

## A NEW RECORD OF CLUB ROOT DISEASE ON MUSTARD

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Club root disease of mustard (*Brassica campestris* L var *yellow sarson* Prain) has been observed in several districts of West Bengal during the last three years (1983–85) in c.v. 'Benoy' under irrigated *rabi* cultivation. The affected plants were stunted, appearing yellowish with progress of the disease; the roots, on examination, revealed swelling or formation of clubs of various size. There was reduction in the number of branches and pods as well as pod size in the diseased plants. Yield loss as high as 32.5% could be assessed by crop cutting experimental method.

The causal organism of the disease was identified as *Plasmo-diophora brassicae* Woron and confirmed by Dr D. J. Stamps of the Commonwealth Mycological Institute, Kew, Surrey, England (IMI 292504). This is the first record of Club root on mustard (*Brassica campestris* L var *yellow sarson* Prain).

## EFFECT OF POLYOXIN COMPLEX—A CHITIN SYNTHESIS INHIBITOR ON IMMATURE STAGE OF *DYSDERCUS CINGULATUS*

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THE polyoxin complex is an antifungal mixture of peptidyl pyrimidine nucleoside antibiotics produced by *Streptomyces cacaoi* var *asoensis*. The structure of major and minor components of this mixture has earlier been described<sup>1–3</sup>. The structural similarity of polyoxins to uridine disphospho-N-acetyl glucosamine (UDPNAG), the natural substrate of chitin synthetase was known to account for the competitive nature of their inhibition in fungi<sup>4</sup>. Also polyoxins have been shown to inhibit *in vitro* chitin synthesis in insects, both in an organ culture system<sup>5</sup> and in excised abdominal integuments incubated under appropriate conditions<sup>6</sup>. *In vivo* toxicity of polyoxins towards insects has been first reported by Vardanis<sup>7</sup>. In his experiment with grass hopper nymphs, he observed

that death of the nymphs usually occurred at moulting stage. We report here the effect of polyoxin complex on 5th instar nymphal stage of hemipteran pest of cotton and other malvaceous crops—*Dysdercus cingulatus*.

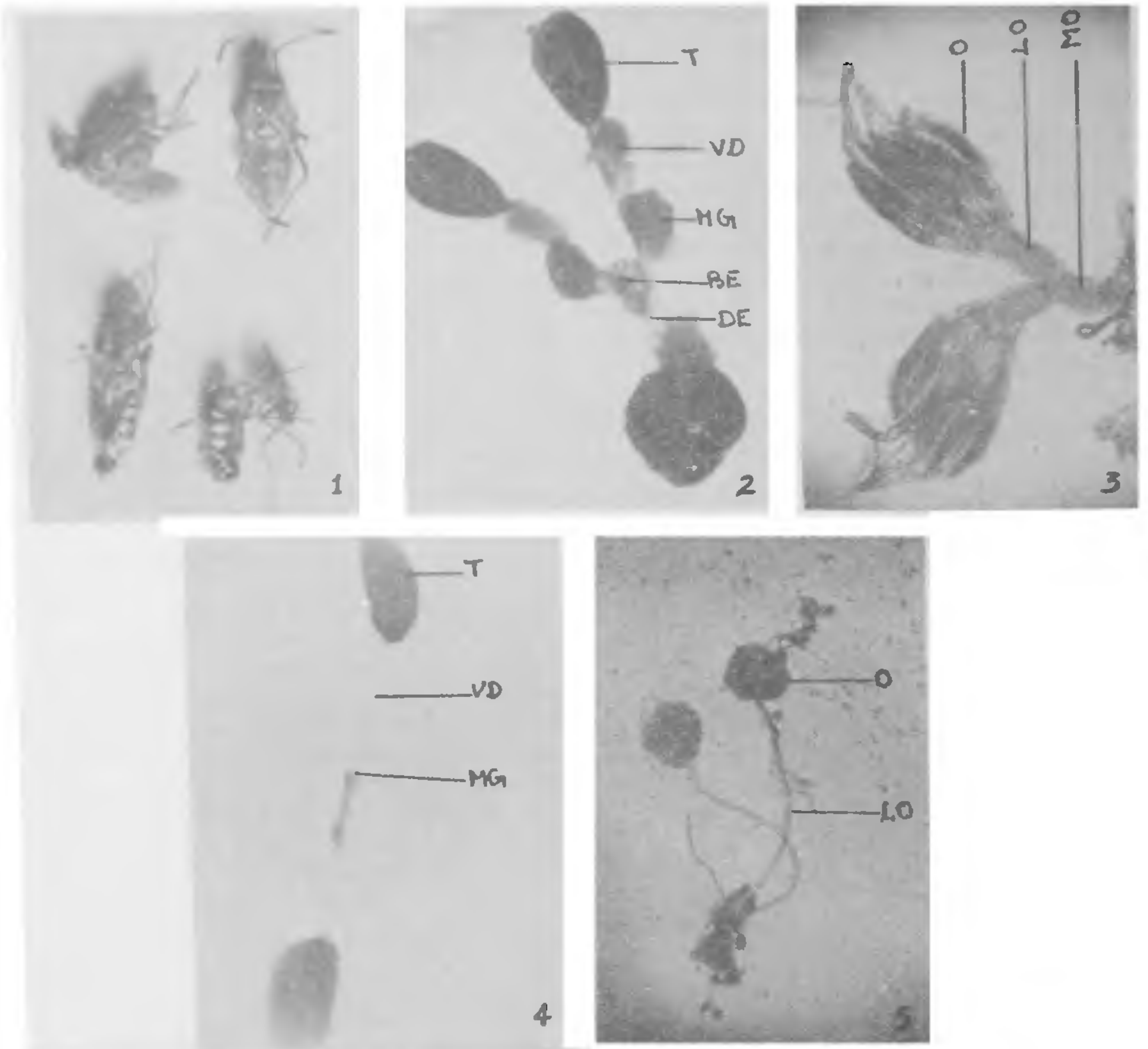
The colony of *D. cingulatus* was reared in the insectary at  $28 \pm 1^\circ\text{C}$  and 70% R.H. The nymphs as well as adults were fed on soaked cotton seeds in petri dishes. The sample of polyoxin complex was kindly provided as a gift by Dr Isono, Institute of Physical and Chemical Research, Japan. Early 5th instars nymphs of *D. cingulatus* were selected for the present investigation. Polyoxin complex was dissolved in distilled water and 1  $\mu\text{l}$  of different dilutions of test compound was injected through the leg base into the haemolymph. Control nymphs were injected with distilled water alone. All experiments were performed in duplicate.

Application of polyoxin complex to 5th instar nymphal stage of *D. cingulatus* resulted in the death of nymphs while moulting to the adult stage (figure 1). Always a few of the nymphs that underwent normal moulting showed abnormal wings. Also at all dosages, the nymphal life was prolonged by 4–6 days and ultimately died as nymphs without moulting to the adult stage. Percent inhibition of growth was calculated from the graph drawn between the log dose and probit inhibition. The dose for 50% inhibition, calculated from the graph was found to be  $12.746 \pm 0.035 \mu\text{g}$ .

Similar results were reported on *D. superstitionus*<sup>8</sup>, *D. similis*<sup>9</sup> and *D. cingulatus*<sup>10</sup>, with the chitin synthesis inhibitors diflubenzuron (dimilin) and penfluron. Gijswijt and Deul<sup>11</sup> compared the effects of dimilin with polyoxin D on *P. brassicae* larvae and found that both the compounds gave similar results. Histological sections of cuticles of affected larvae of *P. brassicae*, revealed similar abnormalities, like the disturbance of the regular endocuticular layer and the formation of globular coagulated particles.

The nymphs with prolonged nymphal life were dissected in insect ringer solution to observe any abnormality in the reproductive system. The female reproductive system showed very thin, long and filamentous oviducts in contrast to bulbous oviducts of control insects (figures 3, 5). The male reproductive system of nymphs with prolonged larval life showed thin and slender vas deferens. Also the size of the mesadene gland was reduced in treated nymphs (figures 2, 4). The adults with deformed wings did not show any abnormality in the reproductive system.

The prolongation of nymphal period of *D. cingulatus* after polyoxin complex application, suggests that



**Figures 1-5.** 1. Adults of *D. cingulatus* showing death during ecdysis, 2. & 3. Reproductive system of freshly moulted adults of *D. cingulatus*, 2. Male 3. Female, 4. & 5. Reproductive system of nymphs with prolonged nymphal life after application of polyoxin complex, 4. Male, 5. Female. T = testes; V.D. = vas deferens; A.G. = accessory gland; B.E. = bulbous ejaculatorius; D.E. = ductus ejaculatorius; M.G. = mesadene gland; O = ovary; L.O. = lateral oviduct; M.O. = median oviduct.

polyoxin complex besides interfering chiefly with moulting process resulted in hormonal imbalance like dimilin<sup>9-12</sup>. The associated abnormalities in the reproductive systems of nymphs with prolonged nymphal life are similar to those induced after exogenous application of juvenile hormone analogues, reported by Revathy<sup>13</sup> and Sighamony<sup>14</sup>.

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#### NOTES ON THE INCIDENCE AND LIFE HISTORY OF *JAPANAGROMYZA* SP (AGROMYZIDAE: DIPTERA) ON RAPESEED AND MUSTARD HITHERTO UNREPORTED

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DURING Rabi 1984-85, while recording observations on seasonal abundance of major pests of rapeseed and mustard crop, certain plants were found having holes vertically upto the height of 0.3 m from the ground level. Such affected plants were brought to the laboratory and examined for the incidence of pest. After slitting the plants, maggots were seen in most of the cases, feeding on the pith of stem. These maggots were bred in the laboratory and adults were recovered. After taxonomic studies, adults were identified as agromyzids and sent to British Museum, London for confirming their identity, and were later identified as *Japanagromyza* sp.

Observations revealed that at low infestation, affected plants did not show any special symptoms from a distance, but a closer examination indicated the presence of exit holes in the stem just above the ground level. The maggots burrow into the stem and make deep tunnels inside, causing drying of the affected pith.

A single plant had 15-20 such larvae inside the pith of stem. The damage caused by this pest was recorded to the tune of 60% and peak of its infestation was noticed in the second fortnight of February 1985. The detailed studies on its various aspects of bionomics are under way.

The adult fly is black and mates after 4 days of its emergence. A single female laid about 35 eggs into the leaf petiole by making an elliptical cavity with her ovipositor. Incubation period lasted for 4 days and maggots coming out of eggs, mined through the petiole of stem and went down the stem.

The larva passed through three instar, mean larval period being 12.5 days. The full grown maggot was about 2 mm long. It pupated in the stem itself after making an exit hole through which the adult emerges. The exit holes were marked by a thin covering. The mean pupal duration was 19 days and the mean pupal length measured 3 mm.

The report of this pest by the present authors is the first ever made record from India and abroad.

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#### RECORD OF *CREATONOTUS GANGIS* (LINNAEUS) ON WHEAT

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*CREATONOTUS GANGIS* (Linnaeus) (Lepidoptera: Arctiidae) is known to infest coffee, groundnut, lucerne, maruagrass, *Mimulus gracilis*, ragi, *Eleusine coracana* Gaerth, jute, sweet potato, sugarcane and maize<sup>1-3</sup>.

During the period December 1984 to February 1985, the wheat, *Triticum aestivum* Linnaeus, grown at the Regional Research Station, University of Agricultural Sciences, Dharwad Campus, Karnataka, was found heavily infested by *C. gangis*. This constituted the first record of this arctiid pest on wheat. The adults laid eggs in mass on the bottom surface of tender leaves. On hatching, the caterpillar scraped the chlorophyll from the leaves. The grown-up caterpillars