

SAVITRIBAI PHULE PUNE UNNIVERSITY,PUNE



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CERTIFICATE

This is to certify that the present work incorporated in the dissertation entitled
“Studies on different types of insect pests at Dindori region in Nashik”

Was satisfactorily carried out by 1) **MISS. APSUNDE TANUJA CHANDRABHAN.**

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Of **T.Y. BSc. ZOOLOGY**. They have completed this project under my supervision and guidance during academic **YEAR 2021-2022** This project work submitted by them is original and the scientific information obtained from other sources have been duly acknowledged.

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I am thankful to all those who helped me for project work. Finally here I take an opportunity to thank to all wishers for their compliments.

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INTRODUCTION

This project is related to the insect pests in our surroundings. It include study of various pests, their nature of damage regarding host plant its geographical distribution along with their control measures. This helps us to know about pest. A pest is any living animal, whether insect, plant or fungus, which humans consider troublesome to themselves, their possession or the environment. It is a loose concept as an organism can be a pest in one setting but beneficial, domesticated, or acceptable in another.

A pest is any organism that spreads diseases causes destruction or otherwise a nuisance. The term is particularly used for creatures that damage crops,livestock,and forestry or cause a nuisance to people.

A pest is any animal or plant harmful to humans or human concerns. The term is particularly used for creatures that damage crops, livestock, and forestry or cause a nuisance to people, especially in their homes.

Some example of pest are mosquitoes, rodents, and weed. Not all insect are pest. Many different kinds of insect eat other insect and are beneficial species.

Organism which damage cultivated plants or plant products or make them unfit for human consumption is known as **pest**.

Material /Methods

Generally pest is available anywhere in our surrounding environment. Spring and summer is a wonderful time to start making insect/pest collection. By late summer many insect pest have gone through their stage of metamorphosis and emerged as an adult. Insect pests are abundant in many different habitats. They are found in air, water as well as in soil.

Pests are found on their host plants like brinjal fruit borer is found on brinjal plant, mango stem borer is found on mango tree. Pests are also found on the host animal like mites or tick are found on cattle, etc.

We have observed various pests in my surrounding crop area at Dindori. For collection the picture we have used the GPS map camera. We can collect the pest with the help of light trapping, by using nets. Generally the pest can be observed in kitchen, store room, farm house, gardens, any other water places. Most bugs are going to be in our homes for two things food and water.

Some common pest observed in our surroundings: Ants, Termites, Flies, Rats, Mosquitos, Cockroach, Bed bug, Mice,

Observation and Discussion

During our study, we found the pests like May beetle, tick, and house cricket.

May beetles cut main roots or chew off fine roots of mature plants. This hinders the uptake of water and nutrients, which usually results in stunted, wilted, and discolored canopy.

Ticks comprise veterinary problem because they transmit diseases, produce paralysis or toxicosis, and cause physical damage to livestock.

While house crickets don't post a health risk to humans, they can cause damage to property, specifically clothing, Carpets and areas covered in fabric.

1. May Beetle

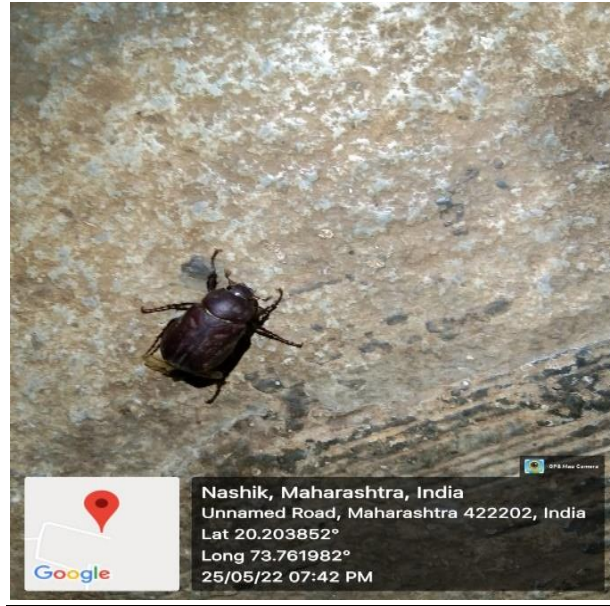


Fig. May beetle

Scientific classification:-

Kingdom: Animalia

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Scarabaeidae

Tribe: Meelolonthini

Genus: *Phyllophaga*

Identification characters:

There are three main characters of May beetles.

- **Notches on the elytra:** Notches, arranged according to the dots code can be cut in the border of the elytra with the help of a cutter. This method is more suitable for big species, but it is in general not advisable due to its intrusive characters.
- **Carving of elytra:-**Number or dot can be carved on the elytra with the help of a cutter. This method is very intrusive and is not recommended, especially for small species. An apparently harmless variation of this method is suggested by Maria Fremlin.
- **NON-Toxic paint:-** Colour utilized should not be very conspicuous in order to not affecting the beetle.

Geographical distribution:-

May beetles are found in nearly all habitats, including freshwater and coastal habitats, wherever vegetative foliage is found, from trees and their bark to flowers, leaves, and underground near roots-even inside plants in galls, in every plant tissue, including dead or decaying ones.

Beetles have lived on earth for about 300 million years

Hostplant:

Phyllophaga exhibited preference for oak, elm, Bean, Chickpea and Gram, Black and green, Gram, Maize, Millet, Peanut, etc.:

Lifecycle:

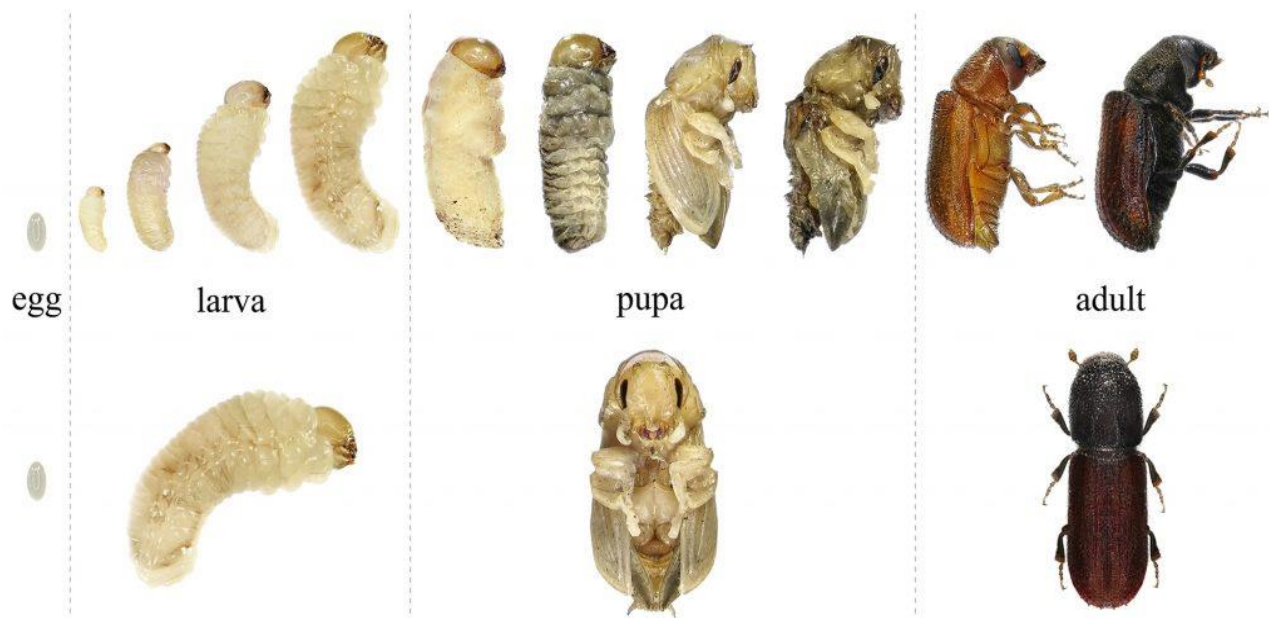


Fig. life cycle of May beetles

May beetles are in family scarabaeidae. These native insect are common throughout Wisconsin and can often be seen flying near light or heard hitting window screens on light or heard hitting window screen on early summer evenings. Twenty-nine species of May beetle have been documented in the state. Although there are over 200 species known throughout North America.

All May beetle in Wisconsin have three year life cycles (except for the widely distributed *phyllophagatristis* which has a two year life cycle). Adults emerge in the late May and early June and are active in the evening hours. Adults mate, and female burrow into the soil to lay eggs. After hatching from eggs white grubs feed on plant roots. Over the course of the next two years larvae pass through three stages (called instar) becoming larger and more destructive with each stage. In the late summer and fall of their third (or second year in the case of *phyllophagatristis*). Larvae begin pupating in the soil. Adults emerge the following spring. In a given location, overlapping generation can occur so that adults will be present every year. In some (but not all) locations, one of the overlapping generation can be notably larger than the others, resulting in a large adult population every three year.

The life cycle of a beetle is defined by four stages.

The life cycle of a beetle is known as a complete metamorphosis, meaning it has four very different stages; egg, larva, pupa, and adult.

Eggs:

The female beetle, depending on the species, will lay hundreds of small white or yellow eggs. The eggs can be deposited in decaying leaves, rotten wood and even animal feces. Some beetles keep their eggs inside and give birth to live larvae.

Larva:

Beetle larvae are grubs or worm-like in appearance and have voracious appetites. It is in this stage that wood-destroying beetles, such as powderpost and longhorned beetles, do their damage to the structure of timber, eating the wood from the inside out. As the larvae begin to grow, they need to discard the exoskeleton to provide more room. This shedding called molting may occur between seven to ten times before the larvae enter the pupal stage.

Pupa:

This stage of the beetle life cycle is where the greatest change in form takes place. The worm-like larvae form the pupa or cocoon as it is often called, the larva being to take the shape of the adult beetle. The time period to reach adulthood from the pupal stage varies dramatically among different types of beetles. Some take as little as 30 days while others may take up to two to three years to fully develop. Once adulthood is reached, the fully mature beetle emerges from the cocoon and begins another life cycle all over again.

Adult:

The adult stage is the final stage in the life cycle of a beetle. Adults are found in many sizes, shapes and colors. Some adults have large mandibles for catching their prey and for defense from predators. Some species, such as the cerambycid beetle, resemble wasps to fool predators into staying away. Other species can emit poisonous or distasteful substances to ward off their enemies.

Understanding the beetles life cycle may help you better identify any better identify any that you may find in or around your home and need help with identification or control measures, call a pest control professional.

Nature of damage:-

May beetles cut main roots or chew off fine root of mature plants. This hinders the uptake of water and nutrients, which usually results in stunted, wilted, and discolored canopy. Emerging seedling can also be attacked, resulting in patches of wilted growth in the field or simply gaps in the rows. Typically, the stem of the injured plants turns purple, indicating phosphorus deficiency. Cool, wet soils will exacerbate the situation because the growth of corn seedlings will be slowed and remain susceptible for a longer time.

The damage is caused by the larvae of several beetles belonging to the genus *Phyllophaga* .Other types of beetles may be involved and therefore, it is important to learn how to recognize them. The beetles are about 12 to 25 mm long yellow to reddish-brown or black .Larvae are whitish with a brown head and c-shaped.

Control measures:

Organic control:-

Natural enemies that control white grubs include parasitic wasps in the genera *Tiphia* and *Mazinum*, and the species *Pelecinius polyturator*. Parasitic flies include the species *Pyrgotaundata*. The fungi in the genus *Cordyceps* also infect the larvae and can be used in solution to control their population inoculating the soil with bacterial spores of *Bacillus lentimorbus* can also help to reduce population.All of these products are available commercially.

Chemical control:-

Always include an integrated approach with both preventive measure together with biological treatments if available. Management of white grubs requires a through monitoring of the field before planting to detect their presence. Fumigation with soil insecticides can be used to reduce treatment also helps to an acceptable level seeds treatment also helps to an acceptable level. Seeds treatment also helps to reduce the impact of white grubs in some cases but usually no chemical treatment is recommended.

Preventive measures:-

- Grow more tolerant varieties if available.
- Change planned planting date to avoid peak population of beetles.
- Monitor field by digor field by digging up some plants in the affected area and looking for white grubs in the root zone.
- Rotate with up some plants in the affected area and looking for white grubs in the root zone.
- Rotate with non-host crops such as deep rooted legumes.
- Keep the field free of grass and weed growth to reduce the number of eggs laid.
- Avoid to sow corn in field previously used for soybean or potato.
- Expose the insect to predator with a midseason plowing.
- Deep plow, remove and burn harvest residues and stubbles after harvest.
- Alternatively, used pasturing hos to unearth and eat grubs.

2.Tick (*Rhipicephalus microplus*)



Fig. Tick collected from cattle

Scientific name:

Kingdom: Animalia

Phylum: Arthropoda

Class: Arachnida

Subclass: Acaria

Order: Anactrichidea

Sub order: Ixodida

Family: Ixodidae

Genus: *Rhipicephalus*

Species: *microplus*

Identification marks of tick:

- Tick are grey- brown egg-shaped, blood sucking creepy crawlies.
- They have eight legs, making them look spider- like, and vary in size from about 1 mm to 1 cm long.
- Ticks can look small at first and get bigger and darker as they fill with blood.
- Ticks don't fly or jump, but climb or drop on to your dog's coat when they brush past them.

Habit and Habitat of tick:-

In generally, ticks tends to be found in wooded area, tall grass or bushes, the edges where wood and lawn meet, in the litter, under ground cover plants, and around stone walls and woodpiles where small mammals live. Within this habitat, ticks generally quest in vegetation at the height of their preferred hosts.

Host body:

The tick seen on sheep, goats,cows, cattle, camel, horses, etc. some types of ticks are found on dogs also.

Life cycle of ticks:

Most ticks go through three life stage: egg, six legged nymph and adult. After hatching from the eggs ticks must eat blood at every stage to survive. Ticks that require this many hosts can take up to 3years to complete their full life cycle, and most will die because they don't find a host for their next feeding.

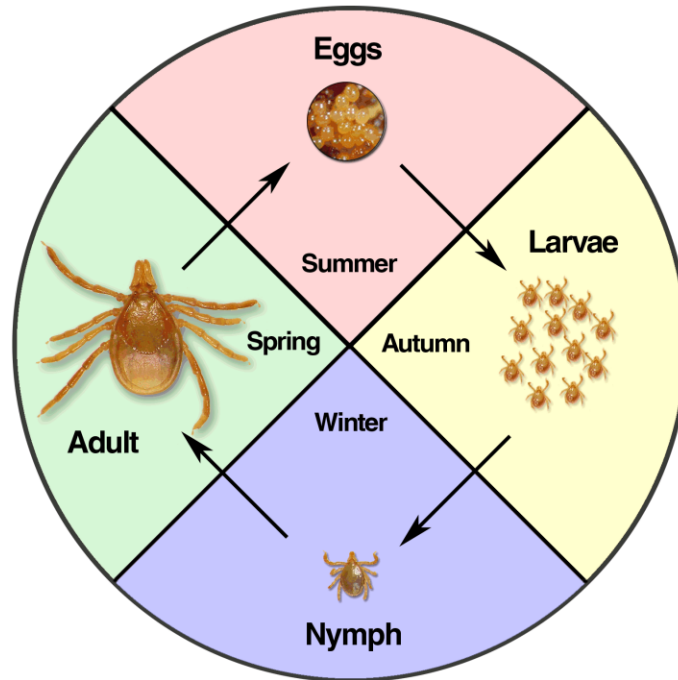


Fig.life cycle of tick

Nature of Damage:-

Ticks comprise veterinary problem because they transmit diseases, produce paralysis or toxicosis, and cause physical damage to livestock. Ticks species are grouped into three families, Argasidae or soft tick, Ixodidae or hard tick and Nuttalliellidae (klompen et al.,1996).Tick are very important to man and his domestick animals, and must be controlled if livestock production is to meet world needs for animals protein. Knowledge of the nature and habitats of the tick and the disease agent it transmit helps in control.

Feeding by large numbers of ticks causes reduction in live weight and anemia among domestic animals, white tick bite also reduce the quality of hides. Apart From irritation or anemia in case of heavy infestations, tick can cause severe dermatitis. These parasite generate direct effect in cattle in terms of milk production and reduce weight gain

Ticks can be carrier, of pathogens, which they transmit from host to host during blood sucking and cause a large variety of diseases. The major diseases include Babesiosis, Anaplasmosis, Theileriosis and heartwater, East Cost fever; in addition other diseases of lesser importance cause severe economic losses to the livestock industry.

In our research area i.e. Dindori, we find ticks on the body of cattles. Cattles are domestic animals and very useful to mankind. Ticks affected that domestic animals

Ways by which ticks find their host:

Ticks find their hosts by detecting animal breath and body odors, or by sensing body heat, moisture, and vibration. Some species can even recognize shadow. In addition, ticks pick a place to wait by identifying well used paths. Then they wait for a host, resting on the tips of grasses and shrubs. Ticks can't fly or jump, but many tick species wait in a position known as questing.

While questing, ticks hold onto leaves and grass by their third and fourth pair of legs. They hold the first pair of legs outstretched, waiting to climb on to the host. When a host brushes the spot where a tick is waiting, it quickly climbs aboard. Some tick is waiting, it quickly climbs aboard. Some tick will attach quickly and other will wander, looking for place like the ear, or other areas where the skin is thinner.

Importance of ticks:

The medical and economic importance of ticks has long been recognized due to their ability to transmit diseases to humans and animals. Ticks cause great economic losses to live stock, and adversely affect livestock hosts in several ways. Loss of blood is a direct effect of ticks acting as potential vector for haemo- protozoa and helminth parasites. Blood sucking by large numbers of ticks causes reduction in live weight and anaemia among domestic animals while their bites also reduce the quality of hide however, major losses cause by ticks are due to their ability to transmit protozoan, rickettsial and viral diseases of livestock, which are of great economic importance worldwide. There are quite a few methods for controlling tick, but every method has certain shortcomings. The present review is focused on ticks importance and their control.

Effects of tick on human:

Most ticks bites are painless and cause only minor signs and symptoms, such as a change in skin color, swelling or a sore on the skin.

But some ticks transmit bacteria that cause illness, including Lyme disease and Rocky Mountain spotted fever. In general, to transmit Lyme disease a tick needs to be attached to a person's skin for at least 36 hours. Other infections can be transferred in a few hours or even a few minutes.

To take care of a tick bites:

- Remove the tick promptly and carefully: Use fine tipped forceps or tweezers to grasp the tick as close to the skin as possible. Gently pull out the tick using a slow and steady upward motion. Avoid twisting or squeezing the tick. Do not handle the tick with bare hands. Do not use petroleum jelly, fingernail polish or a hot match

Control measure on ticks:-

Chemical control of ticks:-

There are several methods being applied for controlling ticks and tickbore diseases. The main weapon for the control of ticks at present is the use of chemical acaricides used to control ticks on livestock or in the environment are applied in such a manner that the ticks are killed, but will not harm livestock or applicators, the tissues of treated animals will not contain chemical residues, and the environment will not be adversely affected. The conventional control methods include the use of chemical acaricides with partially successful results but this treatment has certain implicit drawbacks, such as the presence of residues in the milk and meat and the development of chemical resistant tick strains

Insecticide used to control ticks are acaricide, Arsenic, Chlorinated hydrocarbons, Organophosphorous compounds, Carbamates,

Application of chemicals by the methods of dipping, spray, spot treatment or hand

3. House Cricket

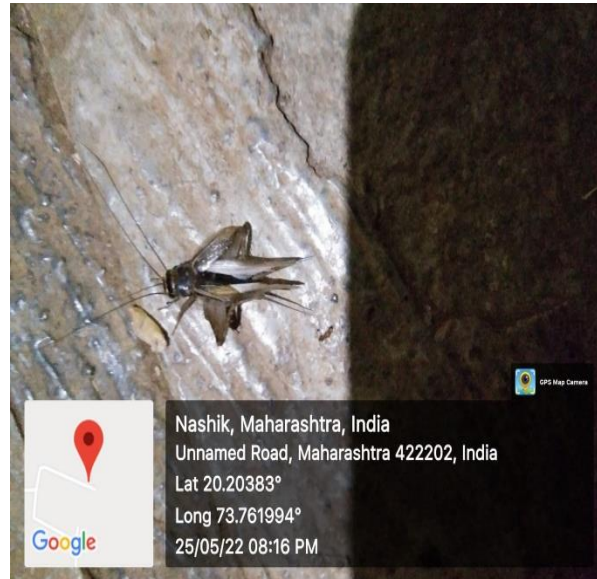


Fig. House cricket

Systematic positions:-

Kingdom: Animalia

Phylum: Artropoda

Class: Insecta

Order: Orthoptera

Suborder: Ensifera

Family: Gryllidae

Genus: *Acheta*

Species: *domesticus*

Identification marks or characteristics:-

Crickets are often mistaken for grasshoppers. Both pests have large, strong, hind legs for jumping, but crickets are smaller and darker in color. Common house crickets are usually yellowish brown, white field crickets are shiny and black. They typically grow $\frac{3}{4}$ to 1 inch long, with rigid, protective forewing and two hind wing for flying. Crickets also have long antennae- sometimes longer than their bodies- while grasshopper antennae are short.

Habitat:

House crickets typically live outdoors during the warmer seasons and are especially fond of garbage dumps. They are often attracted to electric light in larger numbers, sometimes by the thousands, and rest on vertical surface such as light poles and house walls. However, when cold weather approaches, they will move indoors to house and sheds because of the moisture and warmth they provide

Habits:

House crickets are nocturnal or active at night and usually hide in dark warm places during the day. During warm weather months, house crickets typically live outdoors and are especially fond of electric light in larger numbers, sometimes by the thousand and rest on vertical surface such as light poles and house wall. However, when cold weather approaches, they seek shelter in house and sheds because of the moisture and warmth they provide.

Life cycle of house cricket:-

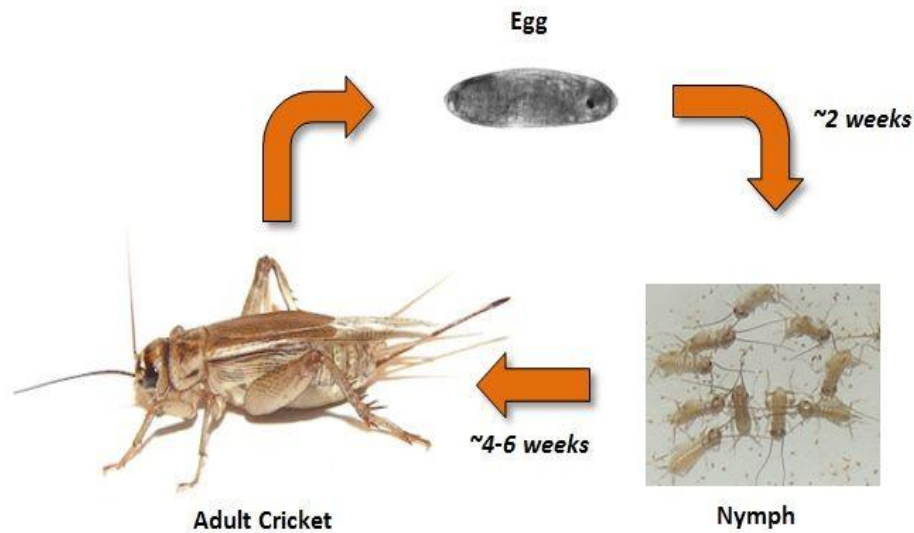


Fig. life cycle of house cricket

Like house cricket, there is no special overwintering stage and generation are continuous. Depending on the temperature, development from egg to adult takes two to three month

House crickets have three stages in their life cycle;egg nymph, and adult. They can live for over six weeks and their months depending on their surroundings. These cricket thrive when the temperature is between 80°F.

They can live for over six week and their entire life cycle. Lasts two to three months dependingon their surroundings. These cricket thrive when the temperature is between80 to 90°F.

Egg:

A cricket beings its life in an egg. After about 14 days, it will have developed into a nymph. It will break the egg capsule and dig out of the substrate.

Nymph:

Nymph looks like small versions of adult crickets with a few differences. They are not as developed so initially do not have wings and females do not have ovipositors. These young cricket often become prey for large cricket and other insect.

In order to to grow, a nymph has to shed its hard exoskeleton. This process is call molting and happens 8 to 10 times. The new exoskeleton is milky white and soft until it harden in a few hours. A nymph will begin growing its wings after about a month.

Adult:

Once a cricket reaches maturity its wings are fully developed and it only has two goals. Eating and mating. A male will attempts to attract fertile females. Once mating has occurred, a female will spend her times findings suitable place to lay her eggs.

Reproduction

The reasons crickets chirp is to find partners. After mating, females lay about 100 egg in damp soil or moist indoor areas. Nymphs hatch from egg during spring months and take roughly two or three months to mature.

Nature of damage:-

While house crickets don't post a health risk to humans, they can cause damage to property, specifically clothing, Carpets and areas covered in fabric. Favorite fabric include wool, cotton, silk, and synthetics. As house crickets typically surface feed, they leave the area roughened from pulling the fibers loose while eating. In the case of a heavy infestation, large area of fabric may be eaten out. This is why it is important to get rid of crickets as soon as possible.

House crickets can bite, but they aren't inclined to bite human and it is rare for their mouthparts to be able to break the skin. This doesn't mean these critters are harmless. The danger with house crickets isn't their bite; it is diseases and parasites they can carry in their bodies and in their waste, like E. coli and salmonella. They are also capable of carrying worms that can come out in their feces. If you handle a cricket or touch its feces, or sores on your skin and if you handle food, you could accidentally introduced harmful bacteria that May beetle be ingested.

The greatest problem with pest-borne disease is that symptoms often get blamed on the flu. If you have a flu-type outbreak in your home and you have been having pest problems, consider the possibility that the two events may be connected

This is the more obvious harm house crickets cause. These pests can be like locusts in your garden and leavesholes all over your house plants. They chew on clothing, bedding, couches and also your wallpaper. You can know one thing for sure when it comes to house crickets: they have no idea what you consider valuable. They are indiscriminate destroyers.

Control measure on house cricket:

Biological treatment:

Crickets aren't frequent garden pests so should be tolerated wherever necessary. They have an array of natural enemies to help keep them under control. In rare cases, crickets can damage flowers, vegetables crops. Clothing and carpeting. If you have a cricket infestation in the home, it is advised to contact an expert pest controller.

If outdoor infestations seem, severe, and you are sure that the culprits are crickets, there are a few things you do to prevent severe outbreaks.

Crickets may seem harmless enough, but don't let their innocent appearance fool you because these insects will eat through just about any type of fabric, causing all sorts of damage. Plus, an infestation of crickets leaves your home vulnerable to spiders and other pests. Don't wait for an infestation to occur before to take action. Instead, follow these three effective preventive pest control measures to keep crickets out.

Seal cracks and crevices:

One of the best ways to prevent a cricket infestation is by sealing off all cracks and crevices in our home's foundation walls. Even if the gaps seem too small for these pests, seal them anyway because crickets can squeeze themselves into even the tiniest cracks. It helps to use a mirror to inspect for gaps in hard-to-reach areas. Caulking and spray foam are two good options for sealing out crickets and other types of pests.

Avoid Clutter:-

As the weather turns colder, house cricket problems tend to rise as these insect seek warm shelter in place like garages, crawl spaces and basements. Crickets often make their nests amidst clutter and debris, so it's always a good idea to keep basement and garages tidy. Since crickets are most active at night, they generally stay hidden during the day. At night, an infestation is easier to notice because the male crickets grow noisier with their chirping songs used to attract females.

Eliminate moisture:-

Crickets love damp, dark place. Piles of dead leaves, heaps of clothing and rolled-up carpets are all good candidates for a cricket nest because they attracts and hold moisture. Unlike moths that create small holes, crickets are known to damage large areas of fabric. If you have a crawl space beneath your home, make sure it is well-ventilated to avoid these moisture-loving pest.

Food of house cricket:

Out side house cricket feed on plants and dead or live insect, including other cricket. Indoor, they can feast on fabric, including clothing and carpet, wool, cotton, silk and synthetic fabric as well as cloths soiled with perspiration are especially attractive to house cricket.

Conclusion

Through the field studies in Dindori region of Nashik district, we observed that the field area and domestic animal associated with it are facing the problems with pests. We found the various crops like brinjal, gram,maize,beans etc. were affected by may flies.

Domestic cattles were affected by ticks, as well as human property like clothes, fabrics etc. was affected by house cricket.

To avoid damage to crops by may beetles, the interaction of planting dates, intercropping treatments can be effectively used. It will improve crop yield.

Ticks and house crickets can be also controlled with proper planning, maintaining clean surroundings along with chemical control. Control over tick will improve yield from domestic animals.

References

To get information about pest I go in our college library and search a book related to pest and I got a book like “**Crickets and Household Pests**” written by Sathe, T V and Manisha R Awate

I also read the book “**Essentials of PEST MANAGEMENT**” It is related on key information on pest identification and its management

To get information about pest I visit on website like

<https://www.intechopen.com>

<https://www.britannica.com>

<https://www.pestworld.org>

<https://en.m.wikipedia.org>

<https://www.aldf.com>

<https://mdc.mo.gov>

<https://www.britannica.com>



