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A REVIEW OF HOST PLANT PREFERENCES OF PENTATOMID PESTS FROM WEST BENGAL

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ABSTRACT

Pentatomid bugs are a group of insects which feed on host plants. They are known to be piercing-sucking type pests of crops in India. In this study we have mainly tried to record Pentatomid pests from West Bengal along with their distribution throughout the state and their interactions with host plant species. The plant family Poaceae is infested by the highest number of Pentatomid pests. There are eleven plant families which are infested by pentatomid species. Among the reported pests of pentatomids viz., *Dolycoris indicus* Stal and *Nezara viridula* (Linnaeus) feed on plant species belonging to seven families followed by *Bagrada hilaris* (Burmeister) which consumes plant species of six families. Pentatomid bugs like *Dolycoris baccarum*, *Eysarcoris ventralis* Westwood, *Menida versicolor* (Gmelin) and *Stenozygum speciosum* (Dallas) are reported to attack plants from two families.

Key words: *Dolycoris indicus*, host plant, monophagous, Pentatomidae, Pentatominae, pest, phytophagous, piercing-sucking, Poaceae, Podopinae, polyphagous, *Scotinophara limosa*

Pentatomid bugs or stink bugs or shield bugs (Heteroptera: Pentatomidae) are distributed in all major zoogeographical regions and are represented by 160 genera and 387 species from India (Salini, 2019). Worldwide, 10 subfamilies are recognized by Rider et al. (2018), such as Aphylinae, Asopinae, Cyrtocorinae, Discocephalinae, Edessinae, Pentatominae, Phyllocephalinae, Podopinae, Serbaninae, and Stirotarsinae. In India, only 4 subfamilies, Asopinae, Pentatominae, Phyllocephalinae, and Podopinae are recognized- Salini and Viraktamath (2015). Phytophagous pentatomid bugs are important pests of many plants (Panizzi, 1997). They feed on several host plants belonging to diverse plant families by introducing their rostrum to remove the contents of plant cells. This piercing-sucking type feeding process can be revealed by a technique known as EPG (electropenetrography or electrical penetration graph) (McLean and Kinsey, 1964; Tjallingii, 1978; Backus and Bennett, 2009). Pentatomid bugs of subfamily Pentatominae known from India are phytophagous. Some species of the subfamily Pentatominae like *Nezara viridula* (Linnaeus), *Bagrada hilaris* (Burmeister), *Antestiopsis cruciate* (F), *Plautia crossota* (Dallas), *Halyomorpha picus* (F), *Dolycoris indicus* Stal, *Menida versicolor* (Gmelin), *Piezodorus hybneri* (Gmelin), and *Rhynchocoris plagiatus* (Walker, 1867) have occasionally been considered as pest of various cultivated plants (Salini, 2019).

Pentatomid bugs as agricultural pests

About 16 species of stink bug are reported as pest of different host plants from West Bengal (Table 1) and they are distributed throughout the state (Table 2). For understanding host-plant interactions it is necessary to review feeding processes and the nature of injury caused by the phytophagous species. The way of feeding adapted by pentatomids is known as salivary (or stylet) sheath feeding, which includes the formation of a sheath of gelling saliva to anchor/ support/ lubricate the stylets (Panizzi and Lucini, 2017). Pentatomids have been reported to cause injury to many crops by feeding on seeds (Panizzi and Lucini, 2017). In general, the majority of species in the subfamily Pentatominae are thought to be polyphagous but some of them may prefer to consume plants in some particular taxa (preference for one or few kinds of taxa). For example *Halyomorpha picus* (F) has a preference to feed on plants of Sapindaceae (litchi) (Gupta and Tara, 2014). On other hand some pentatomids prefer Poaceae, such as *Agonoscelis nubilis* (F) (Ghosh, 2008). A list of host plants of reported stink bugs has been compiled from literature. A plant species is regarded as a host plant on which a particular species of stink bug is collected, but this is not always the case. Actually a plant is considered as host plant that the bug feeds on and that allows the reproductive process i.e. the complete development of nymphs to adult.

Distribution and feeding habits: Pentatomid bugs in West Bengal are found to infest plants from 19 families. The plant families with numbers of species infesting them are given in Fig. 1: Poaceae: 12 species; Sapindaceae: 6 species; Fabaceae: 5 species; Solanaceae: 4 species;

Table 1. Phytophagous pentatomids from West Bengal along with their pest status

Sl.No.	Species	Host plant	Family	Reference
1.	*Agonoscelis nubilis* (Fabricius, 1775)	Rice (*Oryza sativa* L)	Poaceae	Ghosh (2008)
		Wheat (*Triticum aestivum* L)	Poaceae	-do-
		Sugarcane	Poaceae	-do-
		Millets	Poaceae	-do-
		Pulses	Fabaceae	-do-
		Tobacco	Solanaceae	-do-
		Aniseed (*Pimpinella anisum* L)	Solanaceae	-do-
2.	*Antestiopsis cruciata* (Fabricius, 1775)	Coffee	Rubiaceae	Ghosh (2008)
		Citrus fruits	Rutaceae	-do-
		Indian Sandal wood (*Santalum album* L)	Santalaceae	-do-
		Indian jujube (*Ziziphusm aritiana* Lam.)	Rhamnaceae	-do-
3.	*Bagrada hilaris* (Burmeister, 1835)	Wild Cabbage (*Brassica oleracea* L)	Brassicaceae	Ghosh (2008)
		Redish (*Raphanus sativus* L)	Brassicaceae	-do-
		Beet (*Beta vulgaris* L)	Amaranthaceae	-do-
		Groundnut (*Arachis hypogaea* L)	Fabaceae	-do-
		Potato (*Solanum tuberosum* L)	Solanaceae	-do-
		Mallow	Malvaceae	-do-
		Rice (*Oryza sativa* L)	Poaceae	Rajpoot et al. (1996)
4.	*Dalpada oculata* (Fabricius, 1775)	Longan (*Dimocarpus longan* Lour)	Sapindaceae	Tan, Wei & Lan (1998)
		Litchi (*Litchi chinensis* Sonn.)	Sapindaceae	-do-
5.	*Dolycoris baccarum* Linnaeus, 1758	Litchi (*Litchi chinensis* Sonn.)	Sapindaceae	Gupta and Tara (2014)
		Rice (*Oryza sativa* L)	Poaceae	Pal (2006)
6.	*Dolycoris indicus* Stal, 1876	Pigeon pea (*Cajanus cajan* (L) Millsp.)	Fabaceae	Salini (2019)
		Peanuts (*Arachis hypogaea* L)	Fabaceae	-do-
		Potato (*Solanum tuberosum* L)	Solanaceae	-do-
		Egg plant (*Solanum melongena* L)	Solanaceae	-do-
		Corn (*Zea mays* L)	Poaceae	-do-
		Finger millet (*Eleusine coracana* (L) Gaertn.)	Poaceae	Ghosh (2008)
		Wheat (*Triticum aestivum* L)	Poaceae	Salini (2019)
		Rice (*Oryza sativa* L)	Poaceae	-do-
		Upland cotton (*Gossypium hirsutum* L)	Malvaceae	-do-
		Roselle (*Hibiscus sabdariffa* L)	Malvaceae	-do-
		Common mulberry (*Morus alba* L)	Moraceae	-do-
		Rosemary (*Rosmarinus officinalis* L)	Lamiaceae	Salini (2019)
		Soybean (*Glycine max* (L) Merr.)	Fabaceae	-do-
		Spinach (*Spinacea oleracea* L)	Amaranthaceae	-do-
7.	*Eysarcoris guttiger* (Thunberg, 1783)	Rice (*Oryza sativa* L)	Poaceae	Barrion and Litsinger (1994)
8.	*Eysarcoris montivagus* Distant, 1902	Rice (*Oryza sativa* L)	Poaceae	Barrion and Litsinger (1994)
9.	*Eysarcoris ventralis* Westwood, 1837	Litchi (*Litchi chinensis* Sonn.)	Sapindaceae	Gupta and Tara (2014)
		Rice (*Oryza sativa* L)	Poaceae	Jalaeian et al. (2019)
10.	*Halyomorpha picus* (Fabricius, 1794)	Litchi (*Litchi chinensis* Sonn.)	Sapindaceae	Gupta and Tara (2014)
11.	*Halys dentatus* (Fabricius, 1775)	Pine tree (*Casuarina equisetifolia* (Chaterjee)	Casuarinaceae	Ghosh (2008)
		Babul (*Acacia nilotica* (Chaterjee)	Mimosaceae	-do-
		Litchi (*Litchi chinensis* Sonn.)	Sapindaceae	Gupta and Tara (2014)
12.	*Menida versicolor* (Gmelin, 1790)	Rice (*Oryza sativa* L)	Poaceae	Salini (2019)
		Sorghum bicolour L	Poaceae	-do-
		Cyanodon dactylon (L) Pers.	Poaceae	-do-
		Panicum sp.	Poaceae	-do-
		Finger millet (*Eleusine coracana* (L.). Gaertn.)	Poaceae	Ghosh (2008)
		Gooseweed (*Sphenoclea zeylanica* Gaertn.)	Sphenocleaceae	

(contd.)

(contd. Table 1)

13	*Nezara viridula* (Linnaeus, 1758)	Citrus fruits	Rutaceae	Ghosh (2008)
		Coffee	Rubiaceae	-do-
		Rice (*Oryza sativa* L)	Poaceae	-do-
		Millets	Poaceae	-do-
		Wheat (*Triticumaestivum*L)	Poaceae	-do-
		Pulses	Fabaceae	-do-
		Indigo (*Indigo feratinctoria* L)	Fabaceae	-do-
		Potato (*Solanum tuberosum* L)	Solanaceae	-do-
		Tomato (*Solanum lycopersicum* L)	Solanaceae	-do-
		Castor (*Ricinus communis* L)	Euphorbiaceae	Gupta and Tara (2014)
		Litchi (*Litchi chinensis* Sonn.)	Sapindaceae	
14	*Piezodorus hybneri* (Gmelin, 1790)	Pigeon pea (*Cajanus cajan* (L) Millsp.)	Fabaceae	Salini (2019)
		Soybean (*Glycine max* (L) Merr.)	Fabaceae	Pentatomoidea Home Page (maintained by Rider 2018)
		Sesbania sesban (L) Merr.	Fabaceae	Salini (2019)
		Mung bean (*Vigna radiate* (L.) R. Wilczek)	Fabaceae	-do-
		Finger millet (*Eleusine coracana* (L) Gaertns)	Poaceae	-do-
		Indian Sandal wood (*Santalum album* L)	Santalaceae	-do-
		Sesame (*Sesamum indicum* L)	Pedaliaceae	
15	*Scotinophara limosa* (Walker, 1867)	Rice (*Oryza sativa* L)	Poaceae	Ahmad and Afzal (1976), Ahmad and Mohammad (1980)
16	*Stenozygum speciosum* (Dallas, 1851)	Common lantana (*Lantana camera* L)	Verbenaceae	Salini (2019)
		Rice (*Oryza sativa* L)	Poaceae	Salini (2019)
		Capparis deciduas (Forsk.)	Capparaceae	Haldhar and Maheshwari (2018)

Table 2. Distribution of pentatomid pests in West Bengal

S. No.	Taxa	Distribution (district wise)
1.	*Agonoscelis nubilis* (Fabricius, 1775)	Birbhum, Darjeeling, Jalpaiguri, Murshidabad (Chakraborty et al., 1994), Kolkata (Atkinson,1888), Nadia (Salini and Viraktamath, 2015).
2.	*Antestiopsis cruciate* (Fabricius, 1775)	Kolkata (Atkinson, 1888), Murshidabad (Salini & Viraktamath, 2015).
3.	*Bagrada hilaris* (Burmeister, 1835)	Kolkata (Atkinson, 1888).
4.	*Dalpada oculata* (Fabricius, 1775)	Kolkata (Distant 1902).
5.	*Dolycoris baccarum* Linnaeus, 1758	Darjeeling, Jalpaiguri, Maldah (Chakraborty et al., 1994).
6.	*Dolycoris indicus* Stal, 1876	Kolkata (Distant, 1902), Darjeeling (Atkinson, 1887).
7.	*Eysarcoris guttiger* (Thunberg, 1783)	Bankura, Medinipur, Murshidabad, Puruliya (Chakraborty et al., 1994), Kolkata (Distant, 1902).
8.	*Eysarcoris montivagus* Distant, 1902	Maldah, Medinipur, Puruliya, South 24-Parganas (Chakraborty et al., 1994).
9.	*Eysarcoris ventralis* Westwood, 1837	Bankura, Maldah, Medinipur, Puruliya, South 24-Parganas (Chakraborty et al., 1994).
10.	*Halyomorpha picus* (Fabricius, 1794)	Kolakata (Distant, 1902).
11.	*Halys dentatus* (Fabricius, 1775)	Kolkata, Murshidabad, Nadia, Puruliya, South 24 Parganas (Chakraborty et al., 1994).
12.	*Menida versicolor* (Gmelin, 1790)	Birbhum, Maldah, Medinipur, Nadia, North Dinajpur (Chakraborty et al., 1994), Kolkata (Distant, 1902).
13.	*Nezara viridula* (Linnaeus, 1758)	Birbhum, Jalpaiguri, Cooch Behar, Medinipur, Murshidabad, Nadia, North 24-Parganas, Puruliya (Chakraborty et al., 1994).
14.	*Piezodorus hybneri* (Gmelin, 1790)	Bankura, Jalpaiguri, Cooch Behar, Medinipur, Murshidabad (Chakraborty et al., 1994).
15.	*Scotinophara limosa* (Walker, 1867)	Kolkata (Distant, 1902).
16.	*Stenozygum speciosum* (Dallas, 1851)	Jalpaiguri (Chakraborty et al., 1994).

Rubiaceae, Rutaceae, Santalaceae, Amaranthaceae: 2 species each; Rhamnaceae, Malvaceae, Moraceae, Casuarinaceae, Mimosaceae, Sphenocleaceae, Euphorbiaceae, Pedaliaceae, Verbenaceae, Brassicaceae, Lamiaceae: 1 species each. Pentatomid bugs are generally considered to be polyphagous, meaning they feed on multiple plant species. However, some species have been reported as monophagous, meaning they feed exclusively on a single plant species. The examples are given in Fig. 2: *Dolycoris indicus* Stal, (Fig. 3 a) and *Nezara viridula* (Linnaeus) (Fig. 3 b) feed on plants from seven families (polyphagous); *Bagrada hilaris* (Burmeister) (Fig. 3 c) also reported as a polyphagous consuming plants from six families; *Antestiopsis cruciate* (F) (Fig. 3 d) and *Piezodorus hybneri* (Gmelin) (Fig. 3 e) polyphagous, feeding on plants from four different families; *Agonoscelis nubilis* (F) (Fig. 3 f) and *Halys dentatus* (F) (Fig. 3 l) considered pests of plants from three families; *Dolycoris baccarum* (L) (Fig. 3 h), *Eysarcoris ventralis* Westwood (Fig. 3 i), *Menida versicolor* (Gmelin) (Fig. 3 j) and *Stenozygum speciosum* (Dallas) (Fig. 3 k) reported to attack plants from two families; *Dalpada oculata* (F) (Fig. 3 g), *Eysarcoris guttiger* (Thunberg) (Fig. 3 m), *Eysarcoris montivagus* Distant, 1902 (Fig. 3 n), *Halyomorpha picus* (F) (Fig. 3 o) and *Scotinophara limosa* (Walker) (Fig. 3 p) reported to consume plants belonging to a particular family.

CONCLUSIONS

This study is on the first step towards understanding the pest status of phytophagous pentatomid bugs in West Bengal. While their interactions with host plants have been recorded, additional research is needed to assess their damage potential, identify effective control strategies, and quantify their impact on the overall pest production of crops in the region. The findings from this study contribute valuable insights for developing integrated pest management practices to safeguard economically important plants in West Bengal.

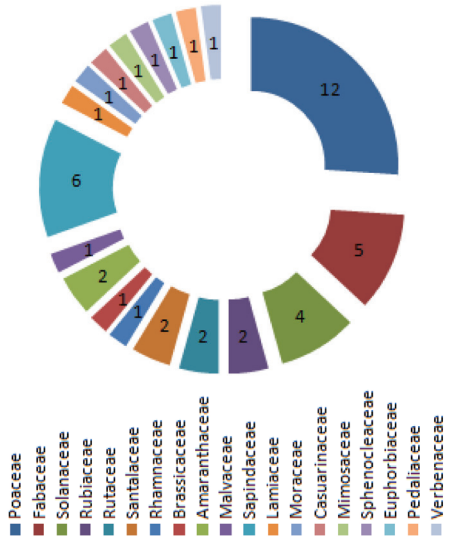

Fig. 1. Records of host plants family wise for stink bugs from West Bengal

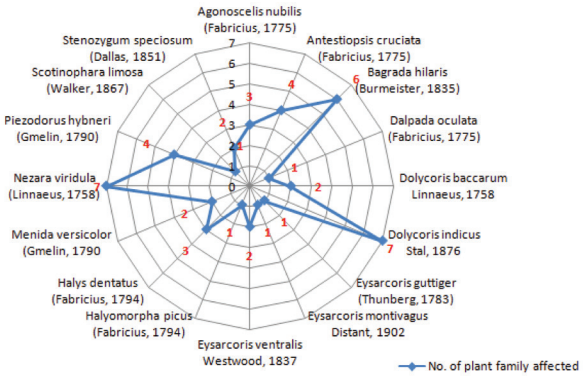

Fig. 2. Records of stink bug on host plants from West Bengal

Fig. 3. Pentatomid bugs feed on plants from families. a. *Dolycoris indicus*, b. *Nezara viridula*, c. *Bagrada hilaris*, d. *Antestiopsis cruciate*, e. *Piezodorus hybneri*, f. *Agonoscelis nubilis*, g. *Dalpada oculata*, h. *Dolycoris baccarum*, i. *Eysarcoris ventralis*, j. *Menida versicolor*, k. *Stenozygum speciosum*, l. *Halys dentatus*, m. *Eysarcoris guttiger*, n. *Eysarcoris montivagus*, o. *Halyomorpha picus,* p. *Scotinophara limosa*

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CONFLICT OF INTEREST

No conflict of interest.

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