Lakwa, Geleki and other wells (Banerjee *et al.*[2]) and no pre-Tipam occurrence is so far known.

The temporal and spatial distribution of recycled Lower Gondwana palynomorphs, when viewed in regional perspective, have led to important synthesis pertaining to tectonic evolution and palaeogeographic reconstruction of Assam–Arakan geolcgical province, which had already been indicated in the tectonic map of India published by the ONGC[4]. These data have revealed that the Lower Gondwana sediments were widely distributed over the major parts of Assam–Arakan geological province and were subjected to various degrees of recycling consequent upon various phases of the tectonic movements of the Arakan–Yoma folded belt, Shillong massif as well as the Himalayan folded belt. At present, Lower Gondwana sediments are known from Singrimari (89° 53′ 30″ E : 25° 38′ 35″ N) to the northwest of Garo Hills; along the Sikkim, Bhutan, Arunachal foothill belt of the northeastern Himalayas and in the subsurface of northern part of Bangladesh in Kuchma (89° 19′ E: 24° 40′ N) and adjoining areas (Rahman[5]). Lower Gondwana sediments occurring to the west were the source of the recycled Lower Gondwana taxa at different stratigraphic sequences in West Bengal subsurface starting from at least Upper Cretaceous upwards. In South Shillong shelf, the recycling of the Lower Gondwana sediments took place from Upper Cretaceous upwards. In Cachar–Tripura–Mizoram areas, occurrences of reworked Lower Gondwana taxa are known from at least Lower Miocene upwards, if not earlier. It is considered that parts of Bangladesh and, probably of Shillong massif also, had cover of Lower Gondwana sequence acting as the provenance for the younger sediments of South Shillong shelf and Cachar–Tripura–Mizoram areas. In Upper Assam subsurface, recycling of Lower Gondwana taxa is considered to have taken place from Middle Miocene upwards and this can be correlated with the Middle Miocene uplift of the Himalayas when the Lower Gondwana sediments of the foothill belt were also uplifted and were recycled.

These data have revealed that the basin margins or the provenances in different parts of Assam–Arakan geological province have different history of tectonic evolution and the directions of sediment transport were also different.

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KARYOTYPES OF TWO SPECIES OF GRYLLIDS

Even though the karyotypes of a number of species of gryllids have been described[1–5] there is paucity of such information on south Indian gryllids. Further there is a need for reinvestigation of the cytologically known species using the newer chromosomal techniques for a better understanding of the morphology of the chromosomes of these species. Since no chromosomal work has been done on the genera *Gryllopsis* and *Teleogryllus* from India, karyotypic studies have been made on *Gryllopsis maculithorax* and *Teleogryllus* sp. belonging to the subfamily Gryllinae of Gryllidae. Lim *et al.*[1] have analysed the chromosomes of two species of *Teleogryllus* from the Australian region. Karyotypes of these species are compared with those from the present investigation.

Twenty specimens of both sexes of *G. maculithorax* (8 ♂, 12 ♀) and 11 males of *Teleogryllus* sp. were collected from the University campus, Manasa Gangotri, Mysore. Chromosomal preparations were made by the flame dry-Giemsa technique[6] using cells from the tests and hepatic caecae.

G. maculithorax showed a diploid number of 19 in the male and 20 in the female (Fig. 1). The autosomal complement consists of a pair of metacentric and 8 pairs of telocentric chromosomes which are in a graded series. In all the animals studied, one of the telocentric chromosomes of pair No. 2 showed a thread-like structure arising from the centromeric region. In most of the metaphase plates of the female one of the X-chromosomes appears more deeply stained and shorter than its homologue (Fig. 5).

The diploid number of *Teleogryllus* sp. is 27 ($2n$ ♂ = 27) with ten pairs of metacentric, two pairs of submetacentric and one pair of telocentric chromosomes (Fig. 3).

In both the species the X is the largest metacentri and the sex chromosome mechanism is of the XX: XO type. Chromosomes have been measured and idiograms have been constructed (Fig. 2 and 4) accroding to the system proposed by Levan *et al.*[7].

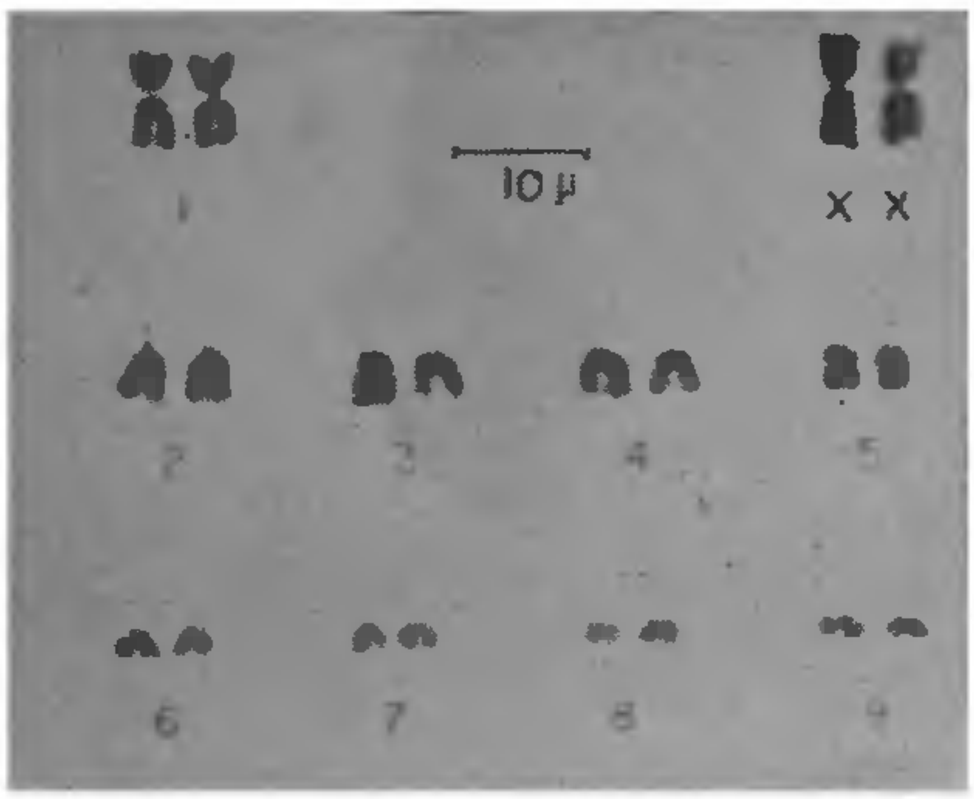

FIG. 1. Karyotype of *G. maculithorax* (Female) $2n = 20$.

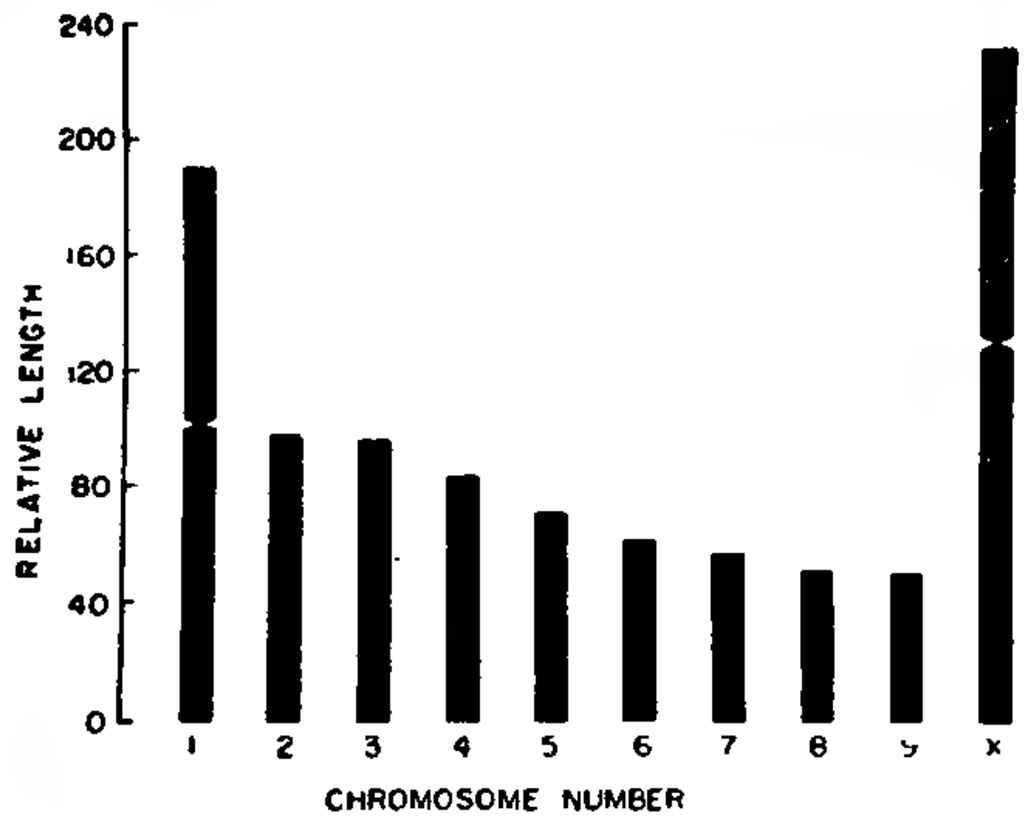

FIG. 2. Idiogram of *G. maculithorax*.

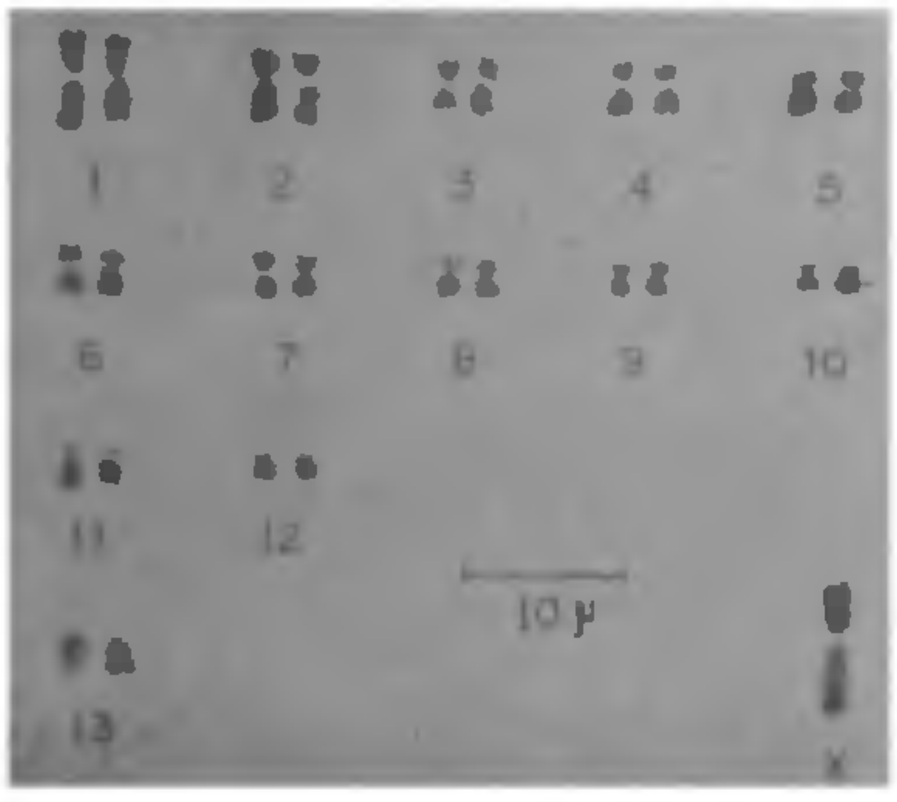

FIG. 3. Karyotype of *Teleogryllus* sp. (Male) $2n = 27$.

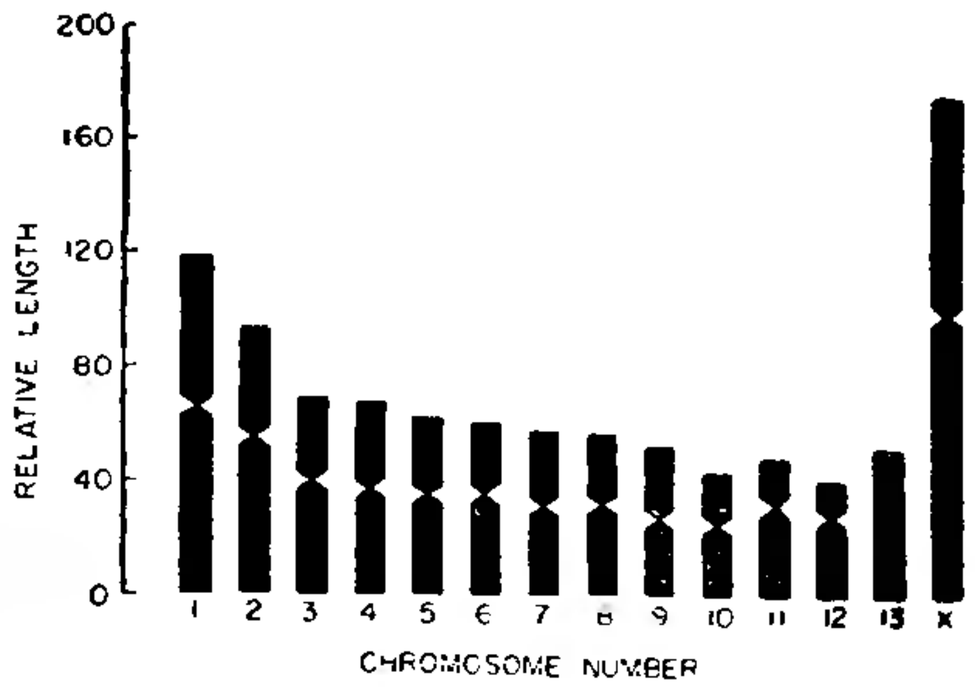

FIG. 4. Idiogram of *Teleogryllus* sp

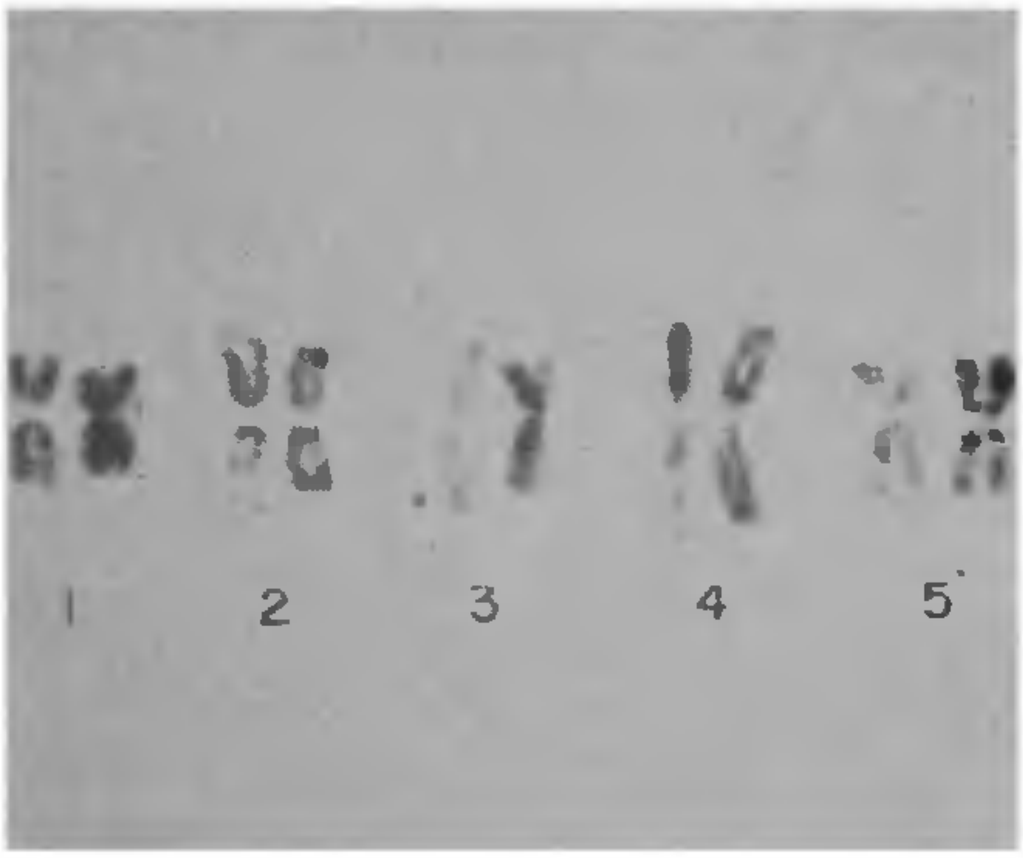

FIG. 5. X-chromosomes from 5 different female mitotic metaphases showing differential condensation.

In the subfamily Gryllinae, the diploid number in males ranges from 11 to 29. But a majority of the species shows 21 chromosomes. Only one species *Tartarogryllus burdigalensis* has 19 chromosomes. This species possesses 3 pairs of metacentric, 3 pairs of submetacentric and 3 pairs of telocentric autosomes and a large metacentric X. *G. maculithorax* also shows a diploid number of 19 but the characteristics of the karyotype are different in that the autosomes are all telocentrics except for one pair which is metacentric. Further the first pair of telocentrics (pair No. 2) and the sex chromosomes of *G. maculithorax* show interesting features. In a majority of mitotic metaphases one of the chromosomes of pair No. 2 exhibits an elongated thread-like structure which arises from the centromeric region, resembling a satellite. In the metaphase plates of the female, the sex chromosomes appear to show differential staining (Fig. 5).[4] One of the X-chromosomes is heavily stained and shorter than its homologue. Probably this chromosome is tightly coiled. But why only one of the X-chromosomes exhibits this feature is not known.

Lim *et al.*[1] have made a chromosomal survey of ten populations of two species of *Teleogryllus*, viz., *T. commodus* and *T. oceanicus*, collected from different parts of Australia and neighbouring islands. Though the diploid number of both the species is 27, the karyotype of each population is different from the other with reference to the number of biarmed and telocentric chromosomes. For *T. commodus* they have described 5 karyotypes from different parts of Australia, one from Tasmania and one from New Zealand. For *T. oceanicus* they found two different karyotypes in two regions of Queensland and one from Tahiti. Interestingly none of these karyotypes resembles the karyotype of *Teleogryllus* sp. of the present study. The only karyotype which is close to the present karyotype is that described for the Tasmanian population.

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A NOTE ON FLORAL ABNORMALITY IN SUGARCANE UNDER *IN VIVO* AND *IN VITRO* GROWN CONDITIONS

THE inflorescence in the case of sugarcane consists of uniflorous spikelets. Each floret in turn has a set of glumes, three stamens and a pistil with two styles ending in hairy stigmas. Occasionally abnormalities are observed in this make-up[1–4]. Often there occurs a partial or complete transformation of the stamens into carpels referred to as pistillody[3]. Crosses involving spontaneum as one of the parents and a few among spontaneum varieties have been reported to contain some such abnormalities[4]. In the present study, some floral abnormalities such as extra style formation and the occurience of multiple pistils observed both *in vivo* and *in vitro* conditions are reported.

A cross-section of varieties representing *Saccharum spontaneum*, *S. officinarum*, a few other species, related genera and commercial hybrids under cultivation were examined for their floral morphology in their growing season. On an average 100 spikelets were examined in each variety. *In vitro* both fertilised and unfertilised pistils of *Saccharum spontaneum* SES 113B were cultured on modified MS medium[5] for tissue culture studies. Initially the cultures were grown for a month in the dark and later they were given a photoperiodic treatment of 18/6 hours at an illumination of 250 lux. All the inoculated pistils carried only two styles.

Under *in vivo*, the type SES 113B alone in Spontaneum and Co 285 among hybrids showed the formation of a extra style, while in the rest of the species, genera and hybrids the spikelets were quite normal. In these two varieties the occurrence of three styles were noteworthy (Fig. 1) as against the normal two

FIG. 1. Showing the occurrence of three styles.

styles. The three styled spikelets were more in Co 285 than in SES 113B. Here the spikelets were all from the early formed arrows. SES 113B flowered in August while the Co 285 was forced to flower early in September by subjecting the plants to photoperiodic treatment. However, not all the plants in these varieties exhibited this abnormality. Pistillody was absent as the stamens were normal.