SCIENTIFIC NOTES

OCCURRENCE OF ENTOMOPATHOGENIC FUNGUS ON MUGA SILKWORM IN JORHAT DISTRICT OF ASSAM

Aparupa Borgohain*, Ranjana Das and Kalyan Dutta

* Silkworm Pathology Section, Central Muga Eri Research & Training Institute, Lahdoigarh, Jorhat, Assam, INDIA. E-mail: aborgohain0@gmail.com

[Borgohain, A., Das, R. & Dutta, K. 2015. Occurrence of entomopathogenic fungus on muga silkworm in Jorhat district of Assam. Munis Entomology & Zoology, 10 (2): 518-520**]**

The North eastern region of India is endowed with large natural wealth of both fauna and flora especially in case of sericigenous insects and their food plants which have given a unique outlook to the region (Choudhuri, 1983; Thangavelu, 1991). Natural silk is the product of a group of sericigenous Lepidoptera insects and muga silk is a wonderful gift of nature which is produced by muga silk worm *Antheraea assamensis* Helfer. It is a semi domesticated endemic sericigenous insect of North East India, especially in Assam. It is a multivoltine, polyphagus insect generally in six crop i.e Jarua (November-January), Chatua (February-March), Jethua (April-May), Aherua (June-July), Bhodia (August-September) and Katia (October-November) in a year. Due to outdoor nature of rearing, muga silkworm are exposed to various rigors of changing environment of the region of varied topography and thus the rearing is prone to numbers of disease and leading to crop loss (Choudhury, 1981; Thangavela et al., 1988; Das et al., 2005). Silkworm crop loss due to outbreak of disease is one of the major constraints uncounted by the farmers, it accounts for 35% of crop loss (Kakoti, 2002). The most common diseases of muga silkworm are flacherie, grasserie, muscardine and pebrine (Thangavelu, 1988). The present study carried on late Aherua crop during July-August.

MATERIALS AND METHOD

The infected Muga cadavers were collected from fields at CMER&TI, Lahdoigarh, Jorhat district, Assam during the late Aherua crop (August, 2012). The dead cadavers were observed morphologically and observation was recorded. The samples were surface sterilized with 0.1% mercuric chloride solution and washed thrice with distilled water. After sterilization the silkworm were dissected and serial dilution was carried out in PDA (Hi-media, Mumbai) for the isolation of fungi and control also maintained from healthy larva. The plates were incubated for 5days at 28°C in BOD. The pure culture of the fungus was obtained by hyphal tip transfer techniques to obtain monotype culture for future use (Fig. 2) (Vishunavat & Kolte, 2005) and then maintained for futher evaluation. The morphological and cultural characterisation of the culture grown on PDA was studied. Isolated colonies were identified as per description of "A Manual of Soil Fungi" by Gilman (1995), "Illustrate Genera of Imperfect fungi" by Burnet & Hunter (1987), and "Introductory Mycology" by Alexopoulos et al. (1986).

Pathogenicity Test: Pathogenicity test of the isolates was done in the 5th instar larva in august 2012 using Single Hyphal Tip technique (Puzari et al., 1994; Vishunavat & Kolte, 2005) obtained from 8d old cultures on PDA, onto healthy

host plant of *Antheara assamensis*. Inoculated endo- rearing potted plant and controls were covered with net for a week and kept under room temperature conditions. In pathogenicity test disease symptoms started developing after 5 days. The re-isolation invariably yielded the same fungus from the infected worm.

Observation: After spore inoculation in foliar host plant and silkworm surface, the fungi started to develop within 5to 7 days and then after taking the food the larva is infected after 5days. The infected larva stops feeding within hours and also stops the movement .The larvae loose appetite and the body colour change to pale and later the body became hard and secrete some juicy part. After infection the larva will die within 5to7 days.

RESULT AND DISCUSSION

The disease was found during the last stage of worms i.e. 4^{th} and 5^{th} instars before spinning. Fungal isolates were identified on the basis of cultural, morphological and microscopic characteristics of the isolates. The mycelial and spore characters of the fungi were studied under phase Contrast microscope (Leica, Germany) and photograph was also taken for the work. Cultural and morphological characters such as colony colour, type of growth, texture were studied on PDA medium. Initially young hyphae were pink white with floppy dense mycelia which then finally appeared as dark pink with slight white regular periphery. During microscopic observation it is observed that the mycelium is septate and right angled branching. The fungal hyphae give rise to simple conidiophores, which produce two types of conidia i.e micro and macro. Microconidia are single celled and ovoid/oblong with blunt end in shape. Macroconidia are hyaline, elongated, filiform and multisepted with pointed ends, measuring 14.3X5.02µm. Each macro-conidia gives rise to several germ tubes (Gupta et al., 1998). In the reverse side also the colony is observed as pink colour. The infected hypodermis and fat bodies may also be infected. The infected & isolated fungus is identified as *Fusarium solani*.

ACKNOWLEDGEMENTS

Authors are thankful to the Director CMER&TI,Lahdoigarh,Assam for providing necessary facilities during course of study and DBT, New Dehli for financial assistance under the project “Establishment of Institutional of Biotech hubs.”

LITERATURE CITED

Alexopoulos, C. J. & Mims, C. W. 1986. Introductory Mycology. Wiley Eastern Limited, New Delhi, pp. 1-566.

Burnett, H. L. & Hunter, B. B. 1987. Illustrated genera of imperfect fungi. (Fourth Edition) Macmillan Publishing Campus N.Y., collar Macmillan Publishers London, pp. 216.

Choudhury, A., Guha, A., Yadav, A., Kumara, J., Unni, B. G. & Roy, M. K. 2002. Casual organism of flacherie in the sikmworm Antherae assama Ww: Isolation,characterisation and inhibition by garlic extract. Phytotherapic Research, 16: 89-90.

Choudhury, S. N. 1983. Eri silk industry. Directorate of seric. Weaving, Government of Assam, India, 1-23.

Das, K., Borah, A., Yadav, A. & Chakravarty, R. 2005. Seasonal incidence of diseases in muga silkworm the in different muga growing belts. In: Proceedings of 20th congress of the International Sericultural Commission: 259-263.

Gilmah, C. J. 1995. A manual of Soil fungi Printwell Jaipur (India), 1-256.

Govindhan, R., Narayanaswamy, T. K. & Devaiah, M. C. 1998. Priciples of silkworm pathology. Seri. Sceintific publishers, Baglalore, 420.

Gupta, V. P., Raju, H. V., Kumar, V. & Govindaiah. 1998. surface ultrastructure of infection process of Alternaria alternata and Fusarium pallidoroseum on mulberry. Arch. Phytopathol. Pflanzenschutz, 31: 429-434.

Kakoti, P. K. 2002. Adoption of prophylactic measures to contain muga silkworm diseases. Indian silk., 41 (1): 19-21.

Majumder, A., Boetel, M. A. & Jaronski, S. T. 2008. Discovery of Fusarium solani as a naturally occurring pathogen of sugarbeet root maggot (Diptera: Ulidiidae) pupae: prevalence and baseline susceptibility**.** J. Inverter. Pathol., 97 (1): 1-8.

Puzari, K. C., Hazarika, L. K. & Deka, N. 1994. Pathogenicity of *Beauvaria bassiana* (Bals.) vuill on development stages of rice hispa. J. Biol. Control., 8: 133-135.

Samson, M. V., Baig, M., Sharma, S. D., Balavenkatasubbaiah, M., Sasidharan, T. O. & Jolly, M. S. 1990. Survey on the relative incidence of silkworm diseases in Karnataka, India. Journal of Sericulture, 29 (2): 248-25.

Thangavelu, K., Chakravarti, A. K. & Bhagabati, A. K. 1988. Hand book of muga culture, 75-84.

Thangavelu, N. 1991. Wild ericigenous insects of India: A need for conservation. In: Wild Silkmoth 1991. Inter. Society for wild silkmoths: Japan, 71-77.

Vishunavat, K. & Kolte, S. J. 2005. Essentials of Phytopathological Technique (Eds), Kalyani Publisher, India. 217.

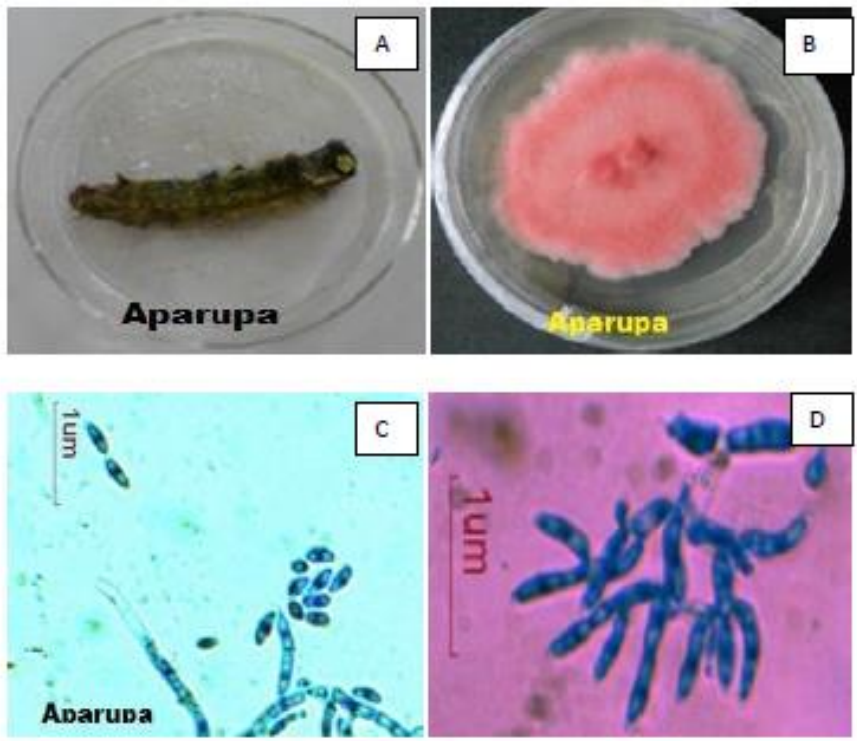

Figure 1. Fungal spore and conidiophore of *Fusarium solani*: (A) Infected Larva; (B) Colony culture; (C) Microconidia; (D) Macroconidia.