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## **Record of Some Hemipteran Insect Pests of Mango (*Mangifera indica*) From Jammu Region of Jammu and Kashmir State**

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### **Abstract**

Mango (*Mangifera indica* L.), a member of family Anacardiaceae is one of the ancient fruit of Indian origin. India accounts for 54% of world's total mango production. In J&K state plant is most widespread in district Jammu, Kathua, Samba, Udhampur and Reasi. The major reason for its low productivity is the threat of insect pests, out of which insects belonging to order Hemiptera damaged mostly the plants. Species diversity analyzed through consistent survey and sampling conducted in various districts of Jammu region from March 2013 to Feb. 2014 indicated that the mango plantations are damaged mostly by insects belonging to order Hemiptera. Adults and nymphs both cause damage to the trees by sucking sap from the tender leaves and cause damage on fruits by hard brownish punctures or black spots. These punctures affect the fruit's edible quality and lower its market value.

**Key words:** Mango, Pentatomid bugs, Damage, Jammu.

### **Introduction**

India is basically an agro-based country where more than 80% of Indian population depends on agriculture. Mango (*Mangifera indica* L.) is known as "king of fruits". It belongs to family Anacardiaceae (Singh, 1968; Litz, 1997). It is one of the most important trees on the earth and is now consumed worldwide. Mango is an important tropical fruit, which is being grown in more than 100 countries of the world (Saucco, 1997). But its original home is South Asia where it has been grown for the last four thousand years (Salunkhe and Desai, 1984). It is an ancient fruit of Indo-Pakistan sub-continent and is of great importance for millions (Singh, 1968 and Litz, 1997). It is nutritionally rich in carbohydrates and vitamin A and C. Insects are known to cause significant damage to mango and affect agricultural productivity. Of the various insect pests recorded, bugs belonging to order Hemiptera causing serious damage to the mango plantations. A total of 8 insect species belonging to 5 different families of order Hemiptera were recorded to infest mango plantations in different districts of Jammu region. The present paper records the taxonomic status, geographic distribution, host plants, diagnostic features and their mode and extent of the damage caused to the host plant.

### **Materials and Methods**

The field studies for recording the pest diversity on mango plants were conducted in Jammu region during the period from March, 2013-Feb., 2014 to record the distribution of mango as well as insect pests associated with the plant

along with their mode of damage. The insects along with their immature stages were collected by traditional methods of hand picking and by using hand nets from study area. Collected insects were killed using ethyl acetate and later on pinned, stretched and finally oven dried for about half an hour at 35°C- 40°C to avoid fungal infection. General morphological descriptions of all the stages of insect pest were made under different magnifications of stereoscopic microscope. Feeding behaviour of larval stages was made both in the field as well as in the laboratory.

### Observations and Discussions

During the period of observation, a total of 08 insect pests belonging to different families were recorded by the investigator from the Jammu region of J& K state. These insects were found to be sap suckers. A general description of each insect species along with their damage pattern is discussed below:

#### 1. *Nezara viridula* Linnaeus, 1758 (fig 1)

**Taxonomic Status:** Hemiptera : Heteroptera : Geocorisae : Pentatomoidea : Pentatomidae : Pentatominae : Nezarini

**Distribution:** It is cosmopolitan and presently distribute throughout South America, New Zealand (Waterhouse and Norris, 1987), North America (Hoffmann et al., 1991), the tropical and sub tropical regions of Africa, America, Asia, Europe (Sudan, 2008) In India, recorded from Assam, Himachal Pradesh, Madhya Pradesh, Maharashtra and West Bengal. In Jammu, Udhampur , Samba and Kathua districts of Jammu and Kashmir State.

**Host Plants:** Host range of *Nezara viridula* encompasses over 30 families of dicotyledons and a number of monocots (Hoffman, 1935). It is highly polyphagous and shows strong preference for certain legumes (Corpuz, 1969). Host crops of economic importance include Beans, Cabbage, Citrus, Cotton, Macadamia nuts, Rice, Sugarcane, soyabean (panizzi et al., 2000) and Wheat (Sudan, 2008) and mango.

#### Diagnostic features

**Adult:** Bug 12-18 mm long, green with piercing and sucking mouth parts, protruded out in form of a long beak like structure called the rostrum. Eyes black. Head and anterior portion of pronotum with yellow marks, scutellum devoid of prominent spots. Antennae 5- segmented; apical 3 segments light brown. Ventral scent (stink) gland pore short and broad located on the sternum between 2nd and 3rd leg. Abdomen with small black dots along sides. Wings completely cover the abdomen. *Nezara viridula* passes through five nymphal instars before attaining adult status, which vary in colour from black in the early very small nymphal stages to green in the late nymphal *Nezara viridula* passes through five nymphal instars before attaining adult status, which vary in colour from black in the early very small nymphal stages to green in the late nymphal stages.

**Damage:** Adults and nymphs obtain their food by piercing plant with mandibular and maxillary stylets thereby extracting plant fluids. Adults cause maximum damage attacking all parts of plant including stem, petioles, foliage, flowers and fruits.

## 2. *Halymorpha picus* Fabricius, 1794 (fig 2 showing eggs and 3 Adult)

**Taxonomic Status:** Hemiptera : Heteroptera : Geocorisae: Pentatominae : Cappaeini

**Common Name:** Pear bug

**Distribution:** Oriental region and Formosa (Miyamoto, 1965).

**In the area of investigation:** From jammu region the insect has been recorded from Marh (district jammu), Majalta (District Udhampur) and Samba.

**Host Plants:** Vannila planifolia (Prakash and Sudarshan, 2000); Pyrus sp., Indigofera arrecta, cowpea (Sudharma and Rani, 2005) and citrus plants (mosambi, Santara) (Chetry 2009)

**Diagnostic features:** Body light brown with dark brown punctuate spots, shield shaped, head freely movable, horizontal, opisthognathus, punctuate, shorter and narrower than pronotum, roughly rectangular but constricted apically, not fused with thorax, with margins generally expanded over base of antennae, compound eyes large, laterally placed, fits in between the lateral concavity formed of head and pronotum, ocelli two and red, placed lateral to the midline in between and towards the base of the eyes, inwards directed; antennae 5- segmented, filiform, longer than head, free and visible from above, arising ventrally little above the eyes, pubescent, pedicel visible dorsally bearing brown spots, first two basal flagellomeres shorter, first flagellomere shorter.

## 3. *Halys dentatus* Fabricius, 1803 (Fig. 4)

**Taxonomic position:**

Hemiptera: Heteroptera: Geocorisae: Pentatomidae

**Common name:** It is commonly known as Mulberry bug, Stink bug, Brown stink bug or bark bug.

**Distribution:** It is distributed throughout Pakistan (Yasmin *et al.*, 1991) and India (Yousuf and Gaur, 1993), China, Japan, North and West Africa.

**In the area under investigation:** In Jammu region the pest was recorded from majalta , marh and samba.

**Host plant(s):** *Acacia nilotica*, *Albizza lebek*, *Cassuarina equisetifolia*, *Morus* sp., *Prosopis juliflora*, *Santalum album*, *Acacia nilotica* (Distant, 1908), *Azadirachta indica*, *cassia fistula*, *Cassia javanica*, *Gravellai robusta*, *Mangifera indica*, *Pinus roxburgii*, *Psidium gujava*, *Prosopis pallida*, *Zizyphus jujube* (Dhiman *et al.*, 2004), *Malus* sp (Gupta, 2013) and citrus (Chetry, 2009). The pest was found feeding on *mangifera indica* plantations in Jammu.

**Diagnostic features:** Body pale ochraceous, coarse, darkly punctuate with brown, 21 mm long and 9 mm wide between pronotal angles; head dark brown with black spots, pronotum and scutellum with light and dark stripes, underside of the body and legs ochraceous; antennae 5-segmented, antennal segments uniformly cylindrical, fourth

antennal segment equal to second and third, apices of second, third and base of fifth segment luteus, first segment brown with dark brown spots, second segment black brown except anterior part light brown, third segment black brown, base of fourth segment or terminal light brown and rest black brown; head longer than pronotum, pyrgophore sinuate, ventroposterior margin of pyrgophore with median projection; rostrum extends beyond the fifth abdominal segment, brown, second segment having dark brown spots, no prominent setae; labium long, paraclypei single lobed, gradually tapering upward with sub acute apex. Compound eyes dark brown, thorax brown with black spots, reaching over half of the abdomen, pale at the apex, indistinct basal angular spots; forewing brown with dark brown spots, wing membrane bears dark brown area from where basal vein of the membrane arises; hind wing transparent; pro, meta and mesothoracic legs brown with dark brown spots, tibiae anteriorly cylindrical having dark brown spots, femur also with dark brown spots, first abdominal segment light brown dorsally and upto 3<sup>rd</sup> segment median light brown, remaining segments brown with dark brown spots, ventrally brown with dark brown spots, spermathecal lobes with 2- 3 processes.

**Damage:** All plant parts are likely to be fed upon by the pest, but growing shoots and leaves are preferred. Attacked shoots normally wither or in extreme cases may die.

#### 4. *Dolycoris baccarum* Linnaeus, 1758 (Fig.5)

##### **Taxonomic status:**

Hemiptera: Heteroptera: Geocorisae: Pentatomoidea: Pentatomidae: Pentatominae

**Common name:** Brown Shield Bug, Bamboo Bug, Berry Bug, Sloe Bug, Hairy Shield bug.

**Distribution:** The pest was recorded from Totton and Southampton City (Schubert, 2007); China, Japan, Turkey, Britain, Austria, Germany, Bulgaria, Spain, Sweden, Denmark, Former USSR, France, Italy, Norway, Poland, Russian Federation, Czech Republic, England, Hungary, UK, Ireland, Wales, Finland, India (Kolkata, Tamil Nadu, Bhavanisagar, Darjiling, Jalpaiguri, Maldah, Koch Bihar, Medinipur), Hungary (Sudan, 2008).

**In the area under investigation:** The present investigator recorded the pest from jammu, samba and kathua.

**Recorded Host plants:** It is a polyphagous pest of perennials, especially in hedge row shrubs and berries, feeding on growing shoots and fruits. Both adult and nymphal stages are found feeding on number of host plants which include: *Rubus idaeus* (raspberry), *Prunus spinosa* (sloe or blackthorn), *Crataegus monogyna* (Hawthorn), *Phaseolus vulgaris* (common bean), *Fragaria* sp. (strawberry), *Glycine max* (soybean), *Oryza sativa* (rice), *Dendrocalamus hamiltoni* and also associated with sunflower, tobacco, cherry, potato, cereals and the plant belonging to families Roseaceae and Caprifoliaceae (c.f. Internet); Most favoured trees and shrubs appear to be Birch *Betula* sp., Oak *Quercus robur*, Gorse *Ulex europaeus*, Hazel *Corylus*, Hawthorn *Crataegus*, Privet *Ligustrum* and Bramble *Rubus fruticosus*, Knapweed *Centaurea nigra*, Thistles *Cirsium* sp., Wild Carrot *Daucus carota*, Teasel *Dipsacus fullonum*, St John's-wort *Hypericum* sp., White Deadnettle *Lamium album*, Fleabane *Pulicaria dysenterica*, Nettle *Urtica dioica*

and Mullein sp., *Verbascum sp.* (Schubert, 2007); *Cannabis sativa* (Cannabaceae), *Mentha longifolia* (Labiatae or Lamiaceae) and *Calotropis procera* (Asclepiadaceae) (Sudan, 2008).

The present investigator recorded this pest feeding on *mangifera indica* from Jammu.

**Diagnostic features:** Body large, distinctive oval, shield-shaped, covered with fine, erect, long hairs with a length of about 10 to 12 mm, dark reddish brown and yellowish brown with grey to dark brown punctures; ground colour attractive brownish, greenish or purplish often becomes uniformly darker and browner in winter. Head roughly triangular, longer than wide, closely punctate; compound eyes large, bulged, laterally placed lying between the posterolateral margin of the head and anterolateral margin of the pronotum; ocelli present, oval, inwardly directed, located at the base of head; beak 4-segmented, ends at hind coxae, green; basal segment of beak slender, at rest lying between bucculae; antennae 5-segmented, longer than head, strikingly black, bases of antennal segments banded yellowish, ventrally located; pedicel small visible from dorsum. Pronotum purplish-brown but more green at the front, proclinate, large, punctate, wider than long, hexagonal, anterior margin concave fitting the head, anterolateral margin longer than posterolateral margin, posterior margin slightly straight, lateral margin entire with rounded angles. Scutellum very prominent, large, olive green to creamish yellow, punctate, convex, broad, more or less triangular forming a shield; shield long, one fifth of apical end cream or yellow and base black, narrowed posteriorly forming U-shape, not extending till the end of abdomen, slightly covers the overlapping margins of the membrane of fore wings. Elytra broader anteriorly, narrow and slightly pointed posteriorly, longer than the abdomen and not covering the connexivum; connexivum strikingly banded black and yellow; elytra punctate, membrane with few lateral veins. Legs distinctly hairy, pale yellowish brown, unequal, hind legs long; tibia cylindrical, longer than femora with dense hair; distal ends of tibiae and tarsi black; tarsi 3-segmented hairy; claws thin, apical, arolia present at the base of each claw.

**Damage:** Adult bugs were found feeding on the shoots and leaves of *mangifera*. In severe infestations, damaged leaves become dry and shriveled and fall out prematurely.

##### 5. *Riptortus linearis* Fabricius (fig 6)

**Distribution:** Ceylon, Burma (Distant, 1902), Indonesia, Japan (Higuchi and Nakamori, 1999), Nigeria (Soyelu et al., 2007). In India, Assam (Hussain and Saharia, 1994), Bangalore, Darjeeling (Distant, 1902), Uttar Pradesh, Maharashtra (Ghuguskar, 2001), Madhya Pradesh, Himachal Pradesh (Nair, 1995), in Jammu district of Jammu and Kashmir State.

**Host plants:** Fig, Maize, Millets, Pulses, Sorghum, Soyabean, Sweet Potato (Nair, 1995) and *Murraya koenigii*.

##### **Diagnostic features**

**Adult:** Dark cinnamon-brown and about 14-16 mm long; pronotum, scutellum, corium and lateral areas of sternum distinctly punctate; first, second and third joints of antennae, disk of sternum, and abdomen black. Lateral areas, base and some spots on abdomen, luteous; pronotum with spot at the middle margin. Apex of scutellum, pale luteous. Hind femora stout, with spines on ventral surface, humeral angle drawn out into spine.

**Damage:** It was an occasional pest and caused an insignificant damage by sucking the sap of the twigs and leaves of *Mangifera indica*.

### 6. *Physopelta gutta* Burmeister, 1834 (fig 7)

**Distribution:** It is widely distributed in Australian region (extra- limital distribution)- East Timor, Indonesia, Aru Islands; Papua New Guinea; Oriental region- Burma (Myanmar), Indonesia, Java, Sumatra, Timor; Philippines, Srilanka, Taiwan; Palaerctic region- Afghanistan, China, Japan (Cassis et al., 2002). In India: Assam: Margherita and North Khasi hills (Distant, 1904), in Jammu district of Jammu and Kashmir State.

#### Diagnostic features

**Adult:** A medium sized bug, reddish; with a length of about 16 mm. Body divisible into head, thorax and abdomen and pilose. Head small, broader elongated into rostrum. Head with a pair of well defined compound eyes and a pair of antennae; base of apical joint of antennae ochraceous and base of first joint of antennae dull reddish. Head with a large spot at the basal end. Pronotum (excluding margins), scutellum and basal of corium fuscous; a discal rounded spot and apical angles of corium and the membrane black. Thorax with three pair of legs; coxae, trochanters and femora dull reddish beneath.

**Damage:** Bugs in large numbers appear during June-July, extracting juice from the seeds and sucking sap from the stem with its piercing and sucking mouth parts. As a result, seeds fail to ripen and stem becomes stunted. The damage caused by the insect does not appear to be of much intensity.

### 7. *Chrysocoris patricius* (Fabricius) fig (8)

#### 8. Taxonomic status:

Hemiptera: Heteroptera: Pentatomomorpha: Pentatomoidea: Scutelleridae: Scutellerina

**Distribution:** The pest was recorded from North West province, Sikkim, Kolkata, Assam and several parts of South India including Pondicherry (Kershaw and Kirkaldy, 1908).

**In the area under investigation:** The pest has been recorded by the present investigator from jammu, udhampur and samba.

**Host Plants:** Recorded on *Populus deltoides* (Roychoudhury et al., 1994; Prabhakar et al., 2008), Poplar, Jatropha (Lefroy, 1971 and Roychaudhary et al., 1994), Litchi, citrus (Nair, 1970; Chhetry, 2009), *Acacia nilotica* (Pillai and Gopi, 1990), *Acacia auriculiformis* (Meshram et al., 1992) *Dalbergia sissoo* (Kalia and Lal, 1999) and jatropha (Parveen et al., 2013).

The pest was seen feeding on the leaves and twigs of *mangifera* in Jammu.

**Diagnostic features**

**Adult:** Body metallic green or blue, smallest species (9-12mm) of *Chrysocoris*, lateral pronotal angles obtuse, dorsoposterior pygophoral region with setal patch, 1st conjunctival appendages apically C-shaped. Dorsally metallic green or blue with golden reflection, central lobe to head and spots over pronotum and scutellum black. Antennae is Five segmented; attached ventrally on head, nearer to eyes, Abdomen ventrally possessed black spots at base and on each abdominal segment. A spiracle on each lateral side from III to VII abdominal segments and also on VIII paratergites, a pair of trichobothria posterior to each spiracle except VIII paratergites.

**Damage:** The pest was found feeding on leaves of mango trees in the study area.

9. *Dysdecercus cingulatus* Fabricus (fig 9)

**Taxonomic Status:** Hemiptera : Heteroptera : Geocorisae : Lygaeoidea : Pyrrhocoridae

**Common Name:** Red Cotton Bug

**Distribution:** The pest has been recorded from Sumatra, Borneo, Phillipines, Austalia, Indo-Chinese Peninsula, Srilanka ,Bangladesh and North Eastern India(Freeman, 1947) ; Punjab province, now in Pakisthan (Mehta,1930);Australia Region-East Timor Fiji, Indonesia , Papua, New Guinea; Oriental Region- Burma, India, Indonesia, Java, Malaysia, Phillipines, Taiwan,Thailand;Palearctic Region- China and Japan (Cassis et al., 2002).

**Diagnostic features**

**Adult:** Body medium size, elongate, oval , reddish with white collar and black corial spot; head small, triangular , impunctate, red; antennae black with both ends red, 4 segmented , longer than head, freely movable arising from lateral sides of the head just above the eye; pedicel pubescent, compound eyes round, black laterally Placed bulged, fitted inside the concavityof the head, ocelli absent; beak four segmented, distal two segments black proximal two red, long, reaching second abdomen posal segment; pronotum marginate, roughly triangular, convex with a transverse red groove towards the anterior end, white collar at the anterior margin, lateral margin red, posterior end dirty yellow, anterior and the posterior margin slightly cover the head and scutellum respectively; scutellum small, triangular, black; elytron of fore wing red, membrane black, two black spots present one on each elytron of fore wing, fore wings with long claval commissure; front coxae small, slightly elongated with apical end narrower than the proximal end, hind coxae broad and circular, femora black, front femora bear two small inwardly curved spines at its apical end, tibia black, hairy, without spine; tarsi 3-segmented, first tarsal segment from proximal end longest, middle tarsi smallest; claws 2, apical, arolia present.

**Damage:** It is an occasional pest found feeding on twigs of Mango plant.

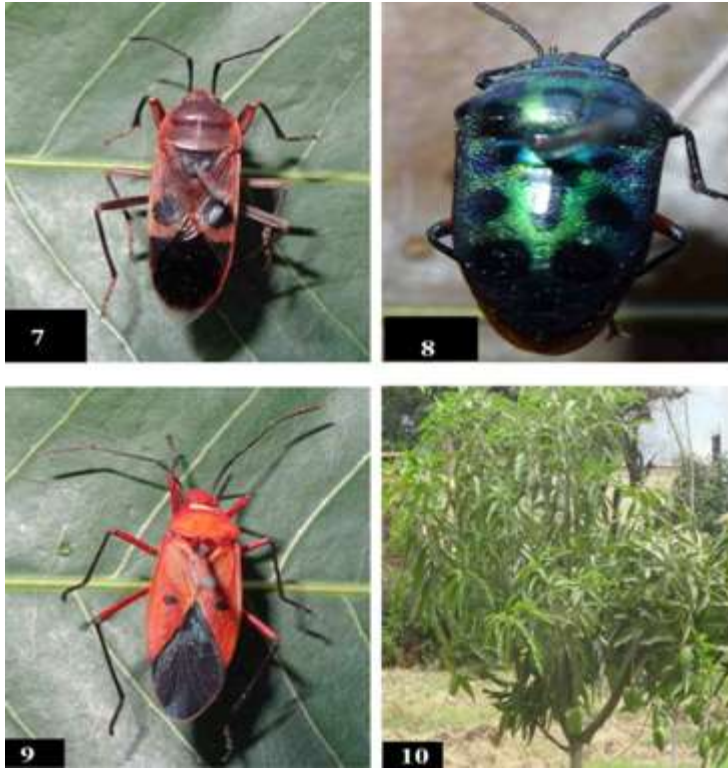
**Table 1: Table showing Hemipteran insect pests recorded in the study area**

S.NO.	SCIENTIFIC NAME	ORDER	FAMILY	PEST STATUS
1	<i>Nezara viridula</i>	Hemiptera	Pentatomidae	Abundance
2	<i>Halymorpha picus</i>			Abundance
3	<i>Halys dentatus</i>			Abundance
4	<i>Dolycoris baccarum</i>			Less
5	<i>Riptortus linearis</i>	Hemiptera	Alydidae	Less
6	<i>Physopelta gutta</i>		Largiidae	less
7	<i>Chrysocoris patricius</i>		Scutelleridae	Abundance
8	<i>Dysdecercus cingulatus</i>		Pyrrhocoridae	Less



**Fig 1** *Nezara viridula* 2. Eggs of *Halymorpha picus* 3. Adult of *Halymorpha picus* 4. *Halys dentatus* 5. *Dolycoris baccarum* 6. *Riptortus linearis*





**Fig 7 *Physopelta gutta* , 8 *Chrysocoris patricius* , 9 *Dysdecercus cingulatus* and 10. Damage made by hemipterans**

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