Pakistan J. Zool., vol. 36(4), pp. 285-293, 2004.

A Revision of Hayline Stink Bug Genus *Erthesina* Spinola (Hemiptera: Pentatomidae: Pentatominae) and Their Clasdistics

IMTIAZ AHMAD, NASREEN MEMON AND SYED KAMALUDIN

Department of Zoology, University of Karachi (IA), University of Sindh Jamshoro (NM), Federal University of Arts, Science an Technology, Gulshan-e-Iqbal Campus, Karachi (SK)

Abstract.- Hayline stink bug genus *Erthesina* Spinola with its seven known world species is revised with brief distinguishing features and zoogeographical distribution. The characters of each taxon are scanned from the present descriptions and those given in the literature to date, and their apomorphic states are recognized, on the basis of out group comparison within the tribe Haylini at large. A cladogram is also constructed based on the principle of parisimony to throw light on the evolutionary relationships of the included taxa.

Key words: Insects, Pentatomidae, Halyini, *Erthesina*, revision, Cladistics.

INTRODUCTION

Spinola (1837) described *Erthesina* to accommodate *Cimex mucoreus* F. (=*fullo* Thunberg) from Oriental region. Distant (1902) gave distinguishing features of the genus *Erthesina* and redescribed the type species *fullo* (Thunberg) alongwith *acuminata* Dallas and *guttata* (F.) from Sikhim, Burma, Bangladesh (Jessore), India, Sri Lanka, Andaman Island, China, Japan, Formosa, Hainan, north Bengal and Burma. Distant (1908) described *E. robertsi* from Sikhim and later (1918) described another species *E. aberrans* from north Bengal but his descriptions were mostly based on colour features. Ahmad *et al*. (1974) recorded *E. fullo* from different areas of NWFP in Pakistan and from Kashmir and Bangladesh. They also illustrated dorsal view and metathoracic scent complex through which it appears that they misidentified their species. Later Ahmad (1979, 1980) corrected this misidentification by recording *E. fullo* only from Bangaldesh and a manuscript species from different areas of Pakistan *i.e.* from Punjab and NWFP and Kashmir. Abbasi (1986) redescribed *E. fullo* from Pakistan following Ahmad *et al*. (1974) earlier misidentification, completely ignoring the new stand of Ahmad (1979, 1980) and his illustrations also appear to be incorrect especially of inflated aedeagus. Ahmad *et al*. (2002) redescribed *E. fullo* highlighting the important features separating it from not only the described species but also from the above undescribed species from Pakistan. Ahmad *et al*. (2003) finally described his udnescribed species from Pakistan and Kashmir with special reference to metathoracic scent complex and male and female genitalia and gave a key to world species highlighting cladistic relationship of their new species with the included taxa. Presently therefore all the seven world species of *Erthesina* alongwith their brief distinguishing features and zoogeographical distribution are given and in this light a cladistic analysis is carried out and a cladogram is constructed on the principle of parsimony.

0030-9923/2004/0004-0285 $ 4.00/0

MATERIALS AND METHODS

The works on *Erthesina* Spinola by Dallas (1851), Distant (1902, 1908 and 1918), China (1925), Ahmad *et al*. (1974), Ahmad (1979), Abbasi (1986), Ahmad *et al*. (2002) and Ahmad *et al*. (2003) along with present descriptions were scanned for the taxonomic characters. The characters were randomly taken. The polarities of these were deduced not unreasonably. The characters were compared with those found in the out group within their tribe at large. No homoplasies had to be invoked. The results were compared with the obtained data by Ahmad *et al.* (2002, 2003) in their cladistic relationships. Plesiomorphic conditions showing primitive characters, represented by “ao”,

"bo" and "co" etc. have been listed in the Table I on characters and characteristics but not taken into consideration in cladogram (Fig. 3).

Erthesina Spinola

Erthesina Spinola 1837: 291; Distant 1902: 117; Ahmad *et al*., 1974: 54; Ahmad, 1979: 56: 1980; 137; Abbasi, 1986: 111; Ahmad *et al*., 2002: 67; Dave-Rider (in unpublished catalogue of Pentatomidae).

Head long, anteriorly narrowed; antennae with basal segment not reaching head apex; labium with basal segment extending beyond the bucculae; metathoracic scent auricle remarkably elongated but its apex not at all reaching outer margin of evaporatoria; anterior and posterior tibiae dilated; in male pygophore with dorsomedian projection highly sclerotized, rectangular and bilobed; stem of paramere with inner spine; blade bilobed; inflated aedeagus with pair of bilobed dorsal membranous conjunctival appendages; in female spermathecal bulb large with three finger-like processes.

Type species

Erthesina fullo (Thunberg).

Distribution

China, Japan, Burma, Sri Lanka, India, Pakistan, Bangladesh, Kashmir, Sikhim and Andaman Island.

Comparative note

This genus is most closely related to *Dalpada* Amyot and Serville in having bilobed paraclypei, basal antennal segment not reaching apex of head and anterior tibiae dilated but it can easily be separated from the same in having paraclypei apically acute, posterior tibiae dilated, humeral angles of pronotum sub-acute and by the other characters as noted in the description.

Erthesina aberrans Distant
(Figs. 1A, 1M)

Erthesina aberrans Distant 1918: 121.

Body ochraceous, thickly and coarsely punctate with black; antennae black, basal segment broadly streaked with ochraceous, other segments palely ochraceous at base; head pointed in front, distinctly shorter than pronotum, lateral margins a little before the apex of 1st antennal segments spinously notched; antennae with basal segment stoutest, not reaching apex of head, 2nd and 3rd segments subequal, 4th longest; pronotum with seven somewhat oblique longitudinal fasciae of dark punctures; anterior and posterior tibiae more or less normally dilated, all femora normal; membrane not extending beyond the abdominal apex; body length 20.00 mm.

Comparative note

This species is most closely related to *robertsi* Distant in having 2nd and 3rd antennal segments sub-equal and 4th longer than both separately but it can easily be separated from the same in having antennae with basal segment broadly streaked with ochraceous, anterior and posterior tibiae more or less normally dilated, femora not peculiarly dilated and by the other characters as noted in the description.

Distribution

North Bengal.

Erthesina acuminata Dallas
(Fig. 2A)

Erthesina acuminata Dallas 1851: 183; Distant 1902: 118.

Body grayish testaceous, very thickly punctate with brown; antennae brown with the two apical segments pitchy, the base of the last segment orange; head remarkably pointed infront, more or less equal to pronotum, lateral margins slightly toothed near the apex; proportions of antennal segments mostly similar to that in *E. fullo;* labium long, reaching base of last abdominal segment; dilation of the anterior tibiae triangular; all femora normal; body length 20.00 mm (remaining features mostly as in *E. fullo*).

Distribution

Sikhim, Assam, Bangladesh, Sri Lanka, China and Japan.

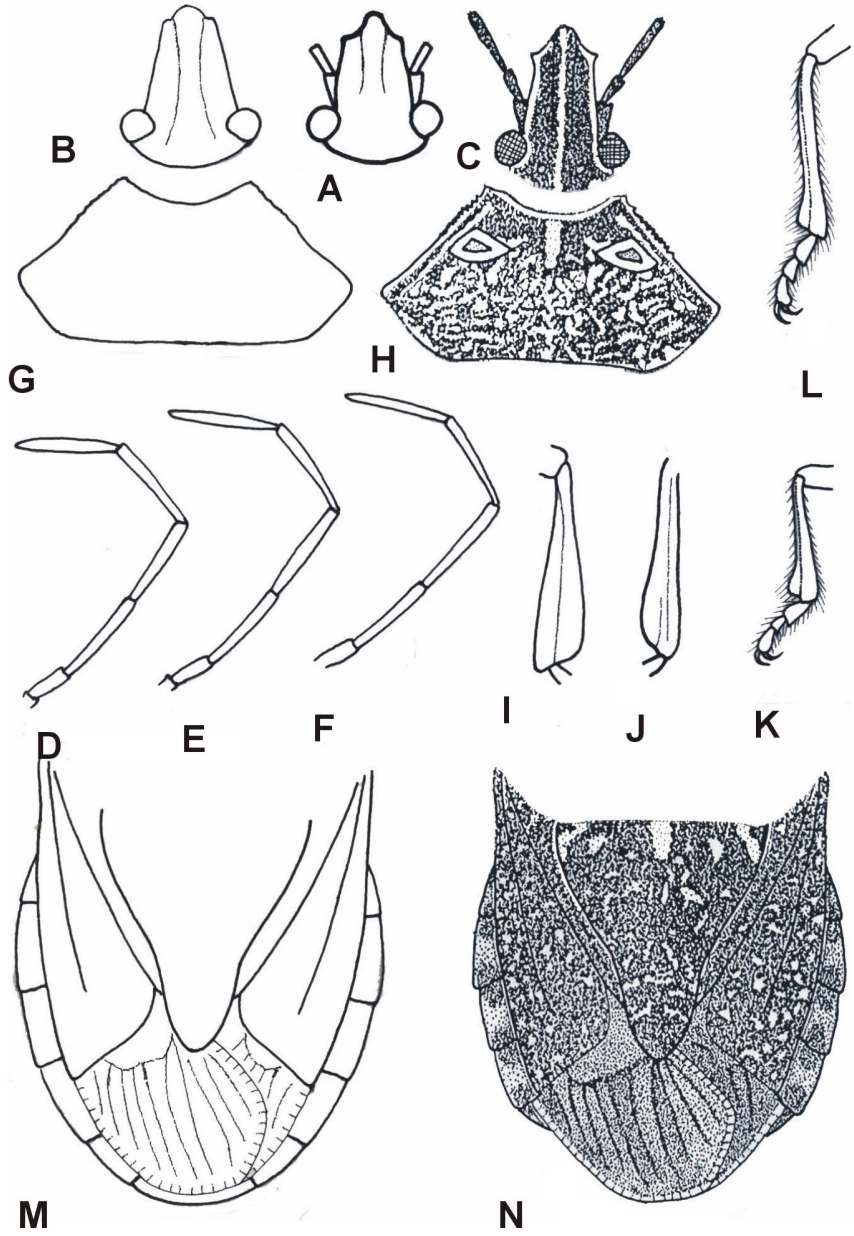

Fig. 1. Apomorphies: Head, dorsal view; A, *E. aberrans*; B, *E. fullo*; C, *E. pakistanensis*; D-F, antenna, lateral view, D, *E. fullo*; E, *E. pakistanensis*; F, *E. robertsi*; G-H, Pronotum, dorsal view; G, *E. fullo*; H, *E. pakistanensis*; I-K, Fore tibiae, lateral view, I, *E. fullo*; J, *E. robertsi* (with femur); Hind femur and tibia, lateral view, L. *E. robertsi*; M, and N, Membrane of hemelytra, dorsal view; M, *E. aberrans*, N, *E. pakistanensis*.

Comparative note

This species appears isolated in the genus *Erthesina* in having head prominently acuminate anteriorly, labium long, reaching to base of 7th abdominal segment and by the other characters as noted in the description.

Erthesina fullo (Thunberg)
(Figs. 1B, D, G, 1; 2B, F)

Cimex fullo Thunberg 1783: 42.
Erthesina fullo, Dallas 1851: 183; Distant 1902: 117; Ahmad *et al*., 2002: 67-71; Ahmad *et al*. 2003; 181: 187.

Cimex mucoreus F., 1794: 117; *Erthesina mucoreus*, Spinola 1837: 291.

Body testaceous brown with piceous or blackish tinge, darkly punctate; antennae brownish ochraceous; head moderately tapering at apex with lateral margins of paraclypei slightly sinuate, length more or less equal to pronotum; basal antennal segment never reaching head apex, second antennal segment slightly less than 2x basal and distinctly longer than 3rd, 4th less than ½ again longer than 3rd, labium reaching 3rd abdominal segment; both anterior and posterior tibiae moderately dilated; all femora normal; membrane of hemelytra well extending apex of abdomen; body length 20.00 to 25.00 mm. Apices of first gonocoxae and of 9th paratergites narrowed but subrounded.

Comparative note

This species is most closely related to *pakistanensis* in general appearance and colouration but it can easily be separated from the same in having, 2nd antennal segment distinctly longer than 3rd, labium reaching to third abdominal segment and by the other characters as noted in the description.

Distribution

Sikhim, North Bengal and Burma.

Erthesina guttata
(Fig. 2C)

Cimex guttata F. 1787: 291; *Erthesina guttata*, Distant 1902: 118.

Body olivaceous green, thickly punctate; pronotum, scutellum and corium speckled with small ochraceous collosities; labium reaching to fourth abdominal segment; anterior and posterior tibiae moderately lobately dilated; all femora normal; body length 20.00 – 25.00 mm (remaining features mostly as in *E. fullo*).

Comparative note

This species appears isolated among *Erthesina* species in having body olivaceous-green, labium reaching to fourth abdominal segment and by the other characters as noted in the description.

Distribution

Sri Lanka.

Erthesina ilia China
(Figs. 1J, 2D, G)

Erthesina ilia China 1925: 452-453.

Body black with ochraceous spots and callosities, coarsely punctate; head tapering at apex, subequal to pronotal length; lateral margins slightly sinuate; antennae black, basal segment short, not reaching apex of head, 2nd segment 2x the length of basal, 3rd slightly shorter than 2nd, 4th 1½ x the length of 3rd; labium reaching middle of the 3rd abdominal segment; anterior tibiae feebly dilated, entirely black, all femora normal; membrane of hemelytra slightly extending beyond the apex of the abdomen; body length 22.0 mm. Apices of 1st gonocoxae and 9th paratergites much narrowed, subacute.

Comparative note

This species appears closely related to *E. fullo* and *E. pakistanensis* in having 2nd and 3rd antennal segments unequal in length but it appears isolated in its group in having head, pronotum, scutellum and legs black, membrane of hemelytra slightly extending beyond apex of abdomen, 2nd antennal segment only slightly longer than 3rd, fore tibiae only feebly dilated and by the other characters as noted in the description of both the species.

Distribution

China.

Taxonomic note

China (1925) on the one hand considered his species allied to *fullo* but on the other, on the basis of shape of dilation of tibiae regarded it very close to and probably synonymous with *robertsi* Distant (from north India) whose type according to him is a teneral specimen and therefore its contrasting colours from *ilia* is not reliable. China (*op.cit.*) ignored however that *robertsi* belongs to *aberrans* group with 2nd and 3rd antennal segments subequal in length, in which both anterior and posterior tibiae are not only much less but also laminately, not

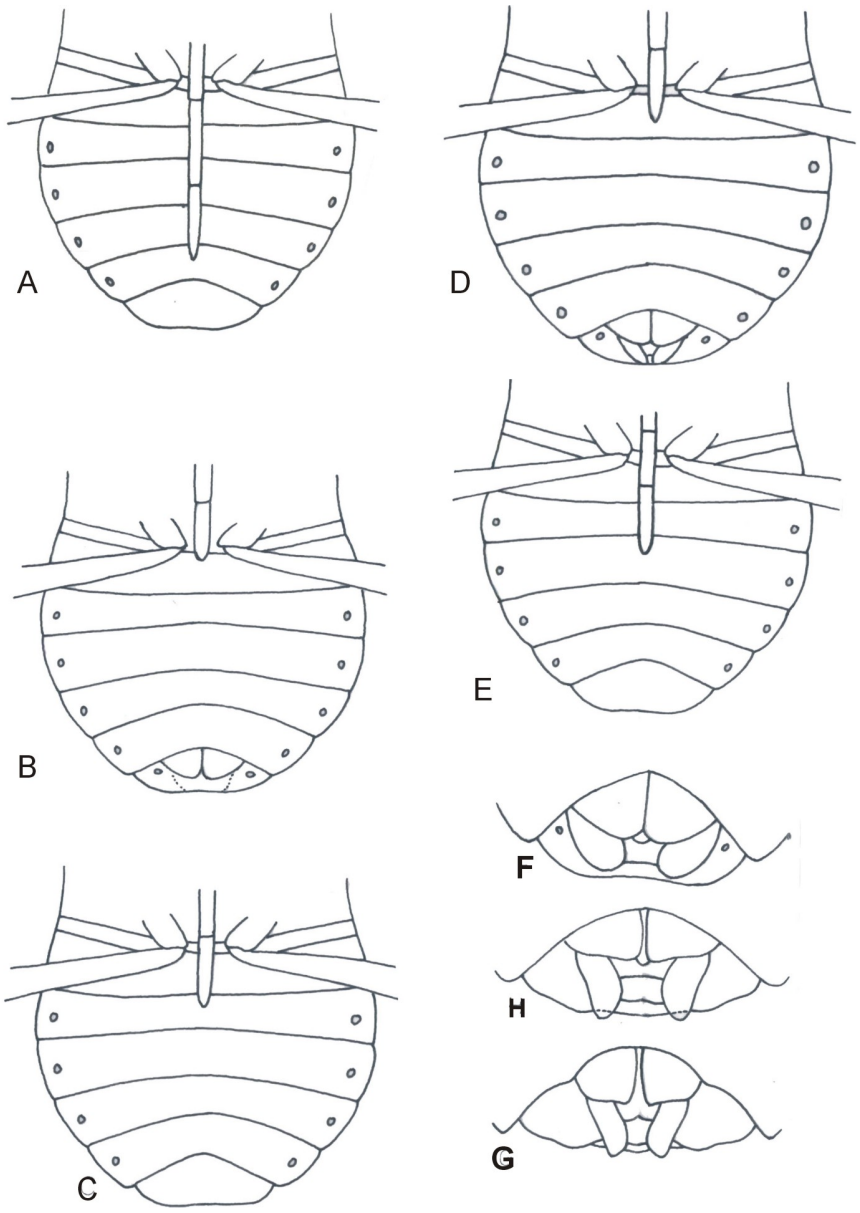

Fig. 2. Apomorphies: Labium, ventral view, A, *E. acuminata*; B, *E. fullo*; C, *E. guttata*; D, *E. ilia*; E, *E. robertsi*; F-H, Female terminalia, ventral view; F, *E. fullo*; G, *E. ilia*; H, *E. pakistanensis*.

lobately dilated (but in *ilia* anterior tibiae are feebly dilated) and according to the original author (Distant, 1908) the peculiar dilation of the anterior and posterior femora is a character of *robertsi* isolating it from all other species of *Erthesina*.

Erthesina pakistanesis Ahmad *et al*.
(Figs. 1C, E, H, N; 2H)

Erthesina pakistanensis Ahmad *et al*., 2003: 182.

Body ochraceous brown with black tinge,

densely punctate; antennae dark brown with basal portions of 4th and 5th segments ochracenous; head moderately tapering at apex, with lateral margins of paraclypei slightly sinuate, longer than pronotum; basal antennal segment much shorter than head apex, 2nd slightly less than 2x the length of basal, 3rd distinctly longer than 2nd, 4th 1¼ x the length of 3rd, labium of variable length, reaching the middle of 3rd to base of 6th abdominal venter; both anterior and posterior tibiae moderatelyly lobately dilated, all the femora normal; membrane of hemelytra moderately passing beyond apex of abdomen; body length 26.8 – 27.5 mm. Apices of 1st gonocoxae and 9th paratergites narrowed but subround.

Comparative note

It is most closely related to *fullo* in general appearance but it can easily be separated from the same in having 2nd antennal segment distinctly shorter than the 3rd, labium of variable length reaching from middle of 3rd upto 6th abdominal venter and by the other characters as noted in the description of both the species.

Distribution

Punjab and NWFP in Pakistan and Kashmir.

Erthesina robertsi Distant 1908: 434
(Figs. 1F, K, L, ZE)

Body testaceous brown with piceous or blackish tinge, darkly punctate; antennae brownish ochraceous, head tapering at apex, as long as pronotum, lateral margin obscurely toothed or notched below apex; antennae with basal segment slightly thickened, not nearly reaching head apex, 2nd and 3rd segments subequal and slightly shorter than 4th separately; labium reaching to base of 5th abdominal venter; anterior and posterior tibiae laminately, not lobately and much less dilated, anterior and posterior femora peculiarly dilated; membrane of hemelytra moderately extending apex of abdomen; body length 21.50 mm.

Comparative note

This species is most closely related to *aberrans* in having 2nd and 3rd antennal segments subequal and 4th longer than both separately but it can easily be separated from the same in having head as long as pronotum, anterior and posterior tibiae much less and laminately not lobately dilated and anterior and posterior femora peculiarly dilated.

Distribution

Sikhim.

Table I.- Characters and character states

a_0	Body moderate-sized.
a_1	Body large-sized (all included taxa).
b_0	Head and antennae light in colour.
b_1	Head and antennae at least slightly dark in colour (all included taxa).
b_2	Head and antennae light gray or brown with base of apical segments orange in colour (*acuminata*)
b_3	Head and antennae darker, somber, castaneous or nigrous (all *Erthesina* spp. except acuminata).
b_4	Head olivaceous green, coarsely punctate (*guttata*).
b_5	Head ochraceous, brownish black, prickly punctate with black (all *Erthesina* spp., except *acuminata* and *guttata*).
b_6	Head and antennae black, coarsely punctate (*ilia*).
c_0	Antennae dull pale.
c_1	Antennae piceous with base of apical segment ochraceous (*fullo*).
c_2	Antennae brownish ochraceous (*robertsi*).
c_3	Antennal segments dark brown with basal portion of 4th and 5th segments ochroceous (*pakistanensis*).
c_4	Antennae black with basal segment broadly streaked black with ochraceous, other segments pale ochraceous at base (*aberrans*).
c_5	Antennae entirely black (*ilia*).
d_0	Ocelli pale.
d_1	Ocelli pink (*pakistanensis*).
d_2	Ocelli ochraceous (*fullo*).
e_0	Pronotum, scutellum and corium unicolourous, light coloured.
e_1	Pronotum and scutellum brownish black with ochraceous spots (*pakistanensis* and *fullo*).
e_2	Pronotum, scutellum and corium testaceous brown and darkly punctate (*robertsi*).
e_3	Pronotum, scutellum and corium black with ochraceous spots and callosities (*ilia*).
f_0	Head equal to pronotum (most species).
f_1	Head somewhat longer than pronotum (*pakistanensis*).
f_2	Head distinctly shorter than pronotum (*aberrans*).
g_0	Head anteriorly rounded.
g_1	Head less acuminate anteriorly (most species except *acuminata*).
g_2	Head much acuminate (*acuminata*).
h_0&h_{a0}	Second, 3rd and 4th antennal segments equal to each other.
h_1	Second and third antennal segments sub-equal (*robertsi* and *aberrans*).
h_2	Second antennal segment shorter or longer than 3rd (*ilia,*

fullo and *pakistanensis*).

h_3 Second antennal segments slightly longer than 3rd (*ilia*).

h_4 Second antennal segment distinctly longer than 3rd (*fullo*).

h_5 Second antennal segment distinctly shorter than 3rd (*pakistanensis*).

h_{a1} Fourth antennal segment longer than 2nd and 3rd separately (*robertsi* and *aberrans*).

h_{a2} Fourth antennal segment about 1¼ longer than 3rd (*fullo* and *pakistanensis*).

h_{a3} Fourth antennal segment about 1½ longer than 3rd (*ilia*).

i_0 Labium moderately long, passing beyond hind coxae.

i_1 Labium passing distinctly beyond hind coxae (in all taxa).

i_2 Labium reaching to middle of 3rd abdominal venter (*ilia*).

i_3 Labium well reaching to 3rd abdominal venter (*fullo*).

i_4 Labium of variable length, reaching to from 3rd to base of 6th abdominal venter (*pakistanensis*)

i_5 Labium reaching to 4th abdominal segment (*guttata*).

i_6 Labium reaching to 5th abdominal venter (*robertsi*).

i_7 Labium reaching to base of last abdominal segment (*acuminata*).

j_0 Anterior and posterior femora not dilated.

j_1 Anterior and posterior femora peculiarly dilated (*robertsi*).

k_0 Anterior and posterior tibiae smoothly elongated.

k_1 Only anterior tibiae dilated posterior tibiae cylinderical (*Dalpada*).

k_2 Anterior and posterior tibiae more or less dilated (in most taxa of *Erthesina*).

k_3 Anterior tibiae only feeby dilated (*ilia*).

k_4 Anterior tibiae triangularly dilated (acuminata).

k_5 Anterior and posterior tibiae not lobately but laminately and much less dilated (*robertsi*).

l_0 Hemelytra reaching to apex of abdomen.

l_1 Hemelytra reaching beyond apex of abdomen (in most *Erthesina* spp.

l_2 Hemelytra short of apex of abdomen (*aberrans*).

m_0 Apices of 1st gonocoxae and 9th paratergites round.

m_1 Apices of 1st gonocoxae and 9th paratergites narrowed (*fullo, pakistanensis* and *ilia*).

m_2 Apices of 1st gonocoxae and 9th paratergites subacute (*ilia*).

Explanation of characters and character states.

Body size (a)

Body large-sized 20.00 mm long or more than 20.00 mm in length in *robertsi, aberrans, acuminata, fullo, guttata, robertsi* and *pakistanensis* shows their synapomorhic condition (a).

Patches and pigmentations of head and antennae (b)

Head and antennae slightly dark in most species reflect their synapomorphic state (b_1). Head and antennae light gray or brown with base of apical segments orange in *acuminata* show its autapomorphic condition (b_2). Head and antennae darker, somber, castaneous or nigrous in all *Erthesina* spp., except in *acuminata* show their synapomorphic condition (b_3). In *guttata* the head olivaceous green, coarsely punctate shows its more derived autapomorphic condition (b_4). Head ocharceous, prickly punctate with black in *aberrants* (and remaining taxa) shows its more derived autapomorphic state (b_5). Head black coarsely punctate in *ilia* appears most specialized autapomorphic condition (b_6).

Colour of antennal segments (c)

Antennae piceous with base of apical segment ochraceous (c_1). In *robertsi* antennae brownish ochraceous show derived autapomorphic condition (c_2). Antennal segments dark brown with basal portion of 4th and 5th segments ochraceous show more derived autapomorphic condition (c_3) in *pakistanesis*. In *aberrans* the antennae appear black having basal segments broadly streaked black with ochraceous and other segments pale ochraceous at base show its further derived autapomorphic state (c_4). In *ilia* antennae entirely black show its most derived autapomorphic condition (c_5).

Ocelli (d)

Ocelli pink in *pakistanensis* show its autapomorphic condition (d_1). In *fullo* the ocelli appear ochraceous and show derived autapomorphic state (d_2).

Colour of pronotum, scutellum and corium (e)

Pronotum and scutellum brownish black with ochraceous spots in *pakistanensis* and *fullo* show their synapomorphic condition (e_1). In *robertsi* the pronotum, scutellum and corium are testaceous brown with darkly punctate appearance show autapomorphic state (e_2). Pronotum, scutellum and corium with ochraceous spots and callosities in *ilia* show its more derived autapomorphic condition (e_3).

Head / pronotal length (f)

Head somewhat longer than pronotum in *pakistanensis* shows its autapomorphic condition (f_1). In *aberrans* head distinctly shorter than pronotum shows its derived autapomorphic state (f_2).

Head shape (g)

Head less acuminate anteriorly in most *Erthesina* species except in *acuminata* shows synapomorphic condition (g_1). In *acuminata* much acuminate head shows its more derived autapomorphic state (g_2).

Ratio of antennal segments (h and ha)

Second antennal segments sub-equal to third in *robertsi* and *aberrans* show their synapomorphic condition (h_1). In *ilia, fullo* and *pakistanensis* 2nd antennal segments shorter or longer than 3rd show their derived synapomorphic condition (h_2). Second antennal segments only slightly longer than 3rd in *ilia* show its more derived autapomorphic condition (h_3). Second antennal segments distinctly longer than 3rd in *fullo* show its further derived autapomorphic condition (h_4). In *pakistanensis* 2nd antennal segments distinctly shorter than 3rd show its remarkably derived autapomorphic state (h_5). In *aberrans* and *robertsi* 4th antennal segments distinctly longer than 2nd and 3rd separately show their much derived synapomorphic state (h_{a1}). In *fullo* and *pakistanensis* 4th antennal segments about 1¼ x longer than 3rd show their further derived synapomorphic condition (h_{a2}). In *ilia* 4th antennal segments 1½ x longer than 3rd show its most derived autapomorphic state (h_{a3}).

Labial reach (i)

Labium reaching from 3rd to base of 7th abdominal venter in *aberrans, acuminata, guttata, fullo, ilia, pakistanensis* and *robertsi* shows their synapomorphic condition (i_1). In *ilia* labium reaching to middle of 3rd abdominal venter shows its autapomorphic state (i_2). In *fullo* labium well reaching to 3rd abdominal venter shows its more derived autapomorphic state (i_3). Labium of variable length, reaching from 3rd to base of 6th abdominal venter in *pakistanensis* appears more derived state (i_4). Labium reaching 4th abdominal venter in *guttata* shows its further derived autapomorphic condition (i_5). In *robertsi* labium well reaching to 5th abdominal venter shows its further more derived state (i_6). In *acuminata* the labium reaching upto base of last abdominal venter shows its most derived state (i_7).

Anterior and posterior femora (j)

Anterior and posterior femora peculiarly dilated in *robertsi* show its autapomorphic state (j_1).

Anterior and posterior tibiae (k)

Anterior tibiae dilated in all the species of *Dalpada* show their synapomorphic condition (k_1). In all the representatives of the genus *Erthesina* the anterior and posterior tibiae are more or less dilated which show their derived synapomorphic state (k_2). In *ilia* anterior tibiae are feebly dilated which show its autamorphic state (k_3). In *acuminata* anterior tibiae are triangularly dilated which show its more derived autapomorphic state (k_4). In *robertsi* anterior and posterior tibiae are not lobately but laminately and much less dilated which show its most derived autapomorphic state (k_5).

Reach of hemelytra (l)

In most *Erthesina* species hemelytra reaching beyond apex of abdomen shows synapomorphic condition (l_1). In *aberrans* hemelytra short of abdomen shows derived autapomorphic state (l_2).

Shape of 1st gonocoxae and 9th paratergites in female genitalia (m)

Apices of 1st gonocoxae and 9th paratergites narrowed in *fullo, pakistanensis* and *ilia* show their synapomorphic condition (m_1). Apices of 1st gonocoxae and 9th paratergites subacute in *ilia* show its more derived state (m_2).

DISCUSSION

The genus *Erthesina* Spinola comprises seven world species *viz., aberrans, acuminata, fullo, guttata, ilia, pakistanensis* and *robertsi* with anterior and posterior tibiae dilated fall into two groups (Fig.3). Group I consists of only one species *acuminata* which plays out group relationships with the entire clade in having apomorphies of head much acuminate anteriorly (g_3) and labium very long reaching to base of abdominal venter (i_2). Group II again is divided into two subgroups. Subgroup-I includes only *guttata* with autapomorphies of head olivaceous green (b_4). The subgroup-II is further divided into two minor subgroups. Subgroup-Ia includes *robertsi* and

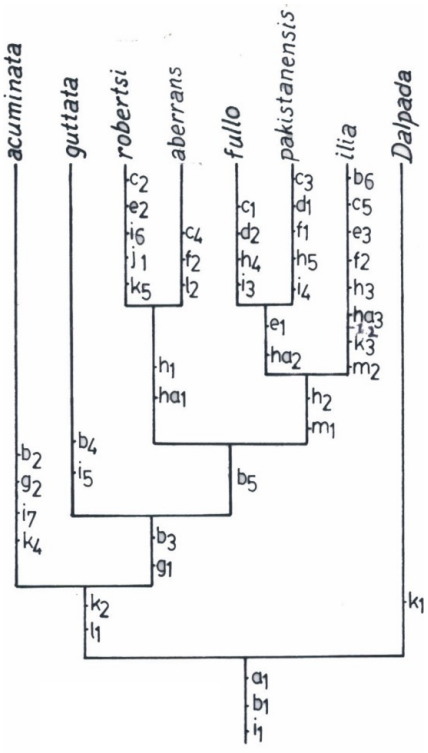

Fig. 3. Cladogram showing relationships of the included taxa.

aberrans which play sister group relationships with each other and outgroup relationships with the remaining clade in having 2nd and 3rd antennal segments subequal (h_1). The second subgroup-Ib includes *fullo, ilia* and *pakistanensis*, in which *fullo* and *pakistanensis* play sister group relationship with each other in having apomorphies of 4th antennal segments about 1¼ x longer than 3rd (h_{a2}) while the species of *ilia* plays outgroup relationship with the former in having head entirely black and coarsely punctate (b_6). The present results generally support those of Ahmad *et al*. (2002, 2003).

REFERENCES

ABBASI, Q.A., 1986. Morpho-taxonomic studies of the family Pentatomidae Leach. 1815 (Heteroptera: Pentatomomorpha) of South Asia (Pakistan, Azad Kashmir and Bangladesh) with reference to the phylogeny of the group. *Pakistan J. ent. Karachi Suppl*., **5**: 105-247.

AHMAD, I., 1979. A revision of the superfamilies Coreoidea and Pentatomoidea (Heteroptera: Pentatomomorpha) from Pakistan, Azad Kashmir and Bangladesh. Part-I. Additions and corrections of coreid and pentatomid fauna with phylogenetic considerations. *Kar. ent. Soc. Suppl*., **4**: 1-113.

AHMAD, I., 1980. Insect fauna of Pakistan and Azad Kashmir: Some groups within the order Hemiptera. *Proc. Pakistan Congr. Zool.,* **1A**: 115-155.

AHMAD, I., ABBASI, Q.A. AND KHAN, A.A., 1974. Generic and supergeneric keys with reference to a check-list of pentatomid fauna of Pakistan (Hemiptera: Pentatomidae) with notes on their distribution and food plants. *Kar. ent. Soc. Suppl*., **1**: 1-103.

AHMAD, I., MEMON, N. AND KAMALUDDIN, S., 2002. Redescription of *Erthesina* Spinola with its type species *fullo* (Thunberg) (Heteroptera: Pentatomidae: Pentatominae: Halyini) and their cladistic relationship. *Bull. Pure appl. Sci. India*, **21a**: 67-71.

AHMAD, I., MEMON, N. AND KAMALUDDIN, S., 2003. A new species of halyine genus *Erthesina* Spinola (Hemiptera: Pentatomidae) from Pakistan with a key to its world species: their distribution and cladistic relationships. *Bull. Pure appl. Sci. India*, **22**: 181-189.

CHINA, W.E., 1925. On Hemiptera from Yunnan. *Ann. Mag. Nat. Hist. Ser*. 9, **16**: 452-453.

DALLAS, W.S., 1851. List of Hemipterous insects. *Coll. Brit. Mus*., **1**: 1-368.

DISTANT, W.L., 1902. *The fauna of British India including Ceylon and Burma*. *Rhynchota*, vol. 1. Taylor and Francis, London.

DISTANT, W.L., 1908. *The fauna of British India including Ceylon and Burma. Rhynchota*, vol. 4. Taylor and Francis, London.

DISTANT, W.L., 1918. *The fauna of British India including Ceylon and Burma*. *Rhynchota,* vol. 7. Taylor and Francis, London.

FABRICIUS, J.C., 1794. Entomologica systematica emendata et aucta secundum, classes, ordines, genera, species, adjectis, synonymis, locis, observationibus, descriptionibus. *Hafniae*, **4**: 117.

SPINOLA, M., 1837. Essai sur les genres d' insectes appartenants a' l' ordre des Hemipteres Linn., on Rhyngotes Fabricius et a' la section des Heteropteres, Dufour. *Chez. Yves. Gravier. Genes*, **1837**: 257-383.

(Received 4 March 2004)