IgMin RESEARCH A BioMed & Engineering Journal
Focusing on Biology, Medicine and Engineering disciplines
BIOLOGY GROUP
Taxonomy | Zoology | Biosphere Interactions
ISSN 2995-8067

Article Information

Submitted: March 26, 2024
Approved: April 16, 2024
Published: April 17, 2024

How to cite this article: Ahmed Z, Lalika HA, Khatri I, Kirschenhofer E. Contribution to the Knowledge of Ground Beetles (Coleoptera: Carabidae) from Pakistan. IgMin Res. April 17, 2024; 2(4): 236-244. IgMin ID: igmin171; DOI: 10.61927/igmin171; Available at: igmin.link/p171

Keywords: Coleoptera; Carabidae; Checklist; New records; New distribution; Pakistan

Research Article

Contribution to the Knowledge of Ground Beetles (Coleoptera: Carabidae) from Pakistan

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Abstract

The present study is based on the examination of specimens housed in different museums and collections, including those of Lianghong Bin (China), Bernd Jaeger (Germany), Saeed Azadbakhsh (Iran), Alexander Anichtchenko (Latvia), Martin Hackel (Czech Republic), Ron Felix (Germany), and the first author (ZACP). A preliminary survey was randomly conducted in various areas of Pakistan from 2016 to 2023. A precise investigation revealed 17 subspecies and 36 species within 31 genera, distributed across 12 subfamilies in the family Carabidae. This survey also documented twenty-three new records for the country, expanding our understanding of their distribution. All determinations presented here are confirmed and validated by Löbl & Löbl (2017). Subfamily Harpalinae tribe Anthiini with 02 species *Anthia (Anthia) sexguttata mannerheimii, A. (A.) sexguttata sexguttata* Brachininae with 03 species *Brachinus (Aploa) nobilis Pheropsophus (Stenaptinus) catoirei, P. (S.) lissoderus, P. stenoderus.* Subfamily Broscinae with 01 species *Broscus punctatus.* Subfamily Carabinae with 07 species *Carabus (Imaibius) caschmirensis fortetuberculatus, C. (I.) wittmerorum, Calosoma (Caminara) imbricatum andrewesi, C. (C.) maderae indicum, C. (C.) imbricatum imbricatum, C. Calosoma (Compalita) Olivieri, C. (Calosoma) scabrosum roeschkei.* Subfamily Dryptinae, Dryptini with 01 species *Drypta (Drypta) lineola virgata,* tribe Galeritini with 04 species records *Planetes bimaculatus, Zuphium (Zuphium) olens olens, Galerita indica, Ophionea (Ophionea) indica.* Subfamily Harpalinae with 03 species *Idiomelas fulvipes indus, Metacolopodes buchanani, Microlestes discoidalis,* tribe Chlaeniini with 12 species *Chlaenius (Amblygenius) atripes, C. (A.) bengalensis, C. (A.) cookie, C. (A.) Chlaenius (Amblygenius) quadricolor orientalis, C. (Pachydinodes) hamifer, C. (P.) pictus, C. (P.) posticus, C. pretiosus, C. (Chlaenites) spoliatus spoliatus, Harpaglossus opacus, H. (Cryptophonus) tenebrosus, H. (Pseudophanus) meridianus,* tribe Cyclosomini with 03 species records, *Masoreus (Masoreus) orientalis orientalis, Caphora afghani, Tetragonoderus (Tetragonoderus) lindemannae,* tribe Licinini with 06 species record, *Diplochiela (Diplocheila) laevigata, Glycia spencei, Eucolliuris fuscipennis, Platytarus faminii faminii, Syntomus lateralis lateralis, Trichis maculata.* Subfamily Melaeninae with 03 spies, *Cymbionotum (Cymbionotum) striatum, C. Cymbionotum candidum, C. semelederi,* tribe Panagaeini with 03 species *Microschemus flavopilosus, M. arabicus, Craspedophorus elegans.* Subfamily Harpalinae with 01 species *Sphodrus leucopthalmus.* Subfamily Scaritinae, Scaritini with 02 species *Scarites (Scallophorites) guineensis, S. (Scarites) procerus eurytus,* subfamily Siagoninae with 01 species *Siagona dilutipes* and subfamily Trechinae, Bembidiini with 01 species *Bembidion (Notaphocampa) niloticum niloticum.*

Introduction

The family Carabidae comprises thirty-two subfamilies with approximately 40,000 species, out of which 35,000 species have been described [1,2]. Ground beetles are always an important part of ecosystems as ecological indicators and have various effects on the predation of pests. They exhibit remarkable richness, and therefore, many studies have been conducted on the abundance and ecological aspects of these ground beetles in tropical regions. Andrewes [3,4] listed many species from the Indian subcontinent, including Ceylon and Burma, but none from Pakistan. In India, some inventories were carried out with ecological notes [5,6]. Several taxonomic works have been conducted in the Palaearctic and Oriental regions [7-26]. Jedlicka (1963) made a major contribution to the study of ground beetles from East Asia. Kirschenhofer and coworkers have made various attempts at systematics and synonymies of Chalaenini from the Oriental and African regions [27-34].

The carabid fauna of Pakistan is poorly known. Hashmi and Tashfeen [35] listed 210 species of Carabidae from Pakistan, housed in four museums in Pakistan. However, this list has a 70% taxonomic error rate in systematic position and validity, with specimens retained in the museum. Additionally, the presence of these species in the museums, particularly those housed in the Karachi National Museum, is uncertain, as the absence of a curator casts doubt on their status. Notably, Pheropsophus sabrinus and Ph. sobrinus were listed separately, while in Ullah, et al. [36], Ph. hilaris sobrinus is considered a valid subspecies. Recent studies have highlighted the biodiversity abundance, richness, and

ISSN 2995-8067 DOI: 10.61927/igmin171

evenness of some species in Azad Kashmir [37,38]. Ahmed and Kabir [37] described Itamus castaneus as a new record for the country. Jaeger & Ahmed [39] conducted an inventory of the tribe Stenolophina from Pakistan, listing species with their current status and validity. Azadbakhsh and Rafi [41] listed 38 species of ground beetles from materials deposited in the National Insect Museum, Pakistan. Ullah, et al. [36] reported ten species of the tribe Brachinini from northern Pakistan, with four species as new records for the country. They also proposed a new combination for one species. Ullah, et al. [42] studied Chlaeniini of Pakistan, listing 32 species, with 16 species reported for the first time from Pakistan.

All species were collected from various regions of Pakistan, especially the upper region of Sindh Province and the Thar Desert. These areas exhibit great diversity and abundance of ground beetles, particularly those attracted to light after rainfall. The upper part of Sindh Province features a vast expanse of agricultural fields, including maize, banana, and sugarcane, along with highways, resulting in a significant number of insects being obtained. Many more species of ground beetles are awaiting exploration in these areas.

Materials

The study materials were collected annually from various regions of Pakistan by different collectors, including the first author. The specimens were deposited in the Zoological Museum at Fuuast, Karachi, Pakistan, and the first author's collection (ZACP). Identifications were carried out by various experts specializing in different groups of Carabidae, as mentioned in the acknowledgements. The present study is based on the examination of specimens housed in different museums and collections, including those of Lianghong Bin (China), Bernd Jaeger (Germany), Saeed Azadbakhsh (Iran), Alexander Anichtchenko (Latvia), Martin Hackel (Czech Republic), Ron Felix (Germany), and the first author (ZACP). All determinations were confirmed and validated by Löbl & Löbl [43].

Results and discussion

The study comprises 17 subspecies, and 36 species with 23 new records indicating that precisely searching all habitats can increase the biodiversity fauna of the country (Figure 1, Table 1).

Family Carabidae Latreille 1802

Subfamily Harpalinae Bonelli, 1810

Anthiini Bonelli, 1813

1. *Anthia (Anthia) sexguttata mannerheimii* Chaudoir, 1842 New record

Table 1: Distributional map of Carabidae of Pakistan.

Subfamily	Tribe	Species	Distribution in Pakistan					
			AK	BA	GB	KPK	PB	SD
Harpalinae	Anthiini	*Anthia (Anthia) sexguttata mannerheimii*				*	*	
		Anthia (Anthia) sexguttata sexguttata						*
Brachininae		*Brachinus (Aploa) nobilis*	*					
		Pheropsophus (Stenaptinus) catoirei			*			
		Pheropsophus (Stenaptinus) lissoderus	*					
		Pheropsophus stenoderus				*		
Broscinae		*Broscus punctatus*		*				
Carabinae		*Carabus (Imaibius) caschmirensis fortetuberculatus*	*					
		Carabus (Imaibius) wittmerorum				*		
		Calosoma (Caminara) imbricatum andrewesi						*
		Calosoma maderae indicum		*				
		Calosoma (Caminara) imbricatum imbricatum						*
		Calosoma (Compalita) Olivieri				*		
		Calosoma (Calosoma) scabrosum roeschkei		*				
Dryptinae	Dryptini	*Drypta (Drypta) lineola virgata*						*
	Galeritini	*Planetes bimaculatus*						*
		Zuphium (Zuphium) olens olens						*
		Galerita indica				*		
		Ophionea (Ophionea) indica						*
Harpalinae		*Idiomelas fulvipes indus*				*		
		Metacolopodes buchanani						*
		Microlestes discoidalis						*
	Chlaeniini	*Chlaenius (Amblygenius) atripes*				*		
		Chlaenius (Amblygenius) bengalensis						*
		Chlaenius cookie						*
		Chlaenius (Amblygenius) quadricolor orientalis						*
		Chalenius (Pachydinodes) hamifer						*
		Chlaenius (Pachydinodes) pictus				*		
		Chlaenius (Pachydinodes) posticus				*		
		Chlaenius pretiosus						*
		Chlaenius (Chlaenites) spoliatus spoliatus		*				
		Harpaglossus opacus						*
		Harpalus (Cryptophonus) tenebrosus						*
		Harpalus (Pseudophanus) meridianus						*
	Cyclosomini	*Masoreus (Masoreus) orientalis orientalis*						*
		Caphora afghana						*
		Tetragonoderus (Tetragonoderus) lindemannae						*
	Licinini	*Diplochiela (Diplocheila) laevigata*				*		
		Glycia spencei						*
		Eucolliuris fuscipennis						*
		Platytarus faminii faminii						*
		Syntomus lateralis lateralis						*
		Trichis maculata						*
Melaeninae		*Cymbionotum (Cymbionotum) striatum*						*
		Cymbionotum candidum						*
		Cymbionotum semelederi						*
	Panagaeini	*Microschemus flavopilosus*						*
		Craspedophorus elegans				*		
		Microcosmodes arabicus						*
Harpalinae		*Sphodrus leucopthalmus*		*				
Scaritinae	Scaritini	*Scarites (Scallophorites) guineensis*						*
		Scarites (Scarites) procerus eurytus						*
Siagoninae		*Siagona dilutipes*						*
Trechinae	Bembidiini	*Bembidion (Notaphocampa) niloticum niloticum*						*

ISSN 2995-8067 DOI: 10.61927/igmin171

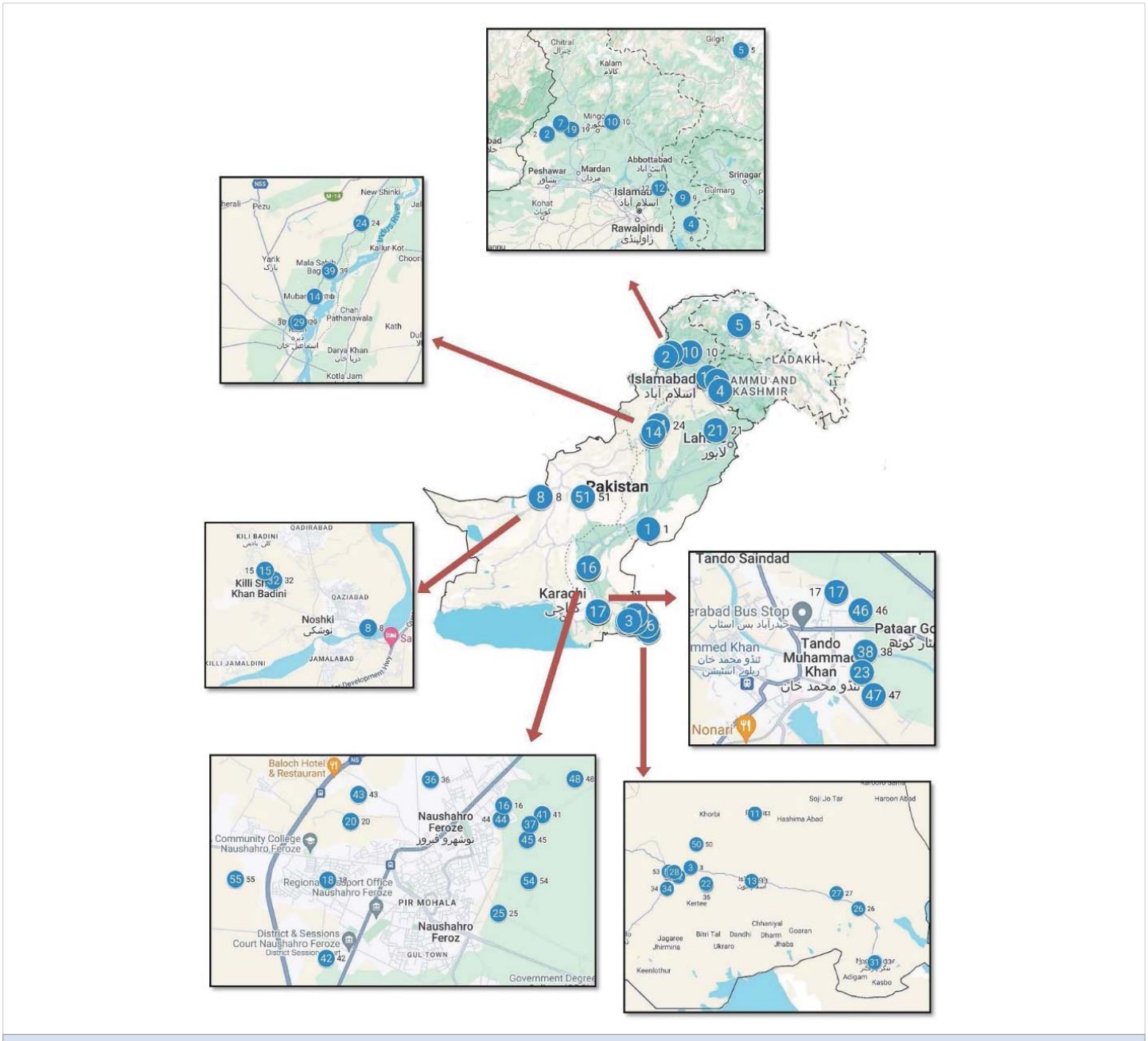

Figure 1: Distributional map of Carabidae of Pakistan. (Numbers indicate species; refer to the name of each species in the Results section corresponding to the assigned number).

Distribution in Pakistan. Pakistan, Punjab Province, Rahim Yar Khan, Cholistan desert (coordinates: 28.336374, 70.737431), 13.vii.2011, leg; Zubair;

2. Pakistan, Village Khar, Bajaur Agency (coordinates: 34.725434, 71.521869). 22.viii.2018, leg; Musa.

Remarks: This subspecies was reported from Iran and Turkmenistan [43]. Hackel and Farkac [24] listed this subspecies from Iran, Kazakhstan, Turkmenistan and Uzbekistan.

3. *Anthia (Anthia) sexguttata sexguttata* (Fabricius, 1775)

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Mithrio Bhatti (coordinates: 24.763454, 69.892772).

Remarks: This subspecies was reported from Asia including Pakistan [24]. Hashmi and Tashfeen [35] listed this species from Pakistan.

Subfamily Brachininae Bonelli, 1810

4. *Brachinus (Aploa) nobilis* Dejean, 1831 New record

Distribution in Pakistan. Pakistan, Azad Kashmir, Kotli, Village Roli (coordinates: 33.505196, 73.906823).

Remarks: The species are distributed in North Africa and Asia. In Asia, the species are distributed in Iran, Iraq, Israel, Saudi Arabia, Syria, Turkey, and Yemen [43].

5. *Pheropsophus (Stenaptinus) catoirei* Dejean 1825

Distribution in Pakistan. Pakistan, Gilgit-Baltistan (coordinates: 35.849087, 74.734673).

Remarks: Löbl & Löbl [43] listed from Pakistan.

6. *Pheropsophus (Stenaptinus) lissoderus* Chaudoir, 1850

Distribution in Pakistan. Pakistan, Kotli, Azad Kashmir, Damol (coordinates: 33.492883, 73.917205).

Remarks: This species was reported from Pakistan by Löbl & Löbl [43].

7. *Pheropsophus stenoderus* Chaudoir, 1850 New record

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Lower Dir (coordinates: 34.872384, 71.747955).

Remarks: This species is not mentioned in the Catalogue of Löbl & Löbl [43].

Subfamily Broscinae Hope, 1838

8. *Broscus punctatus* Dejean, 1828 New record

Distribution in Pakistan. Pakistan, Balochistan Province, Nushki, Balochistan (coordinates: 29.550023, 66.033995).

Remarks: This species was reported from North Africa and Asia by Löbl & Löbl [43].

Subfamily Carabinae Latreille, 1802

9. *Carabus (Imaibius) caschmirensis fortetuberculatus* Heinz, 1983

Distribution in Pakistan. Pakistan, Azad Kashmir, Rawlakot (coordinates: 33.858504, 73.770353).

Remarks: This species was reported from Pakistan by Löbl & Löbl [43]. It was collected from Rawalakot, Azad Kashmir in dead form. Panin Ruslan also indicated *C. I. barysomus* and *caschmirensis* but in the catalogue, later species is more reliable as tubercles are found on the body.

10. *Carabus (Imaibius) wittmerorum* Heinertz 1978

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Shangla (coordinates: 34.890306, 72.601120).

Remarks: Löbl & Löbl [43] reported this subspecies from Pakistan.

11. *Calosoma (Caminara) imbricatum andrewesi*, Breuning, 1928

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Wejhiar (coordinates: 24.990073, 70.193348).

Remarks: Löbl & Löbl [43] did not report this subspecies in the catalogue.

12. *Calosoma maderae indicum* Hope, 1830

Distribution in Pakistan. Pakistan, Balochistan Province, Nushki (coordinates: 33.994992, 73.383779).

Remarks: This species was reported from Pakistan [43]. Hashmi and Tashfeen [35] listed *Calosoma indicum* and *Calosoma maderae* separately.

13. *Calosoma (Caminara) imbricatum imbricatum* Klug, 1832 New record

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar (coordinates: 24.707351, 70.177582).

Remarks: This subspecies was reported from Saudi Arabia and Yemen by Löbl & Löbl [43].

14. *Calosoma (Compalita) Olivieri* Dejean 1831

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Dera Ismail Khan, Dahoter Adda (coordinates: 31.989014, 70.972574).

Remarks: This species was reported from Pakistan [43].

15. *Calosoma (Calosoma) scabrosum roeschkei* Breuning, 1927 New record

Distribution in Pakistan. Pakistan, Balochistan Province, Nushki (coordinates: 29.573011, 65.986125).

Remarks: This subspecies was formerly named as *C. orientale* Hope, 1831 but Hackel, et al. [26] synonymized some species of *Calosoma* and the species *C. orientale* has been changed. The Catalogue of Lobl & Lobl [43] did not report this subspecies.

Subfamily Dryptinae Bonelli, 1810

Dryptini Bonelli, 1810

16. *Drypta (Drypta) lineola virgata* Chaudoir,1850

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.848656, 68.132323).

Remarks: This subspecies was reported from Pakistan by Löbl & Löbl [43]. Hashmi and Tashfeen [35] listed this species as *D. lineola* from Pakistan.

Galeritini Le Conte 1853

17. *Planetes bimaculatus* W.S. MacLeay, 1825 New record

Distribution in Pakistan. Pakistan, Sindh Province, Tando M. Khan (coordinates: 25.136728, 68.545308).

Remarks: The species distributed in Arunachal Pradesh [43].

18. *Zuphium (Zuphium) olens olens* P. Rossi 1790

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.840658, 68.110892).

Remarks: This species was reported from Europe, North Africa and Asia including Pakistan [43]. Hashmi and Tashfeen [35] listed this species as *Z. olens* from Pakistan.

19. *Galerita indica* Chaudoir, 1861 New record

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Lower Dir, Bandagai (coordinates: 34.787449, 71.923909).

Remarks: This species is reported from Asia as Hindustan [43]. Borislav Gueorgulev suggested this species should be *G. indica* or probably *G. ruficeps* (personnel communication). Ron Felix suggested as *G. orientalis* (personal communication).

20. *Ophionea (Ophionea) indica* New record

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.846960, 68.113693).

Remarks: Hashmi & Tashfeen [35] listed *Cosnoidea indica*, but this species was reported from Asia except Pakistan [43].

Subfamily Harpalinae Bonelli, 1810

21. *Idiomelas fulvipes indus* Kataev, 1997 New record

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Hafizabad (coordinates: 32.065141, 73.704510).

Remarks: This species was reported from Nepal only [43].

22. *Metacolopodes buchanani* (Hope, 1831)

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Mahalore Khawria (coordinates: 24.696048, 69.965287).

Remarks: This species was reported from Pakistan [43]. Hashmi and Tashfeen [35] listed this species as *Colpodes buchanani* from Pakistan.

23. *Microlestes discoidalis* Fairmaire, 1892 New record

Distribution in Pakistan. Pakistan, Sindh Province, Village Tando M. Khan (coordinates: 25.124363, 68.549682).

Remarks: Löbl & Löbl [43] reported from Iran, Afghanistan, Oman, Turkemanistan, Yemen.

Chlaeniini Brulle, 1834

24. *Chlaenius (Amblygenius) atripes* Chaudoir 1876

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Dera Ismail Khan, Bilot Sharif (coordinates: 32.243162, 71.164421).

Remarks: This species is not included in the Catalogue of Löbl & Löbl [43]. Ullah, et al. [42] reported from Pakistan as the new record.

25. *Chlaenius (Amblygenius) bengalensis* Chaudoir New record

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.837090, 68.131691).

Remarks: The species listed are from Asia [43]. Erich Kirschenhofer identified this species (personnel communication).

26. *Chlaenius cookie* Andrewes, 1933 New record

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Dane Jo Goth (coordinates: 24.591358, 70.676742).

Remarks: This species is not listed in the catalogue by Löbl & Löbl [43], Alexander Anichtchenko identified this species, also one specimen of this species is retained in Saeed Azad Bakhsh, Iran.

27. *Chlaenius (Amblygenius) quadricolor orientalis* (Dejean 1826)

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Pilu (coordinates: 24.655688, 70.574333).

Remarks: This species is reported from Pakistan [43]. Hashmi and Tashfeen [35] listed the species *Chlaenius quadricolor* from Pakistan.

28. *Chalenius (Pachydinodes) hamifer* Chaudoir, 1856

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Mithi (coordinates: 24.745248, 69.816273).

Remarks: This species was reported from Pakistan [43].

29. *Chlaenius (Pachydinodes) pictus* Chaudoir 1856

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Dera Ismail Khan, Dayal Rd (coordinates: 31.900197, 70.907896).

Remarks: This species was reported from Asia [43].

30. *Chlaenius (Pachydinodes) posticus* (Fabricius 1798)

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Dera Ismail Khan (coordinates: 31.899554, 70.894592).

Remarks: This species was reported from Asia including Pakistan [43].

31. *Chlaenius pretiosus* Chaudoir, 1856

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Nagarparkar (coordinates: 24.365644, 70.751907).

Remarks: This species was reported from Pakistan [35] but not listed in the catalogue by Löbl & Löbl [43].

32. *Chlaenius (Chlaenites) spoliatus spoliatus* P. Rossi, 1792 New record

Distribution in Pakistan. Pakistan, Balochistan Province, Nushki (coordinates: 29.569178, 65.989942).

Remarks: The subspecies distributed in Europe and Asia including Afghanistan, China, Cyprus, East Siberia, Far East, Iran, Iraq, Israel, Kyrgyzstan, Kazakhstan, Lebonan, Mongolia, Syria, Tadzhikistan, Turkmenistan, Turkey, Uzbekistan and West Siberia [43].

33. *Harpaglossus opacus* (Chaudoir, 1856)

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Nangarparkar (coordinates: 24.368486, 70.755206).

Remarks: Löbl & Löbl [43] did not list this species. Ullah, et al. [42] reported this species from Pakistan.

34. *Harpalus (Cryptophonus) tenebrosus* Dejean, 1829

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Mithi (coordinates: 24.675028, 69.782552).

Remarks: This species is reported from Pakistan [43].

35. *Harpalus (Pseudophanus) meridianus* Andrewes, 1923

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Mithrio (coordinates: 24.690873, 69.967640).

Remarks: This species was reported from Pakistan [43].

Cyclosomini Laporte, 1834

36. *Masoreus (Masoreus) orientalis orientalis* Dejean, 1828

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.851427, 68.123419).

Remarks: The species distributed in North Africa and Asia including Iran, India, Iraq, Saudi Arabia, Turkmenistan and Yemen [43]. Hashmi and Tashfeen [35] listed this species as *Masoreus orientalis* from Pakistan.

37. *Caphora afghana* Jedlička, 1956 New record

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.846634, 68.135523).

Remarks: This species was reported from Afghanistan only [43].

38. *Tetragonoderus (Tetragonoderus) lindemannae* Jedlička, 1963a [44]

Distribution in Pakistan. Pakistan, Sindh Province, Tando M. Khan (coordinates: 25.127535, 68.550250).

Remarks: This species was reported from Pakistan [43]. However, the patches on apices of elytra show variable marks in some species.

Licinini Bonelli, 1810

39. *Diplochiela (Diplocheila) laevigata* Bates, 1892 New record

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Dera Ismail Khan, Hafiz Abad, Khaki (coordinates: 32.077828, 71.034322).

Remarks: This species was reported from Asia [43].

Lebiini Bonelli, 1810

40. *Glycia spencei* (Gistel, 1838)

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Mithi (coordinates: 24.742221, 69.808648).

Remarks: This species was reported from Pakistan [43].

41. *Eucolliuris fuscipennis* Chaudoir, 1850 New record

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.847685, 68.137008).

Remarks: The species distributed in China, Japan and Taiwan [43]

42. *Platytarus faminii faminii* (Dejean, 1826) New record

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 6.832258, 68.110708).

Remarks: The subspecies distributed in Europe, North Africa and Asia including Cyprus, Iraq, Israel, Kyrgyzstan, Kazakhstan, Saudi Arabia, Syria, Turkmenistan, Turkey and Uzbekistan [43].

43. *Syntomus lateralis lateralis* Motschulsky, 1855 New record

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.849837, 68.114656).

Remarks: This species was reported from the Nearctic and Asia [43].

44. *Trichis maculata* Klug, 1832

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.847167, 68.131989).

Remarks: This species was reported from Pakistan [43].

Subfamily Melaeninae Csiki, 1933

45. *Cymbionotum (Cymbionotum) striatum* Reitter, 1894

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.844978, 68.135186).

Remarks: The locality of this species is not mentioned in the Catalogue by Löbl & Löbl [43].

46. *Cymbionotum candidum* Andrewes, 1935 [4]

Distribution in Pakistan. Pakistan, Sindh Province, Tando M. Khan (coordinates: 25.133894, 68.549435).

Remarks: This species was reported from Pakistan [43].

47. *Cymbionotum semelederi* Chaudoir, 1861 New record

Distribution in Pakistan. Pakistan, Sindh Province, Tando M. Khan (coordinates: 25.120837, 68.551680).

Remarks: This species was reported from Europe, North Africa and Asia [43].

Tribe Panagaeini Bonelli, 1810

48. *Microschemus flavopilosus* (Laferté-Sénectere, 1851)

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.851508, 68.141002).

Remarks: The species is reported from Asia, but there is a question mark ahead of Pakistan in the catalogue prepared by Hackel and Kirschenhofer, a part of Panageini. When I sent this material to Hackel in 2014, he then inserted it. However, Hackel and Azadbakhsh [26] argued that this species is still unknown in Pakistan.

49. *Craspedophorus elegans* (Dejean, 1826)

Distribution in Pakistan. Pakistan, Khyber Pakhtunkhwa, Lower Dir, Village Munda (coordinates: 34.874818, 71.749574).

Remarks: This species is known from Pakistan and Nepal [43].

50. *Microcosmodes arabicus* Hackel & Azadbakhsh, 2016 New record

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Mithi (coordinates: .861757, 69.919740).

Remarks: This species is described as new from Iran by Hackel and Azadbakhsh, [26]. The western Palaearctic region encompasses desert regions of India, Iran and Africa, therefore transitional species could be possible.

Subfamily Harpalinae Bonelli, 1810

51. *Sphodrus leucopthalmus* Linne, 1758 New record

Distribution in Pakistan. Pakistan, Balochistan Province, Sibi, Mir Chakir Road (coordinates: 29.551231, 67.897450).

Remarks: The species are distributed from the West Palaearctic region to Europe [43].

Subfamily Scaritinae Bonelli, 1810

Scaritini Bonelli, 1810

52. *Scarites (Scallophorites) guineensis* Dejean, 1831 New record

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar, Islamkot Rd (coordinates: 24.726309, 69.835020).

Remarks: This species was reported from Asia [43].

53. *Scarites (Scarites) procerus eurytus* Fischer von Waldheim, 1828

Distribution in Pakistan. Pakistan, Sindh Province, Tharparkar (coordinates: 24.746728, 69.789779).

Remarks: The species distributed in Europe, North Africa and Asia including Pakistan [43].

Subfamily Siagoninae Bonelli, 1813

54. *Siagona dilutipes* Chaudoir, 1850

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.840574, 68.135375).

Remarks: This species is distributed in Himachal Pradesh and Pakistan [43].

Subfamily Trechinae Bonelli, 1810

Bembidiini Stephens, 1827

55. *Bembidion (Notaphocampa) niloticum niloticum* Dejean, 1831

Distribution in Pakistan. Pakistan, Sindh Province, Noshehroferoze (coordinates: 26.840745, 68.099704).

Remarks: This species is distributed in Asia Minor. In the last catalogue by Lorenz, *B. niloticum* and *B. batesi* are considered different species, with *batesi* being synonymized with *B. opulentum* (Personal communication with Alexander Anischenko). This species is distributed in Europe, North

Africa, and Asia [43-46]. Hashmi and Tashfeen [35] listed this species as *B. niloticum* from Pakistan.

Conclusion

The ecozone of Pakistan encompasses all biodiversity hotspots, with the majority of areas cultivating a variety of cereals, crops, and fruits on both large and small scales. While the lower part of Sindh Province, along the sea belt, may not have as much agricultural importance, the upper Sindh Province is known for its high yields of major crops. The western part of Sindh Province exhibits a great diversity of insects, especially in the transitional belt between India and Pakistan, which is a vast desert with a complex and specific fauna. A similar situation is observed in Nushki, Balochistan, which is surrounded by huge sandy mounds like a red desert and mountains connected to the borders of Afghanistan. The western Palaearctic zone extends and overlaps on several points from Afghanistan and Iran, bounded by geographical barriers restricting species within certain limits.

As for the species and numbers known from Pakistan, the present work comprises a large number of taxa identified by world authorities in their expertise, with many species retained in their hands or museums. Most species are still awaiting determination by experts, which could increase the number of species in the fauna of Carabidae of Pakistan in the future.

Acknowledgement

We are indebted to Lianghong Bin (China), Alexander Anisctchenko (Russia), Saeed Azadbakhsh (Iran), Borislav Gu, Riccardo Sciaky, Ron Felix, Martin Hackel, Erich Krischenhofer, and Panin Ruslan for their valuable comments and assistance in species determination.

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How to cite this article: Ahmed Z, Lalika HA, Khatri I, Kirschenhofer E. Contribution to the Knowledge of Ground Beetles (Coleoptera: Carabidae) from Pakistan. IgMin Res. April 17, 2024; 2(4): 236-244. IgMin ID: igmin171; DOI: 10.61927/igmin171; Available at: igmin.link/p171

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