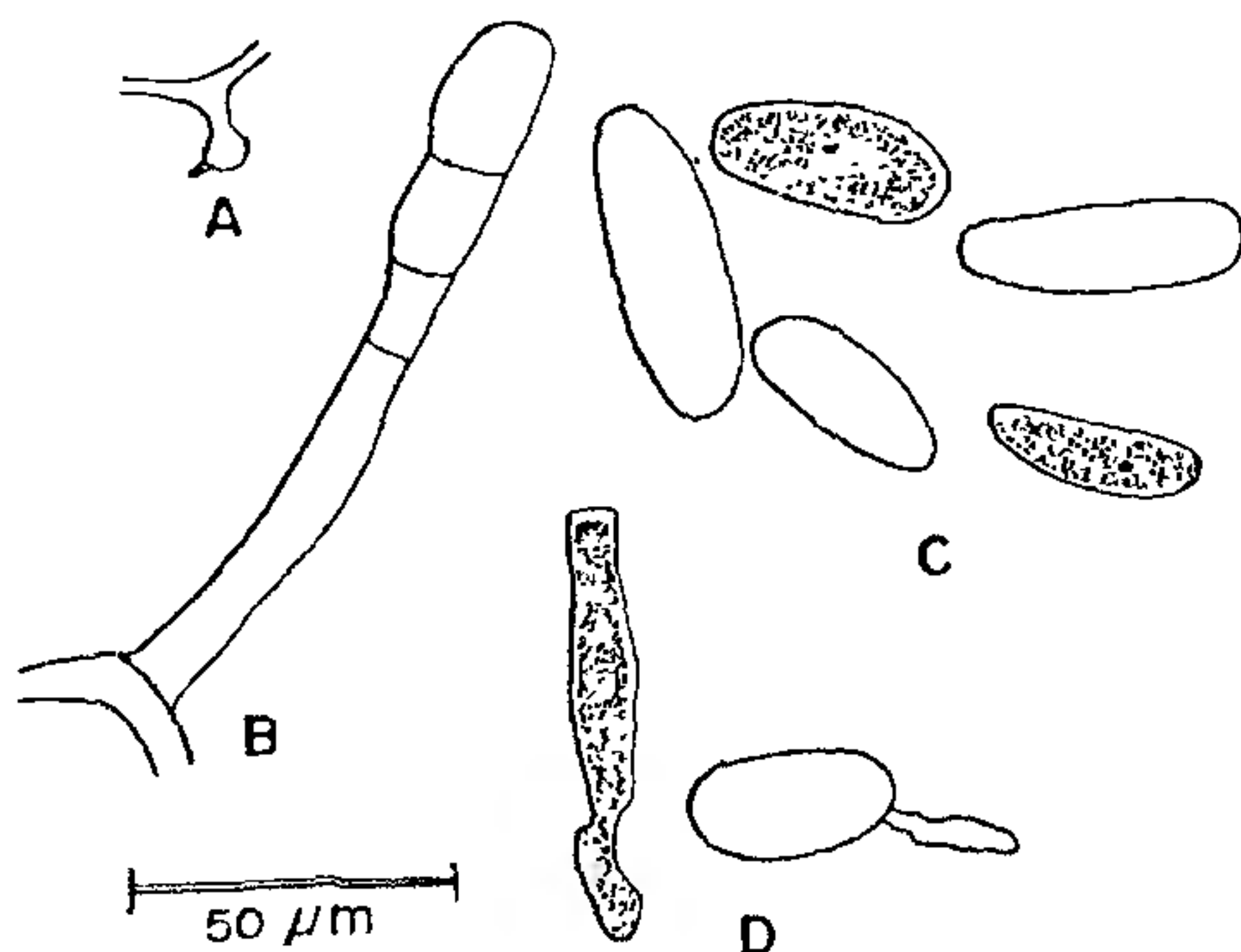




Figure 1. Infected leaf.

They show a remarkable variety. The conidial states and conidiophore nature provide outstanding characters for the differentiation of species as well as genera. Critical literature review¹⁻⁸ and comparison of the imperfect states of powdery mildews show that this fungus differs from all the known species in the conidial structure and size, besides differing in conidiophore morphology. As such it has been described here as a new taxon. The specimen has been deposited at Herbarium Cryptogamic Indiae Orientalis, I.A.R.I., New Delhi.

Oidium antigononii, Sreenivasa Reddy, Nishat Khalis and Manoharachary, sp. nov.



Figures 2A-D. A. Hanstorium, B. Conidiophore with conidial chain, C. Conidia, D. Germinating conidia.

Mycelium superficiale ex hyphis repentibus, ramosis, septatis $12.5\ \mu\text{m}$ diam. conidiophora erecta, simplicia, 1-2 septata, cylindrica, hyalina, $35-210 \times 7-14\ \mu\text{m}$; conidia unicellularis, ovalia vel cylindrica, hyalina, laeviagata, $28-45 \times 12-17\ \mu\text{m}$ (figure 2).

Typus lectus in foliis viventibus *Antigonon leptopus*, Hooke & Arn, in loco Hyderabad, mensis Octobus & Novembus anni 1980 & 1981, a Manoharachary, at positus in herbaria OUFHS subnumeris 1 p. HC10 33797.

20 February 1982

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EPIZOOTIC OCCURRENCE OF NUCLEAR POLYHEDROSIS VIRUSES ON *SPODOPTERA LITURA* F.

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AMONG the various microorganisms responsible for diseases in insects, nuclear polyhedrosis viruses (NPV) occupy an important position and such viruses are being used for insect control in recent years. Nearly 200 such NPV have been recorded on insects and many of them on Lepidoptera¹. One such nuclear polyhedral disease has already been reported from India² *Spodoptera litura* F., a polyphagous pest having a host of range of about 21 food plants including Daincha (*Sesbania bispinosa*)³.

In October 1981, NPV in an epizootic form was observed on *Spodoptera* larvae in two daincha fields within the campus of the Agricultural College, Madurai. This natural virus epizootic assumes significance since no such epizootic of *S. litura*, a potential pest, difficult to control has so far been reported from India, although, an epizootic of a fungus, *Beauveria* sp. has been reported on this pest on sunn hemp⁴.

Hence observations were made on the disease occurrence, their extent and the possible causes for the outbreak. In a square metre plot, on an average 20 larvae were observed hanging on to the plants exhibiting typical NPV symptoms; the larvae with such polyhedrosis symptoms constituted 86.6% of the field population. Though daincha has been reported as a host¹ for this polyphagous pest, it does not seem to be a natural host since no egg laying was observed on this crop. The larvae were, however, found to migrate to this crop from groundnut, cowpea and jute grown around daincha crop and pick up virus infection by feeding on the leaves. This epizootic observation has lent support the view that if proper distribution methods are provided, the virus can establish well in field and induce epizootics resulting in natural control of *S. litura*.

It is reported that causes for such outbreaks may be attributed to soil borne virus particles which play a major role in the initiation of epizootics. The accumulated virus particles near the surface of the soil spread to outer leaves of the growing crop, and ingested by the early instars, lead to the initiation of infection, and rapid dissemination occurs when the infected larvae crawl to the central parts of the plants⁵. Further infection occurs on fresh larvae either by ingestion of the contaminated food or by feeding on the liquified cadavers of virus killed larvae. Thus, once the infection is initiated, rain is the chief spreading agent and high mortality rate could occur in the second or subsequent generations⁶. In this case also initiation would perhaps have started from soil borne virus particles accumulated at the instance of first generation larvae, which were first noticed on weed hosts during the last week of July 1981. The subsequent almost continuous monsoon rains in August and September splashing on the accumulated soil virus, onto the plants, together with the unfavourable climatic conditions had been conducive for the increased infection resulting in the severe epizootic disease reported in this note.

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A NEW MULTICRYSTALLIFEROUS *BACILLUS THURINGIENSIS* ISOLATE FROM DISEASED MOSQUITO LARVAE

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THE entomocidal bacterium *Bacillus thuringiensis* produces a proteinaceous, bipyramidal crystal concomitant with sporulation that is toxic upon ingestion and solubilization to the larvae of Lepidopteran and Dipteran insects¹. The organism usually produces one crystal per maturing cell except in *B.t. var thuringiensis* (BA-068)², *B.t. var darmstadensis*³ and *B.t. var tohokuensis*⁴, which are bicrystalliferous. In this note, we report yet another, hitherto unknown multicrystalliferous *B.t.* isolate (ISPC-4).

From the jet black larval cadavers that appeared in our *Culex fatigans* colony, the pathogen was isolated on nutrient agar medium. The opaque creamish colonies with curly hair margins were those of typical *Bacillus thuringiensis*.

Morphological observations with the purified growth material showed that the vegetative cells were motile, gram positive rods, measuring 1.2–1.6 $\mu\text{m} \times$ 4.2–5.6 μm . The spores were elliptical, measuring 0.86–1.01 $\mu\text{m} \times$ 1.6–3 μm . The organism showed 2–5 bipyramidal crystals per sporangium (figures 1 and 2), was aerobic or facultative anaerobe and tolerated upto 5% NaCl.

Biochemical reactions were as follows: indole and β -exotoxin production, MR, VP, citrate utilization and acid from mannitol, xylose, arabinose were negative. NO_3 - NO_2 , catalase, acid from glucose, and growth in 1% lysozyme were positive. Also, this organism belonged to serotype 3a, 3b and biotype III₂.

Thus morphological, biochemical and serological studies identified our new multicrystalliferous isolate (ISPC-4) as *B. thuringiensis* var *kurstaki* (serotype 3a, 3b and biotype III₂).

This organism was shown to be pathogenic to *Culex fatigans* larvae. The LC_{50} values⁵ were found to be 1.91×10^5 and 1.93×10^5 spores/ml to 2nd and 3rd instar larvae respectively. These values were based on the cumulative mortality data recorded for 5 days. The bacillus also gave 100% mortality to 2nd, 3rd and 4th-instar larvae of *Achaea janata* (Lepidoptera: Noctuidae) at a concentration of 10^9 spores/ml within 48 hr.

Presently the microbial insecticide formulations which are widely used in agriculture and forestry are based on single crystal producing *Bacillus thuringiensis* varieties like (HD-1) strain⁶ and these have been proved safe to man and other non-target organisms. Since our new isolate *B.t. var kurstaki*