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Ahlbergia confusa spec. nov. from SE China

(Lepidoptera: Lycaenidae)

by

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Abstract: *Ahlbergia confusa* **spec.nov.** is described from Jiangsu and Fujian, SE China. It has been misidentified as *Ahlbergia frivaldszkyi* (LEDERER, 1855) in previous Chinese papers. However, the examination of the genitalia of both sexes proves it is a new species of *Ahlbergia* BRYK.

Zusammenfassung: Aus dem Südosten Chinas, den Provinzen Jiangsu und Fujian, wird *Ahlbergia confusa* **spec.nov.** beschrieben. Diese Art wurde in der bisherigen chinesischen Literatur als *Ahlbergia frivaldszkyi* (LEDERER, 1855) falsch bestimmt. Die Untersuchungen der Genitalien beider Geschlechter belegen jedoch, daß es sich um eine neue Art von *Ahlbergia* BRYK handelt.

Introduction. For years *A. frivaldszkyi* (LEDERER, 1855) has been reported from Jiangsu, Zhejiang and Fujian in various Chinese publications. Such records were seriously doubted by the senior author and he tried to examine these specimens from SE China. With the help of cooperative collectors several specimens, including both sexes, were collected and examined. Surprisingly, the dissection of both sexes proved these specimens to be a new species of *Ahlbergia*, here described. To avoid repeating the publication of the same figures, the genitalia of some related species for comparison are not illustrated here but can be found in HUANG & ZHAN (2006) and HUANG & SONG (2006).

Ahlbergia c o n f u s a spec. nov. (colour plate 4: E, F)

Description ♂. Upperside of forewing: ground color dark brown, with a steel blue hue in the basal and discal areas; ♂ scent brand brownish grey and very long, about half as long as the forewing discocellular cell.
Upperside of hindwing: ground color dark brown, with steel blue hue in basal and discal areas; no marginal line; anal lobe of hindwing fully developed, suffused with brown.
Underside of forewing: ground color dark greyish brown in the basal area, reddish brown in the discal area inside of the postdiscal line above vein 2, greyish brown below vein 2;

ground color of the area outside of the postdiscal line is of a yellowish brown; discocellular bar blackish; postdiscal line rather broad and reddish brown, margined by a white line on its outer side, interrupted at vein 4, with the lower part below vein 4 shifted-out; submarginal markings very faint and pale reddish brown; no marginal and submarginal greyish dusting. Underside of hindwing: ground color of basal disc blackish brown, densely dusted by whitish scales; ground color of the area outside of the discal line of a yellowish brown; no subbasal line; discocellular bar blackish and rather obscure; discal line dark reddish brown, margined with whitish scales on its outer side throughout; submarginal markings reddish brown, sagittate and well separated by veins; marginal area broadly clad with reddish brown, dusted by whitish scales near the outer margin of the hindwing.
♂genitalia: as illustrated, the bilobed configuration of the valvae is rather broad, the caudal extension of the valvae maintaining its width at the juncture with the bilobed configuration for more than half of the terminal length, then contracting to a sharply pointed tip.

Description ♀. As in the ♂, only the upperside ground color is more widely of a brighter steel blue on both wings and no brand on the forewing upperside.
♀ genitalia: as illustrated, ductus bursae much expanded near the terminal lamellae, lamella postvaginalis very short and broad, flat at the terminal end, lamella postvaginalis ventrum only with slight convolutions, signum bifurcate, dorsal surface of cephalic end of corpus bursae near ductus bursae sclerotized.

Diagnosis. This new species is very similar to *A. frivaldszkyi* (LED.) and *A. leei* JOHNSON, 1992, but can be easily distinguished from both of them by the following combination of characters.
1: ♂ brand is larger than in *A. leei* JOHNSON, and not absent as in *A. frivaldszkyi* (LED.).
2: On the upperside of the hindwing, the pale marginal line is almost absent, and is not well marked as in *leei* and *A. frivaldszkyi* (LED.).
3: On the underside of both wings the submarginal area has fewer whitish scales than in *A. leei* JOHNSON and *A. frivaldszkyi* (LED.).
4: On the underside of the forewing, the postdiscal spot in space 2 is conjoined with the one in 3, and is not widely separated from the one in 3 as in *leei* and *A. frivaldszkyi* (LED.)
5: ♂ valvae are stronger in a bilobed configuration and have sharply pointed at tip, and not obtuse as in *A. leei* JOHNSON and *A. frivaldszkyi* (LED.).
6: ♀ genitalia are different: ductus bursae is much longer and larger near the terminal lamellae than in *A. leei* JOHNSON and *A. frivaldszkyi* (LED.), and the lamella postvaginalis is much shorter and broader in shape than in *A. leei* JOHNSON and *A. frivaldszkyi* (LED.).

Discussion. The new species undoubtedly belongs to the *A. frivaldszkyi* group (*sensu* HUANG & ZHAN, 2006) including *A. frivaldszkyi* (LED.), *A. leei* JOHNSON, *A. ferrea* (BTL.) (= *korea* JOHNSON), *A. arquata* JOHNSON *A. hsui* JOHNSON and two more new species described in other papers by HUANG. Among the group, the most allied species of *A. confusa* **spec.nov.** should be *A. frivaldszkyi* (LED.) and *A. leei* JOHNSON, both of which show the very similar wing-color and wing-pattern to the new species. According to the recent works (OMELKO & OMELKO, 1995; KORSHUNOV, 1996; MATSUDA & BAE, 1998; HUANG & ZHAN, 2006; HUANG &

SONG, 2006), the following systematic accounts can be made for the entire *A. frivaldszkyi* group.

1: ***Ahlbergia frivaldszkyi*** (LEDERER,, 1855)
Type locality: Eastern Buchtarminsk in Altai, Russia. Type preservation: Zoologisches Museum, Humboldt University, Berlin.
Distribution: Altai, E Russia; North China (specimens from Beijing examined and dissected); Korea.
Lectotype and paralectotype illustrated in MATSUDA & BAE (1998). ♂ and ♀ genitalia of type series unknown. ♂ and ♀ genitalia of specimens from other localities illustrated in MATSUDA & BAE (1998).
Characters: ♂ brand absent; hindwing upperside pale marginal line prominent; the underside both wings in the submarginal area are suffused with whitish scales to a medium degree; valvae shorter, obtuse at the tip; ductus bursae shorter, lamella postvaginalis ventrum with deep convolutions.

2: ***Ahlbergia leei leei*** JOHNSON, 1992 (colour plate 4: D)
Type locality: China (no detailed collecting data for holotype; only the locality for the holotype is employed here, as the allotype from "Amorland" [Amurland] may not belong to this taxon). Type preservation: Natural History Museum, London.
Distribution for nominotypical subspecies: N. China (specimens from Shaanxi examined).
Holotype illustrated in JOHNSON (1992). ♂ genitalia of holotype illustrated in JOHNSON (1992). ♀ genitalia of topotype unknown. ♂ and ♀ genitalia of specimens from Shaanxi illustrated in HUANG & SONG (2006).
Characters for species: ♂ brand present, grey and slender in shape; hindwing upperside pale marginal line prominent; both wings underside submarginal area are suffused with whitish scales to a medium degree; valvae shorter, obtuse at the tip; ductus bursae shorter, lamella postvaginalis ventrum with deep convolutions. [Different from *A. frivaldszkyi* (LED.) only in ♂ brand.]
Characters for nominotypical subspecies: Upperside ground color blackish brown with steel blue hue, more bluish than in *A. l. tricaudata* JOHNSON, 1992 but without the bright blue dusting in *A. l. aquilonaria* JOHNSON, 1992 and *A. l. inopinata* OMELLO & OMELLO, 1995; underside of a more uniform chocolate brown.
Notes: The holotype was labeled from China but without any detailed data whereas the paratypes were labeled from various areas ("Amorland", "N W Islafrontiere", "Regional Baikal d'Irkoutsk", "Siberia" "Sayan Mts.", "Greater Chingan Mountains") in Russia and NE China. Since JOHNSON himself made mistakes in identifying *A. frivaldszkyi* (LED.), no localities from the paratypes can be employed for the type locality of *A. leei* JOHNSON. It is very interesting that some specimens recently collected from Shaanxi, China agree with the holotype of *A. leei* JOHNSON very well in all diagnostic characters. Thus Shaanxi can be regarded as a reliable locality for the nominotypical *A. leei leei* JOHNSON.

2 a: ***Ahlbergia leei aquilonaria*** JOHNSON, 1992
Type locality: Manchuria (only the locality for holotype is employed here, as the allotype

from "North of Peking" and paratypes from Sayan, Amurlands and Manchuria may not belong to this taxon). Type preservation: American Museum of Natural History.
Distribution: NE China.
Holotype illustrated in JOHNSON (1992). ♂ genitalia of holotype illustrated in JOHNSON (1992). ♀ genitalia of topotype unknown.
Characters for subspecies: ♂ upperside more broadly of a brighter iridescent blue than in other subspecies.
Notes: The taxon, *Ahlbergia leei aquilonaria* JOHNSON was incorrectly treated as a synonym of *A. frivaldszkyi* (LED.) by MATSUDA & BAE (1998). According to the original description and figures by JOHNSON (1992), the holotype of *Ahlbergia leei aquilonaria* JOHNSON has the ♂ brand present, not absent as in *A. frivaldszkyi* (LED.).

2 b: ***Ahlbergia leei tricaudata*** JOHNSON, 1992
Type locality: China (holotype, no detailed data) (allotype was taken from Southwest Irkutsk, but collected by the same collector, AVINOFF, thus it is possible that the allotype locality is very close to the holotype locality). Type preservation: American Museum of Natural History.
Distribution: Sino-Russian border near Irkutsk.
Holotype illustrated in JOHNSON (1992). ♂ genitalia of holotype illustrated in JOHNSON (1992). ♀ genitalia of topotype unkonwn. ♀ genitalia of allotype from another locality illustrated in JOHNSON (1992).
Characters for subspecies: Hindwing deeply crenate at the end of veins 2-4 and at the anal lobe; upperside ground color brownish black without any blue dusting; underside ground color more contrasted between the basal disc and the outer area.

2 c: ***Ahlbergia leei inopinata*** OMELKO & OMELKO, 1995
Type locality: Russia, Primorskii Krai province, 18 km SE from Ussuriisk, Gornotaezhnoe, Mountain-Taiga Station. Type preservation: Siberian Zoological Museum, (Novosibirsk, Russia).
Distribution: Ussuri, E. Russia.
Type series taken from the same locality in Russia. Holotype and genitalia illustrated in OMELKO & OMELKO (1995).
Characters for subspecies: Upperside ground color bright blue in the basal half; underside ground color more reddish than in other subspecies.
Notes: This taxon, *A. l. inopinata* OMELKO & OMELKO, was incorrectly treated as a synonym of *A. leei tricaudata* JOHNSON by KORSHUNOV (1996). According to the original descriptions and figures, *A. l. inopinata* OMELKO & OMELKO has bright blue coloring in the basal half of the forewing upperside in ♂♂, not totally brownish black as in *A. leei inopinata* OMELKO & OMELKO, and has the underside ground color more reddish and less contrasting between the basal disc and the outer area than in *A. l. tricaudata* JOHNSON.

3: ***Ahlbergia ferrea*** (BUTLER, 1866)
Type locality: Japan. Type preservation: Natural History Museum, London.
Distribution: Japan, Korea, N. China (specimens from Beijing examined), E. Russia (E.Siberia, Amur).
Topotypical specimens and both, ♂ and ♀ genitalia, illustrated in INOMATA (1994) and MATSUDA & BAE (1998).

Characters: Forewing shape more pointed at the apex than in all other species of the group. ♂ brand rather big; hindwing upperside pale marginal line absent; forewing underside submarginal area without whitish scales; hindwing underside discal line broadly margined with white near the costa; valvae relatively longer, obtuse at the tip; ductus bursae longer, lamella postvaginalis ventrum convolutions slight or absent.
Ahlbergia korea JOHNSON, 1992 (synoymized by MATSUDA & BAE (1998)
Type locality: Korea. Type preservation: American Museum of Natural History.
Notes: According to MATSUDA & BAE (1998), the dissection of additional ♀♀ from Korea showed the same ♀ genitalia as those of *A. ferrea* (BTL.) from Japan. Moreover, the lamella postvaginalis ventrum showed remarkable variation in the presence of convolutions.

4: ***Ahlbergia arquata*** JOHNSON, 1992
Type locality: Andijan, Uzbekistan. Type preservation: Museum National d' Histoire Naturelle, Paris.
Distribution: Uzbekistan.
Holotype and genitalia of holotype ♂ and of allotype ♀ are illustrated in JOHNSON (1992).
Characters: ♂ brand present; hindwing upperside pale marginal line present; forewing underside submarginal area without whitish suffusion; the hindwing underside in the postdiscal is area much paler than in the basal disc and submarginal area; valvae relatively longer, sharply pointed at tip; ductus bursae much shorter, lamella postvaginalis ventrum with heavy convolutions.

5: ***Ahlbergia hsui*** JOHNSON, 2000
Type locality: S. Gansu. Type preservation: Institute of Zoology, Chinese Academy of Science, Beijing.
Distribution: S. Gansu (Kangxian, Yuzhong).
Holotype ♀ and its genitalia are illustrated in JOHNSON (2000). ♂ and ♂ genitalia are illustrated in HUANG & SONG (2006).
Characters: ♂ brand absent; hindwing upperside pale marginal line prominent; forewing underside submarginal area without whitish suffusion; both wings underside ground color rather uniform, more yellowish than in other species; hindwing underside subbasal lines and discal line more clearly defined than in other species; valvae shorter, obtuse at the tip; ductus bursae longer, lamella postvaginalis ventrum without convolution.

6: ***Ahlbergia dongyui*** HUANG & ZHAN, 2006
Type locality: N. Guangdong. Type preservation: Biological Laboratory of Qingdao Vocational and Technical College, Qingdao, China.
Distribution: N. Guangdong (most probably also in Zhejiang).
Holotype ♂ and its genitalia are illustrated in HUANG & ZHAN (2006).
Characters: ♂ brand rather long; hindwing upperside pale marginal line present but faint; forewing underside submarginal area powdered with whitish scales to a medium degree; both wings underside ground color uniform, more reddish than in other species; hindwing underside subbasal lines and discal line rather clearly defined; valvae longer, obtuse at the tip.

7: ***Ahlbergia c o n f u s a* spec.nov.**
Type locality: Jiangsu. Type preservation: Biological Laboratory of Qingdao Vocational and Technical College, Qingdao, China.
Distribution: Jiangsu, Fujian.
Characters: ♂ brand large; hindwing upperside pale marginal line hardly visible; forewing underside submarginal area without whitish scales; forewing underside postdiscal spots in spaces 2 and 3 conjoined; hindwing underside ground color with a high contrast between the basal disc and the outer area; ♂ valvae stronger at bilobed configuration and sharply pointed at tip; ductus bursae the longest, expanded very much near the lamellae, lamella postvaginalis shorter and broader than in other species, with heavy convolutions.

8: ***Ahlbergia luoliangi*** HUANG & SONG, 2006
Type locality: Shaanxi. Type preservation: Biological Laboratory of Qingdao Vocational and Technical College, Qingdao, China.
Distribution: Shaanxi.
Holotype ♂, paratype ♀, ♂ genitalia of holotype and ♀ genitalia of paratype illustrated in HUANG & SONG (2006).
Characters: ♂ brand large; hindwing upperside pale marginal line present but faint; both wings underside submarginal area more broadly suffused with white scales than all other species; male valvae shorter, very sharply pointed at tip; ductus bursae longer, lamella postvaginalis ventrum without convolution.

Key to species and subspecies of the *A. frivaldszkyi* group

1. ♂ brand absent ——————————————————————2
   ♂ brand present ——————————————————————3
2. Forewing underside submarginal area without whitish scales; both wings underside ground color more yellowish; hindwing underside subbasal lines clearly defined; ductus bursae longer, lamella postvaginalis ventrum without convolution ——————— *hsui*
   Forewing underside submarginal area with apparent whitish scales; both wings underside ground color more brownish; hindwing underside subbasal lines obscure or absent; ductus bursae shorter, lamella postvaginalis ventrum with heavy convolutions —*frivaldszkyi*
3. Both wings underside whitish suffusion much denser and extended from outer magin of wings to postdiscal area ——————————————————*luoliangi*
   Both wings underside whitish suffusion much sparser or absent, never extended to postdiscal area ——————————————————————4
4. Forewing shape more pointed at apex; hindwing underside discal line broadly margined with white near costa ——————————————————*ferrea*
   Forewing shape more rounded at apex; hindwing underside discal line not broadly margined with white near costa, at most only thinly margined with white —5
5. Hindwing underside postdiscal area much paler than basal disc and submarginal area — ——————————————————————— *arquata*
   Hindwing underside postdiscal area not or only slightly paler than basal disc and submarginal area ——————————————————————6

6. Both wings underside ground color uniform reddish; hindwing underside subbasal lines and discal line rather clearly defined ——————————*dongyui*
Both wings underside ground color not uniform and more brownish; hindwing underside subbasal lines absent or faint, and discal line rather roughly defined ——————7
♂ brand large; hindwing upperside pale marginal line absent; forewing underside submarginal area without whitish scales; forewing underside postdisacal spots in spaces 2 and 3 conjoined; male valvae stronger at bilobed configuration and sharply pointed at tip; ductus bursae much longer, expanded very much near lamellae, lamella postvaginalis shorter and broader ——————————————————— *confusa*
♂ brand small; hindwing upperside pale marginal line clear; forewing underside submarginal area with whitish scales; forewing underside postdisacal spots in spaces 2 and 3 stagger; valvae slender and obtusely pointed at tip; ductus bursae much shorter, not so expanded near lamellae, lamella postvaginalis longer and narrower ——————8 (*leei*)
8. ♂ upperside more or less apparently clad with bright iridescent blue scales ——— 9
♂ upperside ground color blackish brown with steel blue hue, but without bright blue dusting ——————————————————————10
9. ♂ upperside blue area broader, underside ground color less reddish ———*leei aquilonaria*
♂ upperside bright blue in basal half; underside ground color more reddish — *leei inopinata*
10. Hindwing deeply crenate at end of veins 2-4 and anal lobe; underside ground color more contrasting between basal disc and outer area ——————*leei tricaudata*
Hindwing not deeply crenate at end of veins 2-4 and anal lobe; underside ground color less contrasting between basal disc and outer area ——————————*leei leei*

From SE China, the following elfin butterflies have been assuredly recorded, with specimens examined.
Ahlbergia nicevillei (LEECH, 1893) – Hubei, Jiangsu, Zhejiang, Anhui, Fujian.
Ahlbergia leechuanlungi HUANG & CHEN, 2005 – Zhejiang, Anhui, Fujian.
Ahlbergia dongyui HUANG & ZHAN, 2006 – Guangdong, (Zhejiang?).
Ahlbergia confusa **spec.nov.** – Jiangsu, Fujian.

It is possible that there are still species unknown to science in SE China and more exploration is needed to discover these interesting elfin butterflies.

Type data:
Holotype ♀: LF 15mm, Zi-Jin Mt., Nanjing, Jiangsu province, China, March 28th 2004, leg. ZHONG CHEN. Deposited in Biological Laboratory of Qingdao Vocational and Technical College, Qingdao, China.
Paratypes: 2 ♀♀, LF 13.5-14mm, same data as holotype, deposited in the senior author's private collection; 1 ♂, Fuzhou, Fujian, leg. et coll. MIN LI; 4 ♂♂, 2 ♀♀, LF 13,5-15 mm, Nanjing province, China, April 2006, leg. X. LU, coll. HUANG HAO.
Etymology. The name refers to the new species, which closely resembles others which have previously been confused.
Distribution: SE China.

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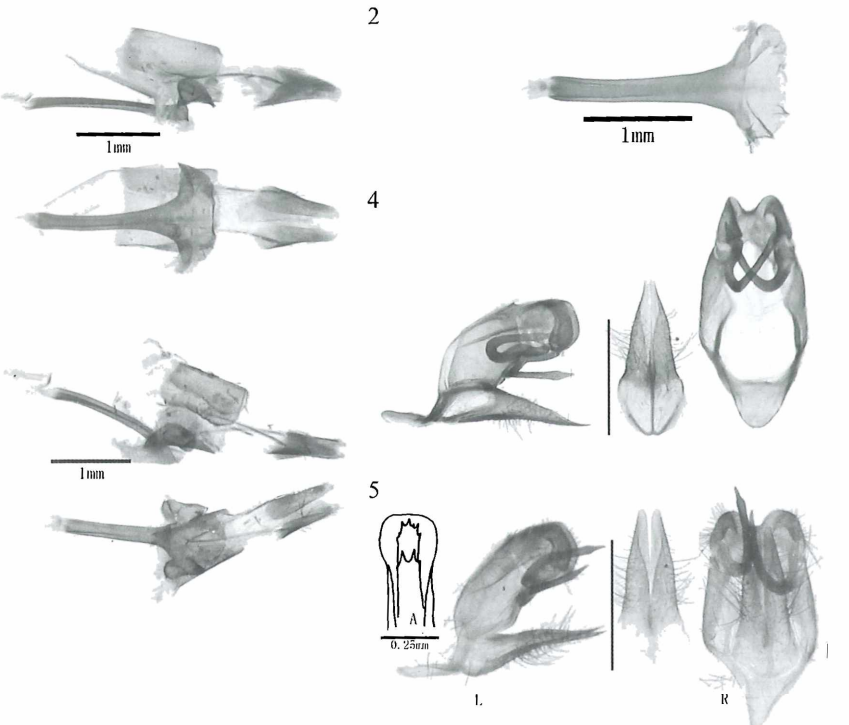

Fig. 1: ♀ genitalia of *Ahlbergia confusa* **spec.nov.** taken from holotype consisting of the whole genitalia in lateral view (top) and of the whole genitalia in ventral view (bottom).
Fig. 2: ♀ genitalia of *Ahlbergia confusa* **spec.nov.** taken from paratype in ventral view.
Fig. 3: ♀ genitalia of *Ahlbergia leei leei* JOHNSON, 1992 (Chang-an, Shaanxi) consisting of the whole genitalia in lateral view (top) and of the whole genitalia in ventral view (bottom).
Fig. 4: ♂ genitalia of *Ahlbergia confusa* **spec.nov.** taken from paratype (L- lateral view of whole genitalia, V- valvae in ventral view, R- ring in ventral view).
Fig. 5: ♂ genitalia of *Ahlbergia leei leei* JOHNSON, 1992 from Shaanxi (A- aedeagus tip enlarged, L- lateral view of whole genitalia, V- valvae in ventral view, R- ring in ventral view).

Colour plate 4, p. 284
Fig. E: *Ahlbergia confusa* **spec.nov.** Holotype ♀ upperside (left half) and underside (right half).
Fig. F: *Ahlbergia confusa* **spec.nov.** Paratype ♂ upperside (left half, with brand outlined in white) and underside (right half).