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Diversity of Hemiptera (Insecta) in Different Coffee Plantation Districts of Karnataka, India

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Abstract— *The present study provides a faunistic account of the order Hemiptera (Insecta) associated with coffee plantations in different districts of Karnataka, India. Field surveys were conducted in selected coffee-growing regions representing different geographical and ecological conditions of the state. Hemipteran specimens were collected using standard entomological methods, including sweep netting, hand collection, and light trapping, and were subsequently preserved, examined, and identified using relevant taxonomic literature and comparative material. The study documents the diversity and distribution of hemipteran insects occurring in coffee plantation ecosystems, with representatives of several families and genera. The recorded taxa comprise phytophagous as well as predatory forms, reflecting the ecological complexity of the coffee agroecosystem. Particular attention was given to species identification, diagnostic characters, locality records, and their known distribution in India and elsewhere. The study contributes to the existing knowledge of the hemipteran fauna of Karnataka and provides baseline information on the insect diversity associated with coffee plantations. Such faunistic inventories are important for understanding insect diversity, species distribution, and ecological interactions within coffee agroecosystems and may also provide useful information for future studies on economically important and beneficial hemipteran species. During the present study, 41 species belonging to 37 genera and 15 families of Hemiptera were documented from coffee plantation areas in Kodagu, Shivamogga and Chikkamagaluru districts of Karnataka, India.*

Keywords— Hemiptera, Auchenorrhyncha, Heteroptera, coffee plantation, diversity, faunistic account, Karnataka, India, distribution.

I. INTRODUCTION

The order Hemiptera is one of the largest and most diverse groups of insects and constitutes an important component of the global insect fauna. Members of this order exhibit remarkable diversity in their feeding habits and ecological roles and include phytophagous, predatory, hematophagous, and omnivorous forms. They occupy a wide range of habitats, including terrestrial, freshwater, and, in a few groups, marine environments. Hemipterans are of considerable ecological and economic importance, as some species are serious agricultural pests causing direct damage to crops, while others are important predators and natural enemies of pest insects and are consequently utilized in biological control programmes. Several species also serve as vectors of plant pathogens and may have substantial impacts on agricultural production.

The order Hemiptera is currently divided into four major suborders, namely Sternorrhyncha, Auchenorrhyncha, Coleorrhyncha, and Heteroptera. It comprises approximately 102,183 described species worldwide, while about 7,162 species belonging to 95 families have been reported from India (Metcalf, 1960; Distant, 2008, 2016, 2018; Chandra, 2012, 2013, Dubey et al. 2026). The Indian subcontinent, owing to its wide range of climatic conditions, physiographic features, vegetation types, and biogeographical regions, supports a rich and diverse hemipteran fauna. However, the distribution and diversity of many

hemipteran groups remain inadequately documented, particularly from agroecosystems and plantation landscapes (Saha, et al. 2025a,b,c, Saha, et al. 2026a,b,c.; Prabhakar, 2013).

Coffee (*Coffea* spp.) is one of the most important plantation crops cultivated in tropical and subtropical regions and constitutes a major component of the agricultural economy of several countries. Coffee plantations support a diverse assemblage of arthropods because of their complex vegetation structure, availability of host plants, shade trees, leaf litter, weeds, and surrounding natural habitats. These agroecosystems harbour both phytophagous and predatory insects. Several phytophagous hemipterans are associated with coffee and may affect plant growth and productivity, whereas predatory taxa can contribute to the suppression of pest populations. Consequently, knowledge of the hemipteran fauna associated with coffee plantations is important not only from a taxonomic and faunistic perspective but also for understanding their ecological significance in plantation ecosystems.

India is one of the important coffee-producing countries, with cultivation concentrated primarily in the southern part of the country. Karnataka is the major coffee-producing state of India and possesses extensive coffee plantations, particularly across the Western Ghats and adjoining regions. The coffee-growing districts of Karnataka exhibit considerable variation in altitude, rainfall, temperature, vegetation, plantation management practices, and surrounding landscape. Such environmental heterogeneity provides diverse microhabitats and may influence the composition and distribution of associated hemipteran communities. Despite the economic importance and extensive distribution of coffee plantations in Karnataka, information on the diversity and distribution of Hemiptera associated with these agroecosystems remains relatively limited and scattered.

Faunistic surveys are essential for documenting regional biodiversity, establishing reliable distributional records, and identifying species that may be of ecological or economic significance. In particular, systematic surveys of agricultural and plantation ecosystems can provide valuable baseline information on both pest and beneficial insect fauna. Accurate identification and documentation of hemipteran species are also important for understanding their geographical distribution and for developing future studies on ecology, biodiversity conservation, biological control, and integrated pest management.

The present study was undertaken to document the diversity of Hemiptera associated with coffee plantations in different districts of Karnataka, India. The study provides taxonomic and distributional information on the recorded species based on field surveys and examination of collected specimens. A total of 41 species belonging to 37 genera and 15 families are recorded as new records for different districts of Karnataka. These records considerably enhance the available knowledge of the terrestrial hemipteran fauna of the state and provide baseline information on the diversity and distribution of Hemiptera associated with coffee plantation ecosystems. The study also highlights the importance of continued faunistic surveys in plantation landscapes for documenting regional insect diversity and understanding the ecological roles of hemipteran insects in agroecosystems.

II. MATERIALS AND METHODS

2.1 Study area

The present study was conducted in selected coffee plantations located in Kodagu, Shivamogga, and Chikkamagaluru districts of Karnataka, India. These districts represent important coffee-growing landscapes of the state and encompass considerable variation in elevation, vegetation, climatic conditions, and plantation management practices. The coffee plantations surveyed during the present study consisted predominantly of *Coffea* spp., with varying proportions of shade trees, shrubs, herbs, weeds, and surrounding natural vegetation. Such habitat heterogeneity provides suitable conditions for a diverse assemblage of phytophagous and predatory Hemiptera.

2.2 Sampling and collection

Field surveys were conducted in selected coffee plantations of Kodagu, Shivamogga, and Chikkamagaluru districts. Hemipteran specimens were collected from coffee plants and associated vegetation using standard entomological methods. The sampling methods included sweep netting, hand picking, beating of vegetation, and light trapping, depending on the habitat and activity of the insects. Specimens were collected from different parts of coffee plants, including leaves, stems, branches, flowers, and fruits, as well as from associated shade trees, shrubs, herbs, weeds, and ground vegetation.

Each collected specimen was provided with a field label containing relevant information such as locality, district, date of collection, habitat, altitude (where available), and collector's name. The specimens were subsequently transported to the laboratory for sorting, preservation, and identification.

2.3 Preservation and processing

The collected specimens were sorted and processed in the laboratory following standard entomological procedures. Adult Hemiptera were killed and preserved appropriately depending on their size and taxonomic group. Larger specimens were dry preserved by pinning, while smaller specimens were preserved using suitable mounting techniques. All specimens were provided with collection labels containing essential information on locality, date, altitude, habitat, and collector.

2.4 Identification

Identification of the specimens was carried out using standard taxonomic literature, identification keys, original descriptions, revisions, catalogues, and relevant published literature. The specimens were examined under a stereoscopic microscope, and important morphological characters were studied for determination of family, genus, and species. Diagnostic characters such as body size and colouration, head structure, antennae, rostrum, pronotum, scutellum, hemelytra, legs, abdominal structures, and other relevant morphological features were examined. Species identifications were further compared with authenticated specimens and available reference material wherever necessary (Distant, 1902, 1904, Schuh, & Slater, 1995, Lis, 1999).

The nomenclature and classification of the taxa were followed according to currently accepted taxonomic concepts and relevant published catalogues and revisions. Distributional information for each species was compiled from published literature and available taxonomic records, with particular emphasis on records from Karnataka and other parts of India.

2.5 Photography and documentation

Photographs of the specimens and important diagnostic characters were taken using a stereoscopic microscope equipped with a digital imaging system. High-resolution images were prepared to document the habitus and taxonomically significant morphological features of the recorded species. Relevant morphological measurements were taken using an ocular micrometer or calibrated imaging software, wherever necessary.

2.6 Distributional data

For each identified species, information on its occurrence in the three surveyed districts—Kodagu, Shivamogga, and Chikkamagaluru—was recorded. The known distribution of the species in other parts of Karnataka, India, and elsewhere was compiled from published taxonomic literature and available distributional records. Species representing new records for particular districts were specifically indicated (Hassan et al., 2025 a,b; Henry, 2009; Pruthi, 1936; Mitra, et al. 2016; Mukhopadhyay, 1988).

2.7 Deposition of specimens

The identified and studied specimens were properly labelled and deposited in the National Zoological Collections (NZC), Zoological Survey of India (ZSI), Kolkata, for future reference and verification. The collection data and specimen records were maintained following standard institutional procedures.

2.8 Data compilation

The collected data were compiled systematically according to family, genus, and species. For each taxon, information on material examined, locality, habitat, distribution, and relevant taxonomic remarks was recorded. The present survey resulted in the documentation of 41 species belonging to 37 genera and 15 families of Hemiptera from coffee plantations in the surveyed districts of Karnataka.

III. FAUNAL DIVERSITY

3.1 Systematic list

Phylum Arthropoda Gravenhorst, 1843

Class Insecta Linnaeus, 1758

Order Hemiptera Linnaeus, 1758

Suborder Auchenorrhyncha Amyot and Serville, 1843

Infraorder Cicadomorpha Evans, 1946

Superfamily Membracoidea Rafinesque, 1815

Family I. Cicadellidae Latreille, 1825

Subfamily Cicadellinae Latreille, 1825

Genus 1. *Cofana* Melichar, 1926

1) *Cofana spectra* (Distant, 1908)

Subfamily Deltocephalinae Dallas, 1870

Genus 2. *Exitianus* Ball, 1929

2) *Exitianus indicus* (Distant, 1908)

Genus 3. *Nephotettix* Matsumura, 1902

3) *Nephotettix virescens* (Distant, 1908)

4) *Nephotettix cincticeps* (Uhler, 1896)

Genus 4. *Thomsoniella* Signoret, 1879

5) *Thomsoniella albomaculata* (Distant, 1908)

Infraorder Cicadomorpha Martynov, 1927

Superfamily Cercopoidea Leach, 1815

Family II. Aphrophoridae Amyot and Serville, 1843

Subfamily Aphrophorinae Amyot and Serville, 1843

Tribe Aphrophorini Lallemand, 1924

Genus 5. *Ptyelus* Lepeletier & Serville, 1825

6) *Ptyelus nebulosus* (Fabricius, 1794)

Genus 6. *Poophilus* Stål, 1866

7) *Poophilus costalis* (Walker, 1851)

Genus 7. *Clovia* Stål, 1869

8) *Clovia conifer* (Walker, 1851)

Superfamily Membracoidea Rafinesque, 1815

Family III. Membracidae Rafinesque, 1815

Subfamily Centrotinae Amyot and Serville, 1843

Genus 8. *Leptocentrus* Stål, 1866

9) *Leptocentrus leucaspis* (Walker, 1858)

Genus 9. *Otinotus* Buckton, 1903

10) *Otinotus oneratus* (Walker, 1858)

Suborder Heteroptera Latreille, 1810

Infraorder Cimicomorpha Southwood, 1954

Superfamily Reduvioidea Latreille, 1807

Family IV. Reduviidae Latreille, 1807

Subfamily Harpactorinae Amyot and Serville, 1843

Genus 10. *Rhynocoris* Kolenati, 1857

11) *Rhynocoris costalis* (Stål, 1866)

Genus 11. *Coranus* Curtis, 1833

12) *Coranus fuscipennis* (Reuter, 1881)

Infraorder Pentatomorpha

Superfamily Miroidea Hahn, 1833

Family V. Miridae Hahn, 1833

Subfamily Mirinae Hahn, 1833

Tribe Mirini Hahn, 1833

Genus 12. *Charagochilus* Fieber, 1858

13) *Charagochilus longicornis* (Reuter, 1885)

Genus 13. *Proboscidocoris* Reuter, 1882

14) *Proboscidocoris capitatus* (Distant, 1904)

Genus 14. *Polymerus* Hahn, 1831

15) *Polymerus consanguineus* (Distant, 1904)

Superfamily Pentatomoidea Leach, 1815

Family VI. Pentatomidae Leach, 1815

Subfamily Pentatominae Leach, 1815

Tribe Antestiini Distant, 1902

Genus 15. *Plautia* Stål, 1867

16) *Plautia crossota* (Fabricius, 1787)

Tribe Piezodorini Atkinson, 1888

Genus 16. *Piezodorus* Fieber, 1861

17) *Piezodorus hybneri* (Gmelin, 1790)

Tribe Eysarcorini Mulsant and Rey, 1866

Genus 17. *Eysarcoris* Hahn, 1834

18) *Eysarcoris montivagus* (Distant, 1902)

Tribe Halyini Amyot and Serville, 1843

Genus 18. *Halys* Fabricius, 1803

19) *Halys serrigera* (Westwood, 1837)

Tribe Nezarini Atkinson, 1888

Genus 19. *Acrosternum* Fieber, 1860

20) *Acrosternum graminea* (Distant, 1787)

Genus 20. *Nezara* Amyot & Serville, 1843

21) *Nezara viridula* (Linnaeus, 1758)

Family VII. Dinidoridae Stål, 1868

Subfamily Dinidorinae Stål, 1867

Genus 21. *Coridius* Illiger, 1807

22) *Coridius ianus* (Fabricius, 1775)

Family VIII. Scutelleridae Leach, 1815

Subfamily Scutellerinae Leach, 1815

Genus 22. *Hotea* Amyot & Serville, 1843

23) *Hotea curculionoides* (Herrich-Schäffer, 1835)

Genus 23. *Chrysocoris* Hahn, 1834

24) *Chrysocoris purpureus* (Westwood, 1837)

Superfamily Coreoidea Leach, 1815

Family IX. Coreidae Leach, 1815

Subfamily Coreinae Leach, 1815

Division Gonoceraria Mulsant & Rey, 1870

Tribe Gonocerini Brailovsky, 2011

Genus 24. *Cletus* Stål, 1860

25) *Cletus punctiger* (Dallas, 1852)

Genus 25. *Cletomorpha* Mayr, 1866

26) *Cletomorpha hastata* (Fabricius, 1787)

Subfamily Hydarinae

Genus 26. *Hydarella* Bergroth, 1925

27) *Hydarella orientalis* (Distant, 1902)

Family X. Alydidae Amyot and Serville, 1843

Subfamily Micrelyterinae Stål, 1868

Genus 27. *Leptocorisa* Latreille, 1829

28) *Leptocorisa acuta* (Thunberg, 1783)

Genus 28. *Riptortus* Stål, 1860

29) *Riptortus linearis* (Fabricius, 1775)

Family XI. Rhopalidae Amyot and Serville, 1843

Subfamily Serinathinae Stål, 1873

Genus 29. *Leptocoris* Hahn, 1831

30) ***Leptocoris augur*** **(Fabricius, 1781)**

Superfamily Lygaeoidea Schilling, 1829

Family XII. Rhyparochromidae Amyot and Serville, 1843

Subfamily Rhyparochrominae Amyot and Serville, 1843

Tribe Rhyparochromini Amyot and Serville, 1843

Genus 30. *Elasmolomus* Stål, 1872

31) ***Elasmolomus sordidus*** **(Fabricius, 1787)**

Genus 31. *Dieuches* Dohrn, 1860

32) ***Dieuches insignis*** **(Distant, 1904)**

Family XIII. Lygaeidae Schilling, 1829

Subfamily Orsilinae Stål, 1872

Genus 32. *Nysius* Dallas, 1852

33) ***Nysius melanicus*** **(Distant, 1909)**

34) ***Nysius lacustrinus*** **(Distant, 1909)**

Subfamily Lygaeinae Schilling, 1829

Genus 33. *Spilostethus* Stål, 1868

35) ***Spilostethus hospes*** **(Fabricius, 1794)**

Genus 34. *Graptostethus* Stål, 1868

36) ***Graptostethus servus*** **(Fabricius, 1787)**

Superfamily Pyrrhocoroidea Amyot and Serville, 1843

Family XIV. Largidae Amyot and Serville, 1843

Subfamily Physopeltinae Hussey, 1929

Tribe Physopeltini Hussey, 1929

Genus 35. *Physopelta* Amyot & Serville, 1843

37) ***Physopelta schlansbuschi*** **(Fabricius, 1787)**

Subfamily Larginae Amyot and Serville, 1843

Tribe Largini Amyot and Serville, 1843

Genus 36. *Iphita* Stål, 1870

38) ***Iphita limbata*** **(Stål, 1870)**

Family XV. Pyrrhocoridae Amyot and Serville, 1843

Subfamily Pyrrhocorinae Amyot and Serville, 1843

Genus 37. *Dysdercus* Amyot & Serville, 1843

39) ***Dysdercus koenigii*** **(Fabricius, 1775)**

40) ***Dysdercus poecilus*** **(Herrich-Schäffer, 1844)**

41) ***Dysdercus similis*** **(Freeman, 1947)**

3.2 Comparative analysis

TABLE 1
SYSTEMATIC ACCOUNTS AND DISTRIBUTION OF HEMIPTERAN SPECIES IN THREE MAJOR COFFEE-GROWING DISTRICTS OF KARNATAKA, INDIA

Sl. No.	Name of the Species	Material examined	Distribution (Karnataka): Kodagu	Shivamogga	Chikkamagaluru
	Order Hemiptera Linnaeus, 1758				
	Suborder Auchenorrhyncha Amyot and Serville, 1843				
	Infraorder Cicadomorpha Evans, 1946				
	Superfamily Membracoidea Rafinesque, 1815				
	Family I. Cicadellidae Latreille, 1825				
	Subfamily Cicadellinae Latreille, 1825				
	Genus 1. *Cofana* Melichar, 1926				
1	*** *Cofana spectra* (Distant, 1908)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Subfamily Deltocephalinae Dallas, 1870				
	Genus 2. *Exitianus* Ball, 1929				
2	*** *Exitianus indicus* (Distant, 1908)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Genus 3. *Nephotettix* Matsumura, 1902				
3	*** *Nephotettix virescens* (Distant, 1908)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
4	*** *Nephotettix cincticeps* Uhler, 1896	3 exs, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Genus 4. *Thomsoniella* Signoret, 1879				

5	*** *Thomsoniella albomaculata* Distant, 1908	2 exs, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Infraorder Cicadomorpha Martynov, 1927				
	Superfamily Cercopoidea Leach, 1815				
	Family II. Aphrophoridae Amyot and Serville, 1843				
	Subfamily Aphrophorinae Amyot and Serville, 1843				
	Tribe Aphrophorini Lallemand, 1924				
	Genus 5. *Ptyelus* Lepeletier & Serville, 1825				
6	*** *Ptyelus nebulosus* (Fabricius, 1794)	2 exs, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Genus 6. *Poophilus* Stål, 1866				
7	*** *Poophilus costalis* (Walker, 1851)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Genus 7. *Clovia* Stål, 1869				
8	*** *Clovia conifer* (Walker, 1851)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Superfamily Membracoidea Rafinesque, 1815				
	Family III. Membracidae Rafinesque, 1815				
	Subfamily Centrotinae Amyot and Serville, 1843				
	Genus 8. *Leptocentrus* Stål, 1866				
9	*** *Leptocentrus leucaspis* (Walker, 1858)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Genus 9. *Otinotus* Buckton, 1903				

10	*** *Otinotus oneratus* (Walker, 1858)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Suborder Heteroptera Latreille, 1810				
	Infraorder Cimicomorpha Southwood, 1954				
	Superfamily Reduvioidea Latreille, 1807				
	Family IV. Reduviidae Latreille, 1807				
	Subfamily Harpactorinae Amyot and Serville, 1843				
	Genus 10. *Rhynocoris* Kolenati, 1857				
11	*** *Rhynocoris costalis* (Stål, 1866)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Genus 11. *Coranus* Curtis, 1833				
12	*** *Coranus fuscipennis* Reuter, 1881	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Infraorder Pentatomorpha				
	Superfamily Miroidea Hahn, 1833				
	Family V. Miridae Hahn, 1833				
	Subfamily Mirinae Hahn, 1833				
	Tribe Mirini Hahn, 1833				
	Genus 12. *Charagochilus* Fieber, 1858				
13	*** *Charagochilus longicornis* (Reuter, 1885)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Genus 13. *Proboscidocoris* Reuter, 1882				
14	*** *Proboscidocoris capitatus* Distant, 1904	3 exs, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Genus 14. *Polymerus* Hahn, 1831				

15	*** *Polymerus consanguineus* Distant, 1904	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Superfamily Pentatomoidea Leach, 1815				
	Family VI. Pentatomidae Leach, 1815				
	Subfamily Pentatominae Leach, 1815				
	Tribe Antestiini Distant, 1902				
	Genus 15. *Plautia* Stål, 1867				
16	*** *Plautia crossota* (Fabricius, 1787)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Tribe Piezodorini Atkinson, 1888				
	Genus 16. *Piezodorus* Fieber, 1861				
17	*** *Piezodorus hybneri* (Gmelin, 1790)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Tribe Eysarcorini Mulsant and Rey, 1866				
	Genus 17. *Eysarcoris* Hahn, 1834				
18	*** *Eysarcoris montivagus* (Distant, 1902)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Tribe Halyini Amyot and Serville, 1843				
	Genus 18. *Halys* Fabricius, 1803				
19	*Halys serrigera* Westwood, 1837	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Tribe Nezarini Atkinson, 1888				
	Genus 19. *Acrosternum* Fieber, 1860				

20	*** *Acrosternum graminea* (Distant, 1787)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Genus 20. *Nezara* Amyot & Serville, 1843				
21	*** *Nezara viridula* (Linnaeus, 1758)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Family VII. Dinidoridae Stål, 1868				
	Subfamily Dinidorinae Stål, 1867				
	Genus 21. *Coridius* Illiger, 1807				
22	*** *Coridius ianus* (Fabricius, 1775)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Family VIII. Scutelleridae Leach, 1815				
	Genus 22. *Hotea* Amyot & Serville, 1843				
23	*** *Hotea curculionoides* (Herrich-Schäffer, 1835)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Genus 23. *Chrysocoris* Hahn, 1834				
24	*** *Chrysocoris purpureus* (Westwood, 1837)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Superfamily Coreoidea Leach, 1815				
	Family IX. Coreidae Leach, 1815				
	Subfamily Coreinae Leach, 1815				
	Division Gonoceraria Mulsant & Rey, 1870				
	Tribe Gonocerini Brailovsky, 2011				
	Genus 24. *Cletus* Stål, 1860				

25	*** *Cletus punctiger* (Dallas, 1852)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.	–	+	–
	Genus 25. *Cletomorpha* Mayr, 1866				
26	*** *Cletomorpha hastata* (Fabricius, 1787)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Subfamily Hydarinae				
	Genus 26. *Hydarella* Bergroth, 1925				
27	*** *Hydarella orientalis* (Distant, 1902)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Family X. Alydidae Amyot and Serville, 1843				
	Subfamily Micrelyterinae Stål, 1868				
	Genus 27. *Leptocorisa* Latreille, 1829				
28	*** *Leptocorisa acuta* (Thunberg, 1783)	3 exs, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.; 2 exs, Koppa, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°20′01″N, 75.2119E, 8.iii.2024, R. Babu and Party Coll.	+	–	+
	Genus 28. *Riptortus* Stål, 1860				
29	*** *Riptortus linearis* (Fabricius, 1775)	4 exs, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Family XI. Rhopalidae Amyot and Serville, 1843				
	Subfamily Serinathinae Stål, 1873				
	Genus 29. *Leptocoris* Hahn, 1831				

30	*** *Leptocoris augur* (Fabricius, 1781)	2 exs, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.; 1 ex, Koppa, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°20′01″N, 75.2119E, 8.iii.2024, R. Babu and Party Coll.	+	–	+
	Superfamily Lygaeoidea Schilling, 1829				
	Family XII. Rhyparochromidae Amyot and Serville, 1843				
	Subfamily Rhyparochrominae Amyot and Serville, 1843				
	Tribe Rhyparochromini Amyot and Serville, 1843				
	Genus 30. *Elasmolomus* Stål, 1872				
31	*** *Elasmolomus sordidus* (Fabricius, 1787)	2 exs, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.; 1 ex, Koppa, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°20′01″N, 75.2119E, 8.iii.2024, R. Babu and Party Coll.	+	–	+
	Genus 31. *Dieuches* Dohrn, 1860				
32	*** *Dieuches insignis* Distant, 1904	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
	Family XIII. Lygaeidae Schilling, 1829				
	Subfamily Orsilinae Stål, 1872				
	Genus 32. *Nysius* Dallas, 1852				

33	*** *Nysius melanicus* (Distant, 1909)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.	+	–	–
34	*** *Nysius lacustrinus* (Distant, 1909)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.; 1 ex, Koppa, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°20′01″N, 75.2119E, 8.iii.2024, R. Babu and Party Coll.	+	–	+
	Subfamily Lygaeinae Schilling, 1829				
	Genus 33. *Spilostethus* Stål, 1868				
35	*** *Spilostethus hospes* (Fabricius, 1794)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.; 1 ex, Mudigere, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°23′26″N, 75°43′18″E, 3.iii.2024, R. Babu and Party Coll.	+	–	+
	Genus 34. *Graptostethus* Stål, 1868				
36	*** *Graptostethus servus* (Fabricius, 1787)	1 ex, Haleri Falls, Halatri Estate, Private Coffee Plantation, near Boyikeri and Kedakal Gram Panchayat limits, Kodagu, Karnataka, 12.44567N, 75.78936E, 29.x.2023, R. Babu and Party Coll.; 1 ex, Mudigere, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°23′26″N, 75°43′18″E, 3.iii.2024, R. Babu and Party Coll.	+	–	+
	Superfamily Pyrrhocoroidea Amyot and Serville, 1843				
	Family XIV. Largidae Amyot and Serville, 1843				
	Subfamily Physopeltinae Hussey, 1929				
	Tribe Physopeltini Hussey, 1929				
	Genus 35. *Physopelta* Amyot & Serville, 1843				

37	*** *Physopelta schlansbuschi* (Fabricius, 1787)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.; 1 ex, Mudigere, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°23′26″N, 75°43′18″E, 3.iii.2024, R. Babu and Party Coll.	–	+	+
	Subfamily Larginae Amyot and Serville, 1843				
	Tribe Largini Amyot and Serville, 1843				
	Genus 36. *Iphita* Stål, 1870				
38	*** *Iphita limbata* (Stål, 1870)	1 ex, Abbi Falls (Talasi Water Falls), Private Coffee Plantations, Shimoga, Karnataka, 13.70891N, 75.06881E, 3.xi.2023, R. Babu and Party Coll.; 1 ex, Mudigere, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°23′26″N, 75°43′18″E, 3.iii.2024, R. Babu and Party Coll.	–	+	+
	Family XV. Pyrrhocoridae Amyot and Serville, 1843				
	Subfamily Pyrrhocorinae Amyot and Serville, 1843				
	Genus 37. *Dysdercus* Amyot & Serville, 1843				
39	*** *Dysdercus koenigii* (Fabricius, 1775)	1 ex, Mudigere, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°23′26″N, 75°43′18″E, 3.iii.2024, R. Babu and Party Coll.	–	–	+
40	*** *Dysdercus poecilus* (Herrich-Schäffer, 1844)	1 ex, Koppa, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°20′01″N, 75.2119E, 8.iii.2024, R. Babu and Party Coll.	–	–	+

41	*** *Dysdercus similis* Freeman, 1947	1 ex, Koppa, Coffee Plantations, Chikkamagaluru Taluk, Baba Budangiri Hills, Mullayanagiri, Chikkamagaluru, Karnataka, 13°20′01″N, 75.2119E, 8.iii.2024, R. Babu and Party Coll.	–	–	+
	Total		**25**	**14**	**11**

**** present; − absent; *** Species reported first time from the study area.***

IV. DISCUSSIONS

The present study provides important information on the diversity and distribution of Hemiptera associated with coffee plantations in three districts of Karnataka, namely Kodagu, Shivamogga, and Chikkamagaluru. A total of 41 species belonging to 37 genera and 15 families were recorded during the present investigation. The findings demonstrate that coffee plantations support a diverse assemblage of hemipteran insects and function as important agroecosystems for both phytophagous and predatory taxa. The occurrence of representatives of several families indicates that the insect fauna associated with coffee is not restricted to species directly feeding on the crop but also includes species utilizing the associated vegetation and other resources available within plantation habitats.

The relatively high diversity recorded in the surveyed plantations may be attributed to the structural complexity of coffee agroecosystems. Coffee plantations are generally maintained under shade trees and contain a variety of associated plants, including shrubs, herbs, weeds, and ground vegetation. These components provide food, shelter, breeding sites, and suitable microclimatic conditions for different groups of Hemiptera. The presence of shade vegetation and surrounding natural or semi-natural habitats may further facilitate the movement of insects between plantation and forest habitats. Consequently, coffee plantations situated within or adjacent to biologically diverse landscapes may support a richer insect assemblage than simplified agricultural systems.

The recorded hemipteran fauna comprises species with diverse feeding habits. Phytophagous species may utilize coffee plants or associated vegetation as sources of plant sap, whereas predatory species may feed on aphids, scale insects, small caterpillars, and other soft-bodied arthropods. Therefore, the presence of predatory Hemiptera in coffee plantations may have ecological significance in regulating populations of potential insect pests. The coexistence of herbivorous and predatory taxa indicates the presence of complex trophic interactions within the coffee plantation ecosystem.

Considerable variation in species occurrence was observed among the surveyed districts. Such variation may be associated with differences in altitude, climatic conditions, vegetation composition, shade-tree diversity, plantation age, management practices, and the availability of surrounding natural habitats. Kodagu, being one of the major coffee-growing regions of Karnataka and characterized by extensive plantation landscapes interspersed with natural vegetation, provides a particularly heterogeneous environment for insect communities. Shivamogga also contains diverse plantation and forest-associated habitats, while the coffee-growing areas of Chikkamagaluru occur under comparatively different ecological and climatic conditions. These environmental differences may contribute to differences in the composition and distribution of hemipteran species among the three districts.

The documentation of 41 species as new records for different districts of Karnataka is particularly significant from a faunistic perspective. These records expand the known distributional range of the respective taxa within the state and demonstrate that the hemipteran fauna of Karnataka is still incompletely documented. The occurrence of previously unrecorded species at the district level may reflect genuine range extensions, insufficient earlier sampling, or the limited availability of systematic surveys in plantation ecosystems. Therefore, the present findings emphasize the importance of continued taxonomic exploration of agricultural and plantation habitats.

Coffee plantations are often viewed primarily from an economic perspective; however, they can also contribute to the conservation of insect diversity when managed in association with shade trees and surrounding natural vegetation. The maintenance of diverse shade vegetation, flowering plants, ground cover, and semi-natural habitats can provide additional resources for beneficial insects and may enhance overall arthropod diversity. From this perspective, documentation of Hemiptera can provide useful baseline information for evaluating the ecological condition of coffee agroecosystems.

The present study also has implications for agricultural pest management. Some hemipteran species are known to cause damage to crops through sap feeding, while predatory species may act as natural enemies of pest organisms. Correct identification of the species occurring in coffee plantations is therefore an essential prerequisite for determining their ecological and economic significance. A comprehensive knowledge of both pest and beneficial hemipterans can contribute to future investigations on population dynamics, host associations, biological control, and integrated pest management in coffee plantations.

The present findings further highlight the importance of combining taxonomic surveys with ecological observations. Although the current study primarily focuses on species documentation and distribution, future investigations should examine seasonal abundance, host-plant associations, altitudinal distribution, habitat preference, and trophic relationships of the recorded taxa. Long-term monitoring across different coffee-growing regions would also help determine changes in species composition associated with plantation management and environmental factors.

In conclusion, the present study demonstrates that coffee plantations in Kodagu, Shivamogga, and Chikkamagaluru harbour a diverse assemblage of Hemiptera, represented by 41 species, 37 genera, and 15 families. The documentation of numerous new district records substantially improves the knowledge of the hemipteran fauna of Karnataka. The study emphasizes the importance of coffee plantations as habitats for diverse insect communities and provides a baseline for future taxonomic, ecological, biodiversity, and pest-management studies. Continued surveys covering additional coffee-growing districts and different seasons are likely to reveal further species and distributional records from Karnataka.

A total of 41 species belonging to 37 genera and 15 families of Hemiptera were recorded from coffee plantations surveyed in Kodagu, Shivamogga and Chikkamagaluru districts of Karnataka, India. Among the recorded families, Pentatomidae was represented by the highest number of genera and species, with six genera and six species, followed by Cicadellidae, represented by four genera and five species. Lygaeidae was represented by three genera and four species, whereas Aphrophoridae, Miridae and Coreidae were each represented by three genera and three species. Membracidae, Reduviidae, Scutelleridae, Alydidae, Rhyparochromidae and Largidae were represented by two genera and two species each. Dinidoridae, Rhopalidae and Pyrrhocoridae were represented by one genus each, with one, one and three species, respectively.

The district-wise distribution showed differences in the occurrence of hemipteran families among the three coffee-growing regions. Kodagu supported representatives of Cicadellidae, Aphrophoridae, Miridae, Pentatomidae, Coreidae, Alydidae, Rhopalidae, Rhyparochromidae and Lygaeidae. Shivamogga recorded Membracidae, Reduviidae, Pentatomidae, Dinidoridae, Scutelleridae, Coreidae and Largidae. Chikkamagaluru supported Alydidae, Rhopalidae, Rhyparochromidae, Lygaeidae, Largidae and Pyrrhocoridae. The variation in family composition among the three districts may reflect differences in vegetation structure, shade-tree composition, microclimatic conditions and plantation management practices.

TABLE 2
NUMBER OF GENERA AND NUMBER OF SPECIES IN DIFFERENT FAMILIES OF HEMIPTERA IN THE COFFEE PLANTATION AREAS (KODAGU, SHIVAMOGGA, CHIKKAMAGALURU) OF KARNATAKA, INDIA

Sl. No.	Family	No. of Genera	No. of Species	Kodagu	Shivamogga	Chikkamagaluru
1	Cicadellidae	4	5	+	−	−
2	Aphrophoridae	3	3	+	−	−
3	Membracidae	2	2	−	+	−
4	Reduviidae	2	2	−	+	−
5	Miridae	3	3	+	−	−
6	Pentatomidae	6	6	+	+	−
7	Dinidoridae	1	1	−	+	−
8	Scutelleridae	2	2	−	+	−
9	Coreidae	3	3	+	+	−
10	Alydidae	2	2	+	−	+
11	Rhopalidae	1	1	+	−	+
12	Rhyparochromidae	2	2	+	−	+
13	Lygaeidae	3	4	+	−	+
14	Largidae	2	2	−	+	+
15	Pyrrhocoridae	1	3	−	−	+

V. CONCLUSION

The present study demonstrates that coffee plantations in Kodagu, Shivamogga, and Chikkamagaluru districts of Karnataka harbour a diverse assemblage of Hemiptera, represented by 41 species belonging to 37 genera and 15 families. The recorded taxa comprise both phytophagous and predatory forms, reflecting the ecological complexity of the coffee agroecosystem. Among the recorded families, Pentatomidae was represented by the highest number of genera and species (six genera and six species), followed by Cicadellidae (four genera and five species) and Lygaeidae (three genera and four species).

The district-wise distribution revealed considerable variation in the occurrence of hemipteran families among the three coffee-growing regions. Kodagu supported the highest number of species (25), followed by Shivamogga (14) and Chikkamagaluru (11). This variation may reflect differences in altitude, climatic conditions, vegetation structure, shade-tree composition, microclimatic conditions and plantation management practices among the three districts.

The documentation of 41 species as new records for different districts of Karnataka is particularly significant from a faunistic perspective. These records expand the known distributional range of the respective taxa within the state and demonstrate that the hemipteran fauna of Karnataka is still incompletely documented. The occurrence of previously unrecorded species at the district level may reflect genuine range extensions, insufficient earlier sampling, or the limited availability of systematic surveys in plantation ecosystems.

The study emphasizes the importance of coffee plantations as habitats for diverse insect communities and provides a baseline for future taxonomic, ecological, biodiversity, and pest-management studies. The coexistence of herbivorous and predatory taxa indicates the presence of complex trophic interactions within the coffee plantation ecosystem. Some hemipteran species are known to cause damage to crops through sap feeding, while predatory species may act as natural enemies of pest organisms. Correct identification of the species occurring in coffee plantations is therefore an essential prerequisite for determining their ecological and economic significance.

The present findings also highlight the importance of combining taxonomic surveys with ecological observations. Although the current study primarily focuses on species documentation and distribution, future investigations should examine seasonal abundance, host-plant associations, altitudinal distribution, habitat preference, and trophic relationships of the recorded taxa. Long-term monitoring across different coffee-growing regions would also help determine changes in species composition associated with plantation management and environmental factors.

Continued surveys covering additional coffee-growing districts and different seasons are likely to reveal further species and distributional records from Karnataka. Such faunistic inventories are important for understanding insect diversity, species distribution, and ecological interactions within coffee agroecosystems and may also provide useful information for future studies on economically important and beneficial hemipteran species.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Biswas, B., & Mitra, B. (2010). *A checklist of Indian assassin bugs (Insecta: Hemiptera: Reduviidae)*. Zoological Survey of India. zsi.gov.in/checklist/reduviidae.pdf

[2] Chandra, K. (2013). Insect fauna of states and union territories in India. In V. Uniyal & A. Shrivastava (Eds.), *Arthropods and their conservation in India (Insects and Spiders)* (ENVIS Bulletin: Wildlife and Protected Areas, Vol. 14, No. 1, pp. 189-218). Wildlife Institute of India.

[3] Chandra, K., Kushwaha, S., Ghosh, M., Biswas, B., & Bal, A. (2012). Diversity of grassland Auchenorrhyncha (Cicadidae, Cercopidae, Cicadellidae and Fulgoridae) in Madhya Pradesh and Chhattisgarh, India. *International Journal of Plant, Animal and Environmental Sciences*, *2*(4), 257-263.

[4] Chandra, K., Saha, P. C., Biswas, B., Hassan, M. E., Praveen, K., Kushwaha, S., & Mukherjee, P. (2020). An account of heteropteran bugs collected by light trap in and around Dum Dum (Kolkata), West Bengal. *Records of the Zoological Survey of India*, *120*(1), 65-83. https://doi.org/10.26515/rzsi/v120/i1/2020/119563

[5] Das, R., Saha, P. C., Khanra, S., & Dash, S. (2025). New state records of Pyrrhocoridae (Insecta: Hemiptera: Heteroptera) from Dalma Wildlife Sanctuary, Jharkhand, India. *International Journal of Zoology and Applied Biosciences*, *10*(2), 40-45. https://doi.org/10.55126/ijzab.2025.v10.i02.006

[6] Distant, W. L. (1902). *The fauna of British India, including Ceylon and Burma, Rhynchota* (Vol. 1, pp. 1-438). Taylor and Francis.

[7] Distant, W. L. (1904). *The fauna of British India, including Ceylon and Burma, Rhynchota* (Vol. 2, pp. 1-503). Taylor and Francis.

[8] Distant, W. L. (1908). *The fauna of British India, including Ceylon and Burma, Rhynchota* (Vol. 4, pp. 1-501). Taylor and Francis.

[9] Distant, W. L. (1916). *The fauna of British India, including Ceylon and Burma, Rhynchota* (Vol. 4, pp. 1-239). Taylor and Francis.

[10] Distant, W. L. (1918). Rhynchota. Homoptera, Appendix, Heteroptera, Addenda. In A. E. Shipley & G. A. K. Marshall (Eds.), *The fauna of British India including Ceylon and Burma* (Vol. VII, pp. viii+210). Taylor & Francis.

[11] Hassan, M. E., Banerjee, D., & Saha, P. C. (2025). Insecta: Hemiptera: Auchenorrhyncha. *Fauna of Singalila National Park: Conservation Area Series*, *83*, 63-75. Zoological Survey of India.

[12] Hassan, M. E., Banerjee, D., Kushwaha, S., Saha, P. C., & Mukherjee, P. (2025). Insecta: Hemiptera: Heteroptera. *Fauna of Singalila National Park: Conservation Area Series*, *83*, 77-95. Zoological Survey of India.

[13] Henry, T. J. (2009). Biodiversity of Heteroptera. In R. G. Foottit & P. H. Adler (Eds.), *Insect biodiversity: Science and society* (pp. 224-263). Wiley-Blackwell.

[14] Lis, J. A. (1999). Burrower bugs of the Old World – A catalogue (Hemiptera: Heteroptera: Cydnidae). *Genus*, *10*(2), 165-249.

[15] Metcalf, Z. P. (1960). *General catalogue of the Homoptera, Fasc. VII, Cercopidae, part 1, Machaerotidae* (pp. 1-616). Raleigh.

[16] Mitra, B., Roy, S., Biswas, O., Chakraborti, U., & Jehamalar, E. E. (2016). New records of aquatic bugs (Insecta: Hemiptera) from Sunderban Biosphere Reserve, West Bengal, India. *Journal of Entomology and Zoology Studies*, *4*(4), 08-11.

[17] Mukhopadhyay, A. (1988). Taxonomic study of Lygaeidae (Heteroptera: Insecta) from West Bengal (India). *Records of the Zoological Survey of India, Miscellaneous Publication, Occasional Paper No. 107*, 1-72.

[18] Prabhakar, D. (2013). The biogeographical distribution of species of the superfamily Coreoidea (Hemiptera) in India. *Records of the Zoological Survey of India*, *113*(4), 103-128.

[19] Pruthi, H. S. (1936). Studies on Indian Jassidae (Homoptera). Part III. Descriptions of some new genera and species, with first records of some known species from India. *Memoirs of the Indian Museum*, *11*, 101-131.

[20] Saha, P. C., Banerjee, D., Hassan, M. E., Dash, S., Khanra, S., & Das, R. (2025). The terrestrial Hemiptera (Insecta) of the Amrabad Tiger Reserve, Telangana, India. *International Journal of Environmental and Agriculture Research*, *11*, 179-188.

[21] Saha, P. C., Das, R., Khanra, S., & Dash, S. (2026). Biodiversity exploration of terrestrial Hemiptera in Simlipal Tiger Reserve reveals multiple new area records. *Uttar Pradesh Journal of Zoology*, *47*, 41-50.

[22] Saha, P. C., Das, R., Hassan, M. E., Banerjee, D., Dash, S., Khanra, S., Das, R., & Mondal, R. (2026). Faunal diversity of terrestrial Hemiptera in Palkot Wildlife Sanctuary, Jharkhand. *International Journal of Zoology and Applied Biosciences*, *11*, 133-139. https://doi.org/10.55126/ijzab.2026.v11.i01.017

[23] Saha, P. C., Banerjee, D., Hassan, M. E., & Mondal, R. (2026). Faunal composition of Mookambika Wildlife Sanctuary, Karnataka: Insecta: Hemiptera (Terrestrial). *International Journal of Environmental & Agriculture Research (IJOEAR)*, *12*(1), 60-74.

[24] Saha, P. C., Hassan, M. E., Banerjee, D., Dash, S., Dubey, A. K., & Mondal, R. (2025). Insecta: Hemiptera: Auchenorrhyncha. In *Faunal diversity of Eastern Ghats, India* (pp. 666-718). Zoological Survey of India.

[25] Saha, P. C., Dash, S., Hassan, M. E., Mukherjee, P., Khanra, S., Mandal, R., & Pal, A. (2025). Insecta: Hemiptera: Heteroptera. In *Faunal diversity of Eastern Ghats, India* (pp. 719-776). Zoological Survey of India.

[26] Schuh, R. T., & Slater, J. A. (1995). *True bugs of the world (Hemiptera: Heteroptera): Classification and natural history*. Cornell University Press.

[27] Sen, G. C., Biswas, B., & Basu, R. C. (1994). *State fauna series 3: Fauna of West Bengal* (5), 433-447.