

A NEW LEAF-SPOT DISEASE OF CASTOR *RICINUS COMMUNIS* L.

DURING the year 1947-48 a severe leaf-spot disease of Castor (*Ricinus communis* L.) was observed on the Castor crop in the Agricultural College farms at Kanpur. Preliminary microscopic examinations and cultures revealed the presence of a *Phyllosticta*. As no species of this fungus has been known to occur on Castor in India an investigation was conducted.

Symptoms.—During the month of July, after the commencement of the rains, minute dot-like light brown spots 0.1–0.3 mm. in diameter appear scattered on the upper surface of the leaf. These spots enlarge into prominent light brown circular lesions usually 0.4 cm. to 1.2 cm. in diameter, but some spots extend upto 2.5 cm. across (Plate I). A few spots are angular in shape. In some cases the spots coalesce



PLATE I.

forming irregular patches. The spots never cross the main veinlets radiating from the apex of the petiole. As the spots enlarge circular zonations of different shades of brown are formed. In many cases the centre becomes white, papery and brittle. Ultimately shot-holes appear in the centre. The spots become dry from the centre outwards. At the margin of the dry area a number of minute white dot-like structures appear in a ring. These gradually turn dirty brown ultimately becoming black and superficial within 48 to 96 hours. As the drying progresses successive concentric rings of such black dot like structures are formed. These are the pycnia of the fungus. As many as five pycnial rings have been observed. The spots attain the

maximum size within 10 to 16 days. The spots are not formed on any other part of the plant.

Mycelium.—The mycelium is mostly intracellular and composed of hyaline, septate and branched hyphæ, 1.8–2.88 μ in breadth. The cells penetrated by the hyphæ lose their chloroplasts and are killed. After the death of the cells the hyphæ form small knots on the surface. These gradually enlarge and darken into the black elliptical pycnia measuring 25.2–97.2 \times 14.2–42.2 μ . Sometimes a number of pycnia coalesce and measure 324 \times 108 μ . The outer wall of the pycnidia is composed of dark brown pseudoparenchymatous hyphæ about 2–4 celled thick at the lower side, becoming many celled thick towards the upper surface. The ostiole is circular and usually situated on the top. It is without a beak. The conidiophores are situated at the base and lower sides of the pycnidial cavity. The pycnospores are biguttulate, hyaline with a greenish hue, elliptical and rounded at both ends. They are 4.32–10.8 μ long and 1.8–2.8 μ broad. In the presence of water, the spores are exuded through the ostiole in a mucilaginous tendril.

Germination.—The spores germinate readily in water by giving out a germ tube from one end within 6–8 hours. The germ tube becomes septate between 8–12 hours.

Growth in culture.—The fungus grows well on Potato-dextrose-agar, Castor leaf decoction agar, Oat meal agar, and gives good growth in each. The colonies are white, circular and compact. After 4 or 5 days greenish dark spore masses appear scattered on the surface of the colony. These become black in a day or two. No pycnia are formed, the spores being produced at the apices of the hyphal branches.

Infection.—Inoculation experiments were conducted during moist humid days in the month of September. A large number of leaves were inoculated on both the surfaces with spore masses taken from culture and from infected leaf tissues. The inoculum was covered with cotton pads moistened with sterilized water. Spore suspensions from cultures were also sprayed on healthy leaves during the evening. In almost all cases infection took place. Within 3 days the inoculated parts became yellow, later becoming thin and brown, and within 8–10 days typical spots with pycnia were formed.

Infection on other parts of the plant was not successful even when the tissues were wounded.

Effect of various fungicides.—As the disease was severe during the year 1948 in the important experimental plots of the Government Economic Botanist (Oilseeds), various fungicides, e.g., Bordeaux mixture (4: 4: 50), Perenox, Spergon (in concentrations recommended for leaf-spots by the respective manufacturers) were sprayed during the month of September. Although the spraying was late, the result was encouraging. In the case of Bordeaux mixture and Perenox the growth of the spots and the pycnial formation were checked. Phygon was less satisfactory, the spots gradually enlarged but no pycnia were formed on them. Spergon was found quite ineffective. A second spraying was given after 15 days with Bordeaux mixture and Perenox. No fresh spots appeared on the treated plants.

Identity of the fungus.—So far only one species of *Phyllosticta*, *P. ricini*,* has been recorded by Rostrop from Denmark. *Phyllosticta ricini* differs from the local species in having shorter and much broader ellipsoidal spores, measuring 6-7—3-4 μ . The species occurring at Kanpur is evidently a new one having oblong slender spores measuring 4.32—10.8 \times 1.8—2.8 μ .

Phyllosticta bosensis.—Spots circular, brown, pycnidia on both sides, elliptical, black, erumpent; pycnidia from infected plants 25.2—97.2 \times 14.2—42.2 μ ; spores hyaline, one-celled, oblong, 4.32—10.8 \times 1.8—2.8 μ , biguttulate.

Habitat.—In spots on the leaves of *Ricinus communis* L.

Phyllosticta bosensis.—Maculæ circulares, brunneæ; pycnidia in utraque facie foliorum, elliptica, atra erumpentia; pycnidia ex plantis infestatis 25.2—97.2 \times 14.2—42.2 μ ; sporæ hyalinæ, uni-cellulatae, oblongæ, 4.32—10.8 \times 1.8—2.8 μ , biguttulatae.

Habitat.—In maculis foliorum *Ricini communis* L.

The type specimen deposited in the Herbarium of the Government Agricultural College, Kanpur, U.P., and Indian Agricultural Institute, New Delhi,

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S. K. BOSE.

S. C. MATHUR.

Botanical Section,
Govt. Agricultural College,
Kanpur, U.P.,
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* Saccardo, P. A., *Sylloge Fungorum*, 16, p. 843.

LIFE-HISTORY, BIONOMICS AND CONTROL OF SAFFLOWER APHIDS (*MACROSIPHUM JACEACE* LIN.)

SAFFLOWER (*Carthamus tinctorius*) commercially an important oil-seed crop is cultivated in Bombay Province to an extent of 6,23,582 acres. Among the various pests that damage the crop are the leaf-eating caterpillars (*Perigea capensis* Gn.) and the aphids (*Macrosiphum jaceace* Lin.). The infestation by aphids is of considerable importance and in bad years, it may vary from 60-80% in Dharwar and Bijapur districts.

Life-history of *M. jaceace* Lin. was worked out under laboratory and field conditions. On an average, the reproductive capacity of a single apterous viviparous female was 29.5 in the first generation with a maximum of 56 young ones during the life period. The duration of life-cycle varied between 7.9 to 8.3 days with four moults. In Poona, *Macrosiphum jaceace* Lin. was observed breeding on the following host plants (1) *Arctotis grandiflora*, (2) *Calendula*, (3) *Dahlia* (*Dahlia viribilis*), (4) *Ficus religiosa*, (5) *Guizotia abyssynica* and (6) *Callopsiopsis tinctoria*. Besides, large number of winged aphids were seen migrating on Ganja (*Cannabis sativa*) and Jute (*Carchhorus ultitorius*), during latter part of January and February.

During the early stages of the crop in November, the pest appears and later on increases considerably reaching to a peak about a week or two before the plants develop flower buds which commence during the last week of December or the first week of January when the average temperature in 1946-47 were 79.0 max. and 66.5 min. with 68.2% humidity.

It was observed that during January and February morning temperatures usually