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**Research Article****Taxonomic study on the subfamily Oedipodinae (Orthoptera: Acrididae) from district Skardu, Gilgit-Baltistan, Pakistan****Naeem Ashraf¹, Mishkat Ullah², Muhammad Abbas², Waheed Ali Panhwar³, Muhammad Asghar Hassan¹, Abdul Matin¹**¹Department of Zoology, University of Baltistan, Skardu, Gilgit-Baltistan-16100, Pakistan.²Zoological Sciences Division, Pakistan Museum of Natural History, Garden Avenue, Islamabad-44000, Pakistan.³Department of Zoology, University of Sindh, Jamshoro, Pakistan.**ABSTRACT**

Oedipodinae is the most species-rich and globally distributed subfamily of grasshoppers in the family Acrididae, with 63 known species in Pakistan. Members of this subfamily are of significant economic importance, as they are pests of both pasture lands and cultivated crops. In this study, we report 10 species including five subspecies under eight genera of the subfamily Oedipodinae, including *Locusta* Linnaeus, 1758, *Pternoscirta* Saussure, 1884, *Gastrimargus* Saussure, 1884, *Scintharista* Saussure, 1884, *Heteropternis* Stål, 1873, *Sphingonotus* Fieber, 1852, *Helioscirtus* Saussure, 1884, and *Acrotylus* Fieber, 1853, from district Skardu, Gilgit-Baltistan, Pakistan. The digital photographs, diagnosis, and regional distribution data of these known species from Pakistan are presented.

Keywords: Band-winged grasshoppers; checklist; migratory locust; Northern areas.**INTRODUCTION**

The order Orthoptera includes grasshoppers, locusts, mole crickets, true crickets, katydids, and bush crickets (Panhwar, 2018; Baloch et al., 2023). The family Acrididae belongs to the superfamily Acridoidea with 28 subfamilies, 1,412 genera, and more than 6,832 valid described species (Cigliano et al. 2025). Among these, 14 subfamilies, 66 genera and 169 species have been reported from Pakistan (Sultana & Song, 2024). A recent study showed the presence of 170 species of Acrididae pertaining to 67 genera from Pakistan, adding the genus *Pyrgodera* Fischer von Waldheim, 1846 with a single species, *Pyrgodera armata* (Fischer von Waldheim, 1820) of the subfamily Oedipodinae (Panhwar et al., 2025). The subfamily Oedipodinae includes 138 genera and 806 valid described species globally (Cigliano et al., 2025), with 20 genera and 63 species reported from Pakistan (Panhwar et al., 2025). Members of this subfamily are widely distributed throughout Pakistan, with the majority occurring in the southwestern regions of the country. Among these, 37 species have been reported from the Punjab province, with 35, 28, 26, 14, and 13 from Balochistan, Sindh, Khyber Pakhtunkhwa, Gilgit-Baltistan, and Azad Jammu & Kashmir, respectively (Sultana & Song, 2024; Panhwar et al., 2025). Oedipodinae are of greater economic importance, as they usually have a wide range of herbivores; their diet normally contains some grasses, while many of them actual or potential pests of cereal crops.

They are distributed worldwide with some species like *Locusta migratoria* and members of *Gastrimargus* are considered as devastating and major pest of crops (COPR, 1982; Vickery & Kevan, 1983; Samways & Lockwood, 1998). These two genera, *Locusta* and *Gastrimargus* have also been reported from district Skardu,

**Correspondence**

Abdul Matin

abdul.matin@uobs.edu.pk

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Gilgit-Baltistan, but have not been reported to cause damage yet (Mahmood et al., 2004). The first taxonomic study on the family Acrididae from the Baltistan region by Mahmood et al. (2004) reported seven species among the three subfamilies: Oedipodinae with five species, Calliptaminae with single species, and Acridinae with single species respectively. Thereafter, no further studies available on the taxonomy of Acrididae from Gilgit-Baltistan. In comparison with 14 known subfamilies reported from Pakistan, only seven subfamilies with 29 species have been reported from Gilgit-Baltistan: Oedipodinae with 14 species, Acridinae with three species, Calliptaminae with three species, Cyrtacanthacridinae with three species, Hemiacridinae with three species, Catantopinae with two species, and Gomphocerinae with single species. Among the subfamilies, Oedipodinae with 11 species are known to occur in Gilgit-Baltistan (Wagan & Sultana, 2013). Prior to this study, Mahmood et al. (2004) reported four species from district Skardu. Herein, we reported 10 species under eight genera from district Skardu. Among these, three genera and five species are new record for Baltistan region.

MATERIALS AND METHODS

Adult grasshoppers were collected from various localities at different regions in District Skardu, Gilgit-Baltistan, Pakistan. Skardu is situated at a latitude of 35°17'60.00"N and a longitude of 75°36'59.99"E, with an average elevation of 2,225 meters (7,300 feet) above sea level (GOGB, 2017). Specimens were collected using a common insect hand net and by hand picking from open dry lands, croplands, pastures, and forest areas from March 2023 to March 2024. Identification of specimens was carried out using the following available literature: Kirby (1910, 1914), Bei-Bienko & Mischchenko (1951), Mahmood & Yousuf (1999), Mahmood et al. (2004), Sultana & Wagan (2015), Tamkeen (2015) and Orthoptera Species file Online (<https://orthoptera.speciesfile.org/>) (Cigliano et al., 2025). Specimens were further confirmed through morphological comparison with identified reference specimens housed in the Insect Museum of the Pakistan Museum of Natural History (PMNH), Islamabad, Pakistan. The identified specimens have been deposited in the department of Zoology, University of Baltistan, Skardu, Gilgit-Baltistan, Pakistan.

RESULTS

A total of 10 species including five subspecies under eight genera of the subfamily Oedipodinae were collected and identified from District Skardu, Gilgit-Baltistan, Pakistan.

Taxonomy

Family Acrididae MacLeay, 1821

Subfamily Oedipodinae Walker, 1871

List of known Oedipodinae species and subspecies in Gilgit-Baltistan

- 1) *Acrotylus humbertianus* Saussure, 1884
- 2) *Gastrimargus africanus africanus* (Saussure, 1888)
- 3) *Gastrimargus marmoratus* (Thunberg, 1815)
- 4) *Helioscirtus moseri moseri* Saussure, 1884
- 5) *Heteropternis respondens* (Walker, 1859)
- 6) *Locusta migratoria* (Linnaeus, 1758)
- 7) *Locusta migratoria migratoria* (Linnaeus, 1758)
- 8) *Scintharista notabilis pallipes* Uvarov, 1941
- 9) *Pternoscirta cinctifemur* (Walker, 1859)
- 10) *Sphingonotus (Sphingonotus) balteatus himalayanus*, Uvarov, 1924

Genus *Locusta* Linnaeus, 1758

Locusta migratoria (Linnaeus, 1758) Figure 1A-D

Diagnosis

Head with median longitudinal keel on vertex, vertex usually convex, angular transverse keel separates fastigium and frontal ridge; pronotum broader at metazoan and shorter, having distinctive structures at middle, rounded at the fore margin and hind angles, profile concave or straight of low median keel; elytra longer; hind femur shorter.

Material examined

Gilgit-Baltistan: Skardu, Chunda, 4♂, 2♀, 25.ix.2023, Tandal, 4♂, 25. viii.2023, Hoto, 4♂, 25.viii.2023, leg. N. Ashraf.

Distribution in Pakistan

Azad Kashmir, Gilgit-Baltistan, Balochistan, Khyber Pakhtunkhwa, Punjab, Sindh (Sultana & Wagan, 2015; Sultana &

Song, 2024).

***Locusta migratoria migratoria* (Linnaeus, 1758) Figure 2A-D**

Diagnosis

Body brown or radish brown, behind the eye runs a brown stripe, these stripes are narrower than in *L. migratoria* pronotum, which is less constricted than in *L. migratoria*. Tegmina subhyaline, brown and reticulate, wings hyaline greenish or yellowish in color. Hind femora greenish brown, thicker and less taper than *L. migratoria*, black bands on the inside, upper surface serrated, hind tibia yellowish red with small fine spines.

Material examined

Gilgit-Baltistan: Skardu, Chunda, 3♂, 25.ix.2023, Tandal, 5♂, 25. viii.2023, Gamba Skardu, 2♀, 25.viii.2023, leg. N. Ashraf.

Distribution in Pakistan

Azad Kashmir, Balochistan, Khyber Pakhtunkhwa, Punjab, Sindh (Sultana & Wagan, 2015; Tamkeen et al., 2015; Panhwar et al., 2024; Sultana & Song, 2024). New record for Gilgit-Baltistan.

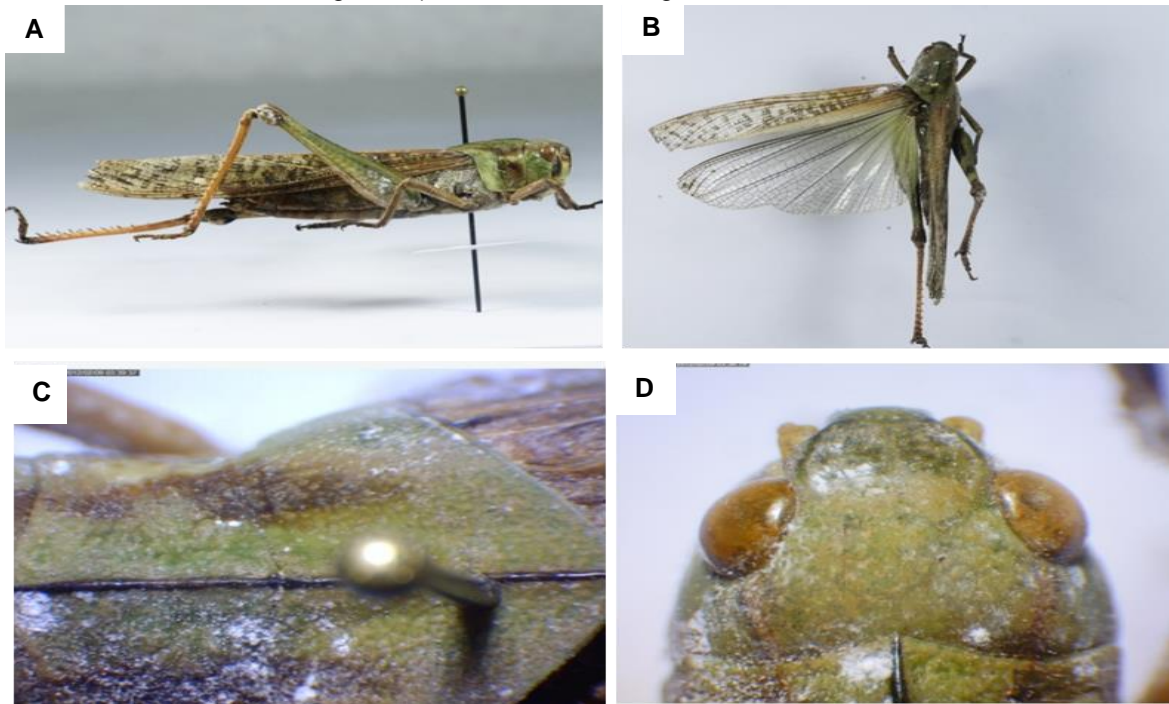


Figure 1. *Locusta migratoria*. A. Lateral view; B. Dorsal view; C. Pronotum, dorsal view; D. Head, dorsal view.

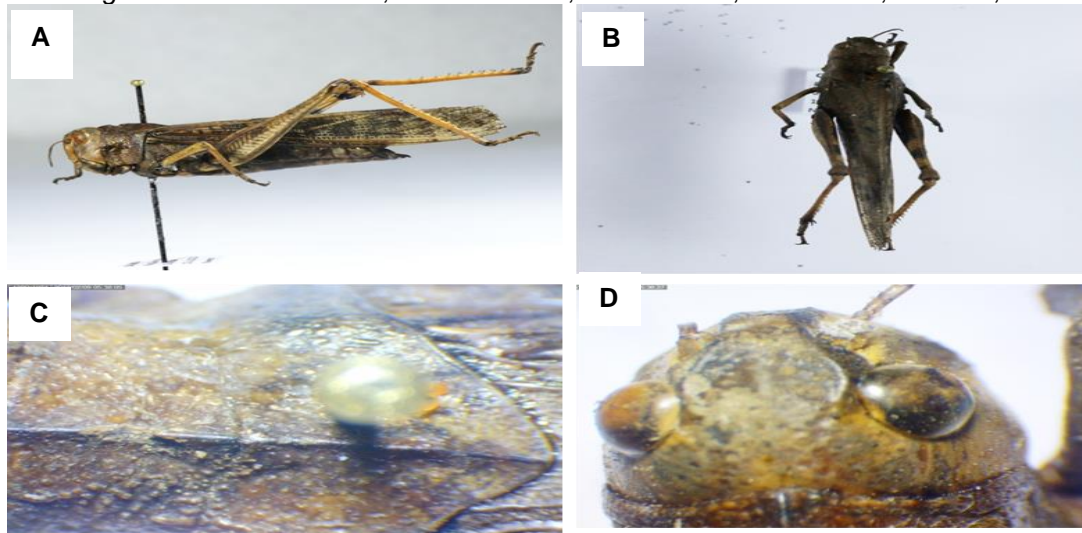


Figure 2. *Locusta migratoria migratoria*. A. Lateral view; B. Dorsal view; C. Pronotum, dorsal view; D. Head, dorsal view.

Genus *Pternoscirta* Saussure, 1884***Pternoscirta cinctifemur* Walker, 1859) Figure 3A-C****Diagnosis**

Medium sized species with hairs on body and legs; head slightly shorter than pronotum; vertex wide, flat and short; pronotum with small tubercles, slightly rough, median carina raised moderately, distinct; legs banded, tympanum not covered; hind tibia having spurs on inner side; forewings testaceous, black; hind wings grey.

Material examined

Gilgit-Baltistan: Skardu, Gamba Skardu, 1♂, 11.x.2023, leg. N. Ashraf.

Distribution in Pakistan

Azad Jammu and Kashmir (Tamkeen et al., 2015; Sultana & Song, 2024). New record for Gilgit-Baltistan.

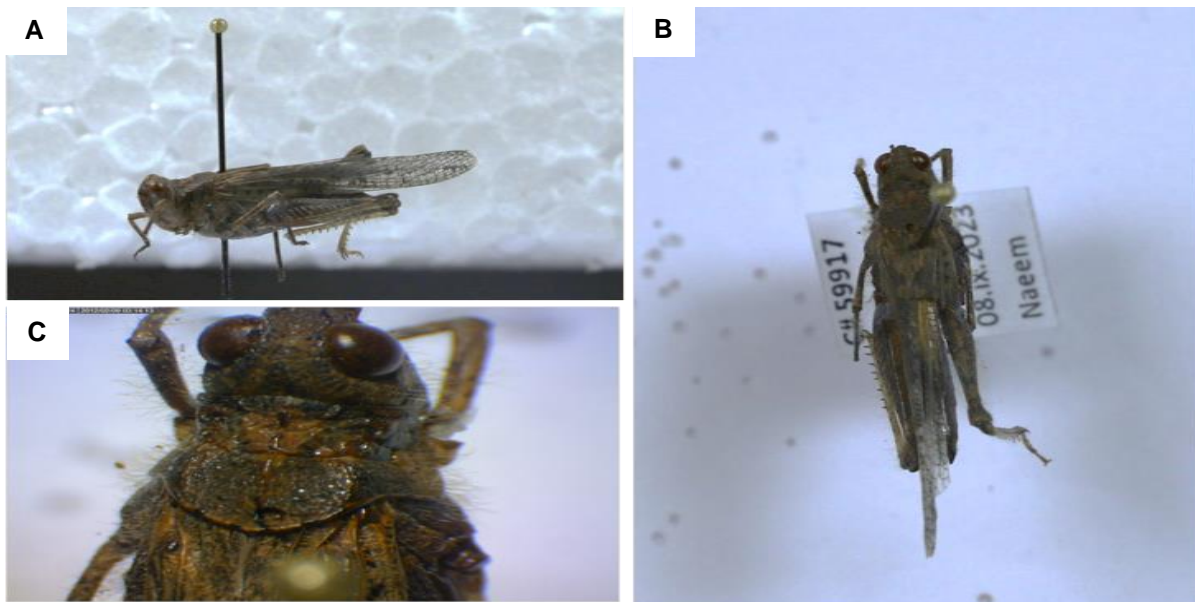


Figure 3. *Pternoscirta cinctifemur*. A. Lateral view; B. Dorsal view; C. Head and pronotum, dorsal view.

Genus *Gastrimargus* Saussure, 1884***Gastrimargus africanus africanus* (Saussure, 1888) Figure 4A-D****Diagnosis**

Pronotum intersected by transverse sulcus posteriorly from median carina; hind femora bluish black at inner margin; inner spurs longer as compared with outer pair on hind tibia; hind tibia reddish at apex.

Material examined

Gilgit-Baltistan: Skardu, Gamba Skardu, 82 ♂, 15.xi.2023, Chunda, 2♂, 25.Viii.2023, leg. N. Ashraf.

Distribution in Pakistan

Azad Kashmir, Balochistan, Gilgit-Baltistan, Khyber Pakhtunkhwa, Punjab (Sultana & Wagan, 2015; Tamkeen et al., 2015; Sultana & Song, 2024).

Gastrimargus marmoratus* (Thunberg, 1815) Figure 5A-D*Diagnosis**

Medium sized species, body brownish; fastigium of vertex slightly concave; pronotum raised, median carina tectiform; pronotum lack intersection of transverse sulcus from median carina at posterior region; hind femora brownish yellow.

Material examined

Gilgit-Baltistan: Skardu, Gamba Skardu, 2♀, 11.xi.2023, Chunda, 2♀, 25.viii.2023, leg. N. Ashraf.

Distribution in Pakistan

Azad Kashmir, Gilgit-Baltistan, Punjab (Sultana & Wagan, 2015; Panhwar et al., 2023; Tamkeen et al., 2015; Sultana & Song, 2024).

Genus *Scintharista* Saussure, 1884

Scintharista notabilis pallipes* Uvarov, 1941 Figure 6A-D*Diagnosis**

Medium sized species, body brown earthy; antenna filiform; tegmina long surpasses the hind knees; wings hyaline light red from base to medial region, the dark band narrow; internal ventral surface of hind femora with three dark bands, hind tibiae light yellow, hind tibia have black tip spins.

Material examined

Gilgit-Baltistan: Skardu, Gole, 7♀, 3♂, 19.ix.2023, leg. N. Ashraf.

Distribution in Pakistan

Azad Kashmir, Balochistan, Khyber Pakhtunkhwa, Punjab, Sindh (Sultana & Wagan, 2015; Tamkeen et al., 2015; Sultana & Song, 2024; Panhwar et al., 2025). New record for Gilgit-Baltistan.

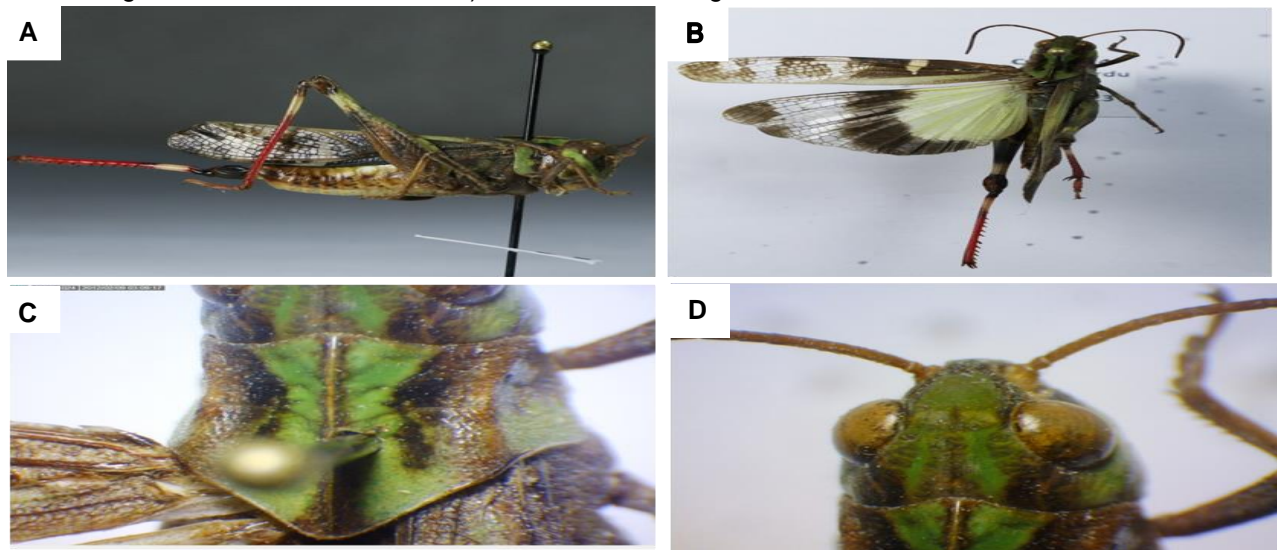


Figure 4. *Gastrimargus africanus africanus*. A. Lateral view; B. Dorsal view; C. Pronotum; D. Head, dorsal view.

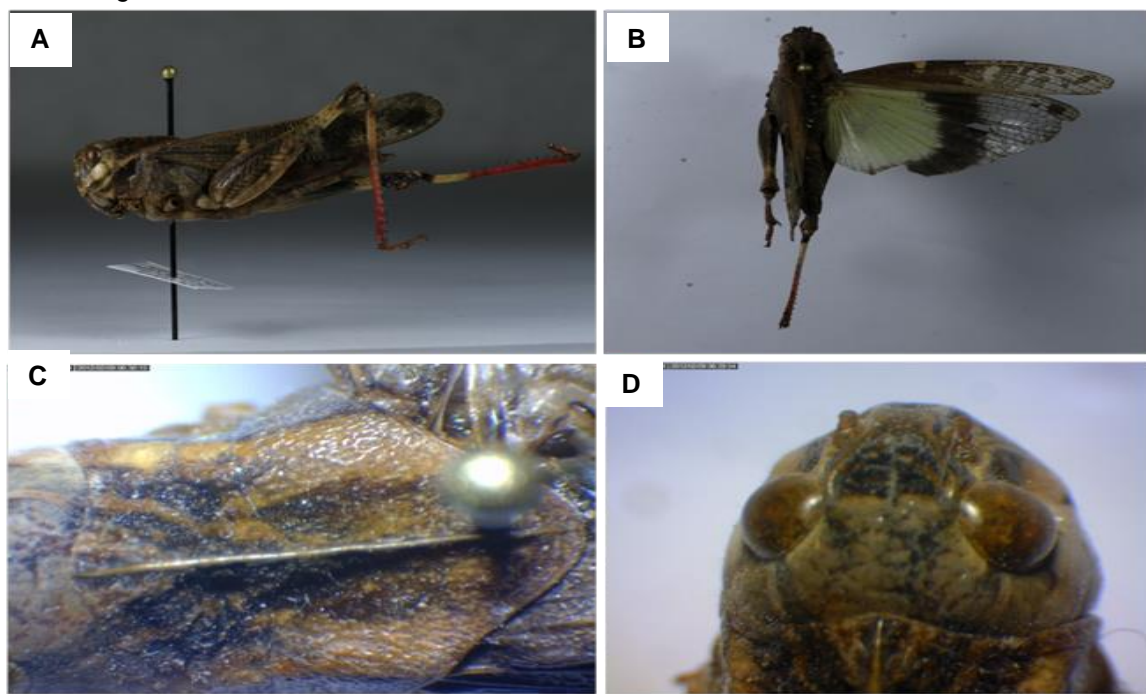


Figure 5. *Gastrimargus marmoratus*. A. Lateral view; B. Dorsal view; C. Pronotum; D. Head, dorsal view.

Genus *Heteropternis* Stål, 1873***Heteropternis respondens* (Walker, 1870) Figure 7A-D****Diagnosis**

Antennae longer and cylindrical, considerably longer than pronotum and head; lateral lobes of pronotum sloping, well-marked at ventral margins; tegmen narrower; wings basally yellowish; mesosternum space wider than its length.

Material examined

Gilgit-Baltistan: Skardu, Gamba Skardu, 1♀, 11.xi.2023, leg. N. Ashraf.

Distribution in Pakistan

Azad Kashmir, Khyber Pakhtunkhwa (Sultana & Wagan, 2015; Panhwar & Ali, 2018; Sultana & Song, 2024). New record for Gilgit-Baltistan.

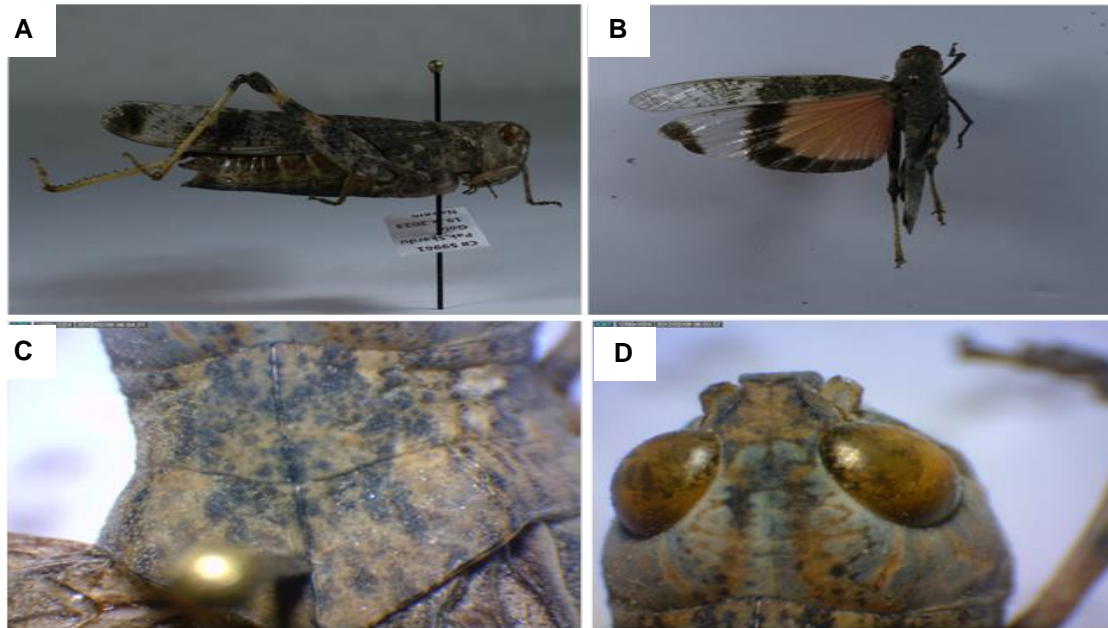


Figure 6. *Scintharista notabilis pallipes*. A. Lateral view; B. Dorsal view; C. Pronotum; D. Head, dorsal view.

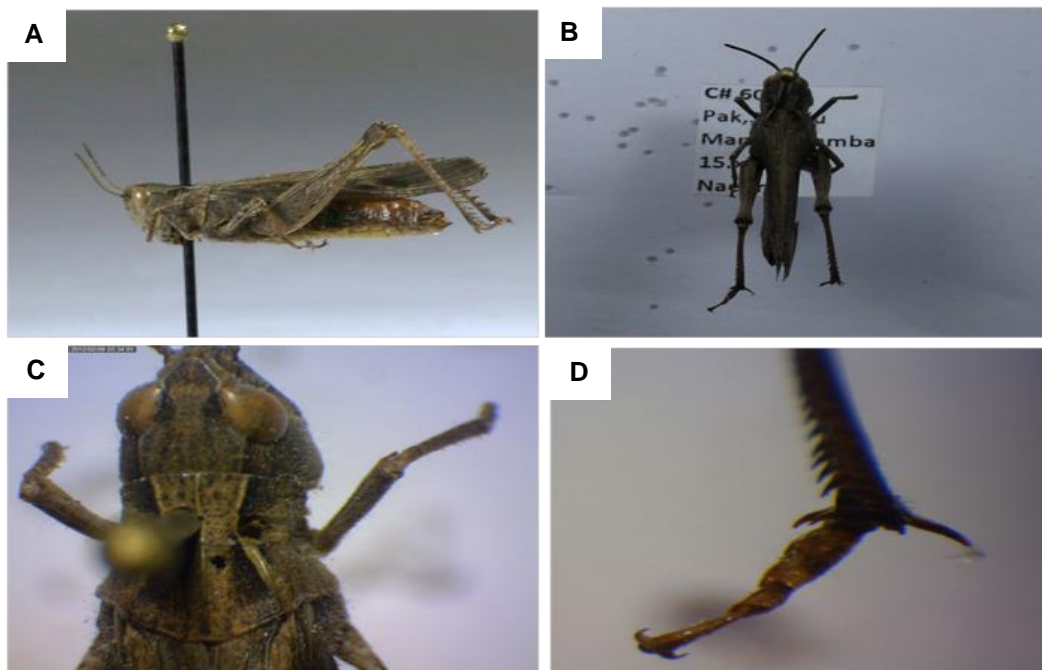


Figure 7. *Heteropternis respondens*. A. Lateral view; B. Dorsal view; C. Pronotum; D. Hind tibia.

Genus *Sphingonotus* Fiber, 1852

***Sphingonotus (Sphingonotus) balteatus himalayanus* Uvarov, 1924 Figure 8A-D**

Diagnosis

Wings with dark band unusually wide, posterior only a little narrowed and leaving a long narrow unshaded border on the posterior margin of wings, width of band amounting to more than 1/3 of the wing-length; base of wings sky-blue; inner aspect of hind tibia dark bluish gray.

Material examined

Gilgit-Baltistan: Skardu, Gamba Skardu, 1♂, 11.x.2023, Nanur, 6♂, 15.x.2023, leg. A. Naeem.

Distribution in Pakistan

Azad Kashmir, Gilgit-Baltistan, Punjab (Mahmood et al., 2004; Sultana & Wagan, 2015; Sultana & Song, 2024).

Genus *Helioscirtus* Saussure, 1884

***Helioscirtus moseri moseri* Saussure, 1884 Figure 9A-D**

Diagnosis

Body large in sized, yellowish, with black irregular marking; antennae filiform; head subglobular, median and lateral carine blackish; tegmina long surpass the hind tibia; femur with black bands from inside while yellow with light black spots from outside, hind tibiae yellow with black end spines; body ventrally covered with sparse hairs.

Material examined

Gilgit-Baltistan: Skardu, Ranga, 3♀, 11.ix.2023, Hoto, 3♀, 5♂, 10.ix.2023, leg. N. Ashraf

Distribution in Pakistan

Gilgit-Baltistan (Mahmood et al., 2004; Sultana & Wagan, 2015; Sultana & Song, 2024).

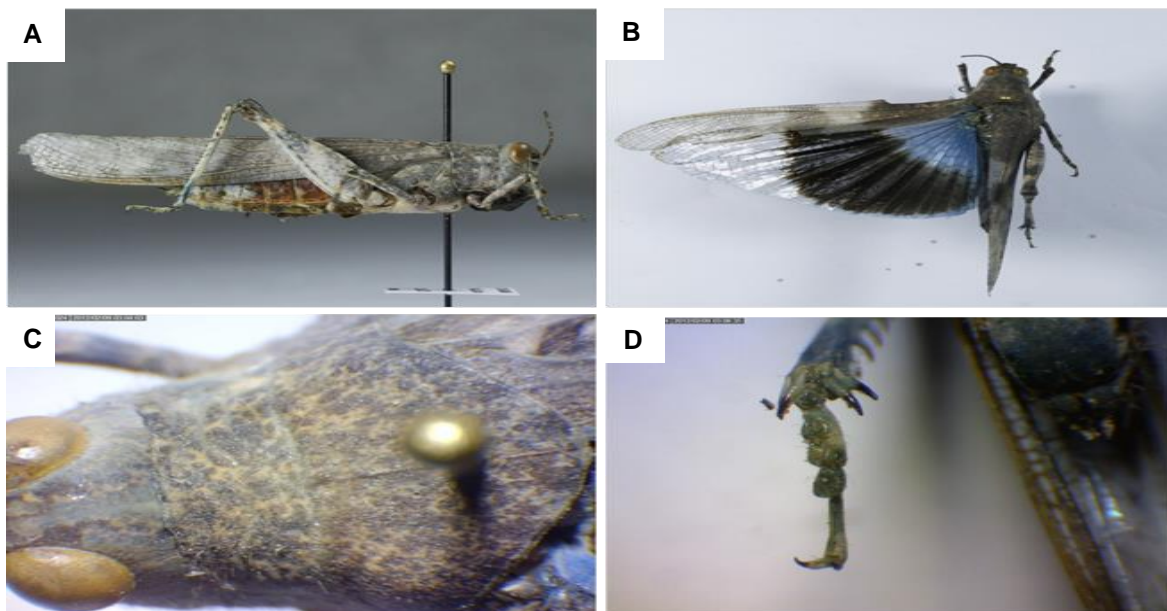


Figure 8. *Sphingonotus balteatus himalayanus*. A. Lateral view; B. Dorsal view; C. Pronotum; D. Hind tibia.

Genus *Acrotylus* Fiber, 1853

***Acrotylus humbertianus* Saussure, 1884 Figure 10A-D**

Diagnosis

Body yellowish black, vertex a little prominent; pronotum finely carinate; prozona with pits and rugae; tegmina light yellow in dorsal view, hyaline at apex; wings hyaline; hind femora blackish brown, hind tibia yellow with spines, inner pair of spurs in hind tibia long, all legs and body covered with hairs.

Material examined

Gilgit-Baltistan: Skardu, Gamba Skardu, 1♀, 1♂, 11.x.2023, leg. N. Ashraf.

Distribution in Pakistan

Azad Kashmir, Balochistan, Gilgit-Baltistan, Punjab, Khyber Pakhtunkhawa, Sindh (Mahmood et al., 2004; Sultana & Wagan, 2015; Tamkeen et al., 2015; Panhwar et al. 2024; Sultana & Song, 2024).

DISCUSSION

In the present study, we identified 10 species under eight genera of the subfamily Oedipodinae from district Skardu, including three species newly recorded for Gilgit-Baltistan: *Heteropternis respondens*, *Locusta migratoria migratoria*, and *Scintharista notabilis*. Among the genera, *Locusta* was most abundant in the high-altitude areas of Chunda, Xoq

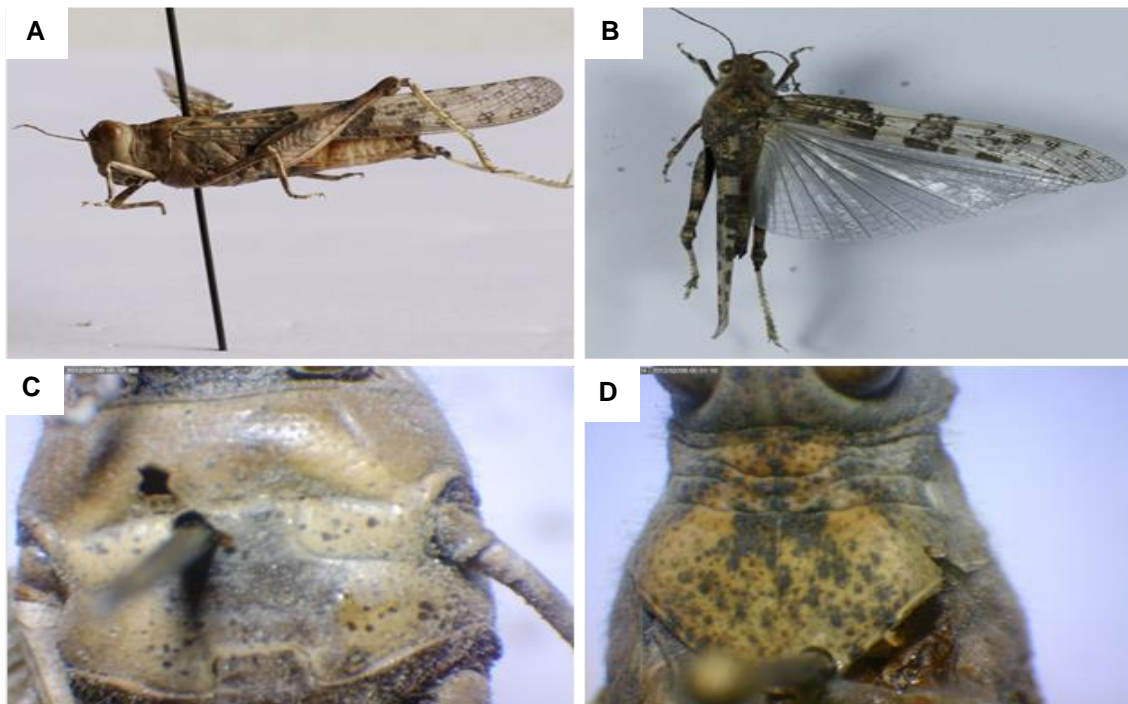


Figure 9. *Helioscirtus moseri moseri*. A. Lateral view; B. Dorsal view; C. Ventral View; D. Pronotum.



Figure 10. *Acrotylus humberianus*. A. Lateral view; B. Dorsal view; C. Pronotum; D. Hind tibia.

and Tandal Valleys. Chunda was identified as a significant hotpot for this genus, where these species were commonly found in colder habitats compared to the lowlands, which receive moderate snowfall. Both *Locusta migratoria* and *L. migratoria migratoria* exhibited a strong potential for swarming behavior and long distance migration, posing a serious

threat widespread crop destruction. Their abundance in the study area represents an alarming concern, and both species are newly recorded from district Skardu. Our specimens of *Locusta migratoria* illustrates as Uvarov (1921) description. The genus *Gastrimargus* is represented by two species in Gilgit-Baltistan. In the present study, they were mostly collected from the pasture lands across both high and low elevations. Like locust, these species were also confined primarily to the Chunda Valley and adjacent areas. These species were frequently observed in tall and short grasses, agricultural fields, grass cut for domestic use, and post-harvest crops residues. Both species are newly record from the study area. Kaufmann (1965) noted the feeding habits of acridid grasshoppers including Oedipodinae species. Ritche (1982) indicated this that these species are pest of wheat and tall grasses. Gardiner (2018) reported that grasshoppers feed on several agricultural lands and grasses. Kati et al. (2004) stated that these are biodiversity indicators. Confirming previous reports by Kirby (1914) and Mahmood & Yousuf (1999), we found *Sphingonotus* (*Sphingonotus*) *balteatus himalayanus* from the semi desert rocky areas in District Skardu. Our specimens' description resembles with Uvarov (1924) description. Single male of *Pternoscirta cinctifemur* collected from Gamba Skardu, showed resemblance with the description of Walker (1859). The samples collected from the Gole, Skardu of *Scintharista notabilis pallipes* showed their similarity with Bey-Bienko & Mistshenko (1951) specimen description. Uvarov (1925) during his survey to Azad Kashmir reported single genus *Heliethera* belonging to Oedipodinae. Similarly, Bughio et al. (2012) while studying *Heliethera* recorded new species to this genus. Nazir et al. (2014) studied molecular and morphological identification of Acrididae grasshoppers from Poonch and observed six species in the subfamily Oedipodinae. Similarly, Bughio et al. (2014) recorded three species of Oedipodinae from various localities of Pakistan. More recently, Panhwar et al. (2025) reported nine species of Oedipodinae from Baluchistan Province of Pakistan. During current study five genera, *Acrotylus*, *Heteroptererns*, *Scintharista*, *Pternoscistra*, and *Heliscirtus*, each represented by a single species identified from the study area, and mostly found from the dry semi desert and rocky areas.

CONCLUSION

This present study provides the first comprehensive checklist of the subfamily Oedipodinae from district Skardu, Gilgit-Baltistan, Pakistan. A total of 10 species belonging to eight genera with three new records for Gilgit-Baltistan: *Heteropterernis respondens*, *Locusta migratoria migratoria*, and *Scintharista notabilis pallipes*. The genus *Locusta* was found to be the most abundant, particularly in the high-altitude valleys of Chunda, Xoq, and Tandal, with both *L. migratoria* and *L. migratoria migratoria* exhibiting swarming potential that poses a potential threat to local agriculture. Other genera showed specific habitat preferences, with *Sphingonotus*, *Acrotylus*, and *Helioscirtus* predominantly occurring in semi-desert rocky areas, while *Gastrimargus* species were widespread in pasture lands across various elevations. This research expands the known diversity of Oedipodinae in the region from 11 to 14 species and emphasizes the need for further exploratory surveys across Gilgit-Baltistan.

AUTHOR'S CONTRIBUTION

Conceptualization: Naeem Ashraf, Abdul Matin; Methodology: Naeem Ashraf, Abdul Matin; Supervision: Abdul Matin; Field investigation: Naeem Ashraf; Species identification: Naeem Ashraf (under supervision of Mishkat Ullah and Muhammad Abbas); Species confirmation: Waheed Ali Panhwar; Photography: Naeem Ashraf, Mishkat Ullah, and Muhammad Abbas; Initial manuscript preparation: Naeem Ashraf and Muhammad Abbas; Manuscript review and editing: Waheed Ali Panhwar, Muhammad Asghar Hassan. All authors reviewed and approved the final manuscript.

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AVAILABILITY OF DATA AND MATERIAL

Not applicable. Whole data available in manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONSENT FOR PUBLICATION

All the authors are agreed on the publication.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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