

Onion maggot (*Delia antiqua*): A destructive pest of onion

Onion is a high valued bulb crop cultivated commercially all over India for its medicinal, aromatic and food plant since ancient times. It is also called as Queen of Kitchen due to its unique characters like aroma, flavor, and taste. It is widely used throughout the year in curry preparation and in the form of processed foods. India is one of the major onion producing countries. The total onion production of India is 228.19 lakh tonnes out of which share of *kharif* onion is 48.41 lakh tonnes, late *kharif* onion 21.50 and *rabi* onion 158.28 lakh tonnes. The major onion producing states are Maharashtra, Madhya Pradesh, Karnataka, Rajasthan, Bihar, Gujarat, Andhra Pradesh, Haryana, West Bengal and Uttar Pradesh in the country. These states account for almost 90% of the total onion production in the country. Maharashtra ranks first in onion production (8047 thousands tonnes) with a share of 35.26% in 2018-19. In India there are several factors like biotic (Insect pests and diseases) and physiological constraints which affect the yield of onion adversely and reduce productivity.

O NION maggot (*Delia antiqua*; Anthomyiidae: Diptera), which is one of the major constraints in the onion production causes rotting of the onion stem in the field and secondary storage, rots in storage leading to heavy losses.

Biology of onion maggot

Egg: The onion fly deposits white elongated eggs of about 1.25 mm in length on the soil near the stem, occasionally on the young leaves and neck of the onion plant. Eggs hatch in 2-3 days.

Maggot: The legless maggots are tapered, creamy-white in colour and reach a length of about 8 mm. Maggots develop through three larval stages in 2 to 4 weeks depending on the temperature. Most newly hatched maggots crawl below the soil surface and feed upon the roots or burrow into the basal plate of the bulbs. Some maggots may enter into the sides of bulbs rather than through the basal plate, after undercutting has occurred. Any injury site on the bulb facilitates the maggot's entry.

Pupa: When full-sized, the maggot leaves the bulb and enters the soil to pupate at a depth 5-10 cm. The pupa is chestnut brown and 7 mm long.

First and second generation pupae remain in the soil for 2-4 weeks before adult emergence. Larvae of the third (fall) generation develop into pupae and pass the winter in that stage. Flies emerging the following spring constitute the spring flight.

Adult: Onion flies are slightly smaller than houseflies. They have longer legs and are more slender and overlap their wings when at rest.

Symptoms of damage

- If the maggots bore into the stem, it rots and it is expected to break just below the rotting stem of the seedling.



Rotten stem of onion



Bulb infested by onion maggots

- If maggots bore into the bulb, it causes growth deformation.
- Plants show yellowing, wilting and hollowing out of the older plants.
- Feeding by third generation maggots results in loss of shape, making it unsuitable for marketing.
- The infested maggots cause secondary storage rots in the storage.

Management practices

- Avoid successive planting of onion in the same field and follow crop rotation.
- Use well decomposed cow manure.
- Field sanitization, removal of weeds, destruction of damaged onions to reduce population build up.
- Soils that are rich in un-decomposed matter should

be avoided.

- Close planting of onions should be avoided to reduce movement of maggots in the nearby areas.
- Drenching of the chlorpyrifos with irrigation at 1.6-2 litre/ acre should be done before transplanting or when infestation starts to appear. This will effectively control maggot infestation up to 8 weeks.
- After hand weeding, fipronil 80% WG should be applied in the soil at 1 kg/ acre followed by irrigation.

For further interaction, please write to:

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Cultivation

Summer squash requires mild climate for its growth, flowering and fruit-set. The optimum temperature requirement for successful growing of summer squash is 24-27°C. It is sensitive to frost and low temperature and its cultivation is difficult in northern plains from December to February because of the prevailing low temperature during this period. However, Pusa Pasand being heat tolerant can be successfully grown during spring summer season under open condition. It can be grown successfully on all type of soils but prefers well-drained loam and sandy loam soils rich in organic matter.

Growing under lowcost polyhouse and low plastic tunnel under North Indian plains

For direct sowing, seeds are sown on raised beds diagonally with a spacing of 90 × 60 cm. Sowing is done under low-cost polyhouse from 3rd week of October to 1st week of November when temperature is mild and

Pusa Pasand – First high...

conducive for summer squash. The seed rate is 3.0-5.0 kg per hectare. The seeds are treated with captaf @ 2 g/kg of seed. Generally, 2-3 seeds are sown on pit prepared diagonally on the side of the raised bed and when the seedlings are established, thinning is done to keep only one plant per pit. It can also be transplanted by raising seedlings in plug tray (1.5 inch cell size) with soilless medium consisting of cocopit, vermiculite and perlite in a 3:1:1 ratio. Single seed should be sown per cell. The 28 days old seedlings (two-leaves stage) should be transplanted @ 1 seedling/hill over raised bed. Earthing up is very essential which should be done at regular interval, whenever required to provide support to the plants. Drenching of seedlings with captaf 2 g/ litre of water should be done to prevent the seedlings from damping off.

A fertilizer dose of 250 kg FYM, 1.2 kg N, 800 g P and 600 g K was found to be optimum for 100 m² (20 × 5 m) polyhouse. A basal dose of 250 kg FYM, 600 g

Table 1. Mean performance of Pusa Pasand (DS-8) and local check under open field condition at IARI, New Delhi during spring summer season from 2010 to 2014

Selection	Yield (t/ha)					Average yield (t/ha)	Percentage increase over check	No. of days to first harvest
	2010	2011	2012	2013	2014			
DS-8	17.60	16.53	15.84	15.14	14.94	16.01	40.93	45-50
DS-13	14.07	14.20	14.33	12.60	11.55	13.35		50-55
DS-18	13.07	13.47	12.40	12.77	10.96	12.53		50-55
Local Check	12.25	10.86	11.42	11.52	10.76	11.36		55-60

Table 2. Mean performance of summer squash Pusa Pasand (DS-8) under naturally ventilated polyhouse during winter season (Mid October - Mid February) at CPCT, IARI, New Delhi from 2011 to 2013

Selection	Yield (t/ha)			Average yield (t/ha)	Percentage increase over check	No. of days to first harvest
	2011	2012	2013			
DS-8	22.40	25.78	25.48	24.55	62.15	40-42
Local check	13.58	16.69	15.14	15.14		47-50