

**AN UPDATED ANNOTATED CHECKLIST AND BIODIVERSITY OF  
PENTATOMOIDEA BUGS (HETEROPTERA:  
PENTATOMOMORPHA) OF JAMMU, KASHMIR AND LADAKH  
HIMALAYAS (INDIA)**

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**ABSTRACT**

*This paper deals with 48 species of bugs, belonging to 36 genera of Superfamily Pentatomoidea, distributed over six families, viz. Acanthosomatidae, Cydnidae, Pentatomidae, Plataspididae, Scutelleridae and Urostylididae. These pentatomoids represent three different geographical regions of north-west Himalaya as Jammu, Kashmir and Ladakh. In these regions, the family Pentatomidae being species- rich, including a total of 39 species, under 28 genera. Acanthosomatidae, Cydnidae and Scutelleridae incorporated 2 spp. each and rest of the families have 1 sp. each. More than 31 species of Pentatomoidea bugs show their occurrence in Kashmir. The Jammu and Ladakh region indicated prevalence of 8 spp. and 5 spp. respectively. More than 20 species of host plants, under 11 families, including agricultural crops and medicinal / aromatic plants, are damaged by 26 spp., under 18 genera of phytophagous bugs. An updated and annotated bug Species Checklist as well as Host plant species- Pentatomoidea Species Catalogue, has been provided. Apart from this, biodiversity of Pentatomoidea bug-fauna has been discussed.*

**Keywords:** Pentatomoidea bugs, checklist, biodiversity, Jammu, Kashmir, Ladakh

**Introduction**

Pentatomoidea is a superfamily of Infra-order Pentatomomorpha, under suborder Heteroptera and order Hemiptera, containing diversified group of true bugs. These bugs are recognized by enlarged scutellum *i.e* hardened extension of the thorax over the abdomen. This scutellum

can be triangular to semi-elliptical in shape. The antennae are usually five-segmented and tarsi two or three segmented. Most of the pentatomoids are phytophagous, feeding on wide range of plants, however, the members of one subfamily (Asopinae: Pentatomidae) are predaceous. Pentatomoidea bugs contain many economically important taxa. The pentatomids of Jammu and Kashmir State, including three Provinces, *viz.* Jammu, Kashmir and Ladakh, are represented by six families as Acanthosomatidae, Cydnidae, Pentatomidae, Plataspidae Scutelleridae and Urostylidae.

Acanthosomatid bugs or shield bugs are small to large flier, with relatively stout bodied. Forewings well developed, in the resting insect lying more or less flat. These bugs are phytophagous. The family Cydnidae includes shield bugs commonly known as burrowing or burrower bugs. These bugs are found burrowing underground / soil and feed on the roots and plants. These bugs spend the major part of life underground. Pentatomidae family is one of the largest and diversified families of Pentatomoidea. These bugs are commonly known as stink bugs, having wide bodies, shaped like shields, appears to be five sides or parts and show green or brown colour of the body. Pentatomids eject a foul smelling glandular substance, secreted from the pores of thorax, when disturbed. Stink bugs damage a wide range of host plants, including agricultural crops and other economically important plants, as pests.

The Plataspids bugs are small in size, their body have broadly oval and strongly convex shape, with the scutellum covering most part of the abdomen and wings. These bugs are phytophagous. Family Scutelleridae includes metallic shield bugs or jewel bugs. Due to enlargement of the section of their thorax into continuous shield over the abdomen and wings, these are also called as shield-backed bugs. These bugs have broad rounded bodies, brilliantly coloured and produce an offensive odour when disturbed. Family Urostylidae (formerly Urostylidae ) are often with an elongated body, legs and antennae. This family is characterized by the presence of ocelli, closer to each other than distance between ocellus and the nearest eye. These bugs suck plant sap.

### **Materials and Methods**

The database incorporated in this paper pertains to 48 species, under 36 genera of Pentatomoidea bugs, occurring in diverse habitats in vast localities of Jammu and Kashmir State of Indian sub-continent. The bug- fauna is representing three geographically and climatically different Provinces of this State, *viz.* Ladakh (cold desert), Kashmir (temperate)

and Jammu (sub-tropical). The pentatomoids of these regions of paramount zoo-geographical importance have been updated in the light of recent taxonomical changes. In this connection, relevant published works (national and international) and the world online data on taxonomic surveys and the systematic catalogues have been consulted.

The valid species / genera under six different families of super-family Pentatomoidea of J & K State are listed under systematic checklist. In this checklist, the references pertaining to authors reporting and describing taxa from various regions / areas, are in the form of code numbers, given in long brackets in front of each listed species. In addition to this, abbreviations in connection with distribution of each listed species, occurring in various Provinces and localities are also given in square brackets, in front of each listed species. The keys to the code numbers and abbreviations are cited at the end of checklist.

## **Results & Discussion**

### **Systematic Checklist**

Order: Hemiptera

Sub-order: Heteroptera ( True Bugs )

Infra – order: Pentatomomorpha

Superfamily: Pentatomoidea

Family 1. Acanthosomatidae ( Shield bugs )

Subfamily Acanthosmatinae

1. *Elasmucha punctata* ( Dallas ) [ 8, K ( Srg ) ]

2. *Sastragala murreeana* Distant [ 1, K ]

Family 2. Cydnidae ( Burrower / Burrowing bugs )

Subfamily Cydninae

Tribe 1. Cydnini

3. *Chilocoris nitidus* Myr [ 16, 20 , K ]

Tribe 2. Geotomini

4. *Microporus nigrita* ( Fabricius ) [ 16, 17, K ]

Family 3. Pentatomidae (Stink bugs )

5 *Eurymenida vallicola* Bergroth [ 10. K ( Gur)

Subfamily 1. Asopinae

6. *Andrallus spinidens* Fabricius [ 3, 12, J, K ]

7. *Dinorhynchus dybowskyi* Jakoulev [ 22, K ]

8. *Zicrona caerulea* ( Linnaeus) [ 3, 4, 9 , K ( Dac), L ]

Tribe Jallini

9. *Cantheoconidea furcellata* Wolff [ 4, 11, J, K ]

Subfamily 2. Odontotarsinae

Tribe Phimoderini

10. *Phimodera rupshuensis* Hutichinson [ 13, 18, L ( Tso) ]

Subfamily 3. Pentatominae

11. *Dalpada mcdonaldi* Azim & Shafee [ 4, 5, K ]

12. *Pariassus spiniger* Huglund [ 9, L ]

13. *Himalayastethus pilosus* Belousera [ 6, K ]

Tribe 1. Aeliini

14. *Aelia* sp. [ 2, K ]

Tribe 2. Cappaeinii

15. *Halyomorpha picus* ( Fabricius ) [ 24, J ( Maj, Udh, Sam) ]

Tribe 3. Carpocorini

16. *Carpocoris nigricornis* ( Fabricius) [ 3,4, K ( Ant, Pah ) ]

17. *Carpocoris pallidus* ( Dallas ) [ 3, 4, K ]

18. *Carpocoris* sp. [ 2,19, J, K ]

19. *Dolycoris baccarum* ( Linnaeus ) [ 24, J ( Sam, Kat ) ]

20. *Dolycoris indicus* Stal [ 2, 3, 4, K ( Mal, Pul, Srg) ]

21. *Dolycoris* sp. [ 19, J, K ]

22. *Euschistus conspersus* Uhler [ 21, K ]

Tribe 4. Degonetini

23. *Degonetus* sp. [ 2, K ]

Tribe 5. Eysarcorini

24. *Eysarcoris guttiger* ( Thunberg ) [ 25, 26, J ]

25. *Eysarcoris inconspicuus* Hahn Herich Schaffer [ 8, K ( Srg) ]

26. *Eysarcoris ventralis* ( Westwood )

(= ?*Eusacocoris ventralis* Westwood) ( genus misspelled) [ 12, J ]

27. *Eysarcoris* sp. [ 2, K ]

Tribe 6. Gynericini

28. *Gynerica* sp. [ 2, K ]

Tribe 7. Halyini

29. *Apodiphus integriceps* Horvath [ 4, 5, K ( Srg ) ]

30. *Apodiphus pilipes* ( Horvath ) [ 3, 4, 9, K ( Haz ), L ]

31. *Erthesina fullo* ( Thunberg ) [ 27, J ]

32. *Halys dentatus* ( Fabricius ) [ 24, J ( Sam ) ]

33. *Halys* sp. [ 2 K ]

34. *Paranevisanus amberinus* Ghauri [ 1, K ]

35. *Paranevisanus melania* Distant [ 3, 4, 5, K ]

Tribe 8. Nezarini

36. *Nezara viridula* ( Linnaeus ) [ 14, 25, 26, 27, J ]

Tribe 9. Pentatomini

37. *Pentatoma* sp. [ 2, K ]

Tribe 10. Sciocorini

38. *Sciocpris* sp. [ 2, K ]

Tribe 11. Strachiini

39. *Eurydema festivum* ( Linnaeus ) [ 4, K ( Pul ) ]

40. *Eurydema pulchrum* ( Westwood ) [ 3, 4, K ]

41. *Strachia* sp. [ 2, K ]

Tribe 12. Tropicorni

42. *Palomena reuteri* Distant [ 3, K ( Ant, Pah ) ]

43. *Tropicoris laeviventris* Stael [ 4, K ( Ant , Pah ) ]

44. *Tropicoris* sp. [ 2, K ]

Family 4. Plataspidae ( Shield-backed bugs )

Subfamily Coptosomatinae

Tribe Plataspidini

45. *Coptosoma duodecipunctatum* Germar [ 23, J, K ]

Family Scutelleridae ( Shield-backed bugs )

Subfamily Scutellerinae

46. *Chrysocoris patricius* Fabricius [ 24, J ]

47. *Scutella perplex* Fabricius [ 25, J ]

Family Urostylididae (= Urostylidae)

Subfamily Urostylidinae

Tribe Urostylidini

48. *Urochela* (*Urochela*) *guttulata* (Stahl) [ 9, L (Chu) ]

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Key to code numbers and abbreviations:

1= Ahmad & Bhat ( 1987 ); 2= Azim ( 2000); 3 = Azim ( 2011); 4=Azim & Bhat ( 2010); 5= Azim & Gani ( 1999 ); 6 = Belousova ( 2007 ); 7= Bhat *et al.* ( 2011 ); 8= Bhat ( 1987 ); 9 = Chandra & Kushwaha ( 2013 ); 10= Distant (1918 ); 11 = Gupta & Tara ( 2014); 12= Gupta *et al.* ( 2014 ); 13 = Hutchinson ( 1934 ); 14= Kaul *et al.* (2007 ); 15= Lis ( 1994 ); 16= Lis ( 1999); 17 = Lis (2006); 18= Mani & Singh ( 1961); 19 = Mathur & Srivastava ( 1967 ); 20= Mayr (1865 ); 21= Rishi (1968) ); 22= Shah ( 2001 ); 23= Srivastava (1982 ); 24= Tara *et al.* ( 2014); 25= Tara & Sharma ( 2010 a ); 26 = Tara & Sharma (2010 b ) and 27 = Tara *et al.* ( 2011 ).

J= Jammu; K = Kashmir; L = Ladakh; J & K = Jammu and Kashmir State; Ant= Anantnag; Chu= Chushul; Dac= Dachigam ; Gur= Gurias; Haz= Hazratbal; Kat= Kathua; Maj= Majaltha; Mal= Malangpora; Pah= Pahalgam; Pul= Pulwama; Sam= Samba; Sri= Srinagar; Tso= Tso- Morari; Udh= Udhampur

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## **2. Diversity and Species richness of Pentatomoids**

A total of 48 species of Pentatomoidea bugs, belonging to 36 genera, under six families, is known to be prevalent in the vast areas and localities of Jammu , Kashmir and Ladakh Himalayan regions of Indian subcontinent. The family Pentatomidae is found to be species-rich family, included 39 spp., under 28 genera , 3 sub-families and 12 tribes. This family in dominance, is followed by Acanthosomatidae, Cydnidae and Scutelleridae, having 2 spp. each. The families – Plataspididae and Urostylididae, incorporated 1 sp. each . Of the three subfamilies, Asopinae, Odontotarsinae, Pentatominae of the family Pentatomidae, Pentatominae was found to dominant subfamily, having 34 species, pertaining to 22 genera, followed by Asponinae and Odontotarsinae , with 4 spp. and 1 sp. respectively ( *see Systematic Catalogue and Table 1* ).

More than 31 species of Pentatomoidea, distributed over four families as Acanthosomatidae ( subfamily Acanthosomatinae ), Cydnidae ( Cydninae), Pentatomidae ( Asopinae, Pentatominae) and Plastaspidae ( Coptosomatinae), are known to occur in Kashmir Himalaya region. 7 spp. pertaining to Pentatomoidea, covering three families- Pentatomidae ( Pentatominae ), Plastaspidae (Coptosomatinae ) and Scutelleridae ( Scutellerinae ), are reported to be prevalent in Jammu Province of J & K State. 5 spp. of Pentatomoid bugs , belonging to families, viz. Pentatomidae ( Asopininae, Odontotarsinae , Pentatominae) and Urostylididae ( Urostylidinae ), represent Ladakh region ( *see Systematic Checklist* ).

### **3. Phytophagous Pentatomoid bugs of economic importance**

More than 20 species of host plant species of economic importance, including valuable agricultural crops ( fruits, vegetables, oil seed) and medicinal / aromatic plants, pertaining to 11 different plant families, are found to be damaged by 26 species, belonging to 17 genera of Pentatomoids of 4 families Pentatomidae, Acanthosomatidae, Scutelleridae, Plastaspidae). Most of phytophagous pentatomoid species of economic importance belong to the family Pentatomidae, subfamily Pentatominae. Many species of these bugs are pests of crops.( *see Host-plant Species and Pentatomoidea bug Catalogue*).The damage done by the pentatomoids ( nymphs and adult ), to the crops and economically important plants, is by feeding through piercing and sucking sap from leaves, shoots, fruits, flowers, seeds.

Fifteen species of Pentatomoid bugs, are found to be affecting valuable fruit crops ( apple, apricot, litchi, mango, peach, pear, plum and walnut) in Jammu and Kashmir region of J & K State. The highest number of species of pentatomoids i.e. 6 spp. , are damaging apple fruit crop in Jammu / Kashmir region, followed by 5 species each attacking litchi and mango crop in Jammu region. In Kashmir region, walnut crop is damaged by 3 species , under family Acanthosomatidae and Pentatomidae and 1 sp. each affects fruits crop – peach, pear and plum ( *see Table 2*). .

The most important bugs found to be as pests in Kashmir region include , *Dolycoris indicus*, *Eurydema festivum* and *E.pulchrum*, attack valuable vegetable crops – Brassicas ( *Brassica oleracea* and its varieties, cabbage, cauliflower, kale and *B.campestris*), raddish and tomato. Also, *D. indicus* and *E. pulchrum*, damage mustard oil seed crop in this region . Pentatomid bug, *Nezara viridula* ( the southern green Stink bug), as a major polyphagous

pest of agricultural importance in India, has been reported to damage olive oil tree in Jammu (see Catalogue and table 2 ).

The medicinal and aromatic plants of Jammu and Kashmir region, are observed to be damaged by as many as 8 species of Pentatomoids, belonging to families like Pentatomidae, Plastaspididae and Scutelleridae. In Jammu region, medicinal / aromatic plants : *Murraya koengii*, is affected by 2 species (*Scutellera perplex* and *Nezara viridula*) ; *Zanthoxylum armatum* , affected by 2 species (*Erthesina fullo*, *Nezara viridula*). Rest of the medicinal / aromatic plants like black henbane, great mullien, Indian snake root and worm wood, distributed in Jammu and Kashmir, are damaged by one species each of pentatomid bug , belonging to different families ( see Catalogue and Table 2).

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### **Host Plant Species / Family and Pantatomoidea Bugs Catalogue of J & K State**

#### **Family 1. Anacardiaceae**

1. *Magnifera indica* Linnaeus ( Common mango / Indian mango )

*Chrysocoris patricius* ( Litchi bug / Shield-backed bug ), *Dolycoris baccarum* (Sloe bug ), *Halyomorpha picus* (Brown marmorated stink bug ), *Halys dentatus* ( Mulberry Bug ), and *Nezara viridis* ( Southern Green stink bug / Green vegetable bug )

#### **Family 2. Apocynaceae**

1. *Rauvolfia serpentine* ( L.) Benth ex Kurz ( Indian Snake root / Sarpaganda)

*Coptosoma duodecipunctatum* ( Black stink bug )

#### **Family 3. Asteraceae**

1. *Artemisia* sp.

*Dolycoris indicus*( Green stink bug )

#### **Family 4. Brassicaceae**

1. *Brassica campestris* Linn. ( Indian mustard )

*Dolycoris indicus*

2. *Brassica oleracea* Linn. and its varieties, viz. *B.o.capitata*, *B.o.botyrtis*

( Cabbage, cauliflower, Kale )

*Dolycoris indicus*, *Eurydema festivum*, *Eurydema pulchrum* ( Cabbage

Shield bug)



3. *Raphanus sativus* ( Linn.) ( Raddish )

*Eurydema pulchrum*

**Family 5. Juglandaceae**

1. *Juglans regia* Linn.( Walnut )

*Elasmucha punctata*, *Eysarcoris inconspicuus* ( White- spotted stink bug) *Paranevisanus amberinus*

**Family 6. Oleaceae**

1. *Olea europaea* Linn. ( Olive )

*Nezara viridula*

**Family 7. Rosaceae**

1. *Malus domestica* Borkh. ( Apple )

*Apodiphus integripes*, *Apodiphus pilipes*, *Dalpada mcdonaldi*, *Eurydema festivum*, *Elasmucha punctata* and *Paraevisanus melania*

2. *Prunus armeniaca* Linn.( Apricot )

*Eysarcoris inconspicuus*, *Euschistus conspersus* ( Conspere stink bug)

3. *Prunus domestica* Linn. ( Plum )

*Euschistus conspersus*

4. *Prunus persica* Linn. ( Peach )

*Euschistus conspersus*

5. *Pyrus communis* Linn. ( Pear )

*Euschistus conspersus*

**Family 8. Rutaceae**

1. *Murraya koengii* Linn. ( Curry leaf / Karipatta )

*Eysarcoris guttiger* ( Two-spotted sesame bug ), *Scutellera perplex* and *Nezara viridula*

2. *Zanthoxylum armatum* DC ( Winged prickly ash)

*Erthesina fullo*, *Nezara viridula*

**Family 9. Sapindaceae**

1. *Litchi chinensis* Sonn.( Litchi, Lychee )

*D.baccarum*, *Eysarcoris ventralis*, *H.dentatus*, *H.picus*, *Nezara viridula*

**Family 10. Scrophulariaceae**

1. *Verbascum thapsus* Linn. ( The great mullein )

*Carpocoris* sp.

**Family 11. Solanaceae**

1. *Hyoscyamus niger* Linn. ( Black henbane )

*Dolycoris* sp.

2. *Solanum lycopersicum* Linn. ( Tomato )

*Eurydema pulchrum*

**Undetermined wild host plants, belonging to unknown plant families**

*Carpocoris nigricoris*, *Carpocoris pallidus*, *Nezara viridula* and *Zicrona aerulea* ( Blue shield bug )

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**Table 1: Total number of Species and Genera under representative families / sub-families / sub-families of Superfamily Pentatomoidea in Jammu and Kashmir State**

Family / Sub-family	No. of Species (Genus /Genera)
<b>Acanthosomatidae</b>	02 (02)
Acanthosomatinae	02 (02)
<b>Cydnidae</b>	02 (02)
Cydninae	02 (02)
<b>Pentatomidae</b>	01*+39 ( 01*+27)
Asopinae	04 (04)
Odontotarsinae	01 (01)
Pentatominae	34 (22)
<b>Plataspidae</b>	01 (01)
Coptosomatinae	01 (01)
<b>Scutelleridae</b>	02 (02)
Scutellerinae	02 (02)
<b>Urostylididae</b>	01 (01)
Urostylidinae	01(01)

\* indicates species / genus, not grouped in any subfamily of Pentatomidae ( see also Systematic checklist )

**Table 2. Total number of species and genera, belonging to various families of Pentatomida bugs, damaging agricultural crops and medicinal and aromatic plants in Jammu and Kashmir State.)**

Host crops / plants	No of Species (genus/genera) of Pentatomoidea	Pentatomoidea Family (species)
<b>Fruits crops</b>		
Apple	6 (5)	Pen (5)
Apricot	2 (2)	Pen (2)
Litchi	5(5 )	Pen ( 5)
Mango	5 (5)	Pen (4), Scu (1)
Peach	1 (1)	Pen (1)
Pear	1 (1)	Pen (1)
Plum	1 (1)	Pen (1)
Walnut	3 (3)	Aca (1), Pen (2)
<b>Medicinal /aromatic plants</b>		
Black henbane	1 (1)	Pen (1)
Curry leaf	3 (3)	Pen (2), Scu (1)
Great mullein	1 (1)	Pen (1)
India snake root	1 (1)	Pen (1)
Winged pricked ash	2 (2)	Pla (2)
Worm wood	1 (1)	Pen (1)
<b>Vegetable crops</b>		
Brassicac ( <i>Brassica oleracea</i> and its varieties, and <i>B. campestris</i> )	3 (3)	Pen (3)
Raddish	1 (1)	Pen ( 1 )
Tomato	1 (1)	Pen (1)
<b>Oil crops</b>		

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Mustard oil crop	2 (2)	Pen (2)
Olive oil crops	1 (1)	Pen (1)

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**Aca= Acanthosomatidae ; Pen=Pentatomidae; Pla= Plataspididae; Scu= Scutelleridae**

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