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Studies on the tribe Acrotylini (Acrididae: Orthoptera) from Pakistan

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Abstract

The tribe Acrotylini are considered as pest of cereal crops, vegetables, orchards and pastures in Pakistan. During present study 5 species and subspecies of the tribe Acrotylini i-e *Acrotylus humbertianus* (Saussure), *A. insubricus insubricus* (Scopoli) *A. patruelis* (Herrich-Schaffer*) A. longipes longipes* (Charpentier) and *A. longipes subfasciatus* were examined. In this manuscript general morphological characteristic along with detail study of phallic complex of each species has carried out. Overall finding showed that there is significant difference in the epiphallus, ancorae, lophi and spermatheca of these siblings' species of Acrotylini.

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Introduction

Grasshopper insects' fauna belonging to sub family Oedipodinae are of great economic importance in Pakistan. The representatives of tribe Acrotylini are considered as pest, because they pose a constant threat to cereal crops, vegetables, orchards, Pastures and rain-feed areas. These grasshoppers are commonly known as band-winged insects and are characterized by different colors. They are widely distributed throughout the world. The grasshoppers of the tribe Acrotylini are entirely vegetarian and voracious feeders . They cause sever damage to various valued crops i.e. rice, wheat, sugarcane and their surrounding grasses. Majority of them (both adults and nymphs) are active during sun shine and cause heavy damage in cultivated crops. Their population mostly increases during the hottest days of the years. The grasshoppers of tribe Acrotylini are entirely vegetarian and voracious feeders, majority of them are active during sun shine can cause heavy damage in cultivated crops when their population may be increased at high densities. Mostly they are known as geophiles (living in open grounds) and Phytophyles (found at vegetation, grasses, herbs and shrubs). Earlier, genus Acrotylus was studied by (Kirby, 1914, Mischehnko 1936, Bei-Bienko and Mischehnko 1951, Uvarov 1966, Dirsh, 1975) and from Pakistan (Ahmed, 1980, Ritchie, 1981-82, Wagan 1990, Baloch, 1997, and Tokhai 1996). Further, on the basis of different features. Moeed (1966) reported the damaging status of *A. insubricus insubricus* at agricultural fields of Larkana district. (Ahmed, 1980) surveyed the grasshoppers fauna of Pakistan and reported that some of the Oedipodinae grasshoppers are the pest of orchards. (Wagan and Solangi , 1990) reported heavy damage of some Oedipodinae species on cultivated crops in different areas of Sindh Province. In order to bring the knowledge of *Acrotylus* of the Pakistan update the present studies highlight the diagnostic characters of phallic complex and epiphallus that have useful value for the purpose of accurate identification. An attempt has been made to classify species belonging to sub-family Oedipodinae on the basis of easily recognizable characters of external morphology and genitalia components. The study of these two parameters would led to the correct identification of this tribe, which will be very useful to control the pest at appropriate time

Materials and methods

Killing and preservation of grasshopper

The grasshoppers were collected from grassland, dry vegetation, rangelands, along the roadsides and rocky areas of various provinces of Pakistan. The specimens were killed and preserved by following slandered entomological method described by (Vickery and Kevan, 1983).

Study of phallic complex

For the study of male genitalia method described by (Kevan *et al.,* 1969) adopted. The method of softening the abdominal terminalia was not followed by immersing these in hot water, but by relaxing the whole insect over water in a small desiccators (to which a few drops of phenol had added) to prevent fungal growth was used. The period of relaxing was usually about 24 hours. After relaxing supra-anal plate of the specimen was raised smoothly with the help of needle cut laterally and whole phallic complex was taken out. The phallic complex was immersed in 10% hot potassium hydroxide solution for 5to 10 hours in order to remove unsclerotized and non chitinous tissues. They were the thoroughly washed in tap water and examined in glycerol on a cavity slide (without a cover glass), using a stereoscope dissecting binocular microscope put in into micro vials and then pinned through their rubber stopper beneath the insects from which the phallic structure had originally been extracted. It's too difficult in maintaining proper orientation of the specimens was overcome by supporting them in the required position with small pieces of absorbent cotton fiber. However, for the study of female genitalia method described by (Randell, 1963) was adopted. After relaxing the insect as per method mentioned above with the help of fine scissors an incision was made on each side of the abdomen where the tergum meets the sub genital plates, and

continued for enough anteriorly to allow removed of the extra plate in the neat operation. The sub genital plate was then depressed with forceps and a third cut made at its base were removed with the sub genital plates**.** The spermatheca lies just above the vagina was also removed. The dissected sub genital plate and spermatheca was then washed with 10 % potassium hydroxide solution and examined in water and stored as above.

Identification and measurements

Identification of specimens was carried out under the stereoscopic dissecting binocular microscope. The diagrams were drawn with the help of "Ocular square Reticule" placed in right eye piece of the stereoscopic dissecting binocular microscope. All the measurements are given in the millimeter. The scheme of measurement followed is that of (Hollis, 1965).The terminology with regard to phallic complex and female genitalia is adopted from (Dirsh, 1956 -1957).

Repository of specimens

The collected material has been deposited in the Museum of Entomology, Department of Zoology, University of Sindh, Jamshoro, Pakistan.

Results

Key to the species and sub species of genus Acrotylus

1. Wings yellow at base. Epiphallus with moderately wide bridge 2

--Wings rose or orange red at base. Epiphallus with narrow bridge 4

2.Wings without band (Fig.5) Epiphallus with ancorae almost straight with little furrow at base, rounded at apex anterior projections shorter, lateral plates fairly expanded towards posteriorly,lophi developed anteriorly but with broad apical lobes..... longipes longipes. Charpentier.

--wings with a band, anterior projection well developed.....3

3. Apex of tegmina with distinct dark speckles, wings with incomplete dark band anteriorly reaching anal vein (Fig.6); mesosternal inter space about twice wider than its greatest length; hind tibia with 10 inner spines. Epiphallus with ancorae large not narrower; lophi elongated rectangular with some narrow anterior

part..... humbertians. Saussur

--Apex of tegmina without dark speckles, wings with short dark band (Fig.7); mesosternal inter space about three times wider than its greatest length; hind tibia with 11 inner spines Epiphallus with ancorae incurved, pointed narrow at base, lophi smoothly straight, posterior portion knob-like in form but with rounded apices .....longipes subfasciatus. Bei-Bienko

4. Tegmina short not reaching to the middle hind tibia, dark band of wings smaller. (Fig 8), spermatheca as in (Fig.2 d) .....insubricus (Scopoli)

--Tegmina long extending to the middle of hind tibia ,dark band of wings larger. (Fig.9) spermatheca (Fig.2 e).....patruelis (Herrich-Schaffer)

Result

1*.Acrotylus humbertianus* (Saussure)

Diagnostic features

♂Medium size, body hairy throughout. Antennae filiform longer than head and pronotum together with 24 segments. Head shorter and little raised than pronotum. Fastigium of vertex concave, angular, with visible lateral carinulae. Fastigial foveolae present, slightly indistinct, frons vertical. Pronotum short but wide and saddle-shaped; strongly tuberculate, constricted in prozona, median carina well marked, lateral carinae irregular and tuberculate. ♀ Similar to male but larger, antennae slender 25-26 segments. Ovipositor short with curved valves conical and straight, lower valve with angular lateral projection.

Table1. Measurements of different morphological characters of *Acrotylus humbertianus* (Saussure) in millimeters (mm).

Parameters	Male (n =20)	Female (n = 20)		
	(Mean ± Sd)	(Range)	(Mean ±Sd)	(Range)
Length of Body	17.1± 6.61	15-19	19.72±5.78	17-22
Length of Antennae	5.96 ± 3.05	5-7	6.88 ± 2.84	6-8
Length of Pronotum	3.23± 1.71	3-4	3.26 ± 1.46	3-4
Length of Tegmina	17.8 ± 2.68	17-19	20.27 ± 6.44	18-23
Maximum width of Tegmina	2.24 ± 1.64	2-3	3.31 ± 1.55	3-4
Length of hind Femur	9.75 ±3.11	9-11	3.21 ± 1.47	9-11
Maximum width of hind Femur	3.04± 0.77	3-3.1	3.38 ± 1.84	3-4
Length of hind tibia	8.75 ± 2.77	8-10	9.97 ± 3.38	9-11

Table 2. Measurements of different morphological characters of *Acrotylus insubricus insubricus* (Scopoli) in millimeters (mm).

Parameters	Male (n = 16)		Female (n =13)	
	(Mean ± Sd)	(Range)	(Mean ±Sd)	(Range)
Length of Body	16.15 ± 2.76	15.2-17	19.15±3.95	18-21
Length of Antennae	6.07 ± 3.29	5-7.2	6.38±1.36	6-7
Length of Pronotum	3.13 ± 0.81	3-3.2	4.06±0.47	4-4.1
Length of Tegmina	16.43±3.98	15-18	19.95±2.49	19-21
Maximumwidthof Tegmina	3.25 ± 1.24	3-4	3.66±1.79	3.2-4
Length of hind Femur	9.29±1.51	9-10	10.33±1.37	10-11
Maximum width of hind Femur	3.11± 0.88	3-3.2	3.16±1.02	3-4
Length of hind tibia	8.33 ±1.59	8-9	9.69±1.03	9.6-10

General coloration

Generally paler brown in color. Antennae dark brownish with white spots at base .Fastigium of vertex with smaller black speckles .Tegmina and wings well developed membrane of tegmina semitransparent, brown opaque at base, rounded at apex. Wings hyaline, colored at base, with or without band. Hind femur slender and yellowish, hind knee rounded. Hind tibia spines , inner spurs large. Arolium small. Supra-anal plate elongate or curved with obtuse apex.

Phallic complex

Apical valve of penis longer than the apical valve of cingulum, valve of penis slightly crescent–shaped, tapered, and with acute apices at apex. Apical valve of cingulum broad at base, little curved, pointed with sub- acute tip. Arch of cingulum well marked. Apodemes inwardly curved , stout, produced anteriorly tube like with roundly process at apex. Rami well developed elongated, cylindrical. Gonopore remarkable slightly thin with truncated arcuate apices. Ejaculatory duct long, produced anteriorly. The distance between the tips of ancorae is measured about 1.6 mm and later on the space between the lobate parts of lophi approximately 0.8 mm, furthermore the length position of ancorae is measuring about 1.0 mm. Ancorae large not so narrower but straight, slightly incurved and with acute apices. Eventually lateral

plates expanded greatly towards posterior portion. Lophi slightly wide, elongated rectangular, divided into inner lobate part and outer narrow portion; posterior projections prominent almost rounded and be set with smaller spinules on the dorsal surface.

Table 3. Measurements of different morphological characters of *Acrotylus patruelis (*Herrich-Schaffer) in millimeters (mm).

Parameters	Female (n = 3)	
	(Mean ±Sd)	(Range)
Length of Body	19.33±2.93	17-21
Length of Antennae	6.73±0.64	6.2-7.0
Length of Pronotum	3.46±0.64	3.2-4.0
Length of Tegmina	20.33±0.89	20-21.0
Maximum width of Tegmina	3.33±0.37	3-3.5
Length of hind Femur	10.33±0.89	10-11.0
Maximum width of hind Femur	3.16±0.63	3-4.0
	10.5±0.61	10-11.0

Spermatheca

The spermatheca with pre-apical diverticulum large laterally upwarded with rounded acute apices at apex .Apical diverticulum sac-like, elongated and smoothly rounded at base.

Remarks

This species is closely related to *A.patruelis* (H. Schaf) in having long tegmina and arolium but can easily be separated from the same in having wings yellowish at base , with incomplete dark bands and by the other characters as noted in the keys and description. This species has been collected from the cultivated fields of maize, vegetables as well as from the rocky areas and the grassy fields of the various parts of Pakistan.

2.*Acrotylus insubricus insubricus* (Scopoli)

Diagnostic features

♂ body straight hairy thoroughly. Antennae filiform longer than head and pronotum together; with 23 segments. Head shorter little forwarded. Fastigium of vertex cylindrical, convex, angular with well marked lateral carinulae. Fastigial foveolae smoothly indistinct, frons vertical. Pronotum short, wide posteriorly, saddle-shaped tuberculate, constricted in prozona, median carina well developed; lateral carinae irregular without touching margin. ♀ similar to male but larger, antennae slender 24-26 segments. Ovipositor with curved valves, ventral valve with lateral projection.

General Coloration

Dark brown and paler brown in color. Antennae dark brownish with white spots at base. Fastigium of vertex cylindrical, convex, angular with well marked lateral carinulae, slightly with blackish spots. Tegmina semitransparent; basal half dirty light brown with a difuse spot at margin, apical margin shining with or without brown speckles. Wings rosy red at base, apex with distinct brown speckles, dark band lunar–shaped. Inner surface of hind femur yellow with black speckles, outer surface paler brown with black spots dorsally with 2-3 black spots. Hind tibia pale in color.

Phallic complex

Apical valve of penis is longer than the valve of cingulum; valve of penis vertical, divergent and with actangular acute apices at apex. Valve of cingulum thickening, broad at base slightly denticulate; with obtuse rounded tip at apex. Arch of cingulum flat, well developed. Basal bridge fold; thick. Apodemes stout; tube like, inwardly curved, produced anteriorly with obtuse rounded process. Rami well developed, lobe like that covers median and posterior projections. Gonopore remarkable with wide middle part. Ejaculatory duct moderate; produced anteriorly. The extent range between the tips of ancorae is measured about 2.8 mm; furthermore the interval cleft between the lobat parts of lophi is measuring about 0.4 mm; later on the length position of ancorae approximately 1.2

mm. Anterior projections protruding outwardly with sub-acute rounded apices; posterior portion of the lateral plates strongly expanded and extending well beyond with shallow deep process. Ancorae almost stout, long laterally placed; fairly convex at apex, and being thick at lower middle portion. Lophi elongated, cylindrical, having furrow at middle part, about denticulate at apex; anterior lobate portion wider than posterior lobate part; having rounded terminal processes.

Spermatheca

The spermatheca with. pre- apical diverticulum short, thin, oval slightly lateral upwarded with obtuse rounded apex. Apical diverticulum elongated, sac like with broad median process, smoothly rounded at base.

Remarks

This species is very closely related to *A . humbertians* . in having middle legs very long and slender inner surface of hind femur yellow with black speckles, but it can be easily separated from the same in having wings hyaline rosy at base and dark band lunar shaped and by the other diagonistic characters as noted in the keys and description.

3. *Acrotylus patruelis (*Herrich-Schaffer)

Diagnostic features

♀ of medium size. Antennae filiform longer than head and pronotum together; 24-26 segments, longer than head and pronotum together. Head conical, shorter than pronotum. Fastigium of vertex triangular, lateral carinulae raised. Fastigial foveolae triangular; frontal ridge sulcate, constricted above the antennae, widened at clypeus. Ovipositor small, valves with curved apices.

General Coloration

Usually dusty brown in color. Antennae dark brownish with white spots at base. Tegmina semitransparent with incomplete light band at base, apex transparent with brownish speckles. Wings hyaline, transparent, base light rose in color, dark band short, narrow and smoky, not reaching anteriorly to anal vein.

Spermatheca

The spermatheca with pre- apical diverticulum moderate, laterally up warded with rounded apex. Apical diverticulum fairly cylindrical, some what narrow and oval rounded at base. The spermatheca of this species possesses a long tube and opens on the dorsal wall of the genital cavity, opposite the genital opening. Pre-apical diverticulum moderate, laterally up warded with rounded apex. Apical diverticulum fairly cylindrical, little narrow and oval rounded at base.

Remarks

This species is closely related to *A .insubricus* (Scopoli*)* but it could easily be separated from the same by the characters noted in the keys and description. This species is recorded for the first time from this area, and has been collected from the rocky areas having mixed vegetation of grasses, herbs and shrubs. This is a rare species.

4. *Acrotylus longipes longipes* (Charpentier)

Diagnostic features

♂ small to medium size, hairy rugose, Antennae filiform longer than head and pronotum together with 23 segments. Head shorter about little raised than pronotum. Fastigium of vertex angular, concave with lateral carinulae. Fastigial foveolae present almost triangular in shape, frons vertical. Pronotum short, tuberculate, constricted in prozona; median carina visible, distinct, lateral carinae irregular; tuberculate. Tegmina and wings well developed frontal and middle legs shorter than hind legs. Hind femur slender. Hind tibia with 10 inner and 9 outer black tipped sharp spines. Arolium small. ♀ Similar to male but larger in size, antennae slender about26 segments. Ovipositor short with curved valves conical and straight, lower valve with angular lateral projection.

Table 4. Measurements of different morphological characters of *Acrotylus longipes longipes* (Charpentier) in millimeters (mm).

Parameters	Male (n = 04)		Female(n=01)
	(Mean ±Sd)	(Range)	
Length of Body	14.6±1.01	14.0-15.2	18.0
Length of Antennae	4.32±0.78	4-5.0	6.0
Length of Pronotum	3.05±0.28	3-3.1	3.2
Length of Tegmina	15.7±1.12	15.3-16.0	18.1
Maximum width of Tegmina	3.02±0.41	3-3.2	3.2
Length of hind Femur	8.15±0.28	8-8.3	9.0
Maximum width of hind Femur	2.8±0.50	3-3.1	3.0
Length of hind tibia	7.17±0.44	7-7.4	8.7

General Coloration

They are usually paler brown and dirty brown in color. Antennae dark brownish with white spots at base. Pronotum short but with brownish speckles. Tegmina semitransparent, basal half light brown with irregular light spots on margin. Wings usually hyaline, base shining yellow without dark bands. Apex 2-3 small dark speckles. Hind femur with two black bands in inner side knee blackish on the inner aspect. Hind tibia pale.

Table 5. Measurements of different morphological characters of *Acrotylus longipes subfasciatus* Bei-Bienko in millimeters (mm).

Parameters	Male (n=12)		Female (n=9)	
	(Mean ± Sd)	(Range)	(Mean ± Sd)	(Range)
Length of Body	16.70±5.29	15-19.0	20.55±2.04	20-22
Length of Antennae	6.83±1.38	6-7.0	6.68 ± 2.71	6-8
Length of Pronotum	3.30±1.40	3.1-4.0	4.0±00	4-4
Length of Tegmina	17.45±16.50	16-19.1	20.11±4.78	17-22
Maximum width of Tegmina	2.87±2.03	2.5-4.0	3.78±1.24	3-4.1
Length of hind Femur	8.62±1.22	9-11	11.0±2.00	10-12
Maximum width of hind Femur	3.05±0.48	3-3.1	3.38±1.03	3-4
Length of hind tibia	8.8±1.62	8-9.2	9.24±2.13	9-10

Phallic complex

Apical valve of penis longer than the apical valve of cingulum, valve of penis slightly crescent–shaped, tapered, and with acute apices at apex. Apical valve of cingulum broad at base, little curved, pointed with sub- acute tip. Arch of cingulum well marked .Apodemes inwardly curved , stout, produced anteriorly tube like with roundly process at apex. Rami well developed elongated, cylindrical. The extent range between the tips of ancorae is measured about 2.5 mm; furthermore the maximum cleft between the lobate parts of lophi measuring about 0.6 mm; later on the length position of an ancorae approximately 0.5 mm .Anterior projections constricted basally, broad, sub acute rounded at apex; lateral plates widened posteriorly. Ancorae greatly straight, moderate, slightly convex, rounded at apex. Lobes of lophi attached marginally to the lateral plates and closely applied to them; upcurved and anteriorly directed, having broad apical lobes; ending into small rounded terminal process.

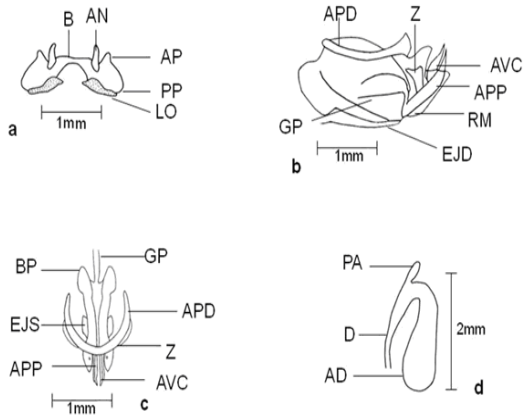

Fig. 1. Acrotylus humbertians , genitalia, a) Epiphallus. b)Endophallus and Cingulum lateral view . c) Same dorsal view. d) Spermatheca.

Spermatheca

The spermatheca with pre-apical diverticulum large laterally upwarded with rounded acute apices at apex .Apical diverticulum sac-like, elongated and smoothly rounded at base.

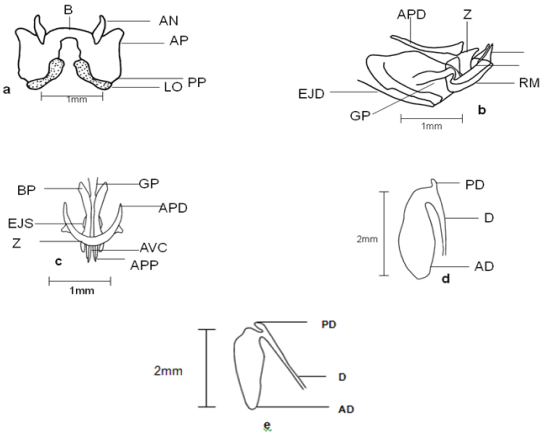

Fig. 2. *Acrotylus insubricus insubricus* , genitalia. a) Epiphallus.b) Endophallus and Cingulum lateral view. c) Same dorsal view. d) Spermatheca. e) Spermatheca .*A . patruelis.*

Remarks

This species is closely related to *A .insubricus* (Scopoli*)* but it could easily be separated from the same by the characters noted in the keys and description. This species is recorded for the first time from this area and has been collected from the rocky areas having mixed vegetation of grasses, herbs and shrubs. This is a rare species.

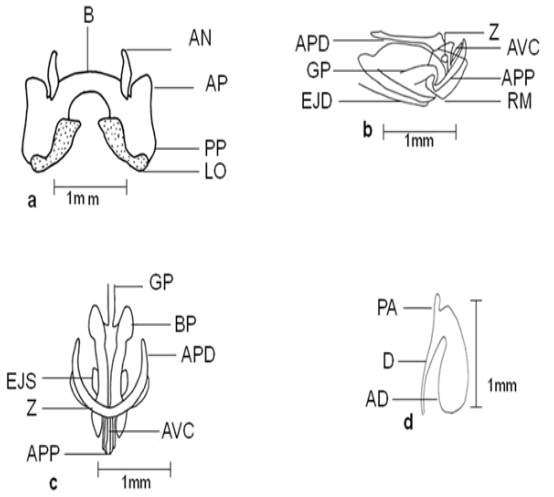

Fig. 3. *Acrotylus longipes longipes,* genitalia. a) Epiphallus. b) Endophallus and Cingulum lateral view. c) Same dorsal view. d) Spermatheca.

5. *Acrotylus longipes subfasciatus* Bei-Bienko

Diagnostic features

♂ of small to medium size, hairy, Antennae filiform with 23-25 segments, longer than head and pronotum together. Head conical shorter than pronotum. Fastigium of vertex triangular with raised lateral carinulae. Fastigial foveolae distinct, irregular; frons vertical, lateral carinulae slightly diverged towards the clypeus. ♀ Similar to male but larger in size, antennae slender about 24-26 segments. Ovipositor short and robust, valves Curved dorsal valves hook like, ventral valve with external lateral projection.

General Coloration

These grasshoppers are paler brown in color. Antennae dark brownish with white spots at base. Pronotum smaller but with white brownish speckles. Tegmina semitransparent, basal half light brown, with a light brown spot at margin, apical margin without half brown speckles. Wings hyaline, yellowish at base, dark band short lunar type. Hind femur has inner lightbrown incomplete band along the ventro-external carina; but shining pale above

the ventro-external carina, dorsal edge with 2 brown spots. Hind tibia pale.

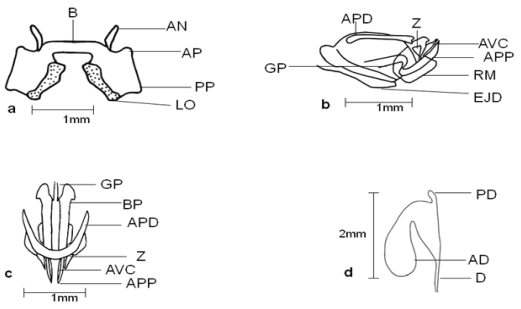

Fig. 4. *Acrotylus longipes subfasciatus* ,genitalia. a) Epiphallus.b) Endophallus and Cingulum lateral view. c) Same dorsal view. d) Spermatheca .

Phallic complex

Apical valve of penis vertical, thickening longer than the valve of cingulum; with rounded apices at apex. Valve of cingulum widened at the base, tapered posteriorly with subacute apices. Arch of cingulum well developed, flattened, have furrow at inner margins. Apodemes moderate, produced anteriorly, slightly incurved, and rounded at apex. Rami flat extending dorsally in cylindrical sheath and lobe like. The distance between the tips of ancorae is measured about 1.3 mm; and the interval margin between the lobate parts of lophi approximately 0.6 mm; later on the length position of ancorae is measuring about 0.7 mm. The anterior portion of lateral plates slightly protruding; having rounded apice; plates expanded well beyond with small-externo lateral expansions. Ancorae convex; with rounded sub acute apices. Lophi have strong stalks, straight and with rounded apical lobes; posterior projections knob like ending into rounded apices.

Fig. 5. *Acrotylus longipes longipes* Charpentier ♂ *Spermatheca*

The pre–apical diverticulum upward slightly laterally placed; rounded at apex. Apical diverticulum moderate, sac like, smoothly rounded at base.

Fig. 6. *A. humbertians* Saussure ♂

Remarks

This species is very closely related to *A.longipes longipes* Charpentier in having middle leg very large and slender inner spur of hind tibia also long and wings yellowish in coloration, but it can easily be separated from the same in having wings with a short lunar shaped dark band and by the other characters as noted in the keys and description.

Fig. 7 *A. longipes subfasciatus* Bei-Bienko ♂

Discussion

Earlier (Kirby, 1914) carried the faunistic studies on acrididae still form the basis for distribution and identification of grasshopper's species. There are two contradictory views on Kirby's fauna. (Roonwal, 1958) found it still useful whereas (Uvarov, 1977) considered it as outdated. In fact Kirby's description covered those grasshoppers' species, which were

mostly found in plains of India; particularly in its southern parts. It also included studies on some grasshopper's species occurring in areas, which are now part of Pakistan. Further (Walker, 1870) first accepts the status of Oedipodinae as family level. Hence it has been considered as a family or sub family. More over (Kirby, 1914, Bei-Bienko and Mischehnko, 1951) considered it as a sub family. While (Dirsh, 1956) included it in sub-family Acridinae. Whereas (Uvarov, 1966) separated this subfamily from Acridinae since it has been regarded as subfamily by (Dirsh 1975, Vickery and Kevan, 1983, Otte, 1995). In fact the systematic position of various groups of insects including Orthoptera has been discussed during the past decades on the basis of external morphological characters alone. As well as in recent years it has been realized by the insect taxonomists in general and; Orthopterist in particular that the external features are greatly influenced by the environmental factors and therefore these do not provide much more an authentic distinctive features that may separate the species from one another. In addition the male and female genital armature being mostly internal structures, are known characters that may be least influenced by the environment Anatomical phase including phallic structures, taxonomy and cytology have discussed by many workers in past time, for example by (Slifer ,1940a, b, 1943,Roberts,1940, Powers, 1942, Uvarov,1942, a,b, Dirsh, 1956, 1961 a, Helwig ,1958 and Eades ,1962).

We have studied morphological and genital structure as a basis of classification of the tribe Acrotylini. This studies is an attempt to discuss the variation and similarity of species in the same tribe and comparison on the basis of the phallic complex (epiphallus).The measurements indicate the slightly difference among the species and sub species of the tribe. According to present study the tribe Acrotylini is comprised on 5 species each of which possesses significant diagnostic characters. (Dirsh ,1956) pointed out that the phallic complex in the two different families' shows variation in almost every respect; as well as subfamily Oedipodinae distinguish rather than other tribes of grasshoppers species. Earlier, (Snodgrass, 1937, Tuxen , 1970, Eades, 2000) stated that male phallic characters occupy a unique place in insect systematic. The present findings have resemblance with previous observations that were carried out on the basis of morphological and internal genital characters. (Roberts, 1941) that Slifer's (1. C.) Scheme is erroneous and further suggested that, if the order of importance reversed, i.e. the form of spermatheca, rather than the presence of glandular pouches is considered to be of primary importance, similarities would be presented and this will shows the relationship between the members of subfamily. At the present we have confirmed the close relationship between the species of tribe Acrotylini by morphological and genital characters; these structures can be used as diagnostic character in insect taxonomy.

Fig. 8. *A. insubricus insubricus* Scopoli ♂

Fig. 9 . A. *patruelis* (Herrich-Schaffer) ♀

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