



ORIGINAL ARTICLE

Mechanical, Cultural and Chemical Control of Greasy Cutworm (*Agrotis ypsilon* Rott.)**Harish Kumar and Sunil Kumar Jain**

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Email: drhkumar.kumar@gmail.comReceived: 16th Feb. 2018, Revised: 21st March 2018, Accepted: 4th April 2018**ABSTRACT**

Agrotis ypsilon Rott is a pest of cruciferi crop specially cabbage (*Brassica oleraceae*). The mature larva of *Agrotis ypsilon* Rott is called greasy cutworm. *Agrotis ypsilon* R. being a large sized notorious pest attracted the attention of agriculturalists and entomologists and the pest has been studied from time to time for its control in India and abroad as well. In the earlier publications only mechanical control and simpler chemicals have been mentioned. Choudhury (1953), Nirula (1961) and Purohit (1973) recommended various chemicals for its control. For *Agrotis ypsilon* R. more commonly soil treatment and two sprays/dusts have been recommended. The larva being large and easily reared, for the study of various aspects of ecology, population and toxicology etc. *Agrotis ypsilon* R being a serious pest of good many economic crops in India, attempts has been made regularly to reduce the population and the following control measures have been suggested. Mechanical control, Cultural control and Various chemical control measures (both spray and dust have been recommended) but present author used carbaryl for the control of *Agrotis ypsilon* R in the forms of dust 10% @ 10 Kg/acer. the following that is showing chemical control *Agrotis ypsilon* R by different methods.

Key words: Cruciferi, Larvae, Endosulfan, Mechanical, chemical control

INTRODUCTION

The greasy cutworm *Agrotis ypsilon* Rott (Lepidoptera: Noctuidae) is a serious pest of cruciferi on a variety of economic plants (mainly cabbage) inflicting maximum loss during winter (December and January) in Uttar Pradesh. Amin (1997), Chandla (1977) Harris and Svec (1968 a&b and 1969 a&b) experimented upon *Agrotis ypsilon* with various insecticides. This moth being in the first place a notorious pest and secondly having a large sized larva provides excellent material for experimentation. Hassanein, *et. al.* (1962) again studied the morphology and anatomy of the mature larva of *Agrotis ypsilon* Rott.

MATERIAL AND METHOD

Works out the life history of the vegetable pest under investigation the pest were collected from the various field groves around the Agra and Etawah, during infested and breeding season. *Agrotis ypsilon* Rott (greasy cutworm) being Nocturnal from where larvae collected during November to February from cruciferi crop specially cabbage (*Brassica oleraceae*) pest visits light points also and can be frequently caught by the light trap; the insect was first studied at room temperature in the laboratory of department of Agra College Agra and the later the result were confirmed by observation in the field under mature condition. Small potted host plants were kept in the muslin covered glass jars (8" x 10" and 6" x 8") and a pair of insect were introduced in jars. *Agrotis ypsilon* Rott was feed on sugar solution kept along with potted host plant in the glass jars.

Recommendations for the control measures have been made mostly after recording the observations from the various Government farms, Private farms. The author also conducted experiments at the kitchen garden, Etawah, following technique chemical control of Gupta (1981), Singh (1986), Krishnah (1983) and Jagpat (1981) but on a small scale. Mostly the author personally tried the mechanical and cultural control methods and trained the local folk which yielded appreciable results.

RESULT AND DISCUSSION

Agrotis ypsilon R. is a notorious pest of *Brassica oleracea*. A record of this insect is available from, Indian plains since long, Lefroy (1909). Lefroy and Howlett (1909) recorded the overwintering pupae, and the hibernating adults falling from the thatch or ceiling wrapped in spiders web. The present author recorded its activities during winter (U.P.). Reddy (1968) reported the presence of the pest in great abundance in the area having mild and humid climate and insignificant in hot and dry area. This is in confirmation to the authors present finding. In authors' opinion, the reason of its regular appearance is the large number of host plants at its disposal, also mentioned by Pruthi (1969) including those of vegetable, cereals and even plants of medicinal value.

MECHANICAL CONTROL

(i) Killing the Moth: During the breeding season the moths are on the lookout for host fields and the female generally lies during the early night, or even late evening. An evening round in the field will bring to light certain laying females. Light trap is more successful and it can be easily put in the kitchen gardens, farms and fields adjoining the building.

(ii) Searching for Eggs and Destroying Them: This pest generally lays the eggs in batches and on the first day of oviposition mostly the largest batch is laid. A careful search may expose the leaf with such a large batch of eggs. An even leaf with smaller number of eggs is not missed by an experienced eye. Searching for eggs and destroying them is safest as they are stationary and the period of hatching is also considerable.

(iii) Hand Picking the Larva: The first instar larva is minute but gregarious. If during the egg stage it is missed it is generally detected during the first instar larva stage because they spin the web. Likewise hand picking the mature larvae is also possible because the eaten away portion of leaf and faecal pellets hint the site of the larva. In some cases the whole leaf is to be removed and crushed well to destroy all the larvae therein (when the attack is too severe). Resowing is necessary when the extent of infection is too much, Pruthi (1969). In such cases all trash must be burnt and completely destroyed, Reddy (1968).

(iv) Searching the Pupae and Destroying Them: In the nature ordinarily this larva pupates in the soil. However, its site of pupation is variable, in the stores, corner of our houses, in the neglected and fallen vegetation the pupae are accidentally met apart from their regular place of pupation. It prefers to pupate in the soil, in close vicinity of the field, ordinarily about six inches deep. The soil being watered it pupates on the plant itself. Tilling or overturning the soil breaking the mud heaps and removing the stones and pebbles frequently expose the pupae. Special care should be taken after reaping the crop and resowing the same. The fresh adults emerge to attack the young plants, hence removing all such pupae is very necessary. At the time of resowing after burning all trash it must be reploughed at least twice and the pupae be exposed to birds.

CULTURAL CONTROL

(i) Removal of Leaves Bearing Eggs: *Agrotis* lays in batches during first few days. Leaves bearing a batch of eggs should be plucked and crushed or buried. It is generally not possible to destroy all the eggs on the leaf hence it is advisable to remove the leaf.

(ii) Removal of Leaves with First Instar Larvae: If a batch of eggs have been overlooked and it has been hatched into first instar larvae, the leaf bearing such larvae should be plucked. Generally the first few instars spin webs and lay unaffected by many of the control measures. Destroying individual larvae is difficult, instead, the complete leaf must be plucked and either dried or buried and destroyed.

(iii) Removal of the Plant Bored by the Larvae: During excessive cold the mature larvae bore into the host plants. The author observed the larvae boring specially into cabbage during December and January at Agra and Etawah (U.P.). The faces (droppings) indicate the presence of such larvae. In such instances the whole plant must be removed, the larva must be brought out and destroyed.

(iv) Clean Cultivation: *Agrotis* is known as cut-worm as it cuts the leaf and drags it in a safer place and feeds upon it, Pradhan (1969). Cleaning the field regularly (i) will not leave any such fallen leaf to be fed upon and (ii) will discover mature larvae (that has dragged the leaf) and is ready for pupation.

(v) Burn Trash: The mature larvae of this moth pupate on the plant rarely and underground regularly. Collecting the trash and regularly burning it will (a) discover the larvae creeping below the trash and (b) all the pupae in the trash will be burnt alongside.

(vi) Destroying the Leftover: After the crop is harvested generally the remains of the plants are left over for good long time. Here the pest is sheltered. The field whenever leftover, (a) the remaining crop must be carefully removed and no plants must be left that may be utilized by the pest, (b) these plants must be either buried or burnt as they harbour lots of pest of all stages.

(vii) Ploughing Deep and Watering: Specially *Agrotis* needs this operation as the pupa is underground and the portion of plants below the earth even may be utilized by the larvae. If the field (after the plants being totally removed) is ploughed (to bring up all the underground pupae) and watered well, the pest is totally destroyed in that field.

CHEMICAL CONTROL

Agrotis ypsilon R. includes cereals and trash vegetation amongst its host plants. Hence it has been studied by many toxicologists both in India and abroad. Harris and Svec (1968 a&b and 1969 a&b) in a series of papers are as yet busy experimenting with this pest. However, the insecticides suggested so far are followed.

Treatment:

1. Aldrin 5% @ 25kg./Hectare
2. Carbaryl 10% @ 10kg./Hectare
3. Endosulfan 0.25%
4. Endrin 5%

The pest has several host plants to attack. Against vegetables, specially *Brassica oleracea*, Carbaryl 10% dust was found most effective. Irrigation water (sprinkling) should let it percolage. Dusting at the time of earthing is further helpful.

Operation Schedule:

First dusting	Middle of November (may be Delayed if the pest is absent)	@ 8-10 kg/acre
Second dusting	First week of December (as and When needed)	@ 10 kg/acre.
Third dusting	Late December or Early January (Along with soil treatment if Necessary).	@ 1 kg/acre.

Agrotis ypsilon R. being a large sized notorious pest attracted the attention of agriculturalists and entomologists and the pest has been studied from time to time for its control in India and abroad as well. In the earlier publications only mechanical control and simpler chemicals have been mentioned. Choudhury, (1953), Nirula (1961) and Purohit (1973) recommended various chemicals for its control. For *Agrotis ypsilon* R. more commonly soil treatment and two sprays/dusts have been recommended. The larva being large and easily reared, for the study of various aspects of ecology, population and toxicology etc. this larva has been employed by Harris and Svec (1968 a&b). Reddy (1968) recommended dust or spray of a persistent contact as well as stomach poison to be most effective against the cut worms, Pradhan (1969) and Rizvi (1977) recommended similar insecticides but cautioned that extreme care should be taken to avoid residual hazards. Harris and Svec (1969 a) conducted further experiments on the control of cut worms. Pruthi (1969) recommended chlordane 5% and toxaphene dust (2%) or technical aldrin for soil treatment. This author further recommended for soil treatment. This author further recommended baits with bare, Paris green, molasses, lemons, flour, and water as the same has been tried in U.S.A. also. Harris and

Svec (1969 b) further studied the control of the insect. Purohit, *et al.*, (1971) again described certain modern insecticides against the moth. Abraham, *et al.* (1972) tested four granulated insecticides against the pest. Chandla (1977), Lampart (1987), Mishra (1998) and Mohasin (1993) have further investigated the control of various cutworms. Sechriest, *et al.*, (1977) designed pilleted bait (with apple pomace, corn meal, wheat barn and molasses, with a toxicant) as a very successful control measure. He also designed carbaryl as toxicant and the results produced have been described satisfactory. Worked out the potentiality of insecticides against our worm and tested as many as twenty seven insecticides against the same. On the basis of these studies chloropyrriphos 0.05% foliar spray has been recommended as very effective. Again tried several insecticides against *Agrotis ypsilon* and recommended dimethoate methyl-parathion, methidithion and melathion as most effective. In series of paper Harris and Svec (1968 a&b and 1969 a&b) conducted toxicological studies on the cutworms and tested pyrethrinoid insecticides.

On the basis of the recommendations made by various workers, the present author used carbaryl for the control of *Agrotis ypsilon* R. in the form of dust 10% @ 10kg/acre. This worked very successfully and could be repeated according to the necessity.

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