



## Research Article

## TORTOISE BEETLES (COLEOPTERA: CHRYSOMELIDAE: CASSIDINAE) OF WEST BENGAL, INDIA

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### ABSTRACT

Altogether, 52 species of tortoise beetles belonging to 11 genera and 4 tribes (Coleoptera: Chrysomelidae: Cassidinae) are reported from West Bengal, India in the present communication. The genus *Cassida* Linnaeus includes the maximum number of 21 species followed by *Aspidimorpha* Hope (11), *Basiprionota* Chevrolat (5), *Lacoptera* Boheman (4), *Notosacantha* Chevrolat (3), *Chiridopsis* Spaeth (3), *Oocassida* Weise (1), *Epistictina* Hincks (1), *Glyphocassis* Spaeth (1) and *Conchyloctenia* Spaeth (1) and *Craspedonta* Chevrolat (1).

**Keywords:** Checklist, Distribution, Taxonomy, Agricultural Pest.

### INTRODUCTION

The subfamily Cassidinae (Coleoptera: Chrysomelidae) includes the group of insects, popularly known as tortoise beetles, characterized by a rounded shape with a convex back and a pointed central area (Maulik, 1919). Tortoise beetles lay eggs singly or in masses most frequently on leaves and eggs and may be surrounded by secretions such as membranes, sacs and hard shells (Flinte *et al.*, 2008). They are cosmopolitan but primarily tropical, with most species occurring in the Neotropical region (Borowiec and Moragues, 2005; Chaboo, 2007). Host records are known for about 63% of genera (Jolivet and Hawkeswood, 1995; Borowiec, 1999), an impressive tally among herbivorous insects. In Asia, they attack food crops such as maize, rice, sugarcane, bamboo, date palm, and coconut (Maulik, 1919). Representatives of the genus *Aspidimorpha* Hope are among the most intensively explored cassidins in terms of their distribution and host records (Świętojańska, 2001).

The baseline data on Indian tortoise beetles were first documented by Maulik (1919) in the Fauna of British India series devoted to Hispinae and Cassidinae, which contained 152 species in 16 genera from the Indian subcontinent. Significant contributions to Indian tortoise beetles were made thereafter. Later, Borowiec (1999) summarized the taxonomic nomenclature, distribution records and host data of the worldwide Cassidinae. While examining the collection of tortoise beetles housed at the National Zoological Collection of the Zoological Survey of India,

Kolkata, we examined 26 species from the state of West Bengal. The present communication aims to document the diversity and distribution of tortoise beetles from the state of West Bengal, India using specimen records and previously published literature. Regarding West Bengal Cassidinae, the initial information was generated by Basu (1996) who documented 44 species. Later, Saha and Raychaudhuri (1997) reported a total of 18 species of Cassidinae, belonging to 5 genera including 7 new records for the state and 2 new records for India. The following articles reported on the Cassidinae from different parts of West Bengal: Vazirani (1968), Kimoto (1981), Borowiec and Takizawa (1991), Basu (1996), Saha and Raychaudhuri (1997), Borowiec (1999, 2009), Rane *et al.* (2000), Świętojańska (2001), Ghatte *et al.* (2003), Sekerka (2011), Agarwala and Bhattacharjee (2012), Raychaudhuri and Saha (2014), and Borowiec and Świętojańska (2023). In this paper, we have compiled the information on tortoise beetle diversity and distribution in the form of a distribution checklist (Table 1) from the state of West Bengal, India based on examined specimens and literature records.

### MATERIALS AND METHODS

#### Study Area

West Bengal is an eastern state of India and extends from 21°25' N to 27°13' N latitudes and 85°50' E to 89°50' E

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longitudes, and covers a total area of 88,752 square kilometres. Because of its geographic distribution, it is blessed with diverse landmasses ranging from the Himalayas in the north to the Bay of Bengal in the south, mangroves deltas, plateaus in the west, and a vast Ganges plain in the centre.

### Identification and Compilation of data

A total of 351 samples (Table 2) were examined and analyzed to obtain a comprehensive faunal list of the West Bengal Cassidinae housed in the Coleoptera Section of ZSI, Kolkata. The determination at the species level was carried out using keys and figures in Maulik (1919), Świętojańska (2001), and Borowiec and Świętojańska (2023). The samples were also compared to the reference collection held at the ZSI, Kolkata. Additionally, literature records were compiled for the distribution records of West Bengal Cassidinae. The nomenclature and global distribution follow Borowiec and Świętojańska (2023).

### RESULTS AND DISCUSSION

A total of 52 species of tortoise beetles belonging to 11 genera and 4 tribes (Aspidimorphini, Cassidini,

Basiprionotini and Notosacanthini) have been reported from West Bengal state, India, in the present communication (Table 1). Species are documented based on a review of pre-existing information and collections present at the Zoological Survey of India, Kolkata (Table 2). Aspidimorphini is represented by 16 species and 3 genera *Aspidimorpha* (11 species), *Conchyloctenia* (1), and *Lacoptera* (4), Cassidini by 26 species and 4 genera; *Cassida* (21), *Chiridopsis* (3), *Glyphocassis* (1) and *Oocassida* (1); Basiprionotini by 7 species in 3 genera, *Basiprionota* (5), *Craspedonta* (1), and *Epistictina* (1); and Notosacanthini by 3 species in a single genus *Notosacantha*. Three species are recorded exclusively from the state of West Bengal: *Cassida stupa* Maulik [Kolkata], *Basiprionota decemstillata* (Boheman) [Darjeeling], *Notosacantha darjeelingensis* Borowiec & Takizawa [Darjeeling]. Among the different districts of West Bengal, the highest species diversity of 37 species is recorded from Darjeeling district, followed by 22 species from Kolkata, 15 from Jalpaiguri, 12 from South 24 Parganas, 7 from Murshidabad, 6 from Howrah, 6 from North 24 Parganas, 6 from Bankura, 2 from Birbhum, 3 from Nadia, 1 from Kalimpong, 1 from Coochbehar, 1 from Hooghly.

**Table 1.** Checklist of tortoise beetles (Coleoptera: Chrysomelidae: Cassidinae) from West Bengal, India.

S.N.	Name of the Species	Distribution		
		West Bengal	Other Indian States	Abroad
	Tribe ASPIDIMORPHINI			
1.	<i>Aspidomorpha amabilis</i> Boheman, 1854	Darjeeling and Kolkata.	Assam and Odisha.	Philippines.
2.	<i>Aspidimorpha chandrika</i> Maulik, 1918	Jalpaiguri, Darjeeling, and Kolkata.	Arunachal Pradesh, Meghalaya, Sikkim, and Uttar Pradesh.	China, Laos, Myanmar, Indonesia, Thailand, Vietnam.
3.	<i>Aspidimorpha dorsata</i> (Fabricius, 1787)	Darjeeling and Kolkata.	Assam, Karnataka, Meghalaya, Nagaland, Sikkim and Tamil Nadu.	Bangladesh, Bhutan, Myanmar, Celebes, Malaya, Indonesia, Sunda Island and Thailand.
4.	<i>Aspidimorpha fuscopunctata</i> Boheman, 1854	Jalpaiguri and Kolkata.	Assam, Arunachal Pradesh, Bihar, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Odisha and Sikkim.	China, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Thailand and Vietnam.
5.	<i>Aspidimorpha furcata</i> (Thunberg, 1789)	Kolkata, Darjeeling, South 24 Parganas.	Assam, Arunachal Pradesh, Chhattisgarh, Karnataka, Kerala and Odisha.	Bhutan, Myanmar, Cambodia, Sri Lanka, China, Indonesia, Laos, Malaysia, Nepal, Taiwan, Thailand and Vietnam.
6.	<i>Aspidimorpha indica</i> Boheman, 1854	Darjeeling, Kolkata, Bankura, South 24 Parganas.	Andhra Pradesh, Sikkim and Tamil Nadu.	Bangladesh, Myanmar, China, Indonesia, Laos, Malaysia, Nepal, Pakistan and Philippines.
7.	<i>Aspidimorpha inquinata</i> Boheman, 1854	Jalpaiguri.	Assam, Arunachal Pradesh, Bihar, Meghalaya and Sikkim.	Indonesia.
8.	<i>Aspidimorpha lobata</i> Boheman, 1854	Kolkata.	-	Bangladesh and Sri Lanka.
9.	<i>Aspidimorpha miliaris</i> (Fabricius, 1775)	Bankura, Birbhum, Darjeeling, Malda, Kolkata, Howrah,	Assam, Andaman Islands, Bihar, Karnataka,	Myanmar, China, New Guinea, Philippines, Sunda Island, Sri Lanka and Vietnam.

		Nadia, and South 24 Parganas.	Meghalaya, Odisha and Tamil Nadu.	
10.	<i>Aspidimorpha orientalis</i> (Boheman, 1856)	Darjeeling and Kolkata.	Punjab, Sikkim and Uttar Pradesh.	-
11.	<i>Aspidimorpha sanctaerucis</i> (Fabricius, 1792)	Bankura, Birbhum, Darjeeling, Jalpaiguri, Malda, Murshidabad, and Nadia.	Arunachal Pradesh, Assam, Chhattisgarh, Karnataka, Kerala, Meghalaya, Odisha, Sikkim and Tamil Nadu.	Bhutan, China, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand.
12.	<i>Conchyloctenia nigrovittata</i> (Boheman, 1854)	Kolkata.	Chhattisgarh, Gujarat, Maharashtra and Karnataka.	-
13.	<i>Lacoptera</i> ( <i>Lacopteroidea</i> ) <i>nepalensis</i> Boheman, 1855 = <i>Lacoptera quadrimaculata</i> Thunberg, 1789	Bankura, Kalimpong, Kolkata, Darjeeling, Murshidabad, Coochbehar, and South 24 Parganas.	Andaman Islands, Arunachal Pradesh, Assam, Karnataka Madhya Pradesh, Meghalaya, Odisha, Sikkim and Tamil Nadu.	China, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Singapore, Sri Lanka, Thailand and Vietnam.
14.	<i>Lacoptera</i> ( <i>Sindia</i> ) <i>sulcata</i> (Olivier, 1808) = <i>Cassida clathrata</i> Fabricius, 1798	Kolkata.	Maharashtra and Tamil Nadu.	-
15.	<i>Lacoptera</i> ( <i>Sindiola</i> ) <i>vigintisexnotata</i> (Boheman, 1855)	Kolkata and Murshidabad.	Assam, Meghalaya and Uttar Pradesh.	Malaysia, Myanmar, Indonesia and Vietnam.
16.	<i>Lacoptera</i> ( <i>Sindiolina</i> ) <i>sedecimmaculata</i> (Boheman, 1856) Tribe CASSIDINI	Darjeeling.	Arunachal Pradesh.	China, Laos, Nepal and Vietnam.
17.	<i>Cassida australica</i> (Boheman, 1855)	Darjeeling, Jalpaiguri and Howrah.	Assam, Jammu & Kashmir, Meghalaya, Nagaland, Sikkim, and Tamil Nadu.	China, Laos, Myanmar, Nepal, Thailand and Vietnam.
18.	<i>Cassida belliformis</i> Maulik, 1919	Darjeeling and Howrah.	Maharashtra and Sikkim.	-
19.	<i>Cassida catenata</i> (Boheman, 1855)	Darjeeling, Jalpaiguri and North 24 Parganas.	Arunachal Pradesh, Assam, Sikkim, Uttarakhand and Uttar Pradesh.	Bhutan, Myanmar, Indonesia, Malaysia and Thailand.
20.	<i>Cassida circumdata</i> (Herbst, 1799)	Bankura, Kolkata, Murshidabad and Nadia.	Maharashtra, Kerala, Odisha, Sikkim, Tamil Nadu and Tripura.	Bangladesh, Caroline Island, Sri Lanka, China, Indonesia, Japan, Laos, Malaysia, Nepal, Philippines, Thailand, Taiwan and Vietnam.
21.	<i>Cassida conchylata</i> (Spaeth, 1914)	Darjeeling and Jalpaiguri.	Assam and Sikkim.	Myanmar, China, Laos, Malaysia, Thailand and Vietnam
22.	<i>Cassida dorsonotata</i> Boheman, 1854	Darjeeling.	Karnataka and Tamil Nadu.	
23.	<i>Cassida desultrix</i> (Spaeth, 1914)	Darjeeling.	Bihar, Sikkim and Tamil Nadu.	China, Laos, Nepal and Thailand.
24.	<i>Cassida enervis</i> Boheman, 1862	Howrah, Kolkata, Hooghly, and North 24 Parganas.	Maharashtra and Uttar Pradesh.	-
25.	<i>Cassida flavoscutata</i> Spaeth, 1914	Darjeeling.	Bihar, Maharashtra, Sikkim, Tamil Nadu and Uttar Pradesh.	China, Laos, and Nepal.
26.	<i>Cassida icterica</i> Boheman, 1854 =	Darjeeling and Jalpaiguri.	Karnataka, Kerala, Sikkim, Uttar Pradesh	China, Indonesia, Laos, Malaysia, Myanmar, Nepal and

	<i>Cassida petulans</i> Spaeth, 1914		and Tamil Nadu.	Thailand.
27.	<i>Cassida justa</i> Spaeth, 1914	Darjeeling.	Sikkim and Maharashtra.	-
28.	<i>Cassida nigriventris</i> Boheman, 1854	Darjeeling Howrah.	and Assam, Chhattisgarh, Himachal Pradesh, Sikkim and Uttar Pradesh.	Bhutan, China, Nepal, Pakistan, Thailand and Vietnam.
29.	<i>Cassida obscura</i> (Fabricius, 1792)	Murshidabad.	Odisha, Puducherry and Tamil Nadu.	Bangladesh, Nepal and Pakistan.
30.	<i>Cassida obtusata</i> (Boheman, 1854)	Darjeeling.	Chhattisgarh and Meghalaya.	Cambodia, China, Myanmar, Indonesia, Japan, Laos, Malaysia, Nepal, Philippines, Sri Lanka, Thailand and Vietnam.
31.	<i>Cassida occursans</i> (Spaeth, 1914)	Darjeeling.	Arunachal Pradesh, Assam, Bihar Meghalaya and Sikkim.	Bhutan, China and Nepal.
32.	<i>Cassida pauxilla</i> Boheman, 1854	Jalpaiguri.	Assam and Sikkim.	China and Sri Lanka.
33.	<i>Cassida pusillula</i> Boheman, 1862	Howrah, Kolkata and Darjeeling.	Chhattisgarh and Uttar Pradesh.	Cambodia, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines and Sri Lanka.
34.	<i>Cassida stevensi</i> Sekerka, 2011	Darjeeling.	Sikkim.	Myanmar.
35.	<i>Cassida stupa</i> Maulik, 1919	Kolkata.	-	-
36.	<i>Cassida syratica</i> Boheman, 1856	Jalpaiguri and Darjeeling.	and Assam, Himachal Pradesh, Kerala, Meghalaya, Sikkim, Tamil Nadu, Uttarakhand and Uttar Pradesh.	Bhutan, Myanmar, Nepal and Pakistan.
37.	<i>Cassida varians</i> (Herbst, 1799)	Kolkata, Jalpaiguri and North 24 Parganas.	Bihar, Odisha and Sikkim.	Bhutan, Myanmar, Nepal and Pakistan.
38.	<i>Chiridopsis bipunctata</i> (Linnaeus, 1767) = <i>Chiridopsis promiscua</i> (Boheman, 1855)	Darjeeling, Bankura and South 24 Parganas.	Kerala, Maharashtra and Tamil Nadu.	Sri Lanka and Thailand.
39.	<i>Chiridopsis mimica</i> (Weise, 1905)	Darjeeling, and Jalpaiguri.	Assam and Meghalaya	Myanmar.
40.	<i>Chiridopsis septemnotata</i> (Boheman, 1855)	Darjeeling, Kolkata and Murshidabad.	Assam, Odisha and Sikkim.	Bhutan, Malaysia and Thailand.
41.	<i>Glyphocassis trilineata</i> (Hope, 1831)	Darjeeling.	Sikkim and Uttar Pradesh.	China, Laos, Nepal, Pakistan, Thailand, and Vietnam.
42.	<i>Oocassida cruenta</i> (Fabricius, 1792) = <i>Cassida obscura</i> Fabricius, 1792 Tribe BASIPRIONOTINI	Kolkata, Murshidabad and South 24 Parganas.	Odisha, Puducherry and Tamil Nadu.	Nepal and Pakistan.
43.	<i>Craspedonta leayana</i> (Latreille, 1807)	Darjeeling.	Arunachal Pradesh, Assam, Maharashtra, Meghalaya, Nagaland and Tamil Nadu.	China, Laos, Myanmar, Nepal, Thailand and Vietnam.
44.	<i>Epistictina viridimaculata</i> (Boheman, 1850)	Darjeeling.	Arunachal Pradesh, Assam, Manipur, Meghalaya,	Cambodia, China, Laos, Malaysia, Myanmar, Nepal, Thailand and Vietnam.

45.	<i>Basiprionota bimaculata</i> (Thunberg, 1789) = <i>Prioptera impustulata</i> Boheman, 1850	Kolkata.		Punjab and Sikkim. Assam and Sikkim.	China, Myanmar, Laos, Thailand, and Vietnam.
46.	<i>Basiprionota decemmaculata</i> (Boheman, 1850)	Darjeeling Jalpaiguri.	and	Arunachal Pradesh, Assam, Meghalaya and Sikkim.	China, Laos, Malaysia, Myanmar, Nepal, Thailand and Vietnam.
47.	<i>Basiprionota decemstillata</i> (Boheman, 1856)	Jalpaiguri.		-	-
48.	<i>Basiprionota prognata</i> (Spaeth, 1925)	Darjeeling.		-	China and Myanmar.
49.	<i>Basiprionota sexmaculata</i> (Boheman, 1850) = <i>Prioptera punctipennis</i> Wagener, 1877 Tribe NOTOSACANTHINI	Jalpaiguri Kolkata.	and	Assam Meghalaya.	and Bhutan, China, Laos, Myanmar, Nepal, Thailand and Vietnam.
50.	<i>Notosacantha darjeelingensis</i> Borowiec & Takizawa, 1991	Darjeeling		-	-
51.	<i>Notosacantha maculipennis</i> (Boheman, 1856)	Darjeeling.		Arunachal Pradesh, Sikkim, Uttarkhand and Meghalaya	Myanmar and Nepal.
52.	<i>Notosacantha tenuicula</i> (Spaeth, 1913)	Darjeeling.		Assam, Maharashtra and Sikkim.	Nepal.

**Table 2.** Specimen records of tortoise beetles in the collection of Zoological Survey of India, Kolkata from West Bengal state.

S.N.	Name of the Species	Material examined (IN: India; WB: West Bengal)
Tribe ASPIDIMORPHINI		
1.	<i>A. amabilis</i>	IN, WB: Kolkata, 1 ex. [4123/11], 1 ex. [4222/11], 1 ex. [4279/11], 1 ex. [3358/11]; Calcutta, 13.vii.1895, 1 ex. leg. W.R. Yates.
2.	<i>A. chandrika</i>	IN, WB: Darjeeling, 1000-3000 ft, 05.vi.1912, 2 exs. [7609/H4A]; Ghum, 4000 ft, 05.vii.1912, 4 exs. [7611/H4A], leg. Lord Carmichael, det. H.A. Hafiz & S. Ribeiro.
3.	<i>A. dorsata</i>	IN, WB: Kolkata, 1 ex. [8147/12], 1 ex. [8123/12], 1 ex. [8129/12], 1 ex. [3197/8], 1 ex. [2379/8], ii-1918, det. S. Maulik.
4.	<i>A. fuscopunctata</i>	IN, WB: Jalpaiguri, 17.xi.1928, 1 ex. [10270/H4A], leg. P.C. Sinha and S.K. Mondal.
5.	<i>A. furcata</i>	IN, WB: Kolkata, 1 ex. [982/18]; 07.xii.1928, 1 ex. [152/H4A], leg. P.C. Sinha and S.K. Mondal, det. G.I.K. Mars; 25.viii.1955, 1 ex. [10271/H4A], leg. D. Mukherjee, det. G. Mathai.
6.	<i>A. lobata</i>	IN, WB: Kolkata, 1 ex. ii-1918, det. S. Maulik.
7.	<i>A. miliaris</i>	IN, WB: Hatirampur, 10.x.1986, 1 ex. [15473/H4A], leg. P. Mukherjee, det. C.R. Basu; Santragachi, 10.ix.1964, 5 exs. [15474/H4A], leg. K. Rai, det. C. R. Basu; Shibpur, Botanical Garden, 10.xii.1961, 1 ex. [15479/H4A], leg. K.S.P. and S. Ali, det. C.R. Basu; Mourigram, 10.ix.1964, 5 exs. [15480/H4A], leg. K. Rai, det. C.R. Basu; Sonarpur, 28.xi.1961, 2 exs. [15482/H4A], leg. R.K.V., det. C.R. Basu; Budge Budge, 13.xi.1966, 12 exs. [16565/H4A], leg. K.V.L. Narayan, det. C.R. Basu.

8. *A. orientalis* IN, WB: Kolkata, 1 ex. [1031/9].
9. *C. nigrovittata* IN, WB: Kolkata, 2 exs. [952/9, 1102/9].
10. *L. nepalensis* IN, WB: Kalimpong, 17.ix.1959, 1 ex. [214/H4A], leg. B.K. Tikadar, det. T.G. Vazirani; Tufanganj, 13.viii.1986, 4 exs. [1549/H4A], leg. T.K. Pal, det. C.R. Basu; Kurseong, 23.vi.1923, 1 ex. [6454/H4A], leg. H. S. Rao, det. S. Maulik.
11. *L. vigintisexnotata* IN, WB: Kolkata, 1 ex. [7874/10].
- Tribe CASSIDINI
12. *C. australica* IN, WB: Kurseong, Mahanadi, 1255 m, 28.iv.1971, 4 exs. [15560H4A], leg. A.R. Bhaumik, det. C.R. Basu; Kurseong, Municipal School Compound, 02.v.1971, 4 exs. [15562H4A], leg. A.R. Bhaumik, det. C.R. Basu; Howrah, Botanical Garden, 2000 m, 11.v.1975, 4 exs. [15562H4A], leg. J.K. Jonathan, det. C.R. Basu.
13. *C. belliformis* IN, WB: Darjeeling, Bhutia Basti, 2000 m, 16.v.1974, 1 ex. [15577/H4A], Darjeeling Chawk, 2000 m, 15.v.1974, 1 ex. [15578/H4A], Rangiroom beat office, 2000 m, 23.v.1974, 1 ex. [15579/H4A], Howrah, Botanical Garden, 2050 m, 16.v.1974, 1 ex. [15580/H4A], leg. J.K. Jonathan., det. C.R. Basu.
14. *C. catenata* IN, WB: Jalpaiguri, 1 ex.; Kolkata, Dum Dum, 1 ex. [4994/8].
15. *C. circumdata* IN, WB: Kolkata, ZSI, 1906, 1 ex. [5542/H4A], det. T.G. Vazirani; Garia, 01.i.1957, 1 ex. [11941/H4A], leg. A.P. Kapur., det. S.P. Shukla; Kolkata, 1 ex. [530/12], 1 ex. [4114/11], 1 ex. [4697/11], 1 ex. [4705/11].
16. *C. conchylata* IN, WB: Darjeeling, Mungphu, Himalayas ~5000 ft., 1987, 1 ex.
17. *C. desultrix* IN, WB: Darjeeling, v-vi.1912, 1 ex. [1900/H2], leg. Lord Carmichal, det. S. Maulik.
18. *C. enervis* IN, WB: Eden Garden, 19.viii.1968, 9 exs. [15531/H4A], leg. R.L. Choudhury, det. C.R. Basu; Eden Garden, 30.iii.1963, 36 exs. [15534/H4A], leg. S. Munsli, det. C.R. Basu; Zoo Garden, 31.iii.1960, 36 exs. [15540/H4A], leg. A. P. Kapur, det. C.R. Basu; Eden Garden, 30.viii.1960, 3 exs. [15541/H4A], leg. A. P. Kapur, det. C.R. Basu; Dhapa, 23.viii.1961, 4 exs. [15542/H4A], leg. S. Ali, det. C.R. Basu; Botanical Garden, Shibpur, 10.xi.1961, 9 exs. [15544/H4A], leg. K.R.R. & S. Ali, det. C.R. Basu, 27.x.1965, 4 exs. [15547/H4A], leg. K.R.R., det. C.R. Basu; 31.viii.1965, 4 exs. [15549/H4A], leg. K. S. P. & K. V. L., det. C.R. Basu.
19. *C. nigriventris* IN, WB: Mahanadi, 1255 m, 28.iv.1971, 16 exs. [15565/H4A], leg. A.R. Bhaumik, det. C.R. Basu; Botanical Garden, 2050 m 16.v.1974, 1 ex. [15569/H4A], leg. J.K. Jonathan, det. C.R. Basu; Rangpo, 08.iv.1973, 1 ex. [15570/H4A], leg. H.S. Sharma, det. C.R. Basu; Kurseong, 1745 m, 15.v.1979, 1 ex. [15571/H4A], leg. M.S. Shishodia, det. C.R. Basu.
20. *C. obscura* IN, WB: Murshidabad, 1 ex. [3991/8], 1 ex. [3990/8].
21. *C. obtusata* IN, WB: Tung, 25.iii.1978, 45 exs. [15572/H4A], leg. C.R. Basu, det. C.R. Basu.
22. *C. pusillula* IN, WB: Calcutta, Eden Gardens, 30.viii.1963, 13 exs. [15525/H4A], leg. S. Munshi and det. S. Ali.
23. *C. syrtica* IN, WB: Darjeeling, Kurseong, 21.vi.1910, 1 ex. [8002/18], leg. Ananndale, det. S. Maulik.
24. *C. varians* IN, WB: Kolkata, 11.viii.1954, 1 ex. [9730/H4], 1 ex. [9734/H4], 1 ex. [9735/H4A], 1 ex. [9736/H4A], 1 ex. [9738/H4], leg. A.Sarkar, det. C. R. Basu; Dum Dum, 1 ex. [4993/8], leg. G.S. Patterson, det. Maulik. 1 ex. [4104/10], det. Maulik; 1914, 1 ex. [4103/12], det. S. Maulik; Kolkata, xi-1914, 1 ex. [4098/21], leg. F.H., det. S.Maulik.
25. *C. septemnotata* IN, WB: Kolkata, 29.i.1966, 1 ex. [15550/H4A], leg. K.S. Pradhan, det. C. R. Basu; Kolkata, 28.ix.1964, 64 exs. [15551/H4A], leg. G. S. Arora, det. C.R. Basu; Kolkata, 29.ix.1965, 1 ex. [15559/H4A], leg. O.B. Chhotani, det. C.R. Basu.
26. *O. cruenta* IN, WB: Murshidabad, 1 ex. [3992/8].

**CONCLUSION**

The present study gives an idea of the diversity of tortoise beetles in the state of West Bengal, India, which revealed 52 species belonging to 11 genera and 4 tribes. Among the 52 species, the maximum species diversity of 26 species belongs to the tribe Cassidini, 16 species belong to the tribe Aspidimorphini, 7 species belong to the tribe Basiprionotini and 3 species belong to the tribe Notosacanthini. This study provides primary data and inventory on the current status, composition of the subfamily Cassidinae in West Bengal. Since agriculture dominates the landscape and economy, these beetles are inherently phytophagous, feeding on leaves, showing the importance of studying the taxonomic and pest traits to further improve sustainable farming strategies.

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**REFERENCES**

- Agarwala, B.K., & Bhattacharjee, P.P. (2012). Long-horned Beetles (Coleoptera: Cerambycidae) and Tortoise Beetles (Chrysomelidae: Cassidinae) of Tripura, northeastern India with some new additions. *Journal of Threatened Taxa*, 4(13), 3223–3227.
- Basu, C.R. (1996). Insecta: Coleoptera: Chrysomelidae In State Fauna Series 3: Fauna of West Bengal, Part 6B, 559-773.
- Borowiec, L. (1999). A World Catalogue of the Cassidinae (Coleoptera: Chrysomelidae). *Biologica Silesiae*, Poland, 1-476.
- Borowiec, L. (2009). New records of Asian and Australopapuan tortoise beetles (Coleoptera: Chrysomelidae: Cassidinae). *Genus*, 20, 435-484.
- Borowiec, L., & Moragues, G. (2005). Tortoise beetles of the French Guyana - a faunistic review (Coleoptera: Chrysomelidae: Cassidinae). *Genus*, 16(2), 247-278.
- Borowiec, L., & Świętojańska, J. (2023). Cassidinae of the world - an interactive manual (Coleoptera: Chrysomelidae). Permanent electronic publication (open in 2002): <http://www.biol.uni.wroc.pl/cassidae/katalog%20internetowy/index.htm> access date: 14.03.2023.
- Borowiec, L., & Takizawa, H. (1991). Notes on Chrysomelid Beetles (Coleoptera) of India and its Neighboring Areas. *Japanese Journal of Entomology*, 59, 637-654.
- Chaboo, C. (2007). Biology and Phylogeny of the Cassidinae Gyllenhal Sensu Lato (Tortoise and Leaf-Mining Beetles) (Coleoptera: Chrysomelidae). *Bulletin of the American Museum of Natural History*, 305. [https://doi.org/10.1206/00030090\(2007\)305\[1:BAPOTC\]2.0.CO;2](https://doi.org/10.1206/00030090(2007)305[1:BAPOTC]2.0.CO;2).
- Flinte, V., Macedo, M.V., Monteiro, R.F., Jolivet, P., Santiago-Blay, J., & Schmitt, M. (2008). Tortoise beetles (Chrysomelidae: Cassidinae) of a tropical rain forest in Rio de Janeiro, Brazil. *Research on Chrysomelidae*, 1, 194-209.
- Ghate, H.V., Borowiec, L., Rane, N.S., Ranade, S.P., & Pandit, S. (2003). Tortoise beetles and their host plants from Pune (Maharashtra State, India) and nearby places (Coleoptera: Chrysomelidae: Cassidinae). *Genus*, 14 (4), 519-539.
- Jolivet, P. & Hawkswood, T.J. (1995). Host-plants of Chrysomelidae beetles of the world: an essay about relationships between leaf beetles and their food plants. Backhuys Publishers, Leiden, 1-281.
- Kimoto, S. (1981). The Cassidinae of Nepal, Bhutan and Northern Territories of India, in the National History Museum in Basel (Coleoptera: Chrysomelidae). *Entomological Review of Japan*, 36(1), 55-62.
- Maulik, S. (1919). The Fauna of British India including Ceylon and Burma, Coleoptera. Chrysomelidae. (Hispinæ & Cassidinae). Taylor & Francis, London, 1-439.
- Rane, N., Ranade, S., & Ghate, H.V. (2000). Some observations on the biology of *Notosacantha vicaria* (Spaeth) (Coleoptera: Chrysomelidae: Cassidinae). *Genus*, 11(2), 197-204.
- Raychaudhuri, D., & Saha, S. (2014). Atlas of Insects and Spiders of Buxa Tiger Reserve. Nature Books India, Kolkata, 1-357.
- Saha, S., & Raychaudhuri, D. (1997). Tortoise beetles (Cassidinae) of Buxa Tiger Reserve, Jalpaiguri, West Bengal. *Insect Environment*, 2(4), 129-130.
- Sekerka, L. (2011). *Cassida stevensi*, a new species from India (Coleoptera: Chrysomelidae: Cassidinae: Cassidini). *Genus*, 22, 499-504.
- Świętojańska, J. (2001). A Revision of the Tribe Aspidimorphini of the Oriental Region: (Coleoptera: Chrysomelidae: Cassidinae). *Biologica Silesiae*, Wrocław, Poland, 1-318.
- Vazirani, T.G. (1968). Notes on collection of Hispinæ and Cassidinae (Coleoptera: Chrysomelidae) from NE India. *Records of the Zoological Survey of India*, 66(1-4), 143-152.