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Taxonomic and Distributional Data of Family Chrysomelidae (Coleoptera) Sindh, Pakistan

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Article History

Abstract

One of the most diversified and economyically significant family in the order Coleoptera is the Chrysomelidae(leaf beetle). The Chrysomelidae family in Sindh region is thoroughly examined in terms of taxonomy and distribution in this study. From January 2020 to December 2023 extensive field surveys and specimen collections were carried out in a variety of Sindhi habitats. Using morphological methods the gathered specimens were recognized and categorized. From single species *Chrysoline graminin* (Linneaus 1758), 120 speciemens were reported from Lower Sindh Pakistan. The distribution patterns show notable variation between ecological zones underscoring the impact of environmental factors on species richness and diversity. This study also addresses the possible effects of changing climate and agricultural practices on Sindh Chrysomelidae populations. The results lay the groundwork for future ecological and conservation research by advancing our knowledge of the biodiversity and biogeography of leaf beetles in this area.

Key words: Coleoptera, Chrysomelidea, Morphology, distribution

Introduction:

Chrysomelidae is among the most diverse beetle families, totaling almost 40,000 described extant species in the world (Crowson1955).making up one of the largest and most commonly encountered of all beetle families. Chrysomelids are known as leaf beetles because most species in this group feed on the green part of the living plant. Some other leaf beetles feed on pollen, flowers, seeds and ant nests debris (Jolivet , Verma 2002). Numerous subfamilies are recognized, but the precise taxonomy and systematics are likely to change with ongoing research. Leaf beetles are partially recognizable by their tarsal formula, which appears to be 4-4-4, but is actually 5-5-5 as the fourth tarsal segment is very small and hidden by the third. Chrysomeloidea is widely considered to be the sister group of superfamily Curculionoidea Latreille, the weevils (Marvaldi *et al*., 2009; McKenna *et al*., 2009, 2015; Robertson *et al*., 2015). Chrysomeloidea known as the Phytophaga, the largest and most diverse radiation of phytophagous beetles, with more than 125 000 described extant species. It is the second largest lineage of phytophagous animals after the order Lepidoptera (Grimaldi & Engel, 2005). The family has been subdivided in up to 16 subfamilies (Seeno and Wilcox, 1982), although the most conservative classification considers 11 subfamilies, lumping several well recognized higher taxa (Reid, 1995) The monophyly of Chrysomelidae was well supported by morphological (Lawrence et,al 2011) Other studies have used specific character systems e.g., larval morphology (Lee, 1993), male genitalia (Verma, 1996); reproductive system and hind wing venation (Suzuki, 1996), Currently,

most beetle systematists have reached a general consensus that the family Chrysomelidae includes 12 subfamilies, namely Bruchinae, Cassidinae, Chrysomelinae, Criocerinae, Cryptocephalinae, Donaciinae, Eumolpinae, Galerucinae, Lamprosomatinae, Sagrinae, Spilopyrinae and Synetinae (Reid,1820 and Haddad , McKenna2016) The general faunistic records on the Chrysomelidae of Pakistan and Afghanistan are summarized in Löbl & Smetana (2010).The taxonomy of eastern Palaearctic and Oriental Chrysomelidae is often influenced by historical factors because the primary type material deposited in some institutions (e.g. those in China) were hardly accessible in the past. (Jan Bezděk and RuiE Nie 2020) The faunistic data on the leaf beetles of Pakistan are still sufficiently incomplete; the majority of species are recorded once for this territory and their distributional pattern is unknown (Konstantin Nadein, et.,al 2012; Mahar et al.,2023-2024). Identification keys of Abdullah & Qureshi (1968, 1969a, 1969b) lack exact geographical data. The Chrysomelidae feed on virtually any species of angiosperm, drawn from all major branches including dicotyledons, magnoliids and monocotyledons. These associations may have existed since the origin of © 2019 The Royal Entomological Society 1 2 Rui-e Nie et al. angiosperms in the Triassic (Zeng et al., 2014; Panhwar et al., 2023; Li et al., 2019). The current classification of Chrysomelidae involved the gradual recognition of major clades. Starting from Latreille (1802), who first proposed the leaf beetles. In addition to efforts to establish an evolutionary classification, numerous studies since the 1950s have attempted to determine the phylogeny of Chrysomelidae (Crowson, 1955, 1960; Furth, 1988; Suzuki, 1988, 1994; Konstantinov, 1994; Reid, 1995, 2000; Lawrence et al., 2011). Schmitt (1996) gave a comprehensive review on the phylogenetic system

Material and methods:

Collection: Specimens were collected during the year 2022 twice in a week. Collected specimens were pick with the pitfall trap method. From different districts of lower Sindh.. Specimens were sort out in the advance entomology laboratory university of Sindh, Pakistan. These specimens were sort out into one species which was *Chysoline graminins.* They are found in the leafs, grasslands.

Killing of Specimens: specimens were killed with the help of Chloroform and pinning and then preserved in the insect box with the help of naphthalene bolls.
Collected samples were brought to the Advance Entomology Laboratory of the Department of Zoology at the University of Sindh Jamshoro, Pakistan. All specimens were kept in insect-poison bottles until they died. The dead beetles were pinned scientifically with the help of stainless entomological pins through the forepart of the right elytra and preserved in wooden insect boxes.

Specimen Identification:
The stereoscopic binocular microscope allows for self-observation as well as the use of keys and other resources to help identify specimens based on their physical characteristics. The advanced entomology laboratory at the university of Sindh Jamshoro in Pakistan housed all of the specimens.

Statically analysis: Analysis all the data with the help of Shinnon wanner formula and all measurement of body parts were taken in the mean and stander devation.

Result:

A total of 120 specimens was collected and sort out into 1 species. Which were *Chrysolina graminins*(Linneanus,1758) belonging family Chryslomelidae was caught through pitfall trap during the year 2022 from different district of lower Sindh Pakistan
Family: Chrysomelidae
Genus: *Chrysolina*
Species:*C. graminis.*

Morphological features of *Chrysolina graminis* (Linnaeus, 1758)
Body is a small to medium-sized beetle, typically measuring around 5 to 8 millimeters in length. It has an elongated oval-shaped body. The coloration is green. The elytra often have a shiny appearance and may exhibit a textured or sculptured pattern. The head is small compared to the body, with compound eyes and mouthparts. The head structure is concave. Antennae are clubbed. The antennae are segmented and extend forward from the head. Pronotum are compact and green color having small punchers are present in throrical

region. The elytra typically smooth, with a metallic sheen and a green color. The elytra may also have fine lines or punctures. They possess six legs, which are well-adapted for walking and gripping surfaces. The legs are typically black or dark in color, contrasting with the bright metallic coloration of the body.

Table no 1: Measurement of Body parameter of *Chrysolina graminis* (Linnaeus, 1758)

Body Parameters	Male n=15mm		Female n=15mm	
Antennal length	5.82	0.19	5.92	0.02
Length of Head	4.53	0.12	3.62	0.07
Width of Head	4.99	0.09	5.12	0.07
Length of Pronotum	5.72	0.03	6.02	0.02
Width of Pronotum	7.54	0.04	8.12	0.06
Length of Femur	10.53	0.03	10.57	0.07
Elytral length	16.72	0.19	17.23	0.08
Total body length	23.05	0.09	27.09	0.04

Material Examined:
District Mirpurkhas: Total speciemens. 24, Vi/2021 to V/2022 male. 12, Vi/2021 to iii/2023 female. District Badin: total speciemens. 16, Vi/2021 to V/2022 male . 6, Vi/2022 to iii/2023 female District Tando Muhammad khan: Total specimens. 35, Vi/2021 to V/2022 male. 13, Vi/2022 to iii/2023 female.

REMARKS:

This species closely related to the *C. herbacea* because this are almost same size and color. (D.S. Chapmen,2006) reported this species from river bank of York. Then in(Chapman et.al 2007) worked out on land scape and fine scale movement of leaf beetle from UK. Later (Schmitt and Röna 2011) reported distribution of leaf beetle in central Europe. Then in (G.Oxford, 2021) researchers investigate this species as a endanger species. (,Hodgon ,2022)work on *Chrysolina graminis* species and sub species from Cambridge shire. After that in (Romano and Duroser ,2002)worked on this species about their conservation plan. Founded this species from lower Sindh Pakistan

Table no 2: shown districts and its adjoining areas of lower Sindh, Pakistan.

S.No	Mirpurkhas (M.P.K) 3 sites	Badin 3 sites	Tando Muhammad Khan (T.M.K) 3 sites	Crops
1	Kot Ghulam Muhammad 46 Km	Matli 54.7 km	Bulri Shah Karim 38 km	Trees. Of catalydone.
2	Digri 23 km	Tando Bhago 22.9 km	Tando Ghulam Hyder 68.4 km	Mango gardens,
3	Juddo 30 skm	Talhar 99.8 km	----------	Gardens, c

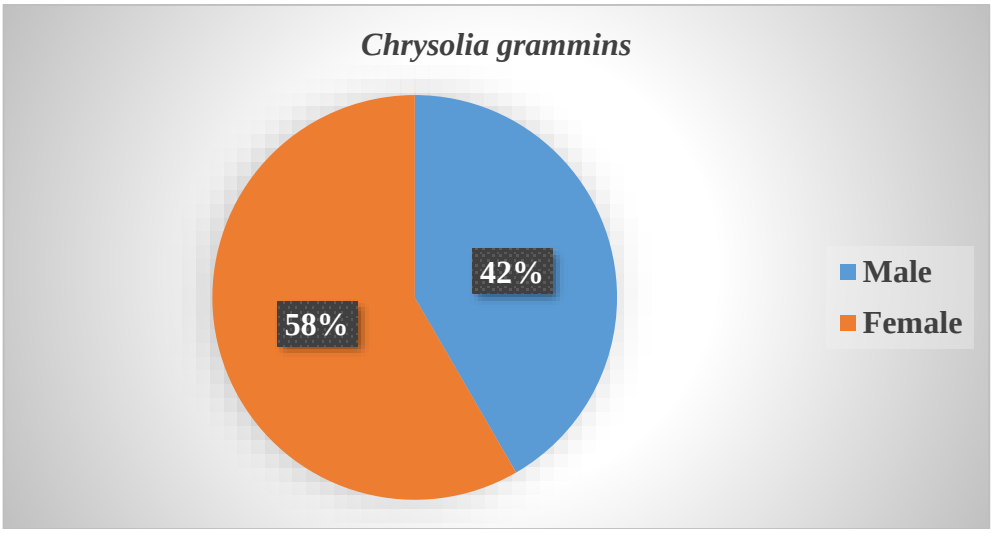

Figure no 1: showing the percentage of *Chrysolina grammins*(linneaus,1758).

References:

1. Abdullah, M., & Qureshi, S. S. (1968). Chrysomelidae, Coleoptera of Pakistan. III. A key to the genera and species of the Galerucinae, with descriptions of new genera and species. *Pakistan J Sci Indus Res*.
2. Abdullah, M., & Qureshi, S. S. (1969). key to the Pakistani genera and species of the Hispinae and Cassidinae (Coleoptera: Chrysomelidae), with description of a new species from West Pakistan including the economic importance. *Pakistan J Sci Indus Res*.
3. Abdullah, M., & Qureshi, S. S. (1969). key to the Pakistani genera and species of the Chrysomelinae and Halticinae (Coleoptera: Chrysomelidae), with description of new genera and species including the economic importance. *Pakistan J Sci Indus Res*.
4. AM, R. C. (1995). A cladistic analysis of subfamilial relationships in the Chrysomelidae sensu lato (Chrysomeloidea). *Biology, Phylogeny, and Classification of Coleoptera (Papers Celebrating the 80th Birthday of Roy A. Crowson)*, *2*, 559-631.
5. Chapman, D. (2006). *Spatial ecology of the tansy beetle (Chrysolina graminis)* (Doctoral dissertation, University of York).
6. Chapman, D. S., Dytham, C., & Oxford, G. S. (2007). Modelling population redistribution in a leaf beetle: an evaluation of alternative dispersal functions. *Journal of Animal Ecology*, *76*(1), 36-44.
7. Crowson RA. The Natural Classification of the Families of Coleoptera. Nathaniel Lloyd, London. 1955.
8. Eyre, M. D. (2005). Book review: Biology of Leaf Beetles. Jolivet, P. and Verma, KK (2002) Intercept Ltd., Andover, Hampshire, UK 322 pp. Hardback. ISBN 1-898298-86-6. Sterling£ 52.50. *Journal of Insect Conservation*, *9*(2), 141-142
9. Grimaldi, D., & Engel, M. S. (2005). *Evolution of the Insects*. Cambridge University Press..
10. Haddad, S., & Mckenna, D. D. (2016). Phylogeny and evolution of the superfamily Chrysomeloidea (Coleoptera: Cucujiformia). *Systematic Entomology*, *41*(4).
11. Hodgson, J. F. A Rare Bronze Colour Morph Of The Endangered Tansy Beetle, Chrysolina Graminis, From Woodwalton Fen, Cambridgeshire (Coleoptera: Chrysomelidae).
12. Lawrence, J. F., Ślipiski, A., Seago, A. E., Thayer, M. K., Newton, A. F., & Marvaldi, A. E. (2011, March). Phylogeny of the Coleoptera based on morphological characters of adults and larvae. In *Annales zoologici* (Vol. 61, No. 1, pp. 1-217). Museum and Institute of Zoology, Polish Academy of Sciences.
13. Löbl, I. (2003). *Catalogue of palaearctic coleoptera* (Vol. 6). Apollo books..
14. Marvaldi, A. E., Duckett, C. N., Kjer, K. M., & Gillespie, J. J. (2009). Structural alignment of 18S and 28S rDNA sequences provides insights into phylogeny of Phytophaga (Coleoptera: Curculionoidea and Chrysomeloidea). *Zoologica Scripta*, *38*(1), 63-77.
15. McKenna, D. D., & Farrell, B. D. (2009). Beetles (Coleoptera). *The timetree of life*, *278*, 289.
16. Mckenna, D. D., Wild, A. L., Kanda, K., Bellamy, C. L., Beutel, R. G., Caterino, M. S., ... & Farrell, B. D. (2015). The beetle tree of life reveals that C oleoptera survived end-P ermian mass extinction to diversify during the C retaceous terrestrial revolution. *Systematic Entomology*, *40*(4), 835-880.
17. Nadein, K. S., Ahmed, Z., & Sergeev, M. (2012). Distributional notes on Chrysomelidae from Pakistan and Afghanistan (Coleoptera). *Beiträge zur Entomologie= Contributions to Entomology*, *62*(1), 225-233.
18. Reid, C. A. M. (2000). Spilopyrinae Chapuis: a new subfamily in the Chrysomelidae and its systematic placement (Coleoptera). *Invertebrate Systematics*, *14*(6), 837-862.
19. Reid, C. A. M., Leschen, R. A. B., & Beutel, R. G. (2014). Chrysomeloidea Latreille, 1802. Handbook of Zoology, Band 4: Arthropoda: Insecta, Teilband/Part 40: Coleoptera, Beetles. In *Morphology and Systematics (Phytophaga)* (Vol. 3, pp. 11-15). Berlin: Walter de Gruyter.
20. Robertson, J. A., Ślipiński, A. D. A. M., Moulton, M., Shockley, F. W., Giorgi, A., Lord, N. P., ... & Mchugh, J. V. (2015). Phylogeny and classification of C ucujoidea and the recognition of a new superfamily C occinelloidea (C oleoptera: C ucujiformia). *Systematic Entomology*, *40*(4), 745-778.
21. Schmitt, M., & Rönn, T. (2011). Types of geographical distribution of leaf beetles (Chrysomelidae) in Central Europe. *ZooKeys*, (157), 131.G. S. Oxford, "Potential for dispersal by flight in the endangered Tansy beetle, Chrysolina graminis (L.) (Coleoptera: Chrysomelidae)," no. August, 2021.
22. Seeno, T. N., & Wilcox, J. A. (1982). Leaf beetle genera (Coleoptera: Chrysomelidae).
23. Mahar, M. A., Panhwar, W. A., & Shaikh, A. M. (2023). Identification Of Heterorrhina Saeedi Sp. Nov.(Scarabaeidae: Coleoptera) From Sindh Region, Pakistan. *Pakistan Journal of Biotechnology*, *20*(02), 243-248.

24. Mahar, M. A., Panhwar, W. A., Shaikh, A. M., Mal, B., Suhriani, S., Samejo, B. A., ... & Larik, S. A. (2024). Studies on the taxonomy and distribution of Cetoniinae (Leach, 1815) from Sindh-Pakistan. *Journal of Wildlife and Biodiversity*, *8*(3), 348-364.
25. Mahar, M. A., Panhwar, W. A., Shaikh, A. M., Suhriani, S., & Ullah, S. (2023). The first report of Chiloloba acuta (Wiedemann, 1823) from Sindh, Pakistan. *Asian Journal of Science, Engineering and Technology (AJSET)*, *2*(1), 1-10.
26. Panhwar, W. A., Mahar, M. A., & Shaikh, M. M. A. (2023). New record of genus Melolontha Fabricius 1775 (Melolonthinae: Scarabaeidae) from Sindh, Pakistan. *Pakistan Journal of Agricultural Research*, *36*(3), 285-289.