Tieghem said that he could only see the tubers of the third of these species and that those of *Th. sanguinea* and *Th. malagasica* are unknown.

Mr. Fawcett, on the other hand, in reporting the Malagasy species could not indicate any of the hosts on which it lives.

We can on these points provide some additional information.

Relative to the host, we have already seen that, at least in the East, it is an *Eleocarpus* which can serve as a host tree.

All the rootlets of the *Eleocarpus quadrilobus* on which one of us observed the parasite were covered with a thick network formed by the very developed and very branched underground cords of *Thonningia*.

All these very hairy cords are about 5 millimeters thick. The female inflorescences which were inserted there were enveloped by the yellowish scales that were well described and illustrated in M. Fawcett; and the flowers of the capitulum - which is initially yellow, but then browns rapidly - show, protruding out of the calyx tube, the papillary style characteristic of Langsdorffiae.

At the levels where the cords are inserted on the roots of the host, the tubers, more or less ovoid (fig. 2) or vaguely rounded, are 15 to 25 millimeters in length by 15 to 20 millimeters in width. According to Mr. Van Tieghem, these *Thonningia* tubers represent only the rhizome, and the cords which leave from them are roots, on which endogenous buds form which will become

the short scaly and flowering branch. At least, this is what Mr. Van Tieghem noted for *Thonningia sessilis*.

In the forest of Analamazaotra, *Thonningia malagasica* is in flower in February.

BALANIELLA HILDEBRANDTII. - We do not know *Balaniella distans* van Tiegh., but one of us, in April 1909, discovered, in the North West, in the Manongarivo massif, around 400 meters of attitude, the *Balaniella Hildebrandtii*, which was parasitic on the roots of *Ficus Baroni*.

The *Balaniella Hildebrandtii* has never, we believe, been reported in Madagascar itself, since the Reichenbach samples had been brought back from the island of Anjouan, and that M. Van Tieghem separated from this species, under the name of *B. distans*, those that had been identified by Mr. Fawcett, and that only came from the big island.

On the *Ficus Baroni* of Manongarivo, the irregular tubers of the parasite can reach twice the size of the fist, and they carry from 5 to 15 flowering branches. The cylindrical part of these branches, which emerges from an irregularly torn volva, and which bears, above all, towards its base, bracts with rounded apex, is a dirty yellowish white; the few male flowers located immediately below the terminal female cone are light yellow perianth. The female flower head, which is conical or club-shaped and is 25 to 23 mm high, less wide towards the base which is darker in color.

The parasite especially likes very dark woods. [However, one of us found it in May 1910 under an *adabo* (*Ficus Sakalavarum*), in a bare place in the Manambo valley, in the south of the island.]

RHOPALOCNEMIS MALAGASICA NOV. MS. - We were not a little surprised to note the presence in Madagascar of a Helosieae, since, until then, none of these Helosieae (ranks, according to the authors, among the Balanophoraceae or Loranthaceae) was seen in Africa. The two genera *Helosis and Corynaea* are American, and the only species so far described of the third genus, *Rhopalocnemis phalloides* Junghh., is a species from the mountains of Java (1,000 to 2,000 meters) and the Himalayas.

It is, however, a new *Rhopalocnemis* - which we will call *Rhopalocnemis malagasica* - which has been collected by one of us, in May 1909, in the very shady places of Marion-Et Garivo, around 1600 meters above sea level.

These Helosieae are almost always Balanophoraceae of great heights.

We cannot say exactly what the host plant was, because it had been killed by the parasite, and only the part of the roots on which it was fixed remained, entirely replacing its host.

The flowering stems are in clusters of five to seven; each (fig. 3) starts from a tuber 2 to 4 cm wide by 3 to 4 cm high.

Fresh, the axis of these stems has a foot [tuber] of 2 to 4 cm in length, over 18 to 20 mm. thick, which is continued by a slightly larger female spike, rounded at the top, 5 to 7 centimeters high by 35 40 millimeters wide.

On dry samples, the foot [tuber] has, on average, 1 cm by 1, and the conical spike 5 cm by 2.

The female flowers, whose glandular apical styles extend a little beyond the base of the hairs, resemble appreciably – as much as we have been able to examine them on our dried samples – those of *Rhopalocnemis phalloides*. The whole is covered by large shielding bracts which, intimately united by their edges, form a continuous envelope above the spike.

The species is much smaller in size than the *Rhopalocnemis* of Java, whose tubers reach the size of a man's head and whose flowering stems are 20 centimeters high.

Its entire surface is blackish in appearance.

HYDNORA ESCULENTA NOV. MS. - In the South-West of Madagascar, in the Menanara and Linta basins, the Mahafaly call it *voantany*, that is to say "fruit of the earth" a Rafflesiaceae Hydnoreae which grows on the roots of *Acacia* and other Leguminosae. The large fleshy roots of this *Hydnora*, at the end of which the cap is clearly visible, are of polygonal section, and covered with 8 to 10 lines and large scabrosities which Schimper considers as the beginnings of aborted ramifications. They are 40 to 60 centimeters in length and reach up to 35 millimeters in diameter; they are rarely branched. They are reddish brown on the outside and red on the inside.

The flowers that these large cords carry from place to place are of two kinds. Some remain short, with a broad ovary, above which, at a small distance (5 centimeters from the base), is the fleshy staminal ring, with its five projecting angles and its five lower angles. These flowers are about 10 centimeters in length and 3 centimeters 5 in width at the level of the ovary.

The second kind flowers are notably longer (15 cm.) and narrower (3 cm.); the ovary is clearly aborted, and the androecia (about 7 cm. from the base) forms a more slender, wavy bead. The five perianth divisions are also narrower.

The reduction of the androcium – although it is relatively less than that of the ovary – does not allow us to assume that the latter flowers are male flowers by abortion, while the former are hermaphrodites. We rather believe that the long-stemmed, straight flowers, as well as the pistil, have grown badly, and that these flowers are entirely sterile.

This floral dimorphism has never, it seems to us, been mentioned in *Hydnora*, and, in particular, in *Hydnora africana*.

Also, to our knowledge, it has never been said that the fruits of these Hydnoreae can be edible. This is the case for our Madagascan species, which deserves the specific name of *Hydnora esculenta*.

These fruits, turbinate in shape (fig. 4), and which, when fresh, are 10 centimeters in length over a width approximately equal towards the summit, while the base is no more than 25 millimeters, contain a whitish, juicy, acidulous pulp, filled with countless very small black seeds, under a firm, brownish envelope of about 1 cm thick.

Now this pulp has a delicious apple-pippin taste and *voantany* is certainly one of the best fruits in Madagascar.

Its name "fruit of the ground" is strictly correct, because when, in May or June, the berries are ripe, the only remains of the perianth which surmount them are at ground level, and, to harvest the *voantany*, it is necessary to dig in the sand a few centimeters deep.

(1) Baillon Sur l'organisation des *Hydnora* (Bull. de la Soc. Linnéenne de Paris; janvier 1886).
(2) W. Fawcett On new species of *Balanophora* and *Thonningia*. (Transact. of the Linnean Society; oct. 1886).
(3) Baker On a new species of *Cytinus* from Madagascar (Journal of the Linnean Society, 1888).
(4) Journal of Bonaty, 1876.
(5) Van Tieghem *Sur les Inovulées; alliance des Balanophorales*. (Annales des Sciences naturelles, 1907).

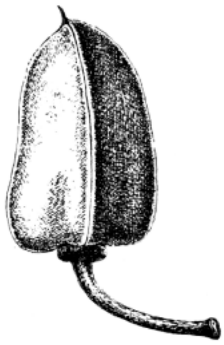

Fig. 1. - Fruit of *Eleocarpus quadrilobus*.

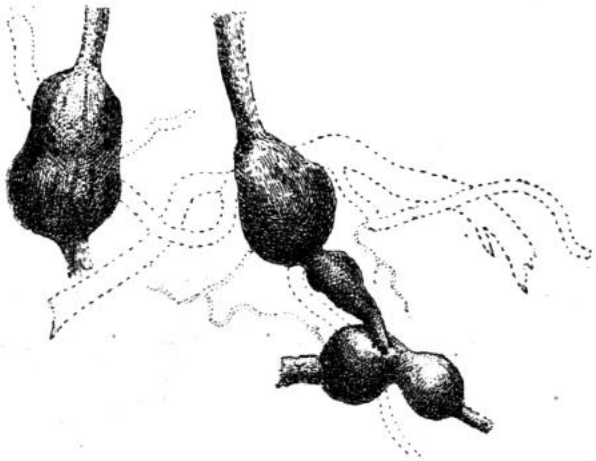

Fig. 2. - Tubers of *Thonningia malagasica* fixed on the roots (dotted) of the *Eleocarpus*.

Fig. 3 - Tuber and female spike of *Rhopalocnemis malagasica*.

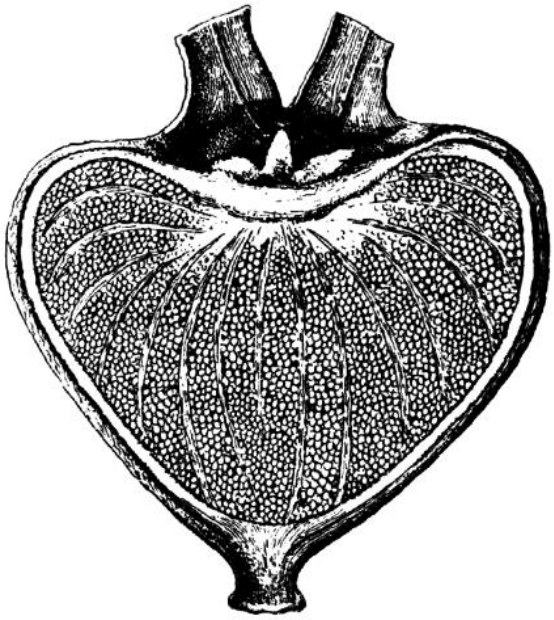

Fig. 4. - Longitudinal section of the underground fruit of *Hydnora esculenta*.