

Some Data Concerning the Subspecific Distribution of *Colias chrysotheme* Esp. (Lepidoptera)

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Four subspecies beside that of the nominate form of *Colias chrysotheme* Esp. had been described, according to the data at my disposal, from the Palearcticum. Unfortunately, the descriptions are not satisfactory in all regards, which caused several kinds of difficulties. This was the case with the subspecies described as the first, ssp. *sibirica*, introduced by Grum-Grshimailo (8) in 1893, on the basis of specimens from Krasnoyarsk. The differentiating characters of this subspecies, according to the diagnosis of Grum-Grshimailo, are the broad black margins of the males and the big yellow marginal spots of the female. These characteristics can, however, be met with occasionally in other territories, so that *sibirica* is regarded by some authors as an individual form only. In 1911, Verity (20) described another subspecies by the name *graeca* from Greece, but this description was based, according to Bollow (6), on an error, as the male serving for the diagnosis had possibly been an American *Colias philodice* and the female a Southern European specimen of unknown locality. Anyhow, no authentic Grecian *C. chrysotheme* specimen had yet been found, at least so far as I know it. Similarly, in 1911, Stichel (19) described another subspecies by the name ssp. *caspicus*, from Rescht, on the Iranian coast of the Caspian Sea. The males of this form are sulphur yellow. Unfortunately again, he had not been able to come to a final decision with regard to the females. According to him, the females captured at the same time are wholly conforming to *Colias croceus* Fourc. females, excepting their smaller size. Consequently, he did not dare to take his final standpoint concerning the state of these females. I may add to the above that the subspecific state of the South-Ukrainian subspecies had not been recognized by Krulikovsky (11) who first discussed it, save that he described its females lacking the orange suffusion as ab. *schugorowi* in 1906. Later, Verity (20) did recognize the subspecific state of the populations in Southern Ukraine but by using for them the aberration name of Krulikovsky as a subspecific name and at the same time omitting from the new designation his own authorship he did not go all the way as requested by the Rules of Nomenclature. This subspecies attained its proper and valid name in 1936, when Obratsov (12) designated it as ssp. *ksienzhopolskii*.

The first attempt to revise the subspecies hitherto described of *C. chrysotheme*, was that of Verity, at the beginning of this century. In his big work, *Rhopalocera Palearctica*, he discussed reiteratedly the subspecific forms of *chrysotheme* and even grouped them in a special list. It was his opinion that this species may be segregated into three groups, which are *chrysotheme chrysotheme*, *chrysotheme sibirica* and *chrysotheme eurytheme* (this last comprising the American group of the species). The first group will, according to him, fall into three subspecies, these again are ssp. *chrysotheme* Esp., ssp. *graeca* Vrtv., (maintained later as non-existent by Bollow), and ssp. *shugorowi* (rightly ssp. *ksienzhopolskii* Obr.). He did not dissemble the group *sibirica*, but segregated three entities within the American subspecies (in 1943, there had already been 6 American subspecies recognized). Verity tried not only to group the subspecies known to him but made his best to complete the deficient descriptions. Of ssp. *sibirica*, he established that it is differing from the nominate form by its pale color, a feature of a more general validity. When stating that populations of Southern Ukraine represent a distinct subspecies, he attempts also to give a more general characterization of them and establishes the fact that the special feature is a pale basic color. This was not mentioned by Obratsov (12) even in 1936. The statements of Verity present an indubitable ad-

vance concerning the knowledge of the *chrysotheme* subspecies, even if important questions yet remained unsolved.

I find it a development of great importance that Verity began the examination of the Central European forms. He had shown that there is, during the summer, in the populations around Mödling, in Lower Austria, a special and frequent *chrysotheme* form differing from the nominate form, but this he regarded as an individual aberration, and did not give it a name. In the followings, I wish to discuss the subspecific problems of the Central European populations of *C. chrysotheme*, based on the rich material of the Collection of the Hungarian Natural History Museum. At the same time, I wish to give a more exact characterization of the subspecies described up to now and I will modify the grouping of Palearctic subspecies as tabulated by Verity.

The nominate form of *Colias chrysotheme* Esp.

This butterfly species had been described by J. Chr. Esper (7). The description has been published in the work of the above author, „Die Schmetterlinge in Abbildungen nach der Natur mit Beschreibungen”, Part I, Volume 2, p. 89—90. Figure 3 of Plate LXV depicts the male, whilst the female is shown by figure 4. As Esper states it, the specimens serving for his description had been collected around Körmöcbánya („Kremnitz”), and he received them from a German collector, called Gerning. With regard to the occurrence of *C. chrysotheme* in Körmöcbánya, this is the sole data even after the perusal of literature and material at my disposal, and the collecting locality of Körmöcbánya had been incorporated into the Fauna Regni Hungariae (4) also on the basis of Esper's citation. From my part and on the ground of our knowledge of the home breeding localities of *chrysotheme*, I think it improbable that this species should breed in this area but rather believe that the former owner of the Esper specimens had some connection with this city.

The more essential part of the problem is, however, not the question of the exact collecting locality of Esper's specimens but whether they could safely be identified with one of the forms of the species. The study of the problem is rendered the more difficult by the fact that the description of Esper, as regards morphological characters, is rather reserved. According to the text of the description, the basic color of the wings of both sexes is a vivid lemon („frisches Zitronengelb”). In the males, the yellow basic color on the median part of the wings is covered by a rufous-yellowish spread. If the orange color was present really on the male only, Esper must have had a very rare female aberration differing from the usual Central European individuals, a form which I had not been able to find among many hundreds of Central European specimens. The colored figure is, however, in opposition with the description, since the orange suffusion is present also on the figure of the female. The female depicted, by the way, very much resembles our large summertime female specimens from the Eastern Transdanubium. Principally, the large yellow spots in the black margin — confluent almost into a band on the hind wings — are characteristic of the Central Hungarian females of the summer generation. The representation of the male was less successful but the clear yellow color of the underside of the wings is also a characteristic feature of the Central Hungarian summertime specimens.

Whatever had therefore been the exact locality of the specimens of Esper, I have to take the standpoint that his description concerns the *C. chrysotheme* form to be collected in the eastern territories of the Transdanubium, a view concurrent with earlier notions. Accordingly, our specimens from the Eastern Transdanubium belong to the nominate form and this form has to be

taken for the base of comparison in the course of research concerning geographical forms.

**The detailed description
and its distribution in Hungary of the nominate form.**

With regard to the fact that several important characters are lacking from Esper's description, — characters necessary for the examination of the subspecies of *C. chrysothème* — I will attempt to give a detailed representation of the species, based on specimens from the Eastern Transdanubium. The main importance lies with the characters of the summer generation, as the differences within the Central European forms jump to the eye most strongly on individuals of the summer brood.

The alar expanse of the males originating from the Eastern Transdanubium varies generally between 38—42 mm in the summer generation, yet also smaller specimens occur. The smallest male which went through my hands was 34 mm. The females are somewhat larger, their alar expanse being generally 40—44 mm. There are also smaller ones, and I found a specimen measuring 45 mm. The fore wings are only rarely narrow and elongated, such specimens occur mostly among females. The tornus of the fore wings lies only slightly more basad than the apex. The termen, if but slightly, arches outwards, a wholly straight termen is a rare occurrence. The orange color of the fore wings is vivid, usually with a yellow tint, with a gradual transition to yellow toward the costa and the submarginal black margin. The yellow color occupies but a smaller-broader zone near the costa in the males, whilst on the females, the immediate costal area is greyish green with yellow only on its inside. The yellow spots within the black margin of the females are elongated in the direction of the termen, both on the fore and on the hind wings. On the fore wings, the two lowest spots are the broadest, their breadth makes up 50—70% of the breadth of the margin. On the hind wings, the discal orange spot are in both sexes big, just as the corresponding brown-inclosed double silver spot on the underside. The brown ring around the silver spot is sharply delineated. On the underside of the hind wings, the yellow color is vivid, clear (with the exception of the base), yet even the greenish-grey suffusion in the basal area is generally weak.

The alar expanse of the specimens of the first brood is less uniform, that of the males oscillates between 31—39 mm, that of the females between 33—44 mm. The orange spread on the wings of the males occupies a smaller area. The yellow before the costa and the termen is less vivid, with rather a greenish tint. The orange suffusion of the females is more vivid, though it takes up a smaller area also in this sex. The greenish-grey suffusion on the underside of the hind wings is stronger and, with the exception of the yellow spot before the margin, it spreads onto the whole wing. The black margin is small, mainly on the males. The yellow spots within the black margin of the females are smaller than on the summer specimens, they are better separated from each other and, since the margin itself is narrower, they do not take place in its middle or in its outer side but rather on the inner side (by this it is evident that the marginal spots change their place but seemingly, it is the breadth of the margin that varies).

The autumnal specimens of *C. chrysothème* take an intermediate place between those of the spring and the summer. The alar expanse of the males varies between 31—42 mm, that of the females between 33—43 mm. They are not so pale and green as are the springtime specimens, and the orange color covers a smaller area than on the specimens of the summer brood. The yellow spots within the black margin of the females are mostly small and they appear in the middle of the margin even if they are larger than usual. They resemble the springtime specimens mostly in the strength of the greenish suffusion on the underside of the hind wings. Specimens of the third generation in Central Europe had come into my hands from Central Hungary only.

To this detailedly discussed form of *C. chrysothème* which, in the sense delineated above, I hold to be identical with the nominate form, belong those that live in the populations of our home fauna between the Danube and Lake Balaton. It reaches the Danube, between Dunaalmás and Esztergom in the north, but I miss data whether it is to be found also further north. It spreads in the east to the slopes of the Mts Dunazug, it occurs in several places in the hills around Buda, and its area is delimited by a straight line running from Buda

along Lake Velence. In the west, we have met with it till the line Dunaalmás-Várpalota-Tihany. The species had been shown in the vicinity of 13 villages in the above area. According to the data of Pillich, *chrysotheme* occurs also further to the South, in Simontornya. Though I have not seen a specimen as yet from this locality, I hold it rather possible that, on the basis of the ecological conditions, the *chrysotheme* of Simontornya also belongs to this group. In the above territory, the collecting localities of the species are situated partly on hill slopes of a southern inclination, in warm depressions and valleys, and partly on dry, stony pastures. I have even caught it on the edge of a dry reedy patch near Lake Velence, but there is also a dry pasture near the reeds. The observation of Abafi-Aigner (3), namely that *chrysotheme* is mainly to be found on wet meadows, is, according to my data gained from the Eastern Transdanubium, not acceptable.

C. chrysotheme on the sandy areas of the Great Plains.

Of *chrysotheme*, there are some collecting localities known from the area between the Danube and the Tisza which are on sand, yet I received a more considerable material from Ágasegyháza only. Specimens collected here are generally larger than those from the Eastern Transdanubium. The alar expanse of a specimen of the spring generation is 47 mm, that of two females 39, that is, 45 mm. The alar expanse of two males from the summer is 43, and 46, respectively, whilst one female measures 45 mm. The expanse of seven males from the fall varies between 33—41 mm, two females measure 42 and 46 mm. The color of the wings also differs from those of the Transdanubium. The orange suffusion has, on all three broods, a strong inclination toward yellow besides being very vivid and shiny. It is a well observable character of the males that the yellow veins within the black margin are broad, their bases expand, — the same veins being, on the Transdanubial specimens, more narrow, their bases do not expand conspicuously. Within the black margins of the summer females, the yellow spots are large and, on the hind wings, press the black basic color of the margins still more into the background. The summertime characteristics appear in an extreme form on one of the springtime females. The crowding into the foreground of the yellow coloring element is still better observable on the underside of the wings as it happens on specimens from the Eastern Transdanubium; the green suffusion retreats rather more into the background also in the first and third broods. These specimens had been collected on loose sand by Gy. Éhik, L. Gözmány, and Mrs. E. Drózdly.

From the other sandy areas of the Great Plains only some few *chrysotheme* specimens had been at my disposal. We have a female from Szigetcsép, which came to the Museum with the collection of A. Kertész, this specimen resembles very much the females from Ágasegyháza. We have a male from Peszér which is, however, so worn that it cannot be decided with any security as to what group it belongs. We have also a female with the locality label Izsák but this differs from any other home female. Finally, we have two specimens from the Dahlström collection, labelled Debrecen, but, owing to the numerous erroneous data of this collection, I did not draw them into my examinations. By the above discussion, it still remains an open question whether the form collected at Ágasegyháza is merely a local form or has a wider distribution on the sand of the Great Plains.

C. chrysotheme around Magyaróvár and the northern shores of Lake Fertő.

West of the Balaton, we were fortunate to find *chrysotheme*, within the borders of the country, near the border at Magyaróvár. Though I am not cognizant of the habitats in this area of the species, it is an indubitable fact that the oscillation of temperature is less extreme in this territory of the country than in the Western Transdanubium or on the Great Plains. The *chrysotheme* from Magyaróvár also differs from the form of the Western Transdanubium, yet in another direction than does the one from the Great Plains. The one from Magyaróvár is the smallest of the *chrysotheme* forms in Hungary that ever went through my hands. The alar expanse of the male of the first generation is 34—45 mm, the sole female measures 36 mm. The five males belonging to the second brood measure 35—40 mm, the four females 39—43 mm. I have not met with autumnal specimens. One of the characteristic features of the Magyaróvár form is the strong development of the red color. The red color is deep, and on some specimens it is absolutely identical with the color of somewhat pale *Colias myrmidone* Esp. specimens. Besides, the red color on the fore wings drives the yellow along the costa and the black margin also into the background. The color of the wing surface is not so shiny as on the Central Hungarian specimens, indeed, it is sometimes rather faint especially on the females. The underside of the fore wings of the males is a chrome yellow (rather lemon in the central parts of the country), whilst it is vigorously greenish on the females. The breadth of the black margin of the males agrees to that on the ones from Central Hungary. It is narrower in the females, and so the yellow spots, which have also a deeper tone, do not sit in the middle of the band but on its internal part. The yellow marginal spots are rather small. The discal spot of the hind wings is fiery red, especially in the females, it is not a vivid orange and is big.

The *C. chrysotheme* around Magyaróvár is not a local occurrence of the species but a member of the population-group living near our northwestern borders. Some 10 kilometres from Magyaróvár, on the shores of Lake Fertő, the species had been found around Nezsider (Neusiedl am See, Burgenland). There are four males and four females in the collection of the Museum from this area. Two of the males are red, and two have a darker orange tint. The yellow element is in the background on all four specimens. The four females are of a uniform pale deep red, their color agrees with that of the females of Magyaróvár. The breadth of the black margin, the discal spot of the hind wings and the green suffusion on the underside are the same as in the case of the Magyaróvár specimens.

The question may arise whether the difference of the *chrysotheme* groups in Central Hungary and that living near our western borders is founded on the effects of oecological factors or represents a different line of phylogenesis. Though, as has been mentioned above, the climatical effects are well observable in the color of the several generations on the Eastern Transdanubium, we meet, in the present case, with such among the differing features which are the exclusive characters of one or the other group, so it may be assumed that they have hereditarily descended to the offsprings.

There is another circumstance worthy of consideration which had but slightly been touched upon yet. Our orange-colored *Colias* species belong to the agile lepidoptera species, capable of enduring flight. Of *C. croceus* Fourc., we know since long that it flies not only sustainedly but is an animal of vagile

nature. It will press yearly to the north and appears in areas where its hibernating forms cannot live through the winter. The considerable mobility and enduring flight of *chrysotheme* may infer the assumption that it also is a vagile species but, according to observations made up to date, this is not the case. Some few collecting localities of this species are known around Budapest where it may be found yearly. Outside of these localities known since long, I have not yet seen *chrysotheme* though I keep our *Colias* species under constant observation. With regard to this circumstance, I have asked for the observations of other collectors and the gained informations only strengthened the validity of my own.

It is evident that our home *chrysotheme*, though an agile species, is not vagile and will strictly adhere to its breeding localities. This will explain the fact why the several populations are isolated from each other, even though they could find food and agreeable oecological conditions elsewhere too. The strict adherence to the given point of the species will also clear up the existence of the "*chrysotheme*-proof" internal zone between the two groups of the Central Transdanubium and the Western Transdanubium. This isolation plays, if also strengthened by different oecological conditions, an important role in the development of deviating characters.

On the basis of the above discussion, I regard the *chrysotheme* group near our western borders as a distinct subspecies, and introduce it by the name ssp. **praealpina** ssp. n. Holotype male: Magyaróvár, 1932, leg. N a t t á n; Allotype female: Magyaróvár, 1932, leg. N a t t á n, both in the Collection of the Hungarian Natural History Museum; paratypes: 1 male, Máriakálnok, 1929. VII. 28. leg. R u f f; 1 male, Magyaróvár, 1933. IV. leg. N a t t á n; 1 male, Magyaróvár, VIII. 2. coll. H á m o r i; and four males, Nezsider (Neusiedl am See, Burgenland), leg. S c h m i d t, 1900. VIII. 7., 1901. VII. 5., 27, and one without date; further 3 females, Nezsider, leg. S c h m i d t, 1900. VIII. 7. and IX. 7., and one without date; finally, 1 female, Nezsider, leg. W a c h s m a n n. All in the Collection of the Hungarian Natural History Museum.

C. chrysotheme in Lower Austria and Moravia.

Chrysotheme is rather frequent in Lower Austria, south of Vienna, around Mödling and in the vicinity of some villages near Steinfeld. The Lower Austrian form is also small, observable especially on specimens of the summer brood. The yellow color is put somewhat into the background on the summertime males. The orange of the females is very faint, it seems to be almost brown if compared with Central Hungarian specimens. The yellow marginal spots of the females are small also on the summer specimens (this was the feature that attracted the attention of V e r i t y), the black margin itself is narrow. We have also a male from Deutschaltenburg and a female from the vicinity of Graz which will probably belong to this group too. — The form living near Nikolsburg, in Southern Moravia, resembles very much the *chrysotheme* around Vienna. I observed differences only on the summer brood which is larger around Nikolsburg than in Lower Austria, its orange is more vivid, its black margin broader. The marginal spots of the females are small.

From the above data, it may be ascertained that there are differences concerning size and color between the *chrysotheme* populations living near our western borders and further to the west. With regard to size, the Moravian devi-

ates from the others and approaches the Central Hungarian form. Concerning color, the Viennese-Moravian group is yellower on the one hand, and the Nezsider-Magyaróvár group more rufous on the other hand, both building thus a separate entity. Aside of these indubitable differences, the two groups have some few characters which are mutual features of both. One of them, first of all, is that the green suffusion on the hind wings (and especially on the underside) is much stronger also in the summer specimens than on those from Central Hungary. On these latter, the green suffusion is perceptible in a higher rate on specimens of the spring and autumnal generations, and so its development turns on the effect of climatical factors. The other agreement is the shineless, faint color conspicuous chiefly on the females. Finally, it is a common character that the red suffusion comes to the foreground at the expense of the basic yellow color, indeed, it sometimes suppresses it. These characters may, though in a smaller measure, be also observed on single individuals of the springtime brood. As far as I can see it, the identical characters will weigh more but, before taking a definite standpoint concerning the taxonomical problems of the populations living further to the west, I deem it advisable to examine whether the differing features do occur on really distinct areas or will appear alternating with each other.

Other data regarding the Central European and Balkanian distribution of *C. chrysotheme*.

We still come across many uncertain data in papers concerning the distribution of *C. chrysotheme*. Informations had, from time to time, divulged new collecting localities some of which had later been thankfully forgotten. So, for instance, Spuler (17) states in 1901 that *chrysotheme* occurs also in Northern Italy, on the other hand the Italian Verity, some years later, omits to mention its Italian occurrence. According to Verity (20), *chrysotheme* had been found also in Southern France, namely in the Alpes Maritimes. Of this occurrence no mention is made either by Röber (16) in the Seitz work, or, much later, by Bollow (6). Concerning the Balkan Peninsula, Rebel (13, 14, 15) mentions the Belgravian, Roumanian and Bulgarian occurrences of *chrysotheme* with certain reservations, and does not bring it forth from Albania at all. It is the more desirable therefore to have trustworthy data with regard to the occurrence of the species together with the actual specimens in evidence. Though there really are some rufous *chrysotheme* males, misleadingly resembling pale *myrmidone* specimens, — indeed, among the females there exist some similar to *croceus*, — all such specimens strike the eye when seen in series. One who works with series and knows all three species will scarcely err.

I have found data not mentioned by literature also in the Collection of the Hungarian Natural History Museum. There is a male from Borosjenő (Ineu, Roumania), situated at the foot the Transsylvania Central Mountains. The date of collecting is 1913. VIII. 27, the collector L. Diószeghy. The basic color of the wings is a rather dark, shineless orange red, the yellow element is in the background. It cannot be relegated without restrictions to any of the known forms. Further, there is a male and a female specimen from Zavidovic, Bosnia. Their collector was K. Kendi, who was there the clerk of a timber exploiting firm at the beginning of the century. The male has a more vivid orange than the one from Borosjenő, the orange of the female is faint, and the

yellow element is also in the background on both specimens. A characteristic feature is the large and vividly red discal spot on the hind wings. These do not agree at all with any form known to me. Though our data are, at the present, scanty, I hold it highly probable that the nominate form of the species does not occur east of the Tisza and south of the Danube.

Data concerning the subspecies living in Eastern Europe and Asia

There is a considerable *C. chrysotheme* material from Volhynia and the Crimea in the Collection of the Hungarian Natural History Museum. We have a smaller series from Zhitomir, consisting of 3 males and 9 females, whilst, from Simferopol, we have 37 males and 79 females. The color of the Zhitomir specimens resembles somewhat the Central Hungarian ones but their orange suffusion is not so vivid. Obratsov (12) relegated the *chrysotheme* from Simferopol to the southern Ukrainian ssp. *ksienzhopolskii*, since it scarcely differs from specimens collected at the typical locality of this subspecies (Gvt. Poltava and Cherson). The authors who worked earlier with the Ukrainian *chrysotheme* saw the most important difference in the yellow color of the females of this subspecies as against the nominate form. With a more minute scrutiny of these specimens, it can be stated that not only do the yellow females but also the males show constant and well observable features differing from the nominate form or, indeed, from every population in the west. The most important difference lies in the deviating size of the discal spot of the hind wings. This spot is large in the populations to the west, and small or sometimes insignificantly tiny in ssp. *ksienzhopolskii*. Not only is this observable on the orange spot on the upperside of the wings but also, — and in a still higher rate — on the brown-ringed double silver spot on the underside of the wings. Besides, the brown ring is indistinct on the Ukrainian specimens, whilst it is sharp on the western ones. Another important feature of the Ukrainian specimens is the elongated form of the fore wings, with the apex strongly sharpened, though this is not so general as the former character. The tornus of the narrow fore wing lies more basally than the apex, its termen is sharp, running in a straight line from apex to tornus. This wing shape occurs only exceptionally among the Central European *chrysotheme*: the termen arching, even if in a minimal way, almost always outwards. Let us add to these differences the fact that, according to the dates on the specimens, there is no difference between the several broods. These characters may be observed, in a smaller or larger measure, also on the Zhitomir specimens, with the exception that I did not find a single female without the orange suffusion. In spite of this, I hold it indubitable that the Volhynian and Ukrainian *chrysotheme* originates from a common source which is but a distant relative of the Central European *chrysotheme*.

I have found only two Siberian specimens in the collection of our Museum. One of these is a male and it comes from Krasnoyarsk, the typical locality of ssp. *sibirica*. The collecting locality is born on the original label of Ermolajev. The other one is a female with the label „Ermolajev, Sibiria” without any nearer designation. There are home labels also attached to both with the inscription ”Ermolajev, Sibiria or.” The male indubitably belongs to ssp. *sibirica* but the marginal spots of the female are rather small, so it cannot be relegated to it on the basis of the original diagnose. The male bears a rather deep, shineless orange suffusion on the upperside of the wings, the yellow is

almost wholly in the background. It is a much more important fact that the form of the fore wing conforms essentially with that of the Ukrainian specimens, further that the orange spot on the upperside of the hind wing cannot be said to be small but is rather of a medium size; the corresponding brown-ringed double silver spot on the underside is decidedly small, its brown margin indistinct. These features claim that *ssp. sibirica* stands nearer to Eastern European populations than to Central European ones.

Some remarks should finally be made of *ssp. caspicus* described by Stichel (19). The author himself considers it probable that the Ukrainian females without the orange suffusion and described by Krulikovskiy (11) are in a closer relationship with this subspecies. Stichel holds the yellow basic color without the orange suffusion to be the manifestation of the relationship and sees the main difference in the fact that this feature is born by the males in Northern Iran, and by the females in Ukraina. I deem it also probable that there is a near relationship between *ssp. caspicus* and *ssp. ksienzhopolskii*. Stichel, namely, had some Northern Iranian males with some faint orange suffusion. Even though I did not find any male in our Crimean material wholly lacking the orange tint, there are more than one among them on which the suffusion is faint and with a transitus into yellow toward the costa and the termen, just like on some of the specimens of Stichel's *caspicus*. Nor is it impossible that the two subspecies are essentially identical. If this proves to be true, the older name should be used, in accordance with the Rules of Nomenclature, and this is *caspicus* 1911 (*ksienzhopolskii* 1936).

The grouping of the Palearctic subspecies of *C. chrysotheme*.

On the basis of the data enumerated above, it is indubitable that the grouping of the subspecies of *C. chrysotheme* made by Verity in 1911, needs certain corrections. The main groups will still remain *chrysotheme* and *sibirica*, but the subdivisions of the subspecies relegated to them will suffer some alterations. Of the first group, the nonexistent *graeca*, based on erroneous data, then *shugorowi* (whose valid name is *ksienzhopolskii*) which stands nearer to *sibirica* must be taken out. At the present, only *chrysotheme chrysotheme* and the newly described *chrysotheme praealpina* will belong to this group. As opposed to this, the *sibirica* group will considerably expand. Not only will *chrysotheme sibirica* belong here but also *chrysotheme caspicus* and *chrysotheme ksienzhopolskii* (Verity's *shugorowi*) too, — if, indeed, these two latter ones are not identical.

It is very possible that the bounds of both groups will further expand in the future. On the basis of our Bosnian specimens it seems to be a safe assumption that a distinct subspecies, belonging to the western group, represents the species in the Balkan. Of the *chrysotheme* forms depicted on Plate XLVII in Verity's work, figs. 22. and 23., — females from the Mts. Altai — represent a possibly other subspecies belonging to the *sibirica* group. Finally, the male from Western Mongolia, shown by fig. 21., wholly differs by the arched termen of its fore wings from the *sibirica* group, and if it is not an individual aberration or a possibly erroneous data, it is likely that the species is represented in Eastern Asia by a subspecies hitherto underscribed. To clear up all these pending problems, however, more data and materials are needed and I should be deeply obliged to anyone to make such accessible to me.

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Данные о субспецифическом разделении вида *Colias chrysotheme* Esp. (Lepidoptera)

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(Резюме)

Автором были исследованы подвиды вида чешуекрылых *Colias chrysotheme* Esp., живущих в палеарктике. По его мнению данный вид подразделяется в палеарктической области на две большие группы, а именно на средневропейскую, и на восточноевропейско-азиатскую группы. Различие этих групп проявляется в двух важных признаках. Одним из этих признаков является различный размер дискового пятна задних крыльев, который проявляется не только на оранжевом пятне на поверхности крыльев, но еще в большей степени на двойном серебристом пятне, окруженном бурым кольцом на нижней стороне крыльев. У средневропейских подвидов дисковое пятно большое, часто весьма сильно развитое, у восточных подвидов же оно небольшого размера, особенно серебряное пятно на нижней стороне, а бурая рамка последнего расплывчатая. Другое отклонение наблюдается в форме крыльев. Передние крылья средневропейских экземпляров не имеют такую продолговатую форму, и их верхушка не настолько заострена, как у восточных экземпляров, и передняя кромка крыльев не проходит так резко прямолинейно, а более или менее дугобразно. В первую группу автор относит основную форму номенклатуры, также как и ssp. *praealpina*, описанную впервые в области Мадьярвар в Венгрии, а во вторую группу — южноукраинский подвид ssp. *ksienzhopolskii*, получивший название от Образцова, ssp. *caspicus*, описанный Штихеем в Персии, также как и красноярские экземпляры ssp. *sibirica*, описанные Грум-Гршмайлом.