



## DIVERSITY OF FIELD CRICKETS (ORTHOPTERA: GRYLLIDAE) FROM DISTRICT NAUSHAHRO FEROZE SINDH

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### ARTICLE INFORMATION

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#### Author's contribution

NB performed experimentation, RS designed the study NB identified the species and SK compiled the data.

#### Key words:

Wheat, Rice, Sugarcane, Maize, Gryllidae

### ABSTRACT

During the present study about 280 specimens were collected from district Naushahro Feroze during year 2016-2017, from wheat, rice, sugarcane and maize field. Collected material was identified as *Acheta domesticus* Linnaeus, (1758), *Gryllus (Gryllus) bimaculatus* (De-Geer, 1773) and *Gryllodes sigillatus* Walker, 1869. Different types of variation were also noted.

## 1. INTRODUCTION

Crickets are found everywhere and widely distributed and mostly present in tropical areas of South East Asia and also found in Pacific region Robillard and Desutter-Grandcolas [1]. The field cricket's fauna of district Naushahro Feroze is limited. Through research on the fauna of field crickets from district Naushahro Feroze tells many new taxa. Through the field studies of insect ecology and their distribution are related with number of problems associated with specimen identification and detection, the survey of common species is impossible at a large spatial scale Basset *et al* [2]. The species of field crickets are differentiated on the basis of the stridulatory apparatus. Walker and Nickel [3] also observed five species of Genus *Gryllus* from southeastern United States on bases of stridulatory length and No. of teeth. The crickets produce songs through their basic structure stridulatory apparatus; there was no relation between acoustic features and basic structure of tooth Walker and Carlisle [4]. Both forewings of crickets consist of stridulatory apparatus, however, left forewing have left stridulatory file which was not functional for calling. Dorso-ventral asymmetry was determined in ultrastructure and morphology of fore wing Desutter-Grandcolas [5].

## 2. MATERIALS AND METHODS

### Sampling

The material that was used in this research was collected from various localities of Naushahro Feroze. The specimens were collected from sugarcane, rice, maize and wheat, there were various sources of collection that is herbs, shrubs, trees, grasses and agricultural land. The field crickets were mostly captured during day night by using hand picking and insect net methods. Total 280 specimens were collected during the year of 2016-2017. Collected specimens were brought to the laboratory for further identification and examination.

### Killing and preservation

All collected specimens of family Gryllidae were brought to the laboratory for killing and preservation, after that the specimens were killed by using (KCN) potassium cyanide bottle or preserved in 80% ethyl alcohol. Through the usage of potassium cyanide preserve the original color of specimens. Photographs of head, pronotum and other important morphological body characters were taken by using digital camera. After examination of specimens, all specimens were pinned on stretching board and tegmina of crickets may be stretched or not on stretching board. Through the stretching of wings we can identify various different species. The analyses of specimens were carried out by using entomological methods. This whole process was carried out with full attention. If

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some time there was extra material and dirt on the specimens were cleaned by using small camel brush. When the specimens become full dry then left for some time and were move towards the insects cabinets. All these specimens were labeled by using the name of person including locality time & date. Naphthalene balls were also kept inside the insect cabinets and these naphthalene balls were protect against predators and parasites.

**Identification**

Specimens were identified under the stereoscope dissecting binocular microscope. For further identification all entomological methods were applied that is description of keys mentioned in different papers, books and articles. We also used Orthoptera species file for further examination of the specimens. Drawing line and measurement of different body parts were also take.

**Statistics analysis**

SPSS Software (version 16.0) was used for analyses different values.

**3. RESULTS AND DISCUSSION**

Currently about 280 specimens with 3 species i-e *Acheta domesticus*, *Gryllus (Gryllus) bimaculatus* and *Gryllodes sigillatus* were collected, diagnostic and described detail is given below:

**a) Acheta domesticus (Linnaeus, 1758)**

**Diagnostic features**

Body medium size, pubescent and deprived. The body with testaceous and light fulvous. Head brown and 2 large brown spots on pronotum. Elytra reach over to the apex of abdomen. Wings larger than elytra. Legs yellowish few brown spots on it. The elytra veins oblique. Ovipositor regular, acute and long in shape.

**Remarks**

*A. domesticus* is house crickets found in everywhere. Distribution record show it occurrences in south western Asia, Europe and U.S.A. Chopard [6] reported from Himalayas, Srinagar and Kashmir on 6000 ft. however, Ghouri [7] reported this as pest of valued crops in Pakistan & India. Malik et al., [8] collected it from human habitats. During present survey we have collected fair number from many agricultural field and also confirm that it pest status.

**Table 1:** Measurement of various body parts of *A. domesticus*

| Body Parameters      | Mean ± SD (mm) |              |
|----------------------|----------------|--------------|
|                      | Male (05)      | Female (05)  |
| Length of head       | 2.25 ± 0.152   | 3.26 ± 2.8   |
| Width of head        | 4.2 ± 0.72     | 2.56 ± 0.35  |
| Length of pronotum   | 3.5 ± 1.4      | 3.83 ± 1.50  |
| Width of pronotum    | 3.15 ± 0.40    | 3.5 ± 0.35   |
| Length of femur      | 11 ± 2.08      | 14 ± 4.11    |
| Width of femur       | 4.5 ± 1.0      | 3.33 ± 0.57  |
| Length of tibia      | 6.0 ± 1.0      | 7.33 ± 2.06  |
| Width of tibia       | 2.0 ± 0.0      | 2.0 ± 0.0    |
| Length of mirror     | 4.5 ± 1.73     | ----         |
| Width of mirror      | 4.5 ± 1.73     | ----         |
| Length of ovipositor | ----           | 10.66 ± 2.94 |
| Total Body length    | 16 ± 3.05      | 15.33 ± 4.2  |

**b) Gryllus (Gryllus) bimaculatus De-Geer, 1773**

**Diagnostic features**

Size medium to large. Utterly smooth and purely black in color. Pronotum shine, hind femur and hind wings short. Tegmina blackish with two pale area spots at base where pronotum is attached. Elytra reaches to the apex of abdomen, wings much longer than the elytra and tibia have 5 or 6 long sharp spines on each margin. Some adults female with pale tegminal areas and few females with slight indication of this area. Ovipositor of female is little larger and acute. Mirror smaller, rhombus shaped and divided behind the middle by a curved vein.

**Remarks**

Morphologically it differ from other due to size and color in this legs with reddish brown. It was reported in Europe, Africa and Tropical Asia by Chopard [6]. He also detected that this species make massive damage in Khanedesh to Potato crops. Prabakar [9] recruited this species and gave it an updated checklist from Tamil Nadu India. Through in this survey, many samples were capture from dry region. During field survey cannibalism was also seen in this. Specimens in abundance in month of March to September.

**Table 2:** Measurement of various body parts of *G. (Gryllus) bimaculatus*

| Body Parameters    | Mean ± SD (mm) |              |
|--------------------|----------------|--------------|
|                    | Male (05)      | Female (05)  |
| Length of head     | 4.76 ± 0.74    | 2.25 ± 0.15  |
| Width of head      | 7.0 ± 0.57     | 6.25 ± 0.057 |
| Length of pronotum | 4.66 ± 0.35    | 3.45 ± 0.057 |
| Width of pronotum  | 7.7 ± 0.2      | 6.5 ± 0.57   |
| Length of femur    | 15.33 ± 0.57   | 14.5 ± 0.57  |
| Width of femur     | 6.33 ± 0.57    | 5.5 ± 0.57   |
| Length of tibia    | 11.66 ± 0.816  | 11 ± 1.15    |

|                      |             |           |
|----------------------|-------------|-----------|
| Width of tibia       | 2.0±0.0     | 2.0±0.0   |
| Length of mirror     | 5.0±0.0     | ----      |
| Width of mirror      | 5.0±0.0     | ----      |
| Length of ovipositor | ----        | 18.5±0.57 |
| Total Body length    | 24.66±0.577 | 22.5±0.57 |

c) *Grylloides sigillatus* Walker, 1869

**Diagnostic features**

Large size with light brown coloration. An extensive yellow transverse band on the head. Face yellow, smaller with spotted clypeus has brown color. Pronotum with brown spots and extending with feebly concave anterior margin. Femur yellowish with a few brown spots. Tibia with 6 spines on each margin. Remarkable difference was seen in the development of elytra in both sexes. Tegmina and hind wings shorter, tegmina covers half of the abdomen while in male elytra ranging to the 3<sup>rd</sup> abdominal section.

**Remarks**

It is common in everywhere and known “tropical house crickets. Its distribution was noticed from Europe, U.S.A, Asia, Malaysia. Presently we also captured its fair numbers from selected area. Khan [10] pragmatic that it caused large harm to fabrics mills in India. During our survey we have reported its large numbers from the bricks & garbage but mostly seen in holes of house.

**Table 3:** Measurement of various body parts of *G. sigillatus*

| Body Parameters    | Mean ± SD (mm) |
|--------------------|----------------|
|                    | Male (05)      |
| Length of head     | 2.8±0.72       |
| Width of head      | 2.45±1.05      |
| Length of pronotum | 3.25±0.62      |
| Width of pronotum  | 4.0±0.35       |
| Length of femur    | 11.5±1.0       |
| Width of femur     | 3.0.5±1.0      |
| Length of tibia    | 8.0±0.57       |
| Width of tibia     | 1.0.5±0.57     |
| Total Body length  | 14.5±1.0       |

**4. CONCLUSION**

Cricket is found everywhere and widely distributed and mostly present in tropical areas of south East Asia and also found in Pacific region. Species are discriminate with each other due to stridulatory tackle. The stridulatory apparatus is the taxonomic characters of field crickets from Mid-20<sup>th</sup> century. The field’s crickets are widely distributed in different fauna of district Naushahro Feroze. They are

omnivorous, Phytophagous, herbivorous and are predators. They are nocturnal and commonly seen in farming places.

**5. CONFLICT OF INTEREST**

All authors have declared that there is no conflict of interest regarding publication of this article.

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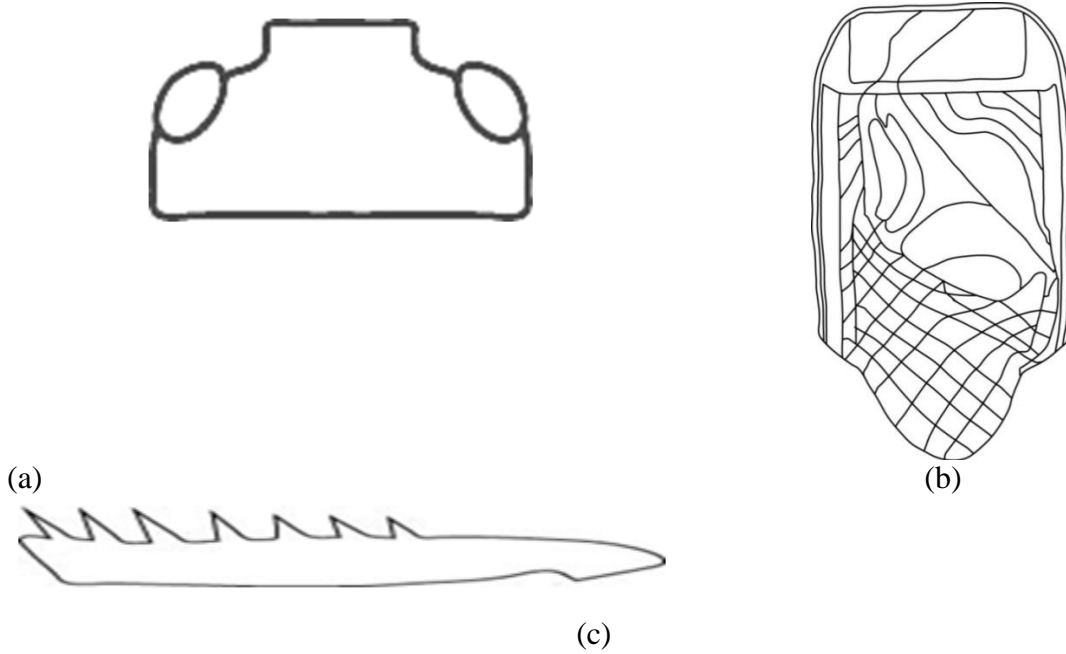
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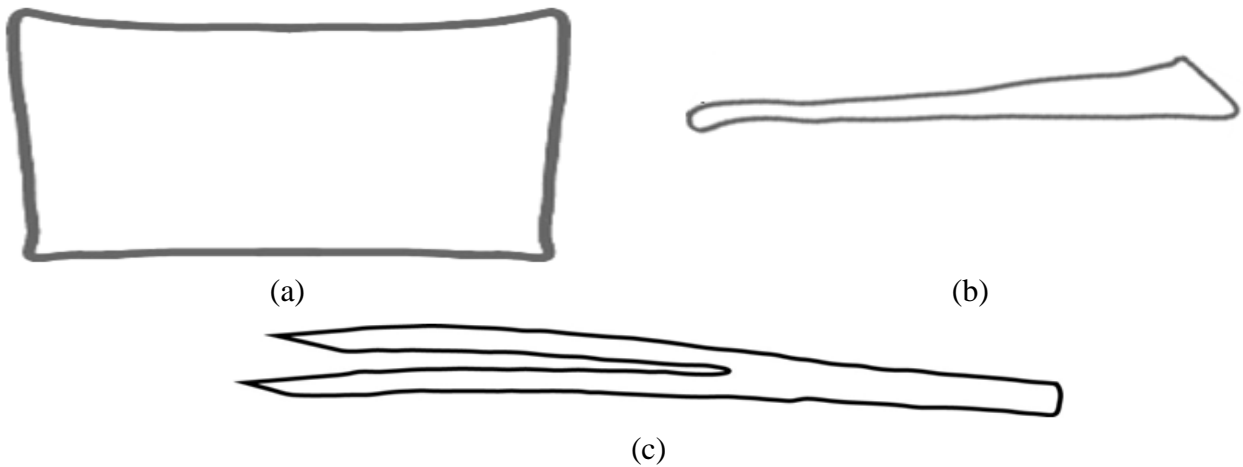
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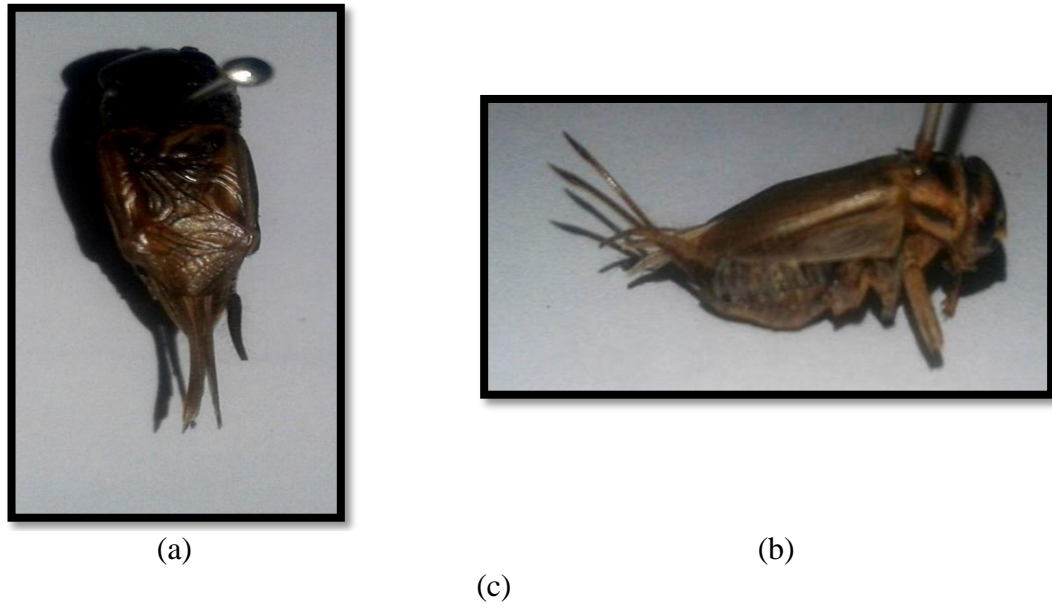
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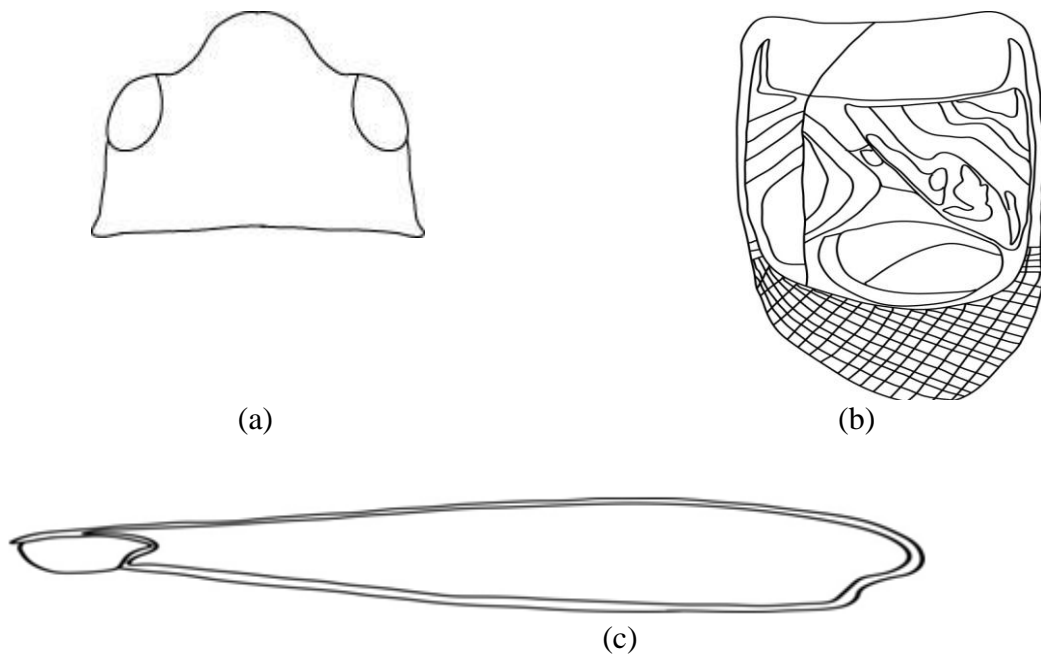
**Fig 1:** *A. domesticus*, a-c Male: a, DV Head, b, DV Elytra, c, LV Tibia  
(Bar line = 4mm)



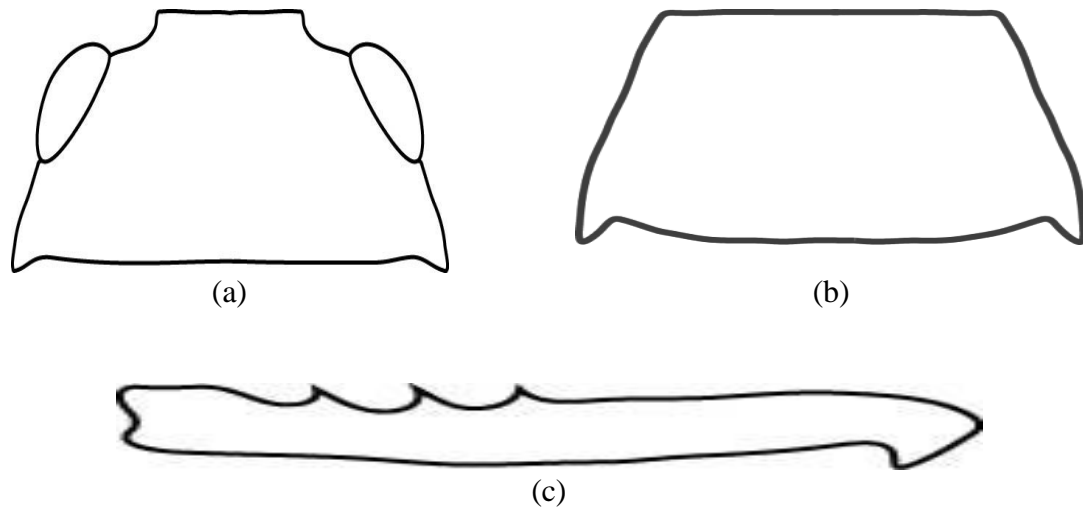
**Fig 2:** *A. domesticus*, a-c Female: a, DV Pronotum, b, LV Cercus, c, LV, Ovipositor  
(Bar line = 4mm)



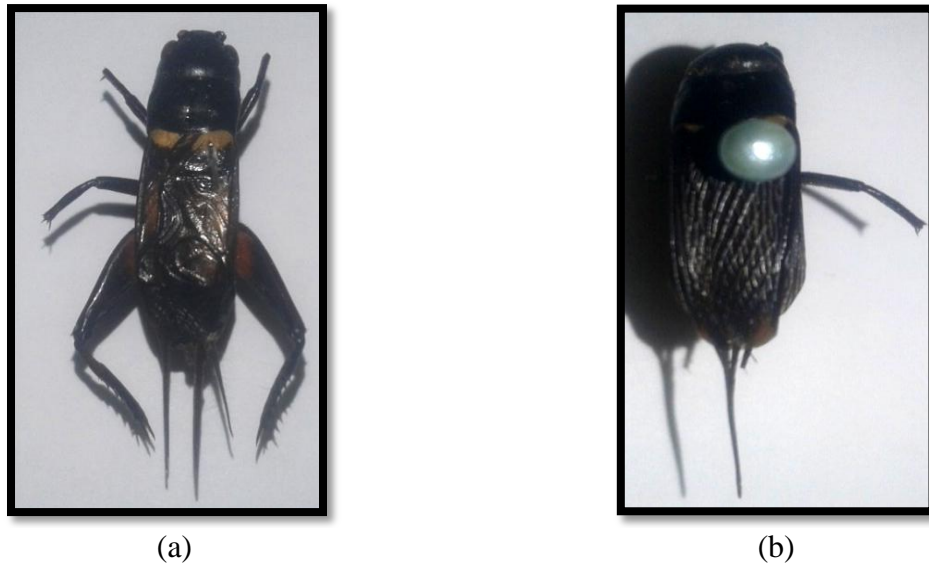
**Fig 3:** *A. domesticus*, (a) Dorsal view of (♂) (b) Lateral view of (♀)



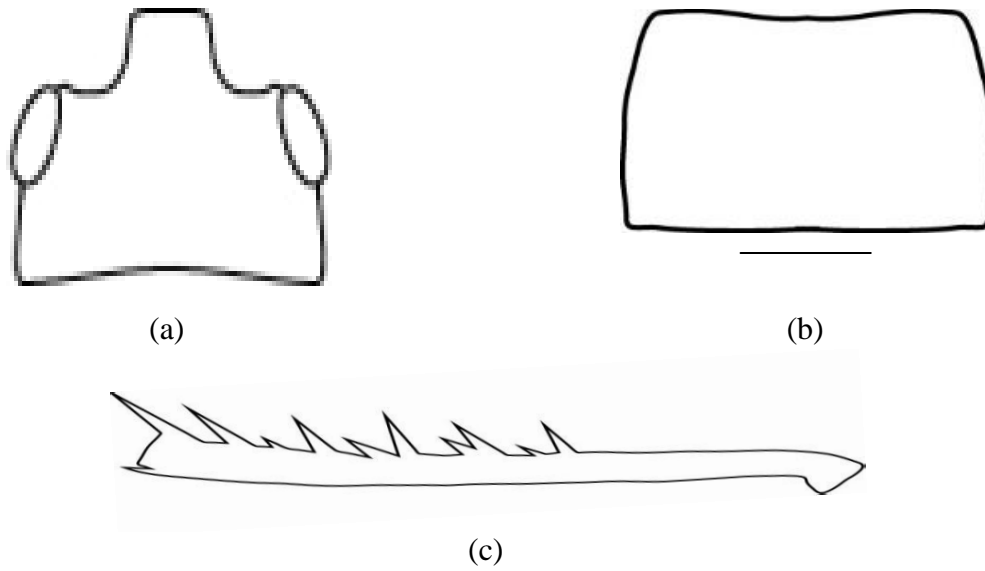
**Fig 4:** *G. (Gryllus) bimaculatus*, a-c Male: a, DV Head, b, DV Elytra, c, LV, Femur  
(Bar line = 4mm)



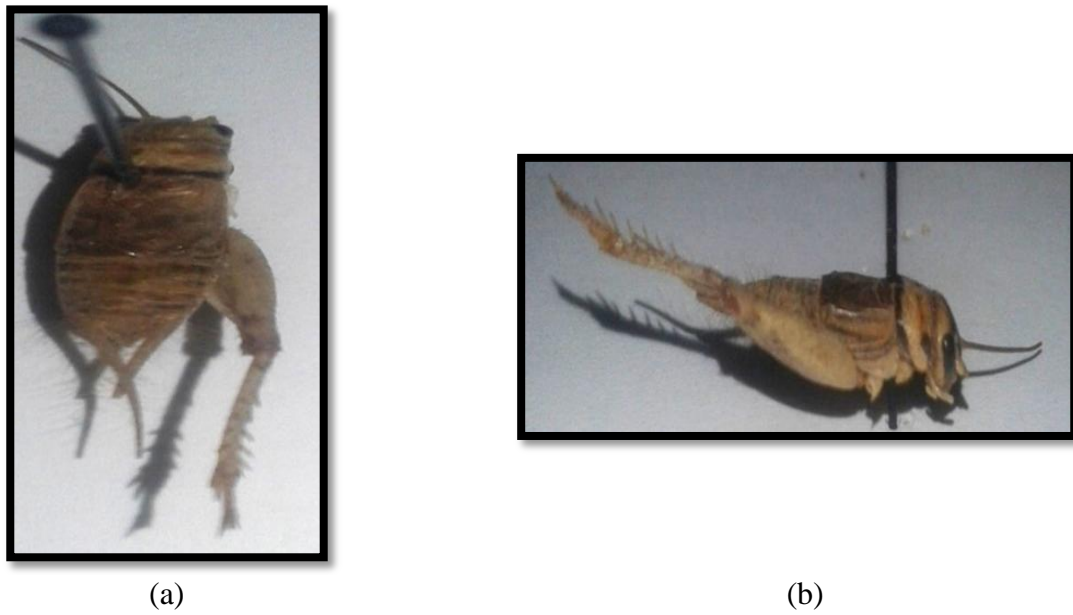
**Fig 5:** *G. (Gryllus) bimaculatus*, a-c, Female: a, DV Head, b, DV Pronotum, c, LV, Tibia  
(Bar line = 4mm)



**Fig 6:** *G. (Gryllus) bimaculatus*, (a) Dorsal view of (♂), (b) Dorsal view of (♀)



**Fig 7:** *G.sigillatus*, a-c, Male: a, DV Head, b, DV Pronotum, c, LV Tibia, (Bar line= 4mm)



**Fig 8:** *G. sigillatus*, (a) Dorsal view of (♂), (b) Lateral view of (♂)