

a keen entomologist. In one moment he might be discussing the purchase of the World whale oil supply for his Company, while at the next he would be in raptures over the capture of a microscopic beetle or other insect new to his collection. His knowledge of the habits and habitats of the Mount Desert insects was profound. The detailed record of the fauna of his beloved Island will long serve as his monument.

CHARLES P. ALEXANDER

The Tribal Position of Certain Genera of the Pyrgomorphinae (Orthoptera: Acrididae)

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The author recently completed a monographic analysis of the acridoid subfamily Pyrgomorphinae as found in Australia, which is to appear as a section of a comprehensive study of the grasshoppers of that continent, prepared at the request of, and to be published by, the Scientific and Industrial Research Organization of that Commonwealth.

In the course of this work, and that on other sections of the Acridoidea, it has been found necessary to examine numerous non-Australian genera to evaluate the relationships and possible origin of genera occurring in Australia. In doing this cases of faulty associations made in the past are frequently encountered. These are due in some instances to previous authors having lacked actual material of relevant genera, or at least of a sufficient representation to furnish a proper background for generalizations, while in other cases errors of judgment or interpretation have been responsible for conclusions which now prove to be unwarranted or unsound.

The genera placed in the pyrgomorphid "section Poecilocerae," or, as I prefer to regard it, the tribe Poekilocerini (*Poekilocerus* being the original spelling of the key genus), by the last critical analyst of the subfamily as a whole, Ignacio Bolivar in 1909,¹

¹ Genera Insectorum, Acridiidae, Pyrgomorphinae.

included the Australian genera *Petasida* White, and *Monistria* Stål, the Burmese *Chlorizeina* Brunner, the Malagasy *Rubellia* Stål, the north African and South Asian *Poekilocerus* Serville, and the tropical African *Sphenexia*, *Stenoscepa*, *Cawendia* and *Humpatella*, all of Karsch. The key genus *Poekilocerus* has a type of distribution, i.e. across northern Africa, Arabia and parts of India, which is found in many palaeotropical genera of semi-arid or savannah environments. The Australian genera, both those included by Bolivar in 1909, and those since made known, are being discussed in the forthcoming monograph.

The Burmese genus *Chlorizeina* was described by Brunner in 1893,² but, as he states, was unknown in 1909 to Bolivar from material. The original description is relatively superficial and Brunner's figures sketchy. As he figured the male sex, this can be regarded as the type of *unicolor*, although we were not told from which of the two original localities it came, nor whether there were before Brunner more than a single male.

Since it was first described our knowledge of *Chlorizeina* has been but moderately amplified. In 1941 Ramme described and figured a second species, *C. elegans*, from Maymyo, Upper Burma,³ and also he has given us a figure of the abdominal apex and cercal outline of the male sex of *unicolor* as understood by him,⁴ from material taken at Hmaubi ("Hmawbi" in the London *Times* atlas), which is about twenty miles nearly due north of Rangoon, Burma, and at a very low elevation. In checking over unstudied series in the Academy collection I found a third species of the genus represented by both sexes from Kalaw, in the Southern Shan States of Burma, which I am describing elsewhere.

It is now evident to me that *Chlorizeina* is not a member of the Poekilocerini, but instead is an aberrant component of the Indo-Malayan tribe Tagastini ("Tagastae" of Bolivar). The genus

² Ann. Mus. Civ. Stor. Nat. Genova, XXXIII, p. 130, pl. V, figs. 51a and 51b. Based solely on *C. unicolor* Brunner, there described. The species was founded on both sexes from Palon, Pegu, Burma, and Bhamo, Burma.

³ Mitt. Zoolog. Mus. Berlin, 25, heft 1, p. 36, text-fig. 13e, pl. XII, fig. 2. [♂; Maymyo, Upper Burma, elevation 800 meters.]

⁴ Idem, p. 36, text-fig. 13u, pl. XII, figs. 1a and 1b.

has been compared with material of *Tagasta* and *Annandalea*, both of Bolivar, which were placed in that assemblage by that author. With these two genera *Chlorizeina* agrees in the dense and closely placed, in fact subattingent, longitudinal venation of the tegmina, instead of the more open, ramifying and usually less strict type of the Poekilocerini, in the appreciably, but not strongly, marked longitudinal carinulae on the dorsal face of the cephalic and median femora, in the definite and well developed supra-coxal lobe of the caudal femora, in the acute apices of the genicular lobes of the caudal femora, and in the distinct and regular pattern of the external paginae of the same, as well as their carinately defined ventro-external face. From the poekilocerine genera *Chlorizeina* differs in all of the above mentioned respects.

The Malagasy genus *Rubellia* Stål is represented by material of both sexes in the Academy series, and similarly it is not a member of the Poekilocerini, where for many years it has been placed. Instead it is clearly one of the tribe Sphenariini ("Sphenariae" of Bolivar), along with *Sphenarium* Charpentier, *Prosphena* Bolivar, *Chirindites* Ramme and *Yunnanites* Uvarov, with all of which it has been physically compared. While the alar organs are always more developed in *Rubellia* than in any of the other genera which have been placed in the Sphenariini, it is apparently more nearly related to the African *Chirindites* than to any of the other components, yet the two genera are widely separated from one another. In addition to many features of *Rubellia* which support the position here given, such as the basic fastigial structure, numerous details of the caudal femora and of the meso-metasternum, the virtually unarmed prosternum is a feature of the Sphenariini, and not of the Poekilocerini. While other tribes of the Pyrgomorphinae have unarmed prosterna, they are distinguished by numerous features not shared by *Rubellia*. I regard *Rubellia* as the most primitive and generalized of the genera of the Sphenariini, by reason of its possession of a fully alate phase in its alately dimorphic genotypic species *R. nigrosignata*.

Of the four tropical African genera described by Karsch, and which have been placed in the Poekilocerini, *Carwendia*, of which

several species are now before me, must certainly be removed from the Poekilocerini. Its exact assignment is as yet uncertain, but it cannot be retained in that assemblage. While no material is before me at this writing I have every reason to believe that of the three remaining genera *Sphenexia* and *Stenoscepa* may prove to be members of the Sphenariini, and not of the Poekilocerini. As to the remaining genus—*Humpatella* Karsch—material, and of both sexes, will be needed to place it with certainty, as the literature is of little use for so doing.

Summarizing, I do not believe the tribe Poekilocerini will be found present in Africa south of the range of the broadly north African *Poekilocerus*. Further it is my opinion that the latter genus and the Australian genera are all which can properly be referred to that tribe, and that no members of it will be found in truly humid sections of the Old World tropics. Also it would appear that the Sphenariini is a very old and widely spread tropical and subtropical assemblage, with its genera, which represent numerous subsidiary evolutionary lines, scattered over Farther India, extreme southern China, Madagascar, tropical Africa (but not Guinea forest areas), and various parts of the New World tropics and subtropics. The Tagastini is a dominant Indo-Malayan entity reaching from eastern India (Bhutan and Assam) to the Philippines and the Moluccas, and is represented in Farther India by three genera, i.e. *Tagasta*, *Annandalea* and *Chlorizeina*.

It is increasingly evident that the Pyrgomorphinae is a comparatively ancient group of grasshoppers, basically of a "Gondwanaland" type of distribution, possessing marked plasticity in certain features in numerous genera and species. Also it has earmarks of an ancient line, which has been able to maintain itself through the possession of particular faculties which presumably have survival value, as repugnatorial glands, "bleeding" ability, aposematic coloration, and in some genera and certain species intra-specific alar dimorphism. Further the possession of a vertically cleft fastigium, a character unique in the Acridoidea, is in itself evidence of the Pyrgomorphinae being a relatively long established line.



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