Atalanta (December 1996) **27** (3/4): 649–656, colour plate XII, Würzburg, ISSN 0171-0079

Notes on butterfly collecting in a natural steppe reserve in Central Russia

(Lepidoptera, Rhopalocera)

by

ALEXANDRE DANTCHENKO, SERGEI ANDREEV,
ALEXANDRE TCHUVILIN & ANDREI SOURAKOV

received 21.XI.1996

Abstract: A list is provided of Rhopalocera collected in 1985–1995 from an isolated locality at the headwaters of the Don River. *P. (A.) ripartii* (FREYER, 1830) is recorded for the first time for the Central European part of Russia. The local population of *P. (A.) ripartii* FRR. inhabits a steppe biotope utilising *Onobrychis tanaitica* as foodplant. It is suggested that the specimens of *Maculinea alcon* ([DENIS & SCHIFFERMÜLLER], 1775) from Central Russia were in fact the mixture of the two species *Maculinea alcon* ([DENIS & SCHIFFERMÜLLER], 1775) and *Maculinea rebeli* (HIRSCHKE, 1904). The problem of establishing scientific mini-reserves at areas of specific plant and insect diversity is discussed.

Introduction

Scanning the Lepidoptera collection made by the zoologist SERGEI RIABOV in 1983–1986 from Tula region we discovered two males of the lycaenid butterfly *Polyommatus (Agrodiaetus) ripartii* (FREYER, 1830), which is extremely unusual for that region. Specimens were not labelled, but according to RIABOV (pers. com., 1986) they have been collected at the headwaters of the Don River in the vicinity of a small village called Tatinki (53° 60' N, 38° 60' E). For the Central European part of Russia, this species was previously known only from the Volga-river region and from the southern part of Central Russia. However, these few scarce specimens were not tied with any particular habitats (ANIKIN et al., 1993; TATARENKO, 1995). Nominative populations of *P. (A.) ripartii* (FREYER, 1830) inhabit dry stony slopes utilising the food plant *Onobrychis crista-galli* (BRETHERTON, 1966). Taking into account these ecological features we expected that native populations of *P. (A.) ripartii* FRR. should inhabit steppe biotopes. The flora of such biotopes was described in detail by GOLITZIN (1941).

Results

In July–August 1987 we explored the locality described by RIABOV. It was located at the left high bank of the Don not far from its juncture with the Nepriadva River. The whole habitat measured about 600 m in length and 70 m in width (colour plate XII, figs. 1, 2). Part of the habitat was covered with typical steppe vegetation, such as *Stipa capillata, Stipa pennata, Gypsophila paniculata, Onobrychis tanaitica, Prunus spinosa.* On the steeper parts of the area, where exposures of sand-stone were found, *Rhamnus cathartica* shrubs and *Coronilla varia* dominated the vegetation. In the ravines, *Quercus robur, Populus tremulus*, and *Salix* ssp. could be found. The right bank of the river and areas adjacent to the habitat described

above were converted to agricultural use. The plodded areas are divided by narrow strips of 40 year-old planted forest.

The first males of *P. (A.) ripartii* FRR. appeared on 14. July, females five days later. The butterflies were found only in the steppe parts of the habitat. Males patrolled these parts and females laid eggs on the dry blossoms of *Onobrychis tanaitica* (colour plate XII, fig. 3). Larvae emerged after two weeks of incubation and went into diapause without feeding. Later, they were raised on *Onobrychis sativa* plants in plastic vials under permanent illumination and 24 °C. Mature larvae and pupae are very much like those of *P. (A.) thersites* (CANTENER, [1835]) (colour plate XII, fig. 4). The biology of this population therefore is very similar to its European nominative relative (POWELL, 1903).

Besides *P. (A.) ripartii* FRR. in July 1987 we collected *Polyommatus (L.) coridon* (PODA, 1761), *Polyommatus thersites* (CANTENER, [1835]), *Aricia agestis* ([DENIS & SCHIFFERMÜLLER], 1775) and *Maculinea alcon* ([DENIS & SCHIFFERMÜLLER], 1775). These species of blues usually are represented by very local populations.

We have to note that *Gentiana cruciata*, a typical plant of dry steppe slopes of this region (cf. colour plate XII, fig. 2), is the foodplant of the local population of *Maculinea alcon* D. & S. We have collected around Tatinki every year since 1987. The density of the Lepidoptera population has differed significantly in numbers of both species and individuals. The populations of *P. (A.) ripartii* FRR. and *P. (L.) coridon* PODA oscillated between approximately 100 and 2000 individuals. For *P. (A.) ripartii* FRR. the estimate was based on the number of collected adults as well as of that of last instar larvae. The main factor determining such dynamics, in our opinion, is the change in vegetation intensity due to the twice-annual burning and changes in the annual precipitation. Thus, in 1987 *Coronilla varia* being very numerous on the chalk exposures of the habitat, the density of *P. (L.) coridon* PODA was enormous: there were 2–3 males of this species per every square meter of its habitat. In 1993 the same slopes were invaded with grasses and *Coronilla varia* was very scarce. We were able to collect only 15 specimens of *P. (L.) coridon* PODA in a whole day of collecting.

Rhopalocera collected by the authors (including RJABOV, KURYLIOV specimens) at the environment of Tatinki village from 1987 to 1995

	year	87	1988			1989			1990				1991			94	1995	
	day	14.–28.	9.	16.–17.	30.–31.	8.	18.	8.–9.	2.–3.	16.–17.	14.–15.	22.	15.–16.	11.–12.	30.–31.	21.	20.	10.–20.
	month	VII	VII	VII	VII	V	VI	VII	VI	VI	VII	VII	VI	VII	VII	V	V	VI
1	*P. machaon*	♂,♀		2,0		2,1		2,4						1,0	0,2		0,1	
2	*L. sinapis*	2,1		0,1				0,1				1,2		1,1	+	2,0	2,0	
3	*E. ausonia volgensis*			1,0			0,1										3,0	1,0
4	*A. crataegi*									2,1				0,1				
5	*P. edusa*	0,4		0,1			0,2								2,7		0,1	
6	*P. napi*	+		+				3,0					0,1	+	+	0,1	+	
7	*P. rapae*	+		+											+		+	
8	*P. brassicae*			+									0,1	1,1			+	

	year	87	1988			1989			1990				1991			94	1995	
	day	14.–28.	9.	16.–17	30.–31.	8.	18.	8.–9.	2.–3.	16.–17.	14.–15.	22.	15.–16.	11.–12.	30.–31.	21.	20.	10.–20.
	month	VII	VII	VII	VII	V	VI	VII	VI	VI	VII	VII	VI	VII	VII	V	V	VI
9	*C. hyale*	6,2	0,2	4,7				0,1	1,1				1,0	3,2	2,8		0,2	
10	*C. erate*							1,0										
11	*C. myrmidone*			0,1	4,7			9,4	1,1	0,2			1,2	2,2	52, 52		3,0	0,1
12	*C.chrysotheme*	specimens collected by SERGEI RJABOV in 1984, 1985																
13	*G. rhamni*							3,1										
14	*L. achine*												3,1					
15	*C. glycerion*												8,1	0,1				1,5
16	*C. pamphilus*			1,0	1,2								1,1		+			0,1
17	*H. lycaon*		2,0	0,2								1,0		1,0	+			
18	*H. hyperantus*						3,0											1,0
19	*M. jurtina*				0,1		2,0							0,2	+			1,0
20	*A. ilia*																	1,0
21	*A. aglaja*						0,1	0,1		1,0			1,0					
22	*A. niobe*			0,1						42,1				0,1				1,0
23	*A. lathonia*				1,11			1,0									+	1,1
24	*B. ino*	2,0		0,1									3,0	1,0				0,2
25	*B. dia*			1,2	2,1	15,1		0,1						0,1	0,1		1,2	
26	*M. cinxia*								2,1	1,2			1,0					
27	*M. aurelia*						4,1			1,0			12,1					10,9
28	*P. c-album*																	1,0
29	*I. io*	1,0	1,0	0,1				1,0						2,0	+		+	
30	*A. urticae*			3,1			2,0					0,1			+		+	
31	*V. atalanta*				2,1													
32	*V. cardui*				1,0					1,0							+	
33	*A. levana*							0,1				0,1					+	
34	*T. betulae*			1,0														
35	*N. quercus*			0,1														
36	*F. pruni*						1,0			1,1			1,2					
37	*S. ilicis*						2,1											
38	*S. spini*			0,2				0,2										1,0
39	*S. w-album*							0,1										0,1
40	*L. phlaeas*			1,0	0,1	1,0									0,1			
41	*H. dispar rut.*				8,0					1,0			1,0					
42	*H. alciphron*		1,1	0,1			3,6						1,0	0,1				3,2

	year	87	1988			1989			1990				1991			94	1995	
	day	14.–28.	9.	16.–17.	30.–31.	8.	18.	8.–9.	2.–3.	16.–17.	14.–15.	22.	15.–16.	11.–12.	30.–31.	21.	20.	10.–20.
	month	VII	VII	VII	VII	V	VI	VII	VI	VI	VII	VII	VI	VII	VII	V	V	VI
43	*H. tityrus*	12,1		4,1	1,3	1,0		1,2							0,2			
44	*H.virgaureae*						1,0											
45	*E. argiades*			3,1		3,2					1,0	0,1		2,1		1,0	1,3	
46	*C. minimus*				2,1			1,0	2,0	2,2			1,1	1,0				0,1
47	*C. argiolus*			0,1														
48	*M. alcon*			2,4			38,2	2,1			0,1	4,1	2,0	4,5				8,2
49	*M. teleius*	16,3		9,19	0,1			12,2				4,0		1,2	0,2			
50	*M. nausithous*	1,0		14, 15				6,3				5,1						
51	*P. argus*	3,1		11,3	5,10		1,1		0,2	4,2		1,1	1,1		2,1			
52	*P. argyrognomon*			1,1	11,7		1,1	1,2	1,0	6,1			1,2		8,3			1,1
53	*P. icarus*	0,1	1,0	1,2	3,5		1,2		3,0	3,1			1,1		9,4			2,2
54	*P. amandus*						3,1			1,1			1,0					0,2
55	*P. thersites*						0,1	0,1	8,2	5,1				2,0	29, 12			1,8
56	*A. allous inchonora*	5,1		0,1	0,1			1,0		2,1								
57	*A. eumedon*	1,0		0,1	1,1		1,0	1,0		4,0			7,2		1,0			1,1
58	*P. semiargus*		0,1	0,1			1,0		4,0	6,3								0,1
59	*P. coridon*	40, 9		56, 13				2,0				6,1		3,0				
60	*P. ripartii*	2,8	1,0	21, 11	0,3			16, 8										
61	*P. daphnis*	7,8		3,1				2,0				1,0						
62	*E. tages*	1,1			1,1	2,0		1,1						1,0	1,0		2,0	
63	*C. alceae*																	
64	*M. tessellum*																	2,0
65	*P. malvae*					5,0				0,2						0,1	1,2	
66	*P. alveus*									1,0								+
67	*C. palaemon*																5,0	
68	*T. lineola*	20, 12	4,4	2,0				1,1				3,2						1,0
69	*O. venatus*	1,0								3,2			0,2		+			
70	*A. silvestris*	specimens collected by A. KURYLIOV in 1987																
71	*H. flocciferus*	specimens collected by A. KURYLIOV in 1987																

sign "+" means more than 25 specimens per collecting day.

All of the specimens on which the above taxonomic list is based are deposited in the collections of the authors. We hope, that this study will be used in the planning and creating a mini-reserve in the region. The need for this kind of reserve has been discussed by previous authors (BULUKHTO, 1987).

Discussion

As we have supposed, the native population of *P. (A.) ripartii* FRR. inhabited steppe biotope. Like other species of the subgenus *Agrodiaetus, P. (A.) ripartii* FRR. is monophagous on species of the genus *Onobrychis*, which one corresponds to the ancestral genus for the most of the *Agrodiaetus* species. In this case it is difficult to explain the origin of the native population of *P. (A.) ripartii* FRR. only by reason of recent migration. More likely, this population is a relict element of the steppe fauna, the origin of which should be explained by the warm postglacial period. This assumption correlates well with the botanical point of view on the origin of the northern steppe in the central part of Russia.

The taxonomic position of this *P. (A.) ripartii* FRR. population is not discussed in detail in the present work. We do not exclude the possibility of this population being different from the nominative group of populations, being so remote and isolated from it. The comparison of DNA sequences of these population would be of great use to clarify this question even in the case if the karyotype of our population proved to be identical with those of the main population of *P. (A.) ripartii* FRR. as it was shown in a recent work (MENSI et al., 1994). In accordance with the biological species concept, we would like to note that the description of new taxa without the detailed knowledge of their biology and without placing these new taxa correctly within existing taxonomic system units (KOLEV & DE PRINS, 1995; TSHIKOLOVETS, 1994) leads to taxonomic inflation, especially when the existing taxa are difficult to distinguish and are highly polymorphic (ROSE, 1995). Therefore it seems much more important to study the ecological parameters of the populations of *P. (A.) ripartii* FRR. from Central European part of Russia.

A few isolated and extremely local populations of *Onobrychis tanaitica* occur in the basin of the Osiotr river near the border of the Moscow region (SKVORTZOV, 1947, 1951). We should not be surprised if populations of *P. (A.) ripartii* FRR. are inhabiting these localities. In accordance with the distribution of *Onobrychis tanaitica, P. (A.) ripartii* FRR. should be found in steppe areas of the headwaters of the Don all the way to the Voronezh region in the South. The absence of specimens of this species in collections made from the regions mentioned above, as well as the recent descriptions of *Argiades pyrenaicus ergane* HIGGINS, 1981 and *Polyommatus (Agrodiaetus) damone tanais* DANTCHENKO & PLJUSHTCH, 1993 illustrate well the local nature of these populations and the poor knowledge of distribution of Rhopalocera in the European part of Russia in general (PLJUSHTCH, 1988).

Specimens of *Aricia* encountered are attributed to *A. agestis* ([DENIS & SCHIFFERMÜLLER], 1775) based on the biological and systematic descriptions by HOEGH-GULDBERG (1979).

The biology of the populations of *Aricia* from Central Russia has not been studied. According to our observation, the population of *Aricia agestis* ([DENIS & SCHIFFERMÜLLER], 1775) differs from *Aricia artaxerxes inchonora* JACHONTOV, 1909 by having two rather than one generation a year and inhabiting dryer habitats. The larval food plant of *Aricia agestis* D. & S. is *Geranium sanguineum*. The northernmost part of the areal of *A. agestis* D. & S. reaches the southern border of the Moscow region. This distribution is correlated well with the distribution of *Gera-*

nium sanguineum. *Aricia agestis* D. & S. is found sympatrically with *Aricia artaxerxes inchonora* in the southern part of the Moscow region (male, vic. Stupino, July, 1986, leg. and coll. E. MATVEEV, Moscow).

Maculinea alcon from Europe is treated now (EBERT, 1991) as two close species: *Maculinea rebeli* (HIRSCHKE, 1904) and *Maculinea alcon* ([DENIS & SCHIFFERMÜLLER], 1775). These two species differ in their ecological demands.
Maculinea alcon D. & S. inhabits damp biotopes. The foodplant of these populations is *Gentiana pneumononthe*. *Maculinea rebeli* HIR. inhabits dry stony slopes and meadow utilising the food plant *Gentiana cruciata*.
The same case is observed for the populations of *Maculinea alcon* D. & S. in the Moscow, Kaluga and Tula regions. According to observations on *Maculinea alcon* D. & S. in Prioksko-terrasny state reserve (SAMODUROV pers. com., 1996) specimens of the native population were collected in a damp meadow with *Gentiana pneumononthe*. In Kaluga region a few specimens of *Maculinea alcon* D. & S. were collected in a dry biotope in mixture with *Polyommatus (M.) daphnis* (SOLNTZEV, pers. com., 1996). Both the specimens from Kaluga and the specimens collected by the authors in Tatinki are externally close to *Maculinea rebeli* HIR. from Central Europe. Thus it would be natural to assume that in dry biotopes of the Tula and Kaluga regions we have populations of *Maculinea rebeli* HIR.
As far the biology of *Maculinea alcon* D. & S. from the damp biotopes of the central part of Russia has not been studied and some authors (BINK, 1992) treat *Maculinea rebeli* HIR. as the ecological form of *M. alcon* D. & S., one could expect to solve this taxonomical problem only on the basis of complete biological knowledge about each taxon under consideration.
As was noted (DANTCHENKO et al., 1996), the bureaucratic approach to the preservation of endangered species leads only to the termination of the whole research on them and, eventually, to their extinction. Present economic situation in Russia and present bureaucratic attitude to conservation unfortunately do not leave much room for optimism about the development of an ecologically oriented conservation program in Russia (PLJUSHTCH, 1989).
Not discussing the important problem of conservation in detail (EITSCHBERGER, 1993), we would like to note that some positive steps could be taken even now.
First of all, there is a need of recognition of the most endangered habitat types and species, and the detailed description of their ecological characteristics. This is especially important in cases of local and isolated parts of the steppe vegetation growing on chalk exposures of the river-heads of Central Russia, which represent the northernmost populations of endemic relict species of the steppe, evolved before the last glaciation. For example, the habitat of the Don river bank described above, represents a unique natural reserve for plant and insect species. For Lepidoptera species that are associated with *Onobrychis tanaitica*, such as *P. (A.) ripartii* FRR., *P. (A.) thersites* CANT., *Colias chrysotheme* ESP. and *Zygaena carniolica* SCOP., this is also the northern border of their distribution. The very fact that, on the background of the land, the natural vegetation of which has been completely distorted by agricultural development, the habitat of the Tatinki area has strong populations of three species of blues of the genus *Maculinea*, all of which are included on the "Endangered List of the European Lepidoptera" (HEATH, 1981) should attract the attention to this site, as the one potentially valuable for reserve establishment. The main factors that endanger such habitats, besides further agricultural development, are spring and fall burning of grass and the careless spraying of pesticides at the neighbouring agricultural lands, which leads to a catastro-

phic drop in insect density and diversity (SOULE, 1987). The immediate preservation of such habitats is the only possibility of survival of these endangered species (KUDRNA, 1984).

References

ANIKIN, V. V. et al. (1993): "Fauna lepidopterologica Volgo-Uralensis" 150 years later: changes and additions. Part 1. Rhopalocera. – Atalanta **24** (1/2): 98–120.

BINK, F. (1992): Ecologische Atlas van de Dagvlinders van Noordwest-Europa. – 512 pp.

BRETHERTON, R. (1996): A distribution list of the butterflies (Rhopalocera) of Western and Southern Europe. – Trans. Soc. Brit. Ent. **17** (1): 1–94.

BULUKHTO, N. (1987): Nasekomie Tul'skogo kraia (Insects of the Tula region). – Tula, 128 pp (in russian).

DANTCHENKO, A. V. et al. (1996): Notes on the life history of *Sephisa princeps* FIXEN (Lepidoptera: Nymphalidae) in Eastern Russia. – Holarctic Lepidoptera **3** (2).

EBERT, G. et al. (1991): Die Schmetterlinge Baden-Württembergs, Band **2**. – Stuttgart, 535 pp.

EITSCHBERGER, U. (1993): Die Entomologie am Scheideweg! (?). – Atalanta **24** (1/2): 313–316.

GOLITZIN, S. (1941): In the cretaceus outcrops of Krasivaja Metcha river. – Scientific and Methodical Notes, issue N 8, pp. 247–250. – The head Office of the National parks, Zooparks and Zoogardens, Moscow, 1941 (in russian).

HEATH, J. (1981): Threatened Rhopalocera (Butterflies) in Europe. – Council of Europe, Strasburg.

HOEGH-GULDBERG, O. (1979): The relationship of *Aricia agestis* and its closest relatives in Europe. – Nota lepid. **2**: 35–39.

KOLEV, Z. & DE PRINS, W. (1995): A new species of the "brown *Agrodiaetus*" complex from the Crimea (Lepidoptera: Lycaenidae). – Phegea **23** (2): 119–132.

KUDRNA, O. (1986): Aspects of the conservation of butterflies of Europe. In: Butterflies of Europe, Band **8**. – Aula-Verlag, Wiesbaden, 323 pp.

MENSI, P. et al. (1994): Biochemical taxonomy and evolutionary relationships in Polyommatus (subgenus Agrodiaetus) (Lepidoptera, Lycaenidae). – Nota lepid., Supplement **5**: 105–114.

OBRAZTSOV, N. S. (1935): *Lycaena (Aricia) allous* HB. und ihre östlichen Rassen. – Folia Zoologica et hydrobiologica **8** (1): 141–150.

PLJUSHTCH, I. (1989): Notes on a little known ecologically displaced blue, *Argiades pyrenaicus ergane* HIGGINS (Lycaenidae). – Journal of Research on the Lepidoptera **27** (2) (1988): 129–134.

PLJUSHTCH, I. (1989): The problems and perspectives of the insects preservation in the USSR. – Kiev, Institute of Zoology of Ac. Sc. of Uk. SSR, 26 pp. (in russian).

POWELL, H. (1903): The egg laying habits of *Polyommatus admetus* var. *ripartii*, with description of its ovum. – Entomologist's Rec. J. Var. **16**: 92–94.

ROSE, K. (1995): Zur Unterarten-Inflation in der Gattung *Parnassius* (Lepidoptera, Papilionidae). – Nach. Ent. Ver. Apollo **16** (2/3): 243–252.

SKVORTZOV, A. (1941): The steppe flora in the basin of Osiotr river in the Moscow region. – Bull. Soc. Nat. Mosc. **52** (6): 37–47 (in russian).

SKVORTZOV, A. (1951): On the steppe flora of North-East border of Middle Russian Plateau. – Bull. Soc. Nat. Mosc. **56** (3): 86–95 (in russian).

SOULE, M. (ed.) (1987): Viable Populations for Conservation. – Cambridge: Cambridge Univ. Press, 224 pp.

TATARENKO, D. (1995): Rhopalocera of the Kursk region and particular of the Belgorod region, pp. 187–190. – in: The problems of the preservation of biodiversity of the steppe and forest-steppe habitats. KMK Scientific Press, Moscow, 250 pp.

TSHIKOLOVETS, V. (1995): New blue butterfly taxa (Lepidoptera, Lycaenidae) from Central Asia. Communication II. – Journal of the Ukrainian Entomological Society **1** (3/4): 39–43.

Explanation of colour plate XII (p. 689):

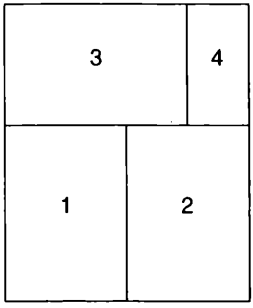


Fig. 1: View of the steppe bank of the Don river, autumn aspect (end of August, 1995).
Fig. 2: The dry meadow populated by *Gentiana cruciata* L., the food plant of *Maculinea alcon* ([DENIS & SCHIFFERMÜLLER], 1775).
Fig. 3: *Onobrychis tanaitica*, the food plant of *P. (A.) ripartii* (FREYER, 1830).
Fig. 4: Mature larvae of *P. (A.) ripartii* (FREYER, 1830).

addresses of the authors

ALEXANDRE V. DANTCHENKO
125493 Moscow
Avangardnaja 11–160
Russia

SERGEI A. ANDREEV
301670 Novomoskovsk
Kirova 7–3
Russia

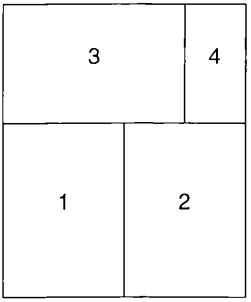
ALEXANDRE V. TCHUVILIN
300001 Tula
Pionerskaja 31
Russia

ANDREI A. SOURAKOV
Dept. of Entomology and Nematology
University of Florida
Gainesville, Florida 32611
USA

Colour plate XII

DANTCHENKO, A., ANDREEV, S., TCHUVILIN, A. & A. SOURAKOV: Notes on butterfly collecting in a natural steppe reserve in Central Russia (Lepidoptera, Rhopalocera). – Atalanta **27** (3/4): 649–656.

Fig. 1: View of the steppe bank of the Don river, autumn aspect (end of August, 1995).
Fig. 2: The dry meadow populated by *Gentiana cruciata* L., the food plant of *Maculinea alcon* ([DENIS & SCHIFFERMÜLLER], 1775).
Fig. 3: *Onobrychis tanaitica*, the food plant of *P. (A.) ripartii* (FREYER, 1830).
Fig. 4: Mature larvae of *P. (A.) ripartii* (FREYER, 1830).



Colour plate XII