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STUDIES ON THE ENTOMOGENOUS FUNGUS *NOMURAEA RILEYI* (FARLOW) SAMSON I

THE green muscardine fungus, *Nomuraea rileyi* (Farlow) Samson proved to be highly pathogenic to the three lepidopterous pests, *viz.*, tobacco caterpillar (*Spodoptera litura* F.), castor semilooper (*Achoea janata* L.) and jowar web worm (*Stenachroia elongella* H.) under laboratory trials. Two applications of the fungus at an interval of a week brought about total mortality of the semilooper within a period of two weeks. This fungus was non-pathogenic to the egg-parasite (*Telenomus proditor* Nixon) of the castor semilooper.

Introduction

Since the authors reported the occurrence and pathogenicity of the green muscardine fungus, *Nomuraea rileyi* on tobacco caterpillar (*Spodoptera litura*)[2], further studies were undertaken of its pathogenic behaviour on this and two other lepidopterous pests. The results are briefly reported here.

Castor semilooper (*Achoea janata* L.) is an important pest of castor and is wide-spread and destructive, particularly in parts of Andhra Pradesh[3]. Pathogenicity trials were carried out on this and other pests employing pure cultures of *N. rileyi*, which in our earlier trials,[2] was found to be a virulent pathogen of *S. litura*.

Materials and Methods

Pathogenicity trials were conducted by spraying a heavy aqueous spore-suspension on eggs and larvae of *A. janata* (obtained through the courtesy of Dr. V. V. Thobbi, Entomologist, I.A.R.I., Regional Research Station, Rajendranagar, Hyderabad, A.P.). The inoculum was obtained from pure cultures of the fungus grown on Sabouraud's maltose agar fortified with 1% yeast extract.

All trials were carried out under laboratory conditions, in specially designed insect-proof cages or in glass jars and plastic boxes with lids provided with perforations or fine muslin cloth to allow adequate aeration. The trials were conducted in four replications and the results are presented in Table I.

Results and Discussion

It could be seen from Table I that the incubation period of the fungus in younger caterpillars ranged from 12 to 14 days while per cent mortality was lower as compared with larvae of III and IV instars. This difference may be attributed to the process of early moulting after inoculation during their period of active growth[1]. In another set of trials, healthy eggs of the pest were sprayed with the fungus inoculum and this treatment resulted in very low per cent of

TABLE I

Results of pathogenicity tests with Nomuraea rileyi *on* Achoea janata *L.*

Eggs and larval instars	No. of applications	% Mortality in different Replications				Incubation period
		I	II	III	IV	
Eggs	One	5	5	10	5	10 to 12 days for newly hatched larvae
I instar	One	60	60	60	60	12 to 14 days
II instar	One	60	60	60	60	13 to 14 days
III instar	One	60	60	60	60	7 to 8 days
IV instar	One	80	80	80	80	7 to 9 days
II instar	Two	80	100	100	100	2 weeks

mortality of larvae, hatched from such eggs, thus showing that the fungus had no effect on hatching. Two applications of the fungus given at an interval of 7 days on II instar larvae were found to be not only effective in reducing the period of incubation appreciably but also increased per cent mortality from 80 to 100%. *N. rileyi* was reisolated from diseased larvae in all cases (Fig. 1). The larvae in controls remained healthy. These trials were conducted during September–November 1977, yielding positive results in all cases, thus confirming the highly pathogenic nature of the *N. rileyi*.

FIG. 1. Mummified caterpillars of castor semilooper parasitized by *Nomuraea rileyi*.

FIG. 2. Glass containers showing healthy parasites (*Telenomus proditor* Nixon) of castor semilooper, 40 days after spraying.

In host-range studies, *N. rileyi* also proved pathogenic and inflicted high mortality on jowar web worm (*S. elongella*). Pathogenicity trials were also conducted using *N. rileyi* on *Telenomus proditor* Nixon, which is a well-known egg-parasite of *A. janata* used in biological control. This was carried out by spraying a heavy aqueous spore-suspension of the fungus directly on parasitized eggs of *A. janata* in some cases and in others by releasing adults of parasite in glass containers heavily dusted with live amorphous spore-powder. Both the trials yielded negative results and the parasites so treated remained entirely unaffected by the fungus, even after a period of 40 days in both the cases (Fig. 2). This is a valuable contribution and should be considered as of great advantage and an effective safeguard in the biological control programme against the semilooper, through the use of the egg-parasite. It may also be of interest to note that the fungus is not phytocidal to the plant-hosts of the three pests and is, therefore, safe to handle involving no hazards.

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A SHORT-CUT METHOD FOR MAKING PERMANENT MOUNTS OF STAINED EPIDERMAL PEELS

SLIDES of epidermal peels described by earlier workers generally represent glycerine mounts, which being semi-permanent are easily spoilt when examined under immersion oil. Though there are some methods of making permanent peel slides,[1–4] the latter do not display the different cell parts in good contrast. The adaptation of 'aniline-blue in lactophenol' staining technique of mycologists[5,6] to the epidermis of plants does provide good contrast between cell elements, but these preparations are also semi-permanent. Therefore, the present procedure was developed which enables preparation of peel slides which have been