Blister Beetles and their management

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INTRODUCTION

Blister beetles are soft-bodied beetles important members of order Coleoptera and specifically are termed as family Meloidae. Due to secretion of 'Cantharidin', a chemically blistering agent, these beetles are called as blister. That secretion is defensive in nature. It is estimated that blister beetles have more than 2,500 species in approximately 120 genera. These beetles are phytophagous. They feed on plant leaves and flowers of various crops like alfalfa, potatoes, soya bean, other beans, and other horticultural crops mainly vegetables and ornamental plants. These animals are mostly diurnal but a few adults are nocturnal. Adults are colourful and live in organized groups. All blister beetle larvae are specialized predators. Larvae of most of the species enter the nests of wild bees and feed on immature. Sometimes, larvae also consume eggs of grasshoppers.

BLISTER BEETLES AS PEST ON CROPS AND LIVESTOCK

Blister beetles are recorded as pest to various crops like alfalfa, potatoes, beans, sugar beets and other leafy plants. These beetles damage leaves and flowers. Blister beetles also affect livestock digestive system when they are ingested. These beetles are regarded as toxic even potentially lethal due to production of cantharidin by the insects. Several scholars mentioned the deleterious impacts of cantharidin on horse, sheep and cattle. Animals may be poisoned by eating crushed beetles in cured hay as dead beetles also contain some amount of cantharidin which affects digestive and urinary tract.

VARIOUS TYPES OF BLISTER BEETLES

Black blister beetle
(Epicauta pennsylvanica)

Striped blister beetle
(Epicauta vittata)

Spotted blister beetle
(Epicauta maculata)

European "Spanish fly"
(Lytta vesicatoria)

Mylabris pustulata
(orange blister beetle) - mainly found in India.

BIOLOGY AND LIFE CYCLE OF BLISTER BEETLE

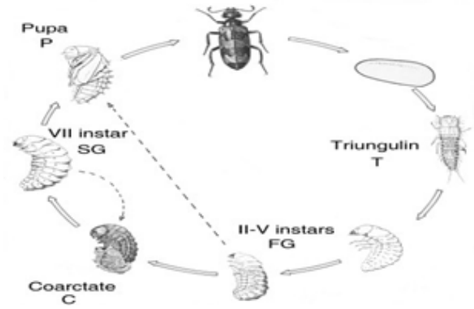


Fig. Life Cycle of Blister beetle

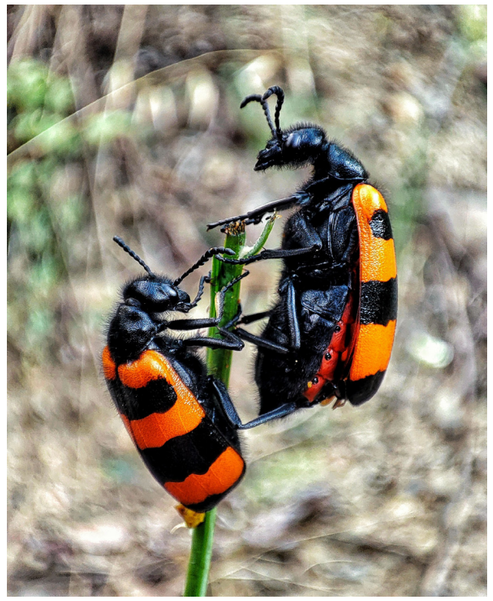
The family is characterized by hypermetamorphosis. Female beetles lay clusters of eggs in the soil in late summer. The small, active larvae that hatch from these eggs crawl over the soil surface and enter cracks in search for grasshopper eggs which are deposited in the soil. After finding grasshopper eggs and immature of aculeate wasps and bees, with development in soil or wood. Blister beetle larvae becomes immobile and spends the rest of their developmental time as legless grubs. The unique feature of this beetle is 'triungulin' larva (T) which is well-sclerotized, highly mobile and campodeiform larvae. The first instar larva develops to legless first grub (FG) and is parasitic in nature, then a coarctate (C) and second grub (SG) that is active but nonfeeding before pupation. It pupate and emerges as adults. The species become active during summer season.

CANTHARIDIN

Cantharidin is an odorless, colorless fatty substance of the terpenoid class, which is secreted by many species of blister beetles. It is a burn agent or a poison in large doses, but preparations containing it were historically used as aphrodisiacs (Spanish fly). In its natural form, cantharidin is secreted by the male blister beetle and given to the female as a copulatory gift during mating. Afterwards, the female beetle covers her eggs with it as a defense against predators.
Poisoning from cantharidin is a significant veterinary concern, especially in horses, but it can also be poisonous to humans, if taken internally. Externally, cantharidin is a potent vesicant (blistering agent), exposure to which can cause severe chemical burns and blisters on skin.

Fig. Blisters on human skin due to attack of Blister beetle

DAMAGE SYMPTOMS ON CROPS



Adult blister beetles are attracted to blooming fields of alfalfa, field crops and weeds (goldenrods, dandelions). Adults can cause severe clipping of leaves and stems and may completely destroy flowers and buds, which could negatively impact crop yield and quality. The sudden appearance of large swarms of blister beetles with voracious appetites often alarm farmers. During drought, crop damage from blister beetles can be more severe by feeding on the growing points of the plants which can stunt or kill plants.

MANAGEMENT OF BLISTER BEETLES

- Adjust dates of harvesting and maintain weed-free alfalfa.
- Immediately prior to harvest, fields should be thoroughly scouted for new swarms of blister beetles, and if blister beetles are present in the field, the harvest should be delayed for several days.
- Control in bean crops is warranted when 30% of the foliage is destroyed prior to bloom or when 20% of the foliage is destroyed after bloom, pod set or fill.
- Pyrethroid insecticides, such as bifenthrin, esfenvalerate, lambda-cyhalothrin, and alpha- and zeta-cypermethrin registered for use on alfalfa, canola, dry edible beans, soybeans, potatoes and sugarbeets provide good control of blister beetles. Apart from these mentioned insecticides, carbaryl also provides good control of this pest.

PRECAUTIONS TO BE TAKEN FOR EFFECTIVE MANAGEMENT

- ✓ Fields should not be treated during flowering, especially peak bloom, to avoid bee kills. Late evening or early morning is the preferred timing of insecticide applications, as bees are not actively foraging then.
- ✓ Dead beetles could be incorporated into cured hay, so it is important to not feed any contaminated hay to livestock.
- ✓ In all cases, contaminated hay should not be fed to horses or other livestock, and removal of the beetles from the hay will not make it safe.
- ✓ It is to farmers' advantage to minimize harvest operations which kill blister beetles, thereby minimizing the possibility of feed contamination.