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## NOTES ON THE GENUS *PYRGUS* (LEPIDOPTERA, HESPERIIDAE)

by

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With 5 text-figures and 1 plate

### 1. *Pyrgus alveus caucasius* Picard and *Pyrgus jupei* Alberti

In a paper on *Pyrgus bellieri*, Picard (1949: 57) casually named the populations of *Pyrgus alveus* from the Caucasus and Transcaucasia *caucasius*. According to Picard, Reverdin (1915) confused this form with the Chinese *sifanicus* which has different genitalia. The description of *caucasius* is very short: "Il faut mentionner l'extrême petitesse de la pièce constituée par l'antistyle et le stylifer, ainsi que l'aspect externe qui n'est pas sans ressembler au *P. bellieri* typique des Alpes". Further, Picard referred to the figures of Reverdin (1915, pl. 5 figs. 5, 6 and 7).

Alberti (1967) described the species *Pyrgus jupei* from the Caucasus, mainly based on the small proportions of the style and antistyle. Although, judging from the description, the external characters of *jupei* are quite different from those of *bellieri* (and therefore, of *caucasius*), the emphasis laid on the proportions of the style and antistyle by both Picard (1949) and Alberti, suggested that *caucasius* and *jupei* may be synonymous. Only a study of the type material could clear up this question. However, Picard did not indicate specified types, he only mentioned: "... après avoir contrôlé moi-même sur divers exemplaires (que je choisis comme type de *caucasius*) ...".

Mr. G. Bernardi kindly looked for these "divers exemplaires" in the collections of the Muséum National d'Histoire Naturelle in Paris. Only two specimens, both males, could be considered syntypes, both indicated as "race *caucasius*" by Picard, but without type indication. Mr. Bernardi kindly sent me the specimens for examination. Their labels read:

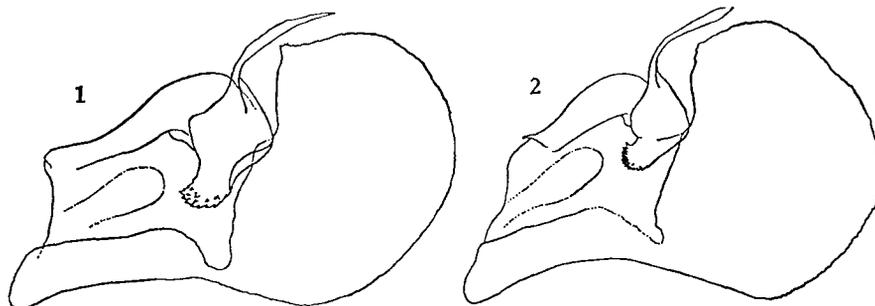
1). "25", "Kaukas.", "Hesp. Alveus, ♂ Monts Adjara, Caucase, Staudinger 1913", "Muséum Paris, 1937, Coll. L. Demaison", "Prépar. J. Picard No. 70,

l'abdomen ne s'est détaché qu'en séparant l'armure" (the last label, in Picard's handwriting);

2). "Kuban, Caucase occid., ♂", "Cauc. sept. oc., Kuban-Gebiet, coll. M. Bartel", "*alveus*", "race *caucasicus* Picard" (the last label, in Picard's handwriting).

By the generosity of Dr. B. Alberti I could compare *caucasicus* with six specimens of *jupei* (among which one male paratype) from Kasbegi and Passanauri.

External characters (pl. 1 figs. 1-6). Both syntypes of *caucasicus* are clearly different from *jupei* with regard to their external characters. On the upper-side the spotting of *caucasicus* is much more extensive than that of *jupei* (the *jupei* male is slightly more extensively spotted than the illustrated female).



Figs. 1-2. Male genitalia, right valvae. 1. *Pyrgus alveus caucasicus*, lectotype (Adjara); 2. *P. jupei* (Passanauri, Georgia).

The underside of the hind wing in *jupei* is very suggestive of *Pyrgus serratulae*, especially by the rounded basal spot in space 7, as stated by Alberti (1967). In *caucasicus* the underside of the hind wing has more coherent, more extensive and squarer spots. Moreover, the Adjara syntype of *caucasicus* has a clearly white termen on the underside of the fore wing, as is the case in many Transcaucasian specimens of *alveus* and in the Chinese race *sifanicus*. The Kuban syntype of *caucasicus* (more worn than the Adjara specimen) shows this character less clearly and is indistinguishable from many *alveus* specimens from Southern Germany, as is the case in most other Caucasian *alveus* specimens (cf. De Jong, 1972). Finally, *jupei* is somewhat smaller than *caucasicus*: *jupei* ♂ 12.7 mm (♀ 13.8 mm), *caucasicus* ♂ Adjara 14 mm, Kuban 13.5 mm.

Genitalia (figs. 1-2). The Kuban syntype of *caucasicus* lacks the abdomen and there are no indications that the genitalia have been dissected. The genitalia of the Adjara syntype of *caucasicus* have been dissected by Picard in 1946

and labelled "*Pyrgus alveus* Hübn. race *sifanicus* Gr. Gr.?" To my surprise, these genitalia did not show the small stylifer/antistyle that, according to Picard, is characteristic for *caucasius*. On the contrary, they proved to agree with the structure found in the average Central European *alveus* and also in many Chinese *sifanicus*. Consequently, *caucasius* and *jupei* are not identical with regard to their genitalia. Probably, Picard got the idea of a small stylifer/antistyle in *caucasius* from the photograph of "*Hesperia sifanicus*" by Reverdin (1915, pl. 6 fig. 6; undoubtedly, the same mount was figured by Warren, 1926, pl. 6 fig. 6). This photograph shows a typical *jupei* structure, but Reverdin did not give a picture of the insect from which the genitalia had been taken.

Conclusion and remarks. As only the Adjara syntype of *caucasius* is complete, I select this specimen as lectotype. It is interesting to note that the name *caucasius* is not quite adequate, as Adjara is a Transcaucasian locality, contrary to Kuban that is located in the NW. Caucasus.

From the above facts it is clear that *caucasius* and *jupei* are not identical with regard to both the external and genital characters. As *jupei* must be considered a separate species, the name *caucasius* is available and it virtually is the only available name to denominate the Caucasian and Transcaucasian *alveus* populations. As I have stated before (De Jong, 1972), the Caucasian and Transcaucasian *alveus* populations are not entirely identical, as the latter has proportionally more specimens with white borders on the underside of the wings. If one likes to give separate names to both populations, the name *caucasius* should be restricted to the Transcaucasian race, as the lectotype originates from Transcaucasia. There is no reason to consider the Caucasian population otherwise than belonging to subspecies *alveus*. However, with the material available I do not think it advisable to separate the Transcaucasian *alveus* population as a distinct subspecies and, therefore, I place the name *Pyrgus alveus caucasius* as a junior synonym of *Pyrgus alveus alveus*.

## 2. *Pyrgus serratulae* (Rambur) in Esthonia

Mr. Mihkelson (Tallinn) kindly informed me that *P. serratulae* is distributed much further to the north than indicated in my distribution map of this species (De Jong, 1972), for it has also been found in Esthonia. This observation was included in Viidalepp & Möls (1963) who supported the correctness of the identification by clear pictures of the genitalia and underside of the hind wing (pp. 91-92). Undoubtedly, the Esthonian population is isolated from the main range of the species, as is the population in Northern Germany. It would be interesting to know whether there are other isolated populations south and east of Esthonia.

### 3. Geographic variation in *Pyrgus sidae* (Esper)

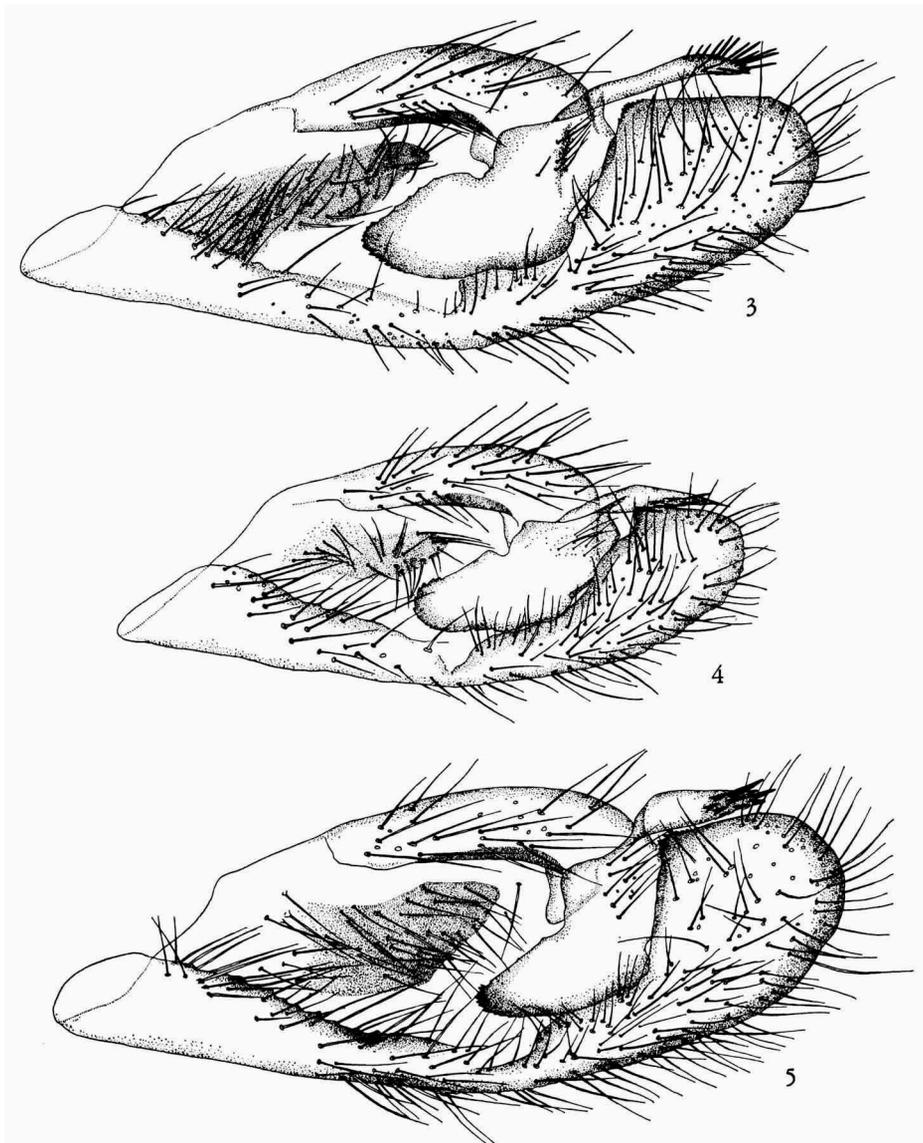
Up to now the geographic variation in *P. sidae* appeared not very complex, three subspecies being recognized, though the variation in Central Asia is not well understood (De Jong, 1972). Recently I could examine a ♂ and a ♀ collected by Vartian (Vienna) in Georgia, 35 km north of Tbilisi (3 and 12. vii.1967, 1800 m). These specimens are practically indistinguishable from the French-Italian ssp. *occiduus*, with which they share the relatively small size (♂ 15.3 mm, ♀ 15 mm), the rather small spots on the upperside of the fore wing, and the narrow, regularly formed, pale yellow-orange bands on the underside of the hind wing.

By the characters of the underside of the hind wing the specimens also approach ssp. *evansi* from the Koppe Dagh region. Virtually, a relationship with ssp. *evansi* is much more likely than with ssp. *occiduus*, as between Georgia and Italy the larger, better and brighter marked ssp. *sidae* is flying. Material from N. Iran would be very elucidating, as it seems possible that a single, perhaps somewhat variable, geographic form occurs from Georgia to NE. Iran and Transcaspia. Probably, the Georgian *sidae* population is the westernmost offshoot from a N. Iranian glacial refugium. As the material from Georgia is scarce and from N. Iran it is wanting, it is premature to assign the Georgian population to a particular subspecies or to consider it even a distinct subspecies.

### 4. A new subspecies of *Pyrgus alpinus* Erschoff

Recently, the Leiden Museum received 2♂ 1♀ Hesperiidæ from southern Pamir, that clearly belonged to the *Pyrgus alpinus* complex. Although the specimens were *alpinus*-like with regard to their external characters, examination of the male genitalia seemed of paramount importance, as the locality is rather southern for *P. alpinus*. In this region one would rather expect to find *P. darwazicus* Groum-Grshimailo and in view of the remarkable subspecies *pseudoalpinus* Alberti of *P. cashmirensis* Moore, the existence of an *alpinus*-like subspecies of *P. darwazicus* cannot be excluded in advance. Moreover, in Badakhshan the well-spotted race *P. darwazicus celsimontius* Kauffmann occurs and the present material could be a further step in this type of variation.

The male genitalia, however, turned out to be of the *alpinus*-type, with an elongated cucullus and a large style and antistyle (figs. 3-4). In one of the males (fig. 4) the cucullus appears rather short, because the proximal edge curves distad in the upper part, but even in this way the cucullus is not *darwazicus*-like. In the other male (which I select as holotype of the subspecies described below), the proximal edge of the cucullus is straighter, giving the cucullus a shape as in ssp. *alpinus* (fig. 3).



Figs. 3-5. Male genitalia, right valvae. 3. *Pyrgus alpinus alpinus* (C. Asia); 4. *P. alpinus alichurensis*, paratype (S. Alichur Mts.); 5. *P. darwazicus darwazicus* (Anzob Pass, Hissar Mts.).

As stated by Alberti (1952) and De Jong (1972) *P. alpinus* does not appear to show geographic variation throughout its large distribution area, except for the small subspecies *mustagatae* Alberti, known from the Mustagh Ata and Hunza (N. Gilgit). It is, therefore, interesting to observe, that the present

material form S. Pamir is distinct from both ssp. *alpinus* and ssp. *mustagatae*. I propose to name this form **Pyrgus alpinus alichurensis** subsp. nov. It may be described as follows.

Male — Small, fore wing 10.9 - 11.3 mm (ssp. *mustagatae* 11.2 - 12.2 mm, ssp. *alpinus* 12 - 13.5 mm). Above, spots well-developed, relatively slightly larger than in the other subspecies, but on the hind wing median spots only in spaces 3 to 6 (and some white suffusion in space 7), not in space 2 (often well-marked in ssp. *alpinus*). Characteristic submarginal spots near the tornus of the hind wing distinct, but not very prominent. Ground colour of underside of hind wing dark greenish brown, slightly suffused by lighter hairs and scales, so that the white spots are less sharply contrasting with the ground colour than usually in ssp. *alpinus*. These spots well-developed, but median spot in space 2 wanting and in space 1C small and indistinct; central spot projecting towards base of wing along vein 6 (unlike ssp. *mustagatae*).

Female — Fore wing 11.5 mm, otherwise like male.

Types — Holotype, ♂, Pamir, S. Alichur Mts., Koytezek Pass, 4500 m, 19.vii.1972, D. S. Lastochkin; paratypes, 1 ♂ and 1 ♀, same data. All types in Rijksmuseum van Natuurlijke Historie, Leiden.

##### 5. Distributional overlap of *Pyrgus alpinus* Erschoff and *darwazicus* Groum-Grshimailo

The taxonomic position of *P. darwazicus* has long been obscure. Originally, the species was described as a variety of *P. alpinus* (Groum-Grshimailo, 1890) (probably, with variety was meant what we now indicate as subspecies). Warren (1926) listed it as a race of *P. alpinus*. Evans (1932) placed the name as a synonym to *P. alpinus alpinus*, but later (1949) he raised *darwazicus* again to subspecific level, placing it as a subspecies of *P. alpinus*.

Another viewpoint was put forward by Alberti (1952), who gave *darwazicus* specific rank, as no intermediate populations or specimens between *P. alpinus* and *P. darwazicus* are known. This classification was largely followed by De Jong (1972), who united *P. alpinus*, *P. darwazicus* and *P. cashmirensis* as semispecies in the superspecies *P. alpinus*.

Alberti thought it possible, that *P. alpinus* and *P. darwazicus* were partly sympatric, as both are known from Samarkand and the Alai. Such vague locality indications (usual with old material) do not prove much, but new material shows the idea of Alberti to be correct. Recently, the Leiden Museum received 3 ♂ 2 ♀ of *P. darwazicus darwazicus* and 1 ♀ of *P. alpinus alpinus* (fore wing, 13.7 mm, compare with female *P. alpinus alichurensis*), all caught in the Hissar Mountains, Anzob Pass, 3400 m, 3-9.vii.1972, D. S. Lastochkin.

These *P. darwazicus* specimens are rather small, the males (valve, fig. 5) measuring 12.8 - 13.5 mm, both females 14 mm, i. e. slightly smaller than *P. darwazicus celsimontius*. One of the males is unspotted above, except for a very small white streak in space 10 of the fore wing and a few white scales, only visible under the microscope, in the cell and in spaces 2, 6, 7 and 8. For the rest the specimens do not differ from *P. darwazicus darwazicus*.

In brief, the *P. alpinus* complex (or superspecies *P. alpinus*) is composed as follows:

*P. alpinus* — widely distributed, from S. Pamir to Kamchatka, without geographic variation, except for two small forms (ssp. *mustagatae* and ssp. *alichurensis*) at the southern and southeastern border of the range in Central Asia.

*P. darwazicus* — from N. Hindu-Kush north to Alai and Hissar Mts., where it flies sympatrically with *P. alpinus*, with marked geographic variation, viz., dark in its range north of Afghanistan (ssp. *darwazicus*), well-spotted and more or less recalling *P. alpinus* in Badakhshan (ssp. *celsimontius*), and very small, spotting intermediate between ssp. *darwazicus* and ssp. *celsimontius*, more or less like *P. cashmirensis*, in a part of the Hindu-Kush (ssp. *lilliput*).

*P. cashmirensis* — from Safed Koh (E. Afghanistan) and Chitral through Kashmir to Kumaon and (discontinuously?) to Bhutan, with little variation, except in the northern part of the range (Chitral, Gilgit) (ssp. *pseudoalpinus*), where externally it looks like *P. alpinus*. Probably, it comes into contact with *P. alpinus* in N. Chitral and N. Gilgit, but sympatric occurrence is not yet known.

#### 6. *Pyrgus* species in northeastern Asia

Data on the occurrence and distribution of Hesperiidæ in NE. Asia are rather scanty. Most data refer to the Amur region and even this relatively well-known area is only very incompletely explored. Therefore, the appearance of "The butterflies of the Far East USSR" by A. I. Kurentzov (1970) seems to fill a wide gap. It may be useful to review critically the *Pyrgus* species listed by Kurentzov (under the name *Hesperia*). Dr. A. Diakonoff kindly translated the Russian text.

*P. maculatus* Bremer et Grey. The figure by Kurentzov (pl. 12 fig. 26) clearly represents the form of this species that resembles the spring form in more southern localities. As I noted previously (De Jong, 1972), *maculatus* appears to have a single brood in E. Siberia. Kurentzov mentions as flying period the second half of May and the first half of June. Therefore, it does not seem appropriate to speak of a spring form in Siberia. *Spiraea ussuriensis* and *media* are recorded as food plants.

According to Kurentzov *maculatus* has been recorded from the Minusinsk region. This observation appeared improbable, as Minusinsk is about 1500 km west of Chita, which was the western-most known locality of *maculatus*. However, Mr. Mihkelson (Tallinn) kindly informed me, that the species was recorded from Irkutsk by V. N. Tomilova as a pest, so the species appears to have a much wider distribution than supposed previously.

Further, Kurentzov quotes Krulikovskiy (1916) with regard to another locality of *maculatus*, viz., where the river Maya runs into the river Aldan, i. e. in the vicinity of Ust-Maya. Although this locality is far to the north and virtually the northern-most locality known, it seems reliable, as *maculatus* was known to occur in the Stanovoy Khrebet.

*P. centaureae* Rambur. This species was not known to occur east of the Lake Baikal (apart from a female from Vitim in the British Museum (Natural History)), although its occurrence there could be expected in view of the distribution in N. America. Kurentzov mentions the following localities: vicinity Magadan ( $\pm 150^{\circ}\text{E } 60^{\circ}\text{N}$ ), the Omsukchan Range (eastern foothills of the Kolymskiy Khrebet,  $\pm 170^{\circ}\text{E } 65^{\circ}\text{N}$ ), Koriak Mountains (river Apuka,  $\pm 170^{\circ}\text{E } 61^{\circ}\text{N}$ ) and the mountain Sankekan in the Jablonowyj Khrebet. In these localities *centaureae* flies in the mountain tundra, sometimes also at lower levels in the coniferous zone.

The addition of these new localities to those already known suggests a more or less continuous distribution of *centaureae* in the northern Palaearctic. It would be very interesting to study the E. Siberian specimens in greater detail, especially the male and female genitalia, as they can possibly reveal much about the interesting geographic history of the species (cf. De Jong, 1972). Kurentzov compared the E. Siberian specimens with the American subspecies *freya* and *loki*, and found them rather similar with regard to external characters, except that the spots on the underside of the hind wing are very reduced and the ground colour of the underside of the hind wing is darker with more pronounced white spots in E. Siberian specimens. According to Kurentzov the E. Siberian population is intermediate morphologically and he gives it the subspecific name *Hesperia centaureae sibirica* (subsp. n.). It is, however, not clear to me between which populations the E. Siberian one is intermediate. Moreover, it is unfortunate that Kurentzov chose a name used almost 60 years earlier by Reverdin (1911). This author gave the name *Hesperia sibirica* to a form from the Altai which he considered a new species, distinct from *centaureae*, but which is now considered a subspecies of *centaureae*. Without genital examination of E. Siberian specimens it is impossible to state whether the populations from E. Siberia and the Altai are

identical, but at all events the name *Hesperia centaureae sibirica* Kurentzov, 1970, is a junior primary homonym of *Hesperia sibirica* Reverdin, 1911, and therefore, must be rejected.

Although the known localities of *centaureae* in E. Siberia are still very scanty, it is interesting that they are all situated in the mountain tundra. In Scandinavia, *centaureae* belongs to the mire fauna, while its near relative *andromedae* lives above the timber line. This supports my idea expressed previously (De Jong, 1972) that *andromedae* arrived in Scandinavia long before *centaureae*. Apparently *centaureae* could establish itself in Scandinavia only by a change of habitat, i.e. from a mountain tundra or alpine habitat to the mires, while in Siberia, the supposed native country of both *centaureae* and *andromedae*, the latter is absent now and *centaureae* can live in its primary habitat. This also supports the views of Petersen (1954) who, in his treatise on the cold-adapted Holarctic fauna, concluded that mires are a secondary habitat of most of the butterfly species now more or less restricted to them.

*P. malvae* Linnaeus. No new data. See also the next two species.

*P. scriptura* Boisduval. This species is only known from the Southwestern USA (California, Colorado, Arizona) and Mexico, so its occurrence in E. Siberia is not very probable. Kurentzov records the capture of a single male in the vicinity of the village of Tugur at the west coast of the Sea of Okhotsk. As this specimen is (of course) not identical with American specimens, Kurentzov creates the subspecies *Hesperia scriptura kuznetzovi*. Probably, it is an individual variation of *P. malvae*.

*P. ruralis* Boisduval. Another North American species, mainly occurring in the western part of the USA. Kurentzov records the capture of two males at the same locality as *P. scriptura*. This is not the only reason for mistrusting the correctness of the identification. The specimens are said to be intermediate between *P. ruralis* and *P. malvae* with regard to the spotting, but they most closely resemble *ruralis*. As they differ from American specimens, e. g. in having very small submarginal spots, Kurentzov gives them the name *Hesperia ruralis ochotica*. Probably a variety of *P. malvae*.

*P. serratulae* Rambur. The occurrence of this species east of Lake Baikal is badly known. I have seen specimens only from the Jablonowyj Khrebet. Kurentzov quotes three records from the literature, viz., Lake Baikal (Bremer, 1864), river Aldan (Herz, 1903) and Bureinskiy Khrebet (Ménétrières, 1859).

Further, he records the species from the mountain Khamar-Dabana and from the Sutschan region, north of Vladivostok.

Although the occurrence of *serratulae* in all these localities is quite possible, one cannot be sure about the correctness of the identifications. All Siberian specimens I have seen (9 ♂ 5 ♀, Altai and Jablonowyj Khrebet) are extensively spotted on the upperside, particularly the hind wing. However, Herz described the specimen found by him along the lower Aldan as "ein ganz typisches ♂", i.e. like European specimens. As some of these records of *serratulae* may refer to *P. alveus* variations, the occurrence of *serratulae* in E. Siberia remains unclear.

*P. alveus* Hübner and *P. speyeri* Staudinger. According to Kurentzov, *P. alveus* probably does not occur east of the upper Amur. This may be correct if one considers *speyeri* a distinct species, as Kurentzov does, but I prefer to consider *speyeri* provisionally a subspecies of *P. alveus*.

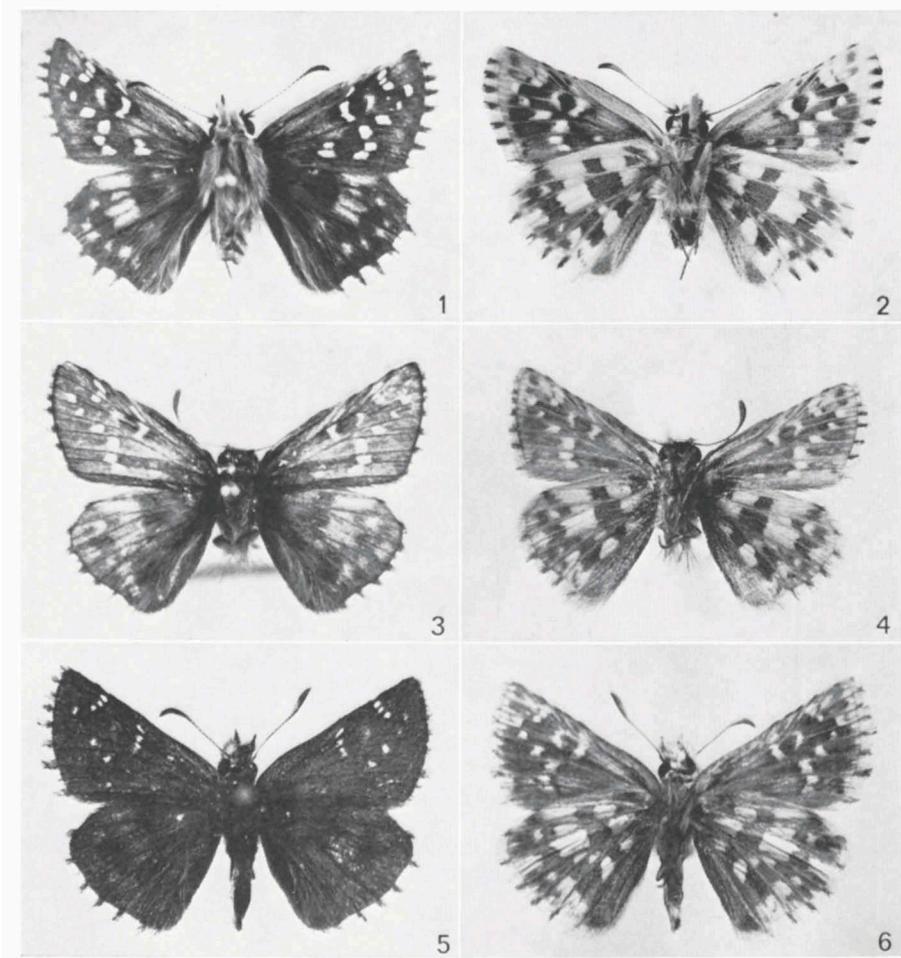
Kurentzov's figure of *speyeri* (pl. 12 fig. 22) is somewhat vague, but it undoubtedly represents *speyeri*. Kurentzov calls *speyeri* a characteristic steppe species that is widely distributed in East Transbaicalia, eastward along the Amur to the Bureinskiy Khrebet and through Manchuria to the E. Manchurian mountainous regions. In the Maritime Province it is much scarcer, having been captured only in the Khanka plains (north of Vladivostok) and along the river Iman.

Two *Pyrgus* species that are known from E. Siberia have not been mentioned by Kurentzov, viz., *P. alpinus* and *P. schansiensis* (see De Jong, 1972). They are, possibly, much more locally distributed than other *Pyrgus* species and show that E. Siberia is still largely unexplored as far as the Lepidoptera are concerned. Undoubtedly, we can expect many surprises from this region in the future.

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Figs. 1-6. Upper (left) and underside (right) of *Pyrgus* species. 1-2 *P. alveus caucasicus* (♂, lectotype, Adjara); 3-4. *P. alveus caucasicus* (♂, paralectotype, Kuban); *P. jupei* (♀, Passanauri, Georgia).