

developmental stages of the parasite are completed within the host body and finally the adult emerges through a hole, generally on the postero-dorsal side of the host.

Ambient temperatures appears to affect the duration of the life-cycle of the parasite. It was observed that under laboratory conditions the life-cycle was completed in 17 to 20 days at 20° C.; 13 to 17 days at 24° C.; and 11 to 14 days at 26° C. The ratio of males to females in the laboratory cultures was 43 : 57 and that from parasitised aphids collected from fields was 58 : 42.

Detailed studies on the morphology of this parasite (which appears to be a new species), and its relationship with its host are on hand.

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Indian Inst. of Sugarcane Res., KISHAN SINGH.
Lucknow-2, May 6, 1966. U. S. SHUKLA.

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SEXUALITY IN *USTILAGO SCITAMINEA* SYD.

FOLLOWING the demonstration of heterothallism in *Ustilago violacea*⁴ it has been shown that sexuality in the smuts may be bipolar or multipolar.¹ Dikaryotization is usually needed for pathogenicity.⁵ Sexual compatibility groupings and their relationship to pathogenicity were studied in *U. scitaminea* Syd., the sugarcane smut organism.

Teliospores of sugarcane smut from different South Indian localities and different varieties were stored over CaCl₂ to preserve their viability indefinitely. Thereby collections made over a 3½-year period were studied. Teliospores were germinated in films of sterilized 1% sucrose solution. Each of the four sporidia produced by the promycelium was collected separately using a Leitz micromanipulator. Sporidia from 72 teliospores were grown on yeast extract-malt extract agar. Monosporidial cultures were buff-coloured, mucoid colonies consisting of budded off secondary sporidia. Colonies had mostly a finely crenulated or occasionally deeply lacera-

ted margin. Colony type was not related to sex group.

When pairs of compatible haplont cultures were mixed on a drop of 1% sucrose solution in van Tieghem cell cultures a short fusion tube appeared within an hour from near one end of the sporidium and fused with a similar tube from a neighbour. Fusion tubes appeared only in the presence of the compatible opposite sex. Following fusion sporidial budding ceased and a hypha grew out to develop a branched mycelium. With incompatible cultures fusion did not occur and sporidia continued to bud off more secondary sporidia without hyphal formation. Compatibility was confirmed by a 'Bauch Test'² on yeast extract-malt extract agar plates. A cottony white mycelium developed from mixtures of compatible pairs but cultures of incompatible pairs remained as mucoid colonies.

Each promycelium gave rise to 2 sporidia of the plus and 2 of the minus sex. Study of all possible combinations among sporidia from 20 promycelia indicated the presence of only two sex types. Among 288 sporidia from 72 promycelia, four cases of haplolethal deficiency³ were encountered all of which were determined, by elimination to belong to the minus sex.

Surface-sterilized buds of single-eye setts from healthy plants of sugarcane varieties Co. 213 and C.P. 33-409 were inoculated by placing a drop of sporidial suspension on them, incubated for 12 hours in a humidity tent and planted in soil. Three 'plus' and three 'minus' haplonts were used singly and in all possible combination pairs. Dual controls consisted of 'no inoculation' and inoculation with teliospore suspension. Twenty-five buds were inoculated in each case. Uninoculated controls and buds inoculated with incompatible pairs of haploid lines or with unpaired cultures gave rise to uninfected plants. Buds inoculated with pairs of compatible lines gave rise to varying numbers of infected plants which developed smut whips in 8 to 10 weeks (Table I). With teliospore

TABLE I

No. of plants infected following inoculation with pairs of compatible sporidial lines (Co. 213 : C.P. 33-409)

Haplont lines				
Plus	Minus	VIII A	XI B	XIV D
		XII B	14 ; 3	17 ; 4
XVII C		7 ; 4	18 ; 5	5 ; 16
XVIII A		2 ; 1	14 ; 19	15 ; 9

inoculation 17 plants of Co. 213 and 15 of C P. 33-409 produced smut whips.

There was an indication that not only did the degree of virulence vary with the combination of haplonts but there also appeared to be differences in susceptibility of the two varieties to different combinations of haplonts.

Sugarcane Breeding Inst., K. C. ALEXANDER.
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ELSHOLTZIA INCISA BENTH.: A NEW SOURCE OF THYMOL IN NORTH-WEST HIMALAYAS

DURING the course of an investigation on the aromatic plant resources of North-West Himalayan region, the leaves and the flowering tops of *Elsholtzia incisa* Benth. (Labiatae) were found to emit a strong smell identical with that of thymol. The herb was collected from Reasi Forest Division in Jammu and Kashmir State during the month of October 1964. The dried leaves and flowering tops on hydro-distillation yielded 0.88% (v/w) of a pale yellow oil with a strong smell of thymol. The oil was found to possess the following properties:

Specific gravity at 25° C.	..	0.9397
Refractive index at 25° C.	..	0.5050
Percentage phenols calculated as thymol	..	53.8

The oil on chilling deposited large crystals, the identity of which was confirmed by TLC comparison with an authentic specimen of thymol using two different solvent systems on silica gel layers (solvent systems: benzene R_f 0.40; benzene chloroform 1 : 1, R_f 0.43). The oil was also subjected to gas liquid chromatography where the major band accounting for about 60% of the oil had retention time identical with that of thymol. This appears to be the first report of the occurrence of thymol in substantial quantities in the genus *Elsholtzia*.

The plant is a pubescent slender herb (plate) about one metre high. Leaves are ovate, 5 to 8 cm. long, coarsely toothed with the base tapering along the length of the petiole. Spike, slender, 6 to 10 cm. in length with small white

flowers in interrupted whorls. It flowers during the months of July and August and frequently grows in open moist edges of temperate or sub-temperate forests between 1900 and 2200 m. The plant material is commonly available from various localities throughout North-West Himalayas extending from Jammu and Kashmir to Kumaon and parts of Western Nepal under similar habitat conditions. A detailed techno-economic survey of the raw material has since been taken up.

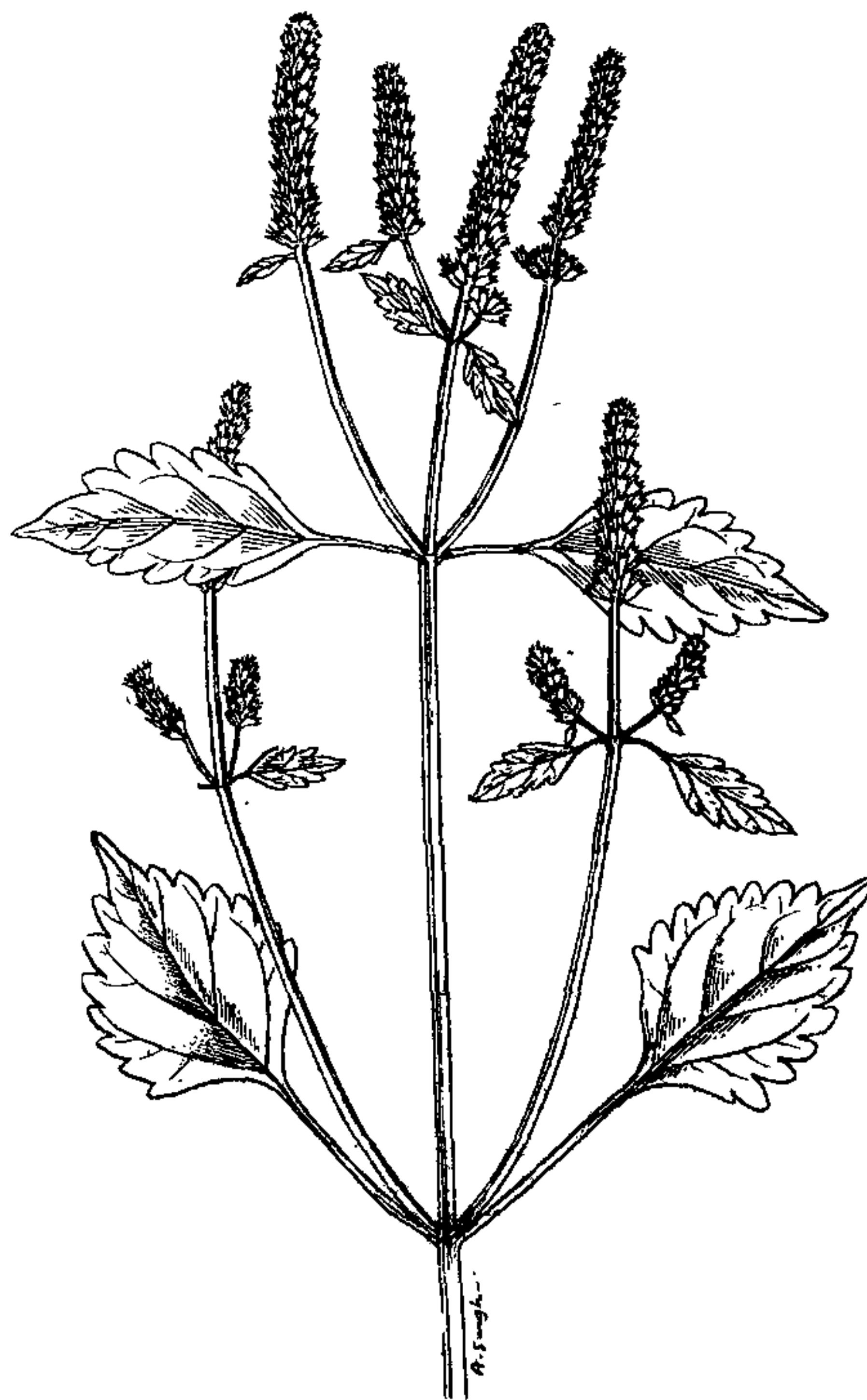


FIG. 1. *Elsholtzia incisa* Benth.; aerial portions.

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