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## HAUSTORIUM AND IPPC

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The Editors

## STRIGA BAUMANII ENGL. AN UNUSUAL BIOLOGY FOR A PARASITIC PLANT Aline Raynal-Roques

since the original description and naming of *Striga baumannii* by Engler in 1897 (Bot. Jahrb., 23: 515-516 and pl. 12, fig. 0-T), little has been added to our knowledge of this unusual plant. It is a perennial herb with stiff glabrous stems, scale leaves and tiny flowers. The broad basal leaves have never been described, nor has its peculiar way of life which appears to be unusual among parasitic flowering plants. *Striga baumannii* occurs in sudanian savannas extending from Kenya and Zaire in East Africa to Sierra-Leone and Mali westwards. It is restricted to plateau and montane grasslands, at 50 to 200 m elevation. This means that it grows in comparatively wet savannas north of the equator where, despite the 2-3 months

and estimated to 1.8 - 0.7 m. In the dry season, wild fires sweep the savannas.

Shortly after the beginning of the rainy season the soil becomes wet or even water-logged. At this time a short stem arises from the rootstock and bears a single pair of green, thin, delicate, nearly circular leaves which spread on the soil surface. Each leaf is about 1 cm in diameter; the perfoliate leaf-base forms a tiny cup around the abortive stem apex. With functioning leaves and water supply the tuberous roots begin to thicken.

These two small leaves do not last long; as soon as the weather becomes dry they fade, turn pale yellow and shrink. At this stage they are easily broken off. As the savanna begins to dry nothing usually remains of the *Striga*, except the subterranean rootstock. As the season becomes even drier, the vegetation becomes sparser on the dried soil. The early wild fires burn the savanna, destroying grasses and leaves. After the fires the flower stems of *Striga baumannii* appear. From the rootstock arises one flowering stem (sometimes two or three). The stem bears opposite-decussate leaves. The upper stem (one half or two thirds of its total height) is densely covered by flowers. When the flowering stems dry, seeds disperse by exploding capsules in the hot savanna. As the dry season progresses other fires come across, burning *Striga* stems, when the first rains finally come the unburnt flowering stems rot quickly, and nothing remains of the plant above ground level. Soon after the tuberous rootstock will produce two new rounded leaves. The functioning leaves will

An unusual biology for a parasitic plant.

During the year, *Striga baumannii* has two distinct vegetative and flowering phases. It looks like two different plants with different stems and leaves. This alternation is related to food production in the vegetative phase, and food utilization in the flowering phase. As a whole *Striga baumannii*'s biology must be considered as a geophytic one. Such a way of life is shared by a number of savanna plants belonging to various families (Compositae, Papilionaceae, Asclepiadaceae, Commelinaceae, etc.). They flower in the dry season after the burning of savanna grasses; all of them have tuberous or woody, turnip-like or bulbous root stocks; produce leafless flowering scapes; leaves appear later on, and develop after fruiting during the next rainy season. Flowers and leaves are not commonly seen at the same time except when small early flowers appear soon after flowering. These geophytic plants are called "pyrophytes", though they do not really need fire to bloom but probably only a bare overheated soil. *Striga baumannii* is a geo-pyrophytic species. The parasitic habit of *S. baumannii* is evident, its hosts are unknown but root-connections are frequent. As far as known, it is the only flowering plant being both a parasite and geo-pyrophyte.

Brief description of *Striga baumannii*:

Leafy stem:

- \*a single stem in the rainy season;
- \*short (2-4 mm high), just enough to raise the leaves up to ground level;
- \*bears no more than one pair of developed leaves; its base, on the root stock, is clasped by two minute scales;
- \*never grows into a flowering nor a leafy stem later.

Vegetative leaves:

- \*one pair per stem borne in the rainy season;
- \*blade round, somewhat broader than long (c. 1 cm long, 1, 3 cm broad), narrowed at base, sessile;
- \*leaf-bases connate.

Flowering stem:

- \*up to four at the same time produced in the dry season;
- \*thin and stiff, 20-50 cm high; mostly unbranched;

- \*glabrous, pale grey-green; 4-angled nearly terete, sometimes longitudinal furrowed;
- \*bears opposite, deussate, scale leaves the upper ones containing auxiliary flowers; leaf length: 4-9 mm;
- \*internodes: up to 4 cm long in basal part of stem; abruptly shorter (10-15 mm) in flowering upper one.

Flowers:

- \*tiny, sessile, erect, stiff; clasped the scaly bract;
- \*two acicular bracteoles;
- \*calyx narrowly tubular, 10-12 mm long about 13-15 ribbed;
- \*four unequal erect teeth; anterior lobes shorter (c. 3 mm long) lateroposterior ones longer (c. 4 mm long); tube deeply cleft on the back;
- \*corolla narrow, as long as the calyx, long-tubular, dark reddish, turning brownish;
- \*five subequal narrow lobes, somewhat carnose-thicken, papillose inside, c. 1 mm long, spreading-excurving;
- \*corolla tube 10 mm long, 0.5-0.9 mm wide;
- \*stamens 4; filaments very short (0.2 mm); anthers 1-1.5 mm high;
- \*inserted by pairs on two different levels in the corolla tube: the anterior pair higher than the lateroposterior one;
- \*pistil 3.5-4 mm high; ovary 1.5 mm long; stigma club-shaped, beneath the anthers.

Fruits and seeds:

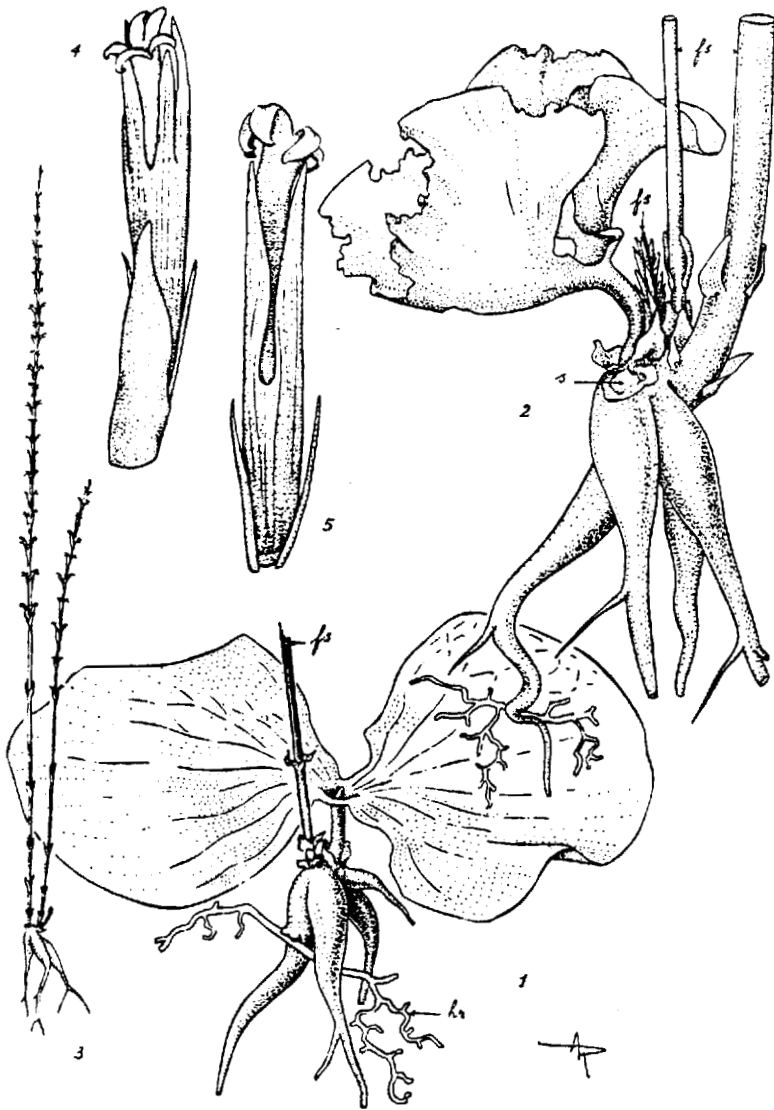
- \*Capsule included in calyx and capped by marcescent corolla;
- \*narrowly linear, 6.5-7.5 mm high, 1-1.3 mm wide; apex truncate;
- \*dehiscence by 2 loculicidal slits;
- \*seeds numerous, angular, dark reddish brown, 0.5-0.7 mm long.

Tuberous rootstock:

- \*Roots clustered, fusiform, tuberous in upper part; fleshy part c. 15 mm long and 2.8 mm thick, tapering downwards; whitish, smooth when fresh; blackish, wrinkled when dry;
- \*roots are thinning when drying; they do not appear obviously tuberous in herbarium specimens;
- \*root-connections with host roots (host unidentified, probably grasses);

\*top of **stock**: a few millimeters under ground level;

\*previous year of **leaves** leave scars on the stock; the **small number** of scars observed suggest that a single plant lives only a few years.



*Striga baumannii* -1. Whole plant in rainy season (vegetative phase) ; scale: 1 mm; fs, base of an old, burnt flowering stem (from last dry season) ; hr, host root.

-2. Basal part of plant in dry season (flowering phase) ; scale: 1 mm; the rounded vegetative leaves are dry; fs, flowering stems, 2 are already developed and blooming, the third one is younger; s, scar left by stem (of previous year).

-3. Habit of whole plant in dry season; scale: 1 mm; vegetative leaves and stem have been destroyed.

-4. Flower, front view, clapsed in its bract; scale: 1 mm. -5. The same, back view, showing the deep sinus on posterior face of calyx.

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## NEW PROJECTS

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The Weed Research Division (previously **Weed** Research Organization, now part of the Long Ashton Research Station of Bristol University), is continuing to work on parasitic weeds under funding from the U. K. Overseas Development Administration (ODA). After many years of work on the *Striga* problem in cereals it is concentrating on cowpea (*Vigna unguiculata*), studying its resistance to *Striga gesnerioides* and *Alectra vocellii* and the possibilities of selective control by herbicides. The project is collaborative with Birkbeck College, London, where the genetic variability of *S. gesnerioides* is being studied. Birkbeck College also has a separate ODA-funded *Striga* project, looking in depth at *Striga*-resistance mechanisms in the cereals.

At the Royal Tropical Institute an EEC-funded project is in progress on the resistance of *Vicia faba* beans to *Orobanche crenata*.

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## LITERATURE

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