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COMPARATIVE MORPHOLOGY AND EVOLUTION OF THE HIND WINGS OF THE FAMILY *CHRYSOMELIDAE* (Coleoptera)

V. Subfamilies *Chrysomelinae*, *Synetinae* and *Aulacoscelinae*

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The subfamily *Chrysomelinae* is a very large subfamily and has long been treated as a group of the Division (or Section) *Cyclica* (Chapuis, 1874; Jacoby, 1908; and many others) but Gressitt (1942) separated this subfamily from the division and placed it as a definite group by itself between the Divisions *Cyclica* and *Trichostomes*. On the other hand, Chen (1940) treated the subfamily as a subfamily of his family "*Chrysomelidae*". The subfamily *Synetinae* has long been treated as a group of the subfamily *Orsodacninae* (Jacoby, 1908; Gressitt, 1942; Chen, 1940; Chûjô, 1953; and many others). Crowson (1946) treated this group as a smaller one of the tribe "*Orsodacnini*" belonging to the subfamily "*Sagrinae*" in his system. Chûjô (1952) pointed out that the genus *Syneta* has the conspicuous structures as compared with the genus *Orsodacne* and should not be included in the same group. In 1953, Edwards established the new subfamily *Synetinae* in his monographic study of the genus *Syneta* of the world, and, his treatment has generally been accepted. The subfamily *Aulacoscelinae* is a very small group, established by Monrós (1953), and has generally been accepted as a natural group.

Materials and Methods

Materials examined by the author himself were collected from various locality of Japan by many collaborators and the author himself.

XIII. Subfamily *Chrysomelinae* Lacordaire, 1845

Chrysomela vigintipunctata (Scopoli, 1763)

8 exs., Spa Ôdaru, Pen. Izu, Shizuoka Pref., Honshu, 4-V, 1965, K. Suzuki leg.

Chrysomela populi Linnaeus, 1758

7 exs., Mt. Hiko, Fukuoka Pref., Kyushu, 7-VI, 1966, K. Suzuki leg.; 3 exs., Pass Daibosatsu, Yamanashi Pref., Honshu, 24-V, 1969, K. Sakai leg.; 1 ex., Mt. Fuji (2400m above the sea), Yamanashi Pref., Honshu, 16-VI, 1969, T. Yokoi leg.

Gastrophysa atrocyanea Motschulsky, 1860

12 exs., Mizonokuchi, Kawasaki-City, Kanagawa Pref., Honshu, 2-V, 1965, K. Suzuki leg.; 3 exs., Eda, Kanagawa Pref., Honshu, 10-IV, 1969, K. Suzuki leg.

Phaedon brassicae Baly, 1874

1 ex., Tsu-City, Mie Pref., Honshu, 27-IX, 1959, K. Maesoma leg.; 3 exs., Mt. Awadake, Is. Okinawa-jima, LooChoo, 1-VI, 1965, K. Mizusawa leg.

Plagiodera versicolora distincta Baly, 1874

102 exs., Spa Kirizumi, Gumma Pref., Honshu, 18-V, 1966, K. Suzuki leg.; 100 exs., Setagaya, Tokyo Pref., Honshu, V, 1966, K. Suzuki leg.; 1 ex., Kashiwa-City, Chiba Pref., Honshu, 19-VI, 1969, A. Koyanagi leg.

Gastrolina depressa Baly, 1859

1 ex., Nidoage, Gumma Pref., Honshu, 6-VII, 1965, K. Yamaoka leg.; 1 ex., Spa Kirizumi, Gumma Pref., Honshu, 2-VII, 1965, K. Suzuki leg.; 4 exs., Kirigamine-Kôgen, Nagano Pref., Honshu, 6-VIII, 1961, K. Suzuki leg.; 2 exs., Uminokuchi, Nagano Pref., Honshu, 21-VIII, 1969, K. Suzuki leg.

Gastrolina peltoides (Gebler, 1832)

5 exs., Sawara-jima, Shizuoka Pref., Honshu, 2-VI, 1964, K. Nakada leg.

Gastrolinoides japonica (Harold, 1877)

1 ex., Nagayama, Tama Hill, Tokyo Pref., Honshu, 10-V, 1964, M. Nishikawa leg.; 1 ex., Pass Daibosatsu, Yamanashi Pref., Honshu, 18-V, 1964, K. Sakai leg.; 2 exs., Naka-Karuizawa, Nagano Pref., Honshu, 23-V, 1964, H. Nakajima leg.

Chrysolina exanthematica (Wiedemann, 1821)

1 ex., Tsu-City, Mie Pref., Honshu, 19-VI, 1959, K. Maesoma leg.; 1 ex., Chôjahara, Foot of Mt. Iide, Yamagata Pref., Honshu, 30-VI, 1969, K. Suzuki leg.

Chrysolina nikolskyi (Jacobson, 1898)

2 exs., Spa Kôgen, Mt. Daisetsu, Hokkaido, 2-VII, 1966, M. Mita leg.

Chrysolina aurichalcea collaris (Weise, 1916)

2 exs., Atsugi-City, Kanagawa Pref., Honshu, 18-X, 1966, K. Suzuki leg.; 1 ex., Nidoage, Gumma Pref., Honshu, 6-VII, 1966, K. Yamaoka leg.; 5 exs., Yagumo-chô, Meguro, Tokyo Pref., Honshu, 31-X, 1959, K. Suzuki leg.; 3 exs., Spa Kirizumi, Gumma Pref., Honshu, 2-VII, 1965, K. Suzuki leg.; 1 ex., Mt. Mitake, Tokyo Pref., Honshu, 1-VI, 1969, H. Mori leg.; 1 ex., Chôjahara, Foot of Mt. Iide, Yamagata Pref., Honshu, 30-VI, 1969, K. Suzuki leg.; 3 exs., Shiga-Kôgen, Nagano Pref., Honshu, 19-VIII, 1969, K. Suzuki leg.

Chrysolina angusticollis (Motschulsky, 1860)

2 exs., Hôheikyo Valley, Near Sapporo-City, Hokkaido, 6-VII, 1964, M. Watanabe leg.

Linaeidea aenea aenea (Linnaeus, 1758)

14 exs., Spa Kirizumi, Gumma Pref., Honshu, 18-V, 1966, K. Suzuki leg.; 1 ex., Mt. Sekirouzan, Kanagawa Pref., Honshu, 5-V, 1966, K. Suzuki leg.; 2 exs., Pass Daibosatsu, Yamanashi Pref., Honshu, 18-V, 1967, T. Hanatani leg.; 1 ex., The same locality, 24-V, 1969, K. Suzuki leg.; 2 exs., Mt. Ôkura-Takammaru, Yamanashi Pref., Honshu, 28-VIII, 1969, T. Yoshida leg.

Linaeidea aenea tsutsuii Nakane, 1955

2 exs., Pass Amagi, Pen. Izu, Shizuoka Pref., Honshu, 24-VII, 1969, K. Niijima leg.

Linaeidea aenea insularis (Chûjô, 1940)

3 exs., Mt. Takachiho, Miyazaki Pref., Kyushu, VI, 1965, T. Miyazaki leg.

Phola octodecimguttata (Fabricius, 1775)

5 exs., Cape Sata, Pen. Ôsumi, Kagoshima Pref., Kyushu, 19-VI, 1966, K. Suzuki leg.

Potaninia cyrtonoides (Jacoby, 1885)

2 exs., Nippara, Tokyo Pref., Honshu, 18-V, 1964, K. Suzuki leg.

Gonioctena (*Brachyphytodecta*) *rubripennis* Baly, 1862

3 exs., Spa Ôdaru, Pen. Izu, Shizuoka Pref., Honshu, 18-V, 1965, K. Suzuki leg.; 2 exs., Mt. Ôgusu, Kanagawa Pref., Honshu, 9-V, 1965, K. Suzuki leg.; 1 ex., Spa Kirizumi, Gumma Pref., Honshu, 18-V, 1966, K. Suzuki leg.; 1 ex., Eda Kanagawa Pref., Honshu, 8-V, 1969, K. Suzuki leg.

Gonioctena (*Gonioctena*) *japonica* Chûjô & Kimoto, 1960

2 exs., Pass Daibosatsu, Yamanashi Pref., Honshu, 8-VIII, 1969, K. Sakai leg.

Gonioctena (*Gonioctena*) *springlovae* Bechyně, 1947

6 exs., Shin-Ôtaki, Near Muroran-City, Hokkaido, 2-VIII, 1966, N. Tamiya leg.

Gonioctena (*Gonioctena*) *takahashii* Kimoto, 1963

1 ex., Shiga-Kôgen, Nagano Pref., Honshu, 19-VIII, 1969, T. Okada leg.

Gonioctena (*Sinomela*) *nigroplagiata* Baly, 1862

2 exs., Spa Ôdaru, Pen. Izu, Shizuoka Pref., Honshu, 18-V, 1965, K. Suzuki leg.

Phratora grandis (Chûjô, 1956)

1 ex., Mt. Fuji (2400 m above the sea), Yamanashi Pref., Honshu, 16-VI, 1969, Y. Kobayashi leg.

XIV. Subfamily *Synetinae* Edwards, 1953

Syneta adamsi Baly, 1877

2 exs., Mt. Nyûkasa, Nagano Pref., Honshu, 14-VI, 1962, Kinzo Suzuki leg.; 1 ex., Pass Daibosatsu, Yamanashi Pref., Honshu, 24-V, 1969, K. Suzuki leg.

XV. Subfamily *Aulacoscelinae* Monrós, 1953

The range of this subfamily is limited in the Neotropical Region. The author had no opportunity to investigate their hind wings.

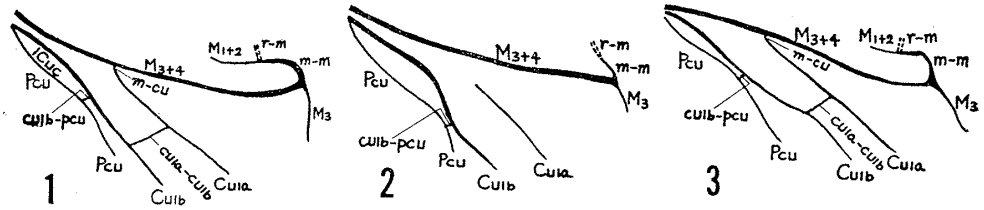
The methods of this study are as applied in the previous paper (Suzuki, 1969b). As for the material unable to examine, the figures of hind wings already published, chiefly by Jolivet (1957), were used for comparison.

Observations and Discussions

A. General structures

XIII. Subfamily *Chrysomelinae* (Fig. 1)

Cu_{1a} is always single, its apical extremity often reaches to the wing margin, and its basal extremity fuses with M_{3+4} at the position about 2/5 from the latter by short *m-cu* which disappears in many species. A long crossvein cu_{1a}-cu_{1b},



Figs. 1-3. Schematic right hind wing venation (*Vannal region* only).
1. *Chrysomelinae* (primitive type); 2. *Synetinae*; 3. *Aulacoscelinae.*

which incidentally disappears in various degrees, runs at nearly right angle against Cu_{1a} and the distal half of Cu_{1b}, and, therefore, a characteristic H-shaped part is formed there. *Pcu* is very weakly sclerotized and fuses with Cu_{1b} at the position about 1/2 from the base of the latter by short cu_{1b}-*pcu*. The distal half of *Pcu* has a tendency of disappearance.

XIV. Subfamily *Synetinae* (Fig. 2)

M_{1+2} is almost reduced. Cu_{1a} is somewhat weakly sclerotized and always single. The *m-cu* always disappears. Cu_{1a} is always single. *Pcu* fuses with Cu_{1a} at near its apical part by cu_{1b}-*pcu*. The apical part of Cu_{1b} incidentally disappears.

XV. Subfamily *Aulacoscelinae* (Fig. 3)

The following description is based on the figure of *Aulacoscelis melanocera* Stål studied by Jolivet (1957).

Cu_{1a} is single and its visible basal extremity fuses with M_{3+4} by short *m-cu*. Cu_{1b} is single and runs nearly straightly. The apical extremities of these two veins nearly reach to the wing margin. A long crossvein cu_{1a}-cu_{1b} runs at nearly right angle against Cu_{1a} and the distal half of Cu_{1b} runs at nearly right angle against Cu_{1a} and the distal half of Cu_{1b}, and, therefore, a characteristic H-shaped part is formed there. *Pcu* fuses with Cu_{1b} at the position about 2/5 from the base of the latter by short cu_{1b}-*pcu*.

B. Evolutionary processes of the hind wing venation and phylogeny

XIII. Subfamily *Chrysomelinae*

This subfamily was divided into following eight tribes by Weise (1916) in Junk's Coleopterorum Catalogus: 1. *Zygogrammini*, 2. *Chrysomelini*, 3. *Phaedonini*, 4. *Dicranosternini*, 5. *Paropsini*, 6. *Phyllodectini*, 7. *Phyllocharini*, 8. *Timarchini*.

Chen (1934, 1936) established a new system as follows: I. Tribe *Chrysomelini* Weise, 1916: 1. Subtribe *Zygogrammina* Chen, 1936, 2. Subtribe *Chrysomelina* Chen, 1936, 3. Subtribe *Doryphorina* Chen, 1936, 4. Subtribe *Dicranosternina* Chen, 1936, 5. Subtribe *Paropsina* Chen, 1936, 6. Subtribe *Phyllodectina* Chen, 1936, 7. Subtribe *Phyllocharina* Chen, 1936, 8. Subtribe *Entomoscelina* Chen, 1936; II. Tribe *Timarchini* Weise, 1916.

Chûjô (1958) nearly accepted Chen's system but established a new subtribe *Chrysolinina* by the genera *Paropsina, Chrysolina, Linaeidea* and etc. which had been included in the subtribe *Chrysomelina* of Chen's system. Chûjô (1959)

mentioned, moreover, that the tribe *Timarchini* should be excluded from this subfamily in future. Therefore, the subfamily *Chrysomelinae* is constituted of following two tribes and nine subtribes and the author's discussion will be make hereafter in accordance with Chen-Chûjô's system.

Chen-Chûjô's classification of *Chrysomelinae* into tribes and subtribes

I. Tribe *Chrysomelini* Weise, 1916
1. Subtribe *Zygogrammina* Chen, 1936
2. Subtribe *Chrysomelina* Chen, 1936
3. Subtribe *Doryphorina* Chen, 1936
4. Subtribe *Dicranosternina* Chen, 1956
5. Subtribe *Paropsina* Chen, 1936
6. Subtribe *Chrysolinina* Chûjô, 1958
7. Subtribe *Phyllodectina* Chen, 1936
8. Subtribe *Phyllocharina* Chen, 1936
9. Subtribe *Entomoscelina* Chen, 1936

II. Tribe *Timarchini* Weise, 1916

The hind wing venation of this subfamily is very stable and can be arranged as a single type. Accordingly, it is very difficult to consider the phylogenetic relationships of infrasubfamilial groups of this subfamily basing on the comparative morphology of the hind wing venation only. And, moreover, the reduction seen in the various groups of this subfamily in various degrees is a great obstruction barrier to suppose the evolutionary processes of the hind wing venation. But, in this subfamily, many knowledges have been accumulated up to the present, especially on the immature stages as compared with the other subfamilies. Therefore, it may be possible to refer to the phylogeny of infrasubfamilial groups.

Paterson (1931) divided this subfamily into following four groups basing on the comparative morphology of the larval stages of British species: I. *Phaedonia*: *Phaedon, Gastroidea* (=*Gastrophysa*), *Phyllodecta* (=*Phratora*), *Melasoma* (=*Chrysomela,* incl. *Linaeidea*); II. *Prasocurina*: *Prasocuris, Hydrothassa*; III. *Chrysomelina*: *Chrysomela*; IV. *Timarchina*: *Timarcha.* And, he concluded that the genus *Phyllodecta* (=*Phratora*) is very similar to the genera *Phaedon, Gastroidea* (=*Gastrophysa*), and so on.

Hennig (1938) studied of the morphology of larval stages, added the knowledges on the "non-glanduliferous" group, and arranged in the following four groups: Group I: *Chrysomela, Chrysochloa* (=*Oreina*), *Leptinotarsa* (=*Polygramma*); Group II: *Phytodecta* (=*Gonioctena*), *Scleophaedon, Colaphellus, Entomoscelis*; Group III: *Phaedon, Gastroidea* (=*Gastrophysa*), *Phyllodecta* (=*Phratora*), *Melasoma* (=*Chrysomela,* incl. *Linaeidea*), *Plagiodera, Prasocuris, Hydrothassa*; Group IV: *Timarcha.* He critisized the Weise's system as follows: the genera *Phyllodecta* (=*Phratora*) and *Phytodecta* (=*Gonioctena*) belonging to the tribe *Phyllodectini* differ from each other in their larval forms; the genus *Phyllodecta* (=*Phratora*) is similar to the genera *Gastroidea* (=*Gastrophysa*), *Phaedon,* and so on belonging to the tribe *Phaedonini*; the genera *Scleophaedon* and *Colaphellus* belonging to the tribe *Phaedonini* are similar to

the genus *Phytodecta* (=*Gonioctena*) belonging to the tribe *Phyllodectini*. And, moreover, he estalished a new group (Group II) constituted of the genera *Phytodecta* (=*Gonioctena*), *Scleophaedon*, *Colaphellus*, *Entomoscelis*. Hennig's system is foundamentally equal to the Paterson's system but he did not recognize the independency of the genus *Prasocuris* from the others and included them into the tribe *Phaedonini*.

Kimoto (1957, 1962a, b, c) studied on the life-history and morphology of immature stages of Japanese *Chrysomelinae* and considered the phylogeny of this subfamily. He divided this subfamily into two large groups, *i. e.*, "glanduliferous" and "non-glanduliferous" groups and recognized the following seven "generic groups": Glanduliferous group: Generic group *Phaedon* (*Phaedon, Gastrophysa, Phratora, Mesoplatys*), Generic group *Chrysomela* (*Plagiodera, Chrysomela, Linaeidea, Gastrolina, Gastrolinoides*), Generic group *Prasocuris* (*Prasocuris, Hydrothassa*); Non-glanduliferous group: Generic group *Chrysolina* (*Chrysolina, Oreina, Polygramma*), Generic group *Gonioctena* (*Gonioctena, Scleophaedon, Colaphellus*), Generic group *Potaninia* (*Potaninia, Entomoscelis*), Generic group *Phola* (*Phola*). And, the phylogenetic consideration of Kimoto's generic groups may be summarized as in Fig. 4.

As Hennig and Kimoto pointed out, it seems to be a very important clue for phylogenetic consideration of this subfamily whether the larvae has the odoriferous gland or not so. But, the characteristics of larval stages do not always

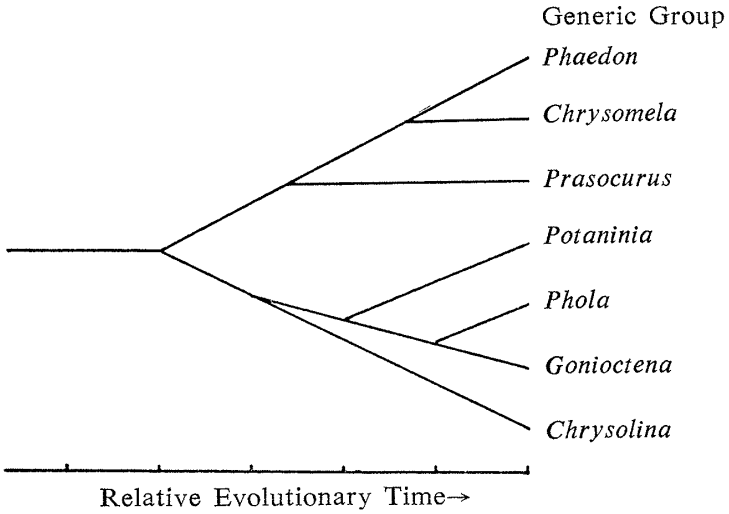


Fig. 4. Cladogram of *Chrysomelinae* (about Kimoto's generic groups) (Constructed after Kimoto, 1962a). Generic group *Phaedon*: *Phaedon, Gastrophysa, Phratora, Mesoplatys*; Generic group *Chrysomela*: *Plagiodera, Chrysomela, Linaeidea, Gastrolina, Gastrolinoides*; Generic group *Prasocuris*: *Prasocuris, Hydrothassa*; Generic group *Chrysolina*: *Chrysolina, Polygramma, Oreina*; Generic group *Gonioctena*: *Gonioctena, Scleophaedon, Colaphellus*; Generic group *Potaninia*: *Potaninia, Entomoscelis*; Generic group *Phola*: *Phola*.

reflect the general classification based on the external characters of adult. For example, as for the odoriferous gland, in the subtribe *Chrysomelina* almost all genera have such gland but the genus *Colaphellus* has not, in the subtribe *Chrysolinina* the genus *Linaeidea* has the gland but the genus *Chrysolina* has not, and moreover, in the subtribe *Phyllodectina* the genus *Phratora* has the gland but the genus *Gonioctena* has not in general.

The author considers that the ethological and morphological characters in the larval stages show their phylogenetic relationships more clearly than in the characters of the adult stages. Though the biological and phylogenetic significances of the odoriferous gland have not yet been proved, the existence of this gland may not be explained by a mere "parallel evolution" concept. The subtribes *Chrysomelina* and *Chrysolinina* include the glanduliferous and non-glanduliferous genera at the same time. The author interpretes this fact as follows: these subtribes have been originally differentiated as the glanduliferous group, and the genera *Colaphellus* and *Chrysolina* belonging to the subtribes *Chrysomelina* and *Chrysolinina*, respectively, may have lost the gland secondarilly. The subtribe *Phyllodectina* may have been originally differentiated as the non-glanduliferous group, and the fact that the genus *Phratora* has the gland seems to signify the necessity of the revision of their systematic position. In fact, according to Kimoto, the genus *Phratora* is similar in some characters to the genera *Phaedon*, *Gastrophysa* and so on of the subtribe *Chrysomelina*.

The hind wing venation of this subfamily does not show the considerable difference as seen in the larval stage characters. But, it seems to offer an important clue for tracing the evolutionary processes of the hind wing venation of this subfamily to investigate the variation of this character among species, genera, and subtribes.

In the genus *Chrysolina* belonging to the subtribe *Chrysolinina*, seventeen species of which the hind wing venation were observed by Jolivet (1957) and the present author have more or less reduced venation and only the three species, *C. aurichalcea collaris*, *C. exanthematica* and *C. confluens*, have the complete wings at least in appearance. Among these three species, in *C. aurichalcea collaris* of which comparatively many specimens were examined a long crossvein cu_{1a}-cu_{1b} shows the considerable variability. And in the two species, *Chrysomela vigintipunctata* and *C. populi*, belonging to the subtribe *Chrysomelina*, the distal half of *Pcu* shows the remarkable interindividual variations.

In the subtribe *Phyllodectina*, the genera *Gonioctena* and *Coccimela* have the very well developed cu_{1a}-cu_{1b} but, on the other hand, in the genus *Phratora* the crossvein does not so develop similar as in the genera *Phaedon* and *Gastrophysa* of the subtribe *Chrysomelina*. Above mentioned relationship seen in the hind wing venation well corresponds to Kimoto's opinion on the systematic position of the genus *Phratora* basing on the immature stages.

In the subtribe *Chrysolinina*, the genera *Chrysolina* and *Sphaerolina* have the tendency that cu_{1a}-cu_{1b} remains at its ends but the genus *Linaeidea*, on the contrary, does not show such tendeney. But, in the subtribe *Chrysomelina* the

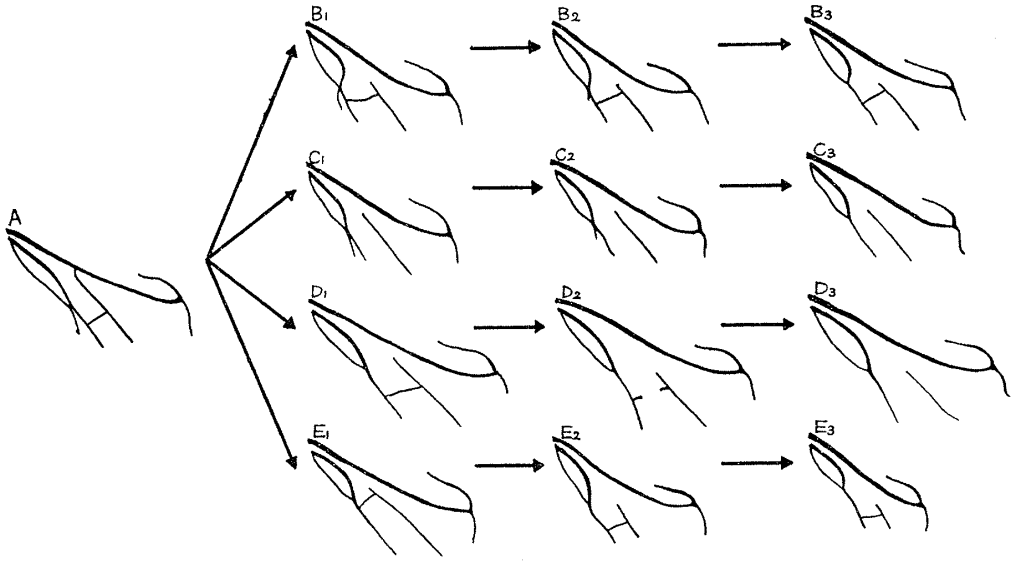


Fig. 5. Supposed evolutionary processes of hind wing venation of *Chrysomelinae*. A. *Eugonycha* type; B1-B3. *Gonioctena*; C1-C3. *Linaeidea*; D1-D3. *Chrysolina aurichalcea collaris* (Weise); E1. *Gastrolina*, E2. *Pseudomela*, E3. *Colaspidema*. (*Vannal region* only). A and E1-E3 were redrawn, partly revised, after Jolivet (1957) and the rests were examined by the author himself.

crossvein shows the very remarkable variability from complete to almost missing. The author, therefore, would divide this subtribe into following two groups: 1) cu_{1a}-cu_{1b} is more or less developed...*Eugonycha, Pseudomela, Colaspidera, Gastrolina, Palimbola*; 2) cu_{1a}-cu_{1b} is completely reduced...*Prosicela, Chrysomela, Gastrophysa, Phaedon, Plagiodera, Gastrolinoides*. Besides these, several species which has the almost completely reduced wing are seen in this subtribe. And, in the genus *Gastrolina, G. depressa* and *G. peltoidea* have the developed cu_{1a}-cu_{1b} but in its allied genus, *Gastrolinoides*, the crossvein is completely reduced.

Ohno (1958) reported on the immature stages of *Paropsides duodecimpustulata yuasai*. According to him the genus *Paropsides* in the glanduliferous group and their larval and adult external characters are similar to the genus *Phyllodecta* (=*Gonioctena*). Ohno mentioned that in the genus *Phytodecta* (=*Gonioctena*) there are glanguliferous subgenus and non-glanduliferous one, and that the genus *Paropsides* should be treated as the same group of the glanduliferous subgenus *Phytodecta* (=*Gonioctena*). It is very interesting that the glanduliferous and non-glanduliferous groups are seen in the same genus. But the glands are divided into several types (Kimoto, 1962 b, c). So the author recognizes the independency of the subtribe *Paropsina* and would interpret that the subtribe may have been derived from the certain ancestor of the subtribe *Chrysomelina* decreasing the number of the odoriferous glands.

The above mentioned discussions may be arranged as in Figs. 5 and 6.

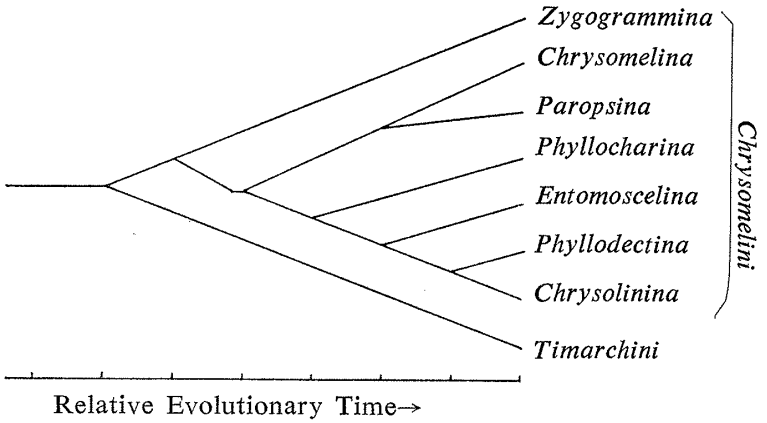


Fig. 6. Cladogram of *Chrysomelinae* (at the tribial and subtribial levels).

Summary

1) General structures of the hind wing venation of the following three subfamilies were described and illustrated; *Chrysomelinae* (Fig. 1), *Synetinae* (Fig. 2) and *Aulacoscelinae* (Fig. 3).

2) Evolutionary process of the hind wing venation of the subfamily *Chrysomelinae* was supposed and illustrated (Fig. 5).

3) Phylogeny at the tribial and the subtribial levels of the subfamily *Chrysomelinae* chiefly based on the comparative morphology of the hind wing venation was discussed and expressed in the cladogram (Fig. 6).

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Abbreviations used in the text and figures

Cu: Cubitus; *Cuc*: Cubital cell; *M*: Media; *Pcu*: Postcubitus; cu_{1a}-cu_{1b}, cu_{1b}-*pcu*, *m-cu*, *m-m*, *r-m*: crossveins.

For details, see Suzuki (1969 a).

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新　著　紹　介

ミツバチのたどったみち　進化の比較社会学
坂上昭一著 (1970).　3+327+10 頁.　思索社 (定価 980 円).

本書は集団性花蜂の生態学的研究の第1人者である 坂上昭一博士が，ハチの出現から説き起し，ハナバチ（花蜂）類がどのような進化をとげて高度なミツバチやハリナシハナバチの社会に達したかをつづる壮大な物語である．副題にもあるとおり，研究の手法は比較社会学だが，現代の生態学や分類学の進歩が，本書出現のバックグランドであることはいうまでもない．特に本書にもたびたび名前がでてくる Michener 博士と彼の教え子たちの研究がなかったならば，本書の出現は早急に望み得なかったかもしれない．とはいうものの，本書を一読して，坂上博士が如何に豊富な知識をもち，すぐれた洞察力と才能をそなえた数少ない研究者の 1人であるかを感じとらない人はないであろう．本書には随所にハナバチを愛し，また機智にとんだ著者の人柄がにじみ出ている．そんな著者の魅力もあって，読む人をぐいぐいとハナバチの生活にひっぱってゆく．しかし何よりも本書の魅力の基本は，日本はもとよりブラジルや東南アジアにまで足をのばした 著者の観察の豊富さとその「まとめ」の見事さであろう．本書は著者の研究の集大成であるが，花蜂王国についていえば，まだその全容がわかったとはいえない．私信によれば，著者は近く再びブラジルに出かける予定とかで，ハナバチの生活に魅せられ，その進化の過程をときあかそうとする著者の“執念”の程を感じさせられるのである．

このような名著が，我が国の学者の手によって成されたことに 私は言い知れぬ喜びを感じている．生物学徒はもとより，広く一般の知識人に一読をおすすめする．（平嶋義宏）