A REVIEW OF THE GENUS *GRYLLUS* (ORTHOPTERA: GRYLLIDAE), WITH A NEW SPECIES FROM KOREA

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ABSTRACT

Gryllus is the most widely distributed genus of the Tribe Gryllini, and may be the largest; it includes 69 described species occupying most of the New World, Africa, and Europe, and much of Asia. A new species from Korea significantly extends the known range of the genus.

Recent Work on *Gryllus*

Chopard 's (1961, 1967) restrictions of the genus *Gryllus* Linnaeus (1758), based largely on male genitalia, reduced it from over 200 species to 42 nominal species, 32 in the New World, one Bermudan, six African and Mediterranean, one Madasgascaran, one European, and one, *Gryllus bimaculatus*, a flying species, widely distributed in southern Europe, Africa, Asia, and the Pacific, in some cases by human transport. Of these 42, *nigra* Harris and *scudderianus* Saussure are synonyms of *pennsylvanicus* Burmeister (Alexander 1957), comptus Walker (Brazil) is a Brachytrupinae (Alexander, unpubl. obs.), and *afer* Saussure is a *Teleogryllus* species (Otte and Cade, 1983). Chopard (1970) later described *G. abnormis* from St. Helena Island. Walker (1974) described *G. ovisopus* from Florida, and Weissman et al. (1980) added two western U.S. species, *brevicaudus* Weissman, Rentz, and Alexander, and cohni Weissman. Weissman et al. also synonymized *determinatus* Walker (Jamaica), *contingens* Walker (Brazil), and *mundus* Walker (Brazil). It is likely, however, that for these three type specimens—at least those from Brazil—nothing more can be said than that they belong to the *assimilis* group (my notes from the types in the British Museum, examined in 1963, say "probably = *assimilis*"). Undescribed species in this group, with distinctive songs, are known from Mexico (Alexander, unpubl.), and probably occur throughout Central and South America.

Otte and Cade (1984) described four new *Gryllus* species from Africa and transferred African species from *Lenigryllus*, *Scapsipedus*, *Homaloblemmus*, and *Platygryllus* to *Gryllus*, increasing the number of *Gryllus* species by 13. Otte (1987) added two new African species. Otte, Toms, and Cade (1988) added three more African species. Gorochov (1988) discussed five additional *Gryllus* species from Western Asia and Africa (*G. urfaensis* Gumussya, *G. geticus* Vasilov, G. *depressiceps* Gorochov, *G. maximus* Gorochov, and *G. palmetorum* Gorochov).

In terms of species numbers, *Gryllus* appears to thin out gradually eastward across the Asian continent. A. V. Popov (in corresp.) describes *G. bimaculatus* and *G. campestris* as sympatric in Azerbaijan and states that *G. bimaculatus* "occupies the whole Middle Asia from the Caspian to Tadjikstan"; *G. bimaculatus* is also

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known from China and tropical Asia (Chopard 1967). Chopard (1969) placed an Indian species *facialis* F. Walker (1871) in the genus *Gryllus*. In his (1967) world catalogue, however, written later but published prior to the Indian work, Chopard transferred this species to the genus *Modicogryllus*. Nevertheless, Chopard's (1969) illustration of the genitalia of *facialis* appears to represent a *Gryllus*. The specimen used for the genitalic drawing is not identified, nor is it indicated whether or not Chopard saw the types of either *facialis* or *Scapsipedus hastatus* Saussure, which he synonymized with *facialis* Walker. A second possible endemic *Gryllus* species from the same region is the Assam (India) species, *Lenigryllus quadrimaculatus* Saussure (Chopard 1967).

As known to the present, then, *Gryllus* includes approximately 68 species and is the most widely distributed and probably the largest genus in the Tribe Gryllini (Otte and Chopard unpubl.). It occurs throughout North, Central, and South America, on islands in the Atlantic (Bahamas, Bermuda, St. Helena), more or less throughout Africa and Europe, and extends eastward to the middle of the Asian continent. Except for *Gryllus bimaculatus*, however, the genus has been unknown in eastern Asia. Nor are endemic *Gryllus* species known on the Australian continent or in the Pacific, except along the west coast of the Americas on the Galapagos Islands (*galapageius* Scudder) and the Revilla Gigedo Islands (Clarion Island, a new species: Otte, pers. comm.). In eastern Asia and the Pacific what appears as the niche occupied by these large, usually shallowly burrowing field crickets is commonly filled by members of the African, Asian, and Australian genus *Teleogryllus*, which are quite similar in overall appearance and behavior but differ from *Gryllus* in song pattern, genitalia, karyotype, and mating behavior (Otte and Alexander 1967—pers. obs., Alexander and Otte 1967, Alexander 1962a,b; Lim, Vickery, and Kevan 1973).

On the basis of numbers of species, *Gryllus* might be thought to have originated in the New World; at least 15 undescribed species are known from North America alone (Alexander ms., unpubl.; Weisman, unpubl.; Alexander and Cade, ms.). Africa, however, contains many more genera similar to *Gryllus* (Chopard 1967, Otte and Cade 1984, Otte, pers. comm., Otte and Chopard, unpubl.).

Gryllus nigrohirsutus, new species

Holotype male. body length, 17.55 mm.; tegmen, 7.488; hind femur, 9.5; cercus, broken; hind tibia, 6.76; head width, 3.9; pronotal width (widest), 4.75; pronotal length, 3.25.

Male tegmina. Three chords; three harp veins; diagonal vein with two cross-veins connecting it to Cu, anterior to mirror; mirror with a Y-shaped dividing vein; apical field much reduced; stridulatory vein length, 2.3 mm; with 94 teeth (fig. 2).

Male genitalia. As in figure 2 (compare to figs. 1–7 Alexander 1962a, fig. 2 Alexander and Otte 1967, Lam. II Chopard, 1961); epiphallus apparently a little thicker and more blunt than those of American and European *Gryllus* species.

Allotype female. body length, 16.25 mm; ovipositor, 11.7; tegmen, 4.5; hind femur, 10.4; cercus (right), 7.15; hind tibia, 6.84; head width, 4.49; pronotal width, 5.2; pronotal length, 3.5.

Color. Solid black in both sexes, with spurs on hind tibiae brownish; tegmina and ovipositor with some brownish areas.

Armature of hind tibiae. Eight spurs on each margin of each tibia of both sexes, including three apical, second apical (center) spur longest of apical spurs.

Tympana. Inner and outer on each front tibia in both sexes, both oval, inner one much smaller and, in the holotype male, with a smaller projection extending partway across its diameter from central part of rear margin; male: outer, 0.653 x 0.223 mm.; inner, 0.373 x 0. 155; female: outer, 0.808 x 0.290; inner, 0.180 x 0.077.

Type Data. Holotype male and allotype female: Korea, Central National Forest,

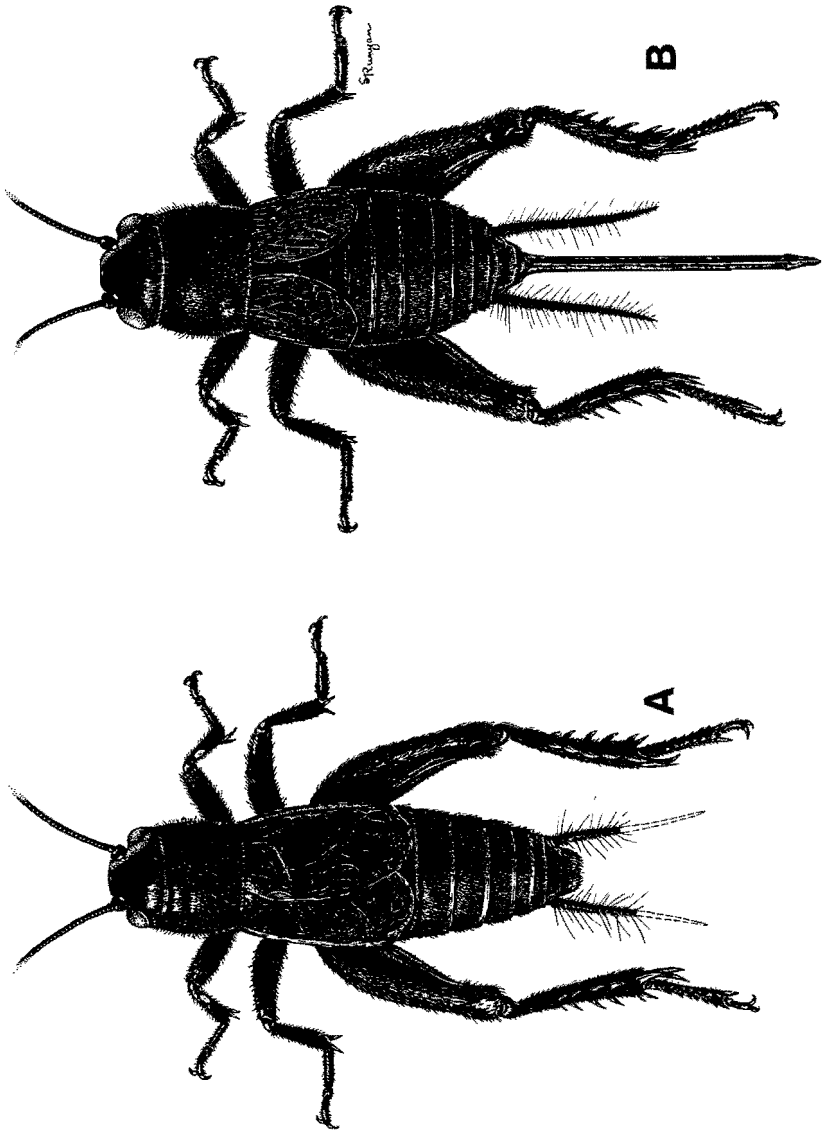

Figure 1a-b. *Gryllus nigrohirsutus*, n. sp.: a—holotype male; b—allotype female.

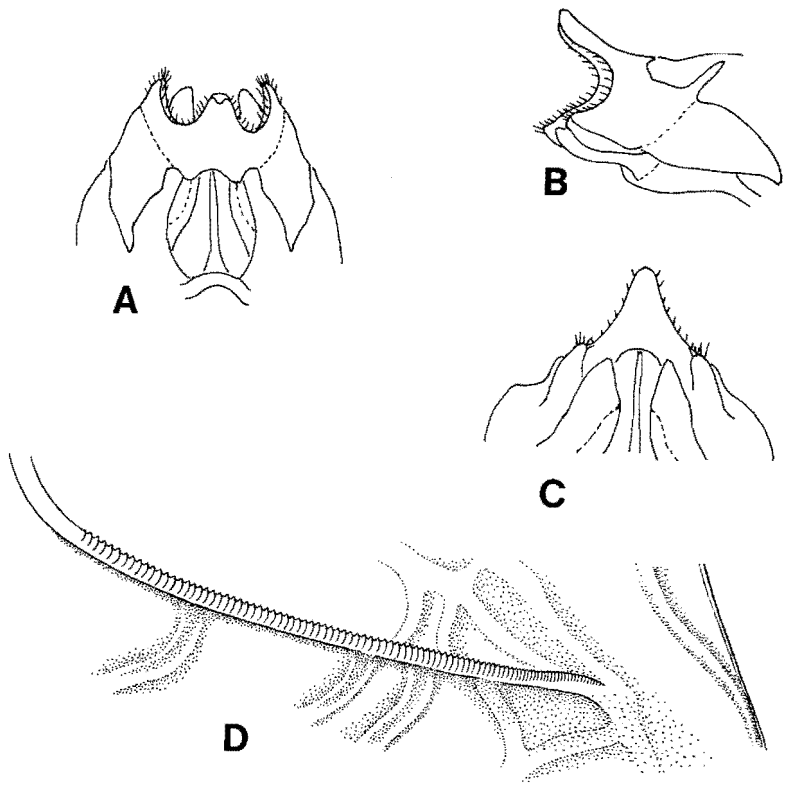

Figure 2a-d. *Gryllus nigrohirsutus*, n. sp.: a-c, genitalia of holotype male; a—dorsal view, b—lateral view, c—ventral view; d—stridulum of holotype male.

27 July 1954 (G. Byers). Deposited in University of Michigan Museum of Zoology, Ann Arbor, Michigan

This small, black, pubescent, micropterous *Gryllus* was taken in the Central National Forest 16 mi northeast of Seoul, Korea (two mi west of Pupyongi), by Dr. George Byers, now of the University of Kansas. The male genitalia (fig. 2) place it in the genus *Gryllus*, thus very far outside the presently known range of micropterous forms in this evidently ancient genus.

The resemblance of *G. nigrohirsutus* to the American wood cricket, *G. vernalis* Blatchley (Blatchley 1920, Alexander 1957), is superficially close, although *G. nigrohirsutus* is considerably more pubescent and distinctive in appearance, owing partly to a slightly flattened shape and partly to the venation of the male tegmen. The general appearance of *G. nigrohirsutus*, and its micropterousness, are consistent with a life in leaf litter, like that of *G. vernalis*. Byers' field notes (pers. comm.) indicate a flat, fairly open hardwood forest with considerable leaf litter and occasional patches of grass. No *Gryllus* species can be identified as a close relative.

DISCUSSION

This species extends the known range of *Gryllus* significantly on the Asian continent, suggesting that historically the genus has occurred essentially everywhere within the range of the Gryllidae except in southeast Asia, on Pacific islands, and in Australia.

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