

**Grasshoppers and crickets of the Dadia Forest Reserve (Thraki, Greece)
with a new record to the Greek fauna:**

***Paranocarodes chopardi* Pechev, 1965 (Orthoptera, Pamphagidae)**

Vassiliki Kati & Fer Willemse

Zusammenfassung

Im Naturschutzreservat von Dadia in Thrakien (Nordost-Griechenland) wurde die Heuschreckenfauna erfasst und im vorliegenden Beitrag dokumentiert. Das trockene und felsige Gebiet besteht überwiegend aus bewaldeten Hügeln und ist daher hinsichtlich der Orthopteren relativ artenarm. Für einzelne Arten ergaben sich jedoch wichtige biogeographische Erkenntnisse. Höchst bemerkenswert ist der für Griechenland erste Nachweis der Pamphagide *Paranocarodes chopardi* Pechev, 1965. Die Gesamtverbreitung der Art ist im Wesentlichen auf die südöstlichen Ausläufer der Rodhopen beschränkt. Der gesetzliche Schutzstatus des Reservates von Dadia kann hoffentlich dazu beitragen, dass ein Aussterben der Art vermieden wird.

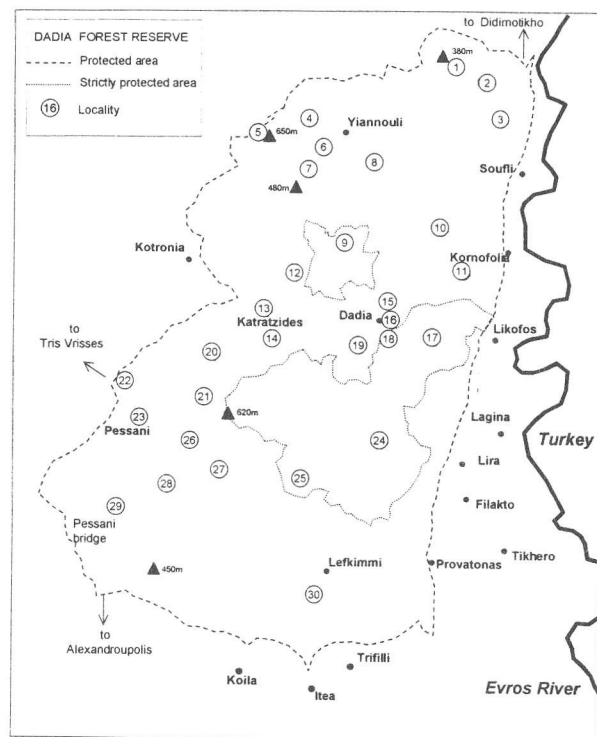
Abstract

The Dadia Forest Reserve, eastern Greek Thraki, is a dry and rocky area, most of it consisting of forested hills. A check-list of Orthoptera is given. The fauna is relatively poor, but some species are biogeographically important. Most interesting is the occurrence of the pamphagid *Paranocarodes chopardi* Pechev, 1965. This species is new to the Greek fauna. Its range is quite limited and the official protected status of the Dadia Forest Reserve will certainly help to prevent extinction.

Introduction

The Dadia Forest Reserve earned the official protected status in 1980. It is registered as the "Dadia-Lefkimmi-Soufli Forest Reserve", covering 42.460 ha, 7.290 of them strictly protected. The reserve is located in the district of Evros (Thraki) near the border to Turkey. It is known for its rich avifauna, hosting 43 of the 47 European species of birds of prey, including one of the two remnant colonies in Europe of the Black Vulture (*Aegypius monachus*).

Within of an evaluation of the biodiversity of this reserve the Orthoptera fauna has been studied. For this reason samples have been taken both from the reserve itself as well as from its adjacent parts during the seasons of 1999 and summer of 2000. Apart from a reference collection of the species at the WWF Ecotouristic Centre in Dadia village, material is deposited in the collection of co-author Willemse.



Map 1.: Map of the Dadia-Lefkimmi-Soufli Forest Reserve.

Results

Most of the Dadia Reserve consists of forested hills (70%). It is a dry and rocky area, soil and vegetation are poor, its habitats mainly pine (*Pinus brutia*) and oak (*Quercus frainetto/cerris*) forests. There are few and small streams, during summer mostly dry or almost so. Its small eastern part that joins the valley of the river Evros, is more fertile and partly cultivated with crops. The few villages within the reserve are small and grazing by cattle is strictly limited.

The Orthoptera fauna of the Evros-district has been partly investigated before, i.e. the lowlands of the river Evros, the coastal region and the hills along the road between Alexandroupolis and Nea Sanda. The fauna of the reserve itself, however, was almost completely unknown.

Our observations resulted into a total number of 53 species of Orthoptera (Saltatoria, Table 1). From this check-list it is clear that the fauna of the Dadia Reserve is relatively poor in number of species. This may be explained by its generally uniform forest-habitats. Seven species are new to the district of Evros (WILLEMSE 1984, 1985, 1986, INGRISCH & PAVICEVIC 1985). Most of them could

be expected to occur there. Some other species also are worth mentioning because of their limited distribution in Greece. One species, however, proved to be new to the Greek fauna: *Paranocarodes chopardi* Pechev, 1965.

Meconema thalassinum in Greece was known only from Makedonia (WILLEMSE 1984, INGRISCH & PAVICEVIC 1985; Drama, Quercus forest, 9 & 25 km NE of Elatia-centre, Rodhopi area, 08.1985, F. Willemse, unpublished). The species is now found also in Ipiros (Milea-Metsobon, 1400 m, 18.08.1985, F. Willemse; Monodendri, entrance of Vikos gorge, Ioannina, 16.07.2000, P. Fontana, R. Kleukers, F. Willemse, both unpublished). Apparently the range of this species extends southward throughout northern Greece. Also the observation of *Saga campbelli* is interesting as it joins the known range of the nominate form in Greek Makedonia with that of the subspecies *gracilis* farther east and north in Bulgaria, Romania and European Turkey.

Callimenus macrogaster was reported from Greece only once (KALTENBACH 1965), a female from Aisimi, southwest of the Dadia Reserve. We found the species in a cultivated area near Dadia village and in a more western site where a single female was crossing the road in a dense beech-oak-pine forest. Until quite recently *Parapholidoptera castaneoviridis* was not known from Greece. Now it is known to occur from the district of Thessaloniki (Apollonia, lake Volvi, in NASKRECKI 1992) to those of Rodhopi and Evros (INGRISCH & PAVICEVIC 1985).

The range of *Pholidoptera fallax* reaches Greece in extreme northeastern Thraki. It was recorded only once, from Elafochori along the river Erithropotamos (misspelled as Elasochoion in WILLEMSE 1984). Lavara, north of Soufli, just outside the Dadia Reserve, is the second known locality. We agree fully that the taxonomy of the *Pholidoptera aptera* group needs revision (INGRISCH & PAVICEVIC 1985).

Omocestus petraeus occurs in continental Greece rather isolated. The finding in Dadia Reserve is the second in the district of Evros. Its typical habitat is very dry, hot and stony with sparse vegetation. The site of the Dadia Reserve was in accordance with that. The species occurred there together with *Omocestus minutus* and *Sphingonotus caeruleus*.

Remarkable is the occurrence of *Stenobothrus eurasius macedonicus*. The first record of this species in Greece (INGRISCH & PAVICEVIC 1985) is also from the district of Evros. Nevertheless it is peculiar that there are no records of *Stenobothrus fischeri* from this area. This species is common and widely spread all over Greece and may occur syntopic with *eurasius* as noticed in Thessalia (Magnisia, Mt. Othris above Kokkotoi, 1100-1500 m, 22-23.07.1991, F. & L. Willemse).

Table 1: Check-list of Orthoptera observed in or close to the "Dadia-Lefkimmi-Soufli Forest Reserve" and their localities. Localities within the Dadia reserve are given in numbers as indicated on Map 1. Species new to the district of Evros are indicated with an asterisk

Ensifera	Localities
<i>Tylopsis lilifolia</i> (Fabricius, 1793)	not specified
<i>Acrometopa servillea</i> (Brullé, 1832)	2, 30
<i>Leptophyes albivittata</i> (Kollar, 1833)	Lavara (N of Soufli))
<i>Poecilimon zwicki</i> Ramme, 1939	21, 28
<i>Poecilimon brunneri</i> (Frivaldsky, 1867)	2-5, 7, 9-11, 13, 15, 20, 24-25, 27-30
<i>Poecilimon thoracicus</i> (Fieber, 1853)	Lavara (N of Soufli)
<i>Conocephalus hastatus</i> (Charpentier, 1825)	2, 10, 15
<i>Tettigonia viridissima</i> (Linnaeus, 1758)	11, 30
<i>Decticus verrucivorus</i> (Linnaeus, 1758)	10-11, 30
<i>Platycleis intermedia</i> (Serville, 1839)	1, 3-4, 7, 13, 23, 25-26, 28
<i>Platycleis escalerae</i> Bolivar, 1899	2, 9, 24
<i>Platycleis incerta</i> Brunner v. W., 1882	2, 5, 7-8, 10-13, 15, 18-19, 21, 24, 27-28, 30
<i>Platycleis sepium</i> (Yersin, 1854)	2, 4-5, 13, 21
<i>Pholidoptera fallax</i> (Fischer, 1853)	Lavara (N of Soufli)
<i>Pholidoptera aptera bulgarica</i> Maran, 1952	5, 14, 21, 23, 28-29
<i>Parapholidoptera castaneoviridis</i> (Brunner, 1882)	21; 8 km NE of Nea Sanda
<i>*Metrioptera oblongicollis</i> (Brunner, 1882)	1, 2, 5, 13, 15, 19, 21, 24
<i>Bucephaloptera bucephala</i> (Brunner, 1882)	2, 4, 6-7, 10-11, 14-15, 23-24, 26, 28-30
<i>Pterolepis germanica</i> (Herrich-Schaeffer, 1840)	3, 5-6, 15, 24, 28, 29
<i>Saga natoliae</i> Serville, 1839	near Tris Vrisses (22); 6 km N of Aisimi
<i>*Saga campbelli</i> Uvarov, 1921	29; Kallithea near Tris Vrisses (W of 22)
<i>Callimenus macrogaster</i> (Lefebvre, 1831)	10; near Tris Vrisses (22)
<i>*Meconema thalassinum</i> (DeGeer, 1773)	Monastir Dadia (E of Dadia village); 6 km N of Aisimi
<i>Gryllus campestris</i> Linnaeus, 1758	15, 30
<i>Melanogryllus desertus</i> (Pallas, 1771)	11
<i>Gryllomorpha dalmatina</i> (Ocskay, 1832)	Dadia village (15)
<i>Pteronemobius heydenii concolor</i> (Walker, 1871)	29
<i>Oecanthus pellucens</i> (Scopoli, 1763)	13, 15, 21

Caelifera	Localities
<i>*Paranocarodes chopardi</i> Pechev, 1965	4, 5, 13, 21, 26, 28; 6 km N of Aisimi
<i>Pezotettix giomae</i> (Rossi, 1794)	2, 6, 14, 23-25, 29
<i>Calliptamus barbarus</i> (Costa, 1836)	not specified
<i>Paracaloptenus c. caloptenoides</i> (Brunner, 1861)	1-4, 6, 11, 16, 19, 21, 28-29
<i>*Anacridium aegyptium</i> (Linnaeus, 1764)	15
<i>Acrida ungarica</i> (Herbst, 1786)	not specified
<i>Locusta migratoria</i> (Linnaeus, 1758)	11, 15
<i>Oedaleus decorus</i> (Germar, 1826)	1, 4, 14, 20, 24-25, 28
<i>Oedipoda caerulea</i> (Linnaeus, 1758)	not specified
<i>Oedipoda germanica</i> (Latreille, 1804)	9, 16, 20, 28

<i>Oedipoda m. miniata</i> (Pallas, 1771)	14, 16-17, 20, 23, 28-29
<i>*Sphingonotus caeruleus</i> (Linnaeus, 1767)	20
<i>Acrotylus i. insubricus</i> (Scopoli, 1786)	1, 2, 4, 6-7, 14, 17, 28
<i>*Acrotylus patruelis</i> (Herrich-Schaeffer, 1838)	4, 16-18, 20, 29
<i>Aiolopus strepens</i> (Latreille, 1804)	not specified
<i>Dociostaurus maroccanus</i> (Thunberg, 1815)	10, 16-17, 20, 23, 28-30
<i>Stenobothrus eurasius macedonicus</i> F. Willemsse, 1974	5; Kallithea, Tris Vrisses (W of 22); 6 km N of Aisimi
<i>Omocestus rufipes</i> (Zetterstedt, 1821)	2, 10-11, 15, 21, 24, 29
<i>Omocestus minutus</i> (Brullé, 1832)	10-11, 14, 16, 20, 29
<i>Omocestus petraeus</i> (Brisout, 1855)	20
<i>Chorthippus bornhalmi</i> Harz, 1971	not specified
<i>Chorthippus biguttulus euhediceae</i> v. Helversen, 1987	13
<i>Chorthippus parallelus tenuis</i> (Brullé, 1832)	10-11, 15, 30
<i>Euchorthippus declivus</i> (Brisout, 1848)	3-4, 13, 19, 21, 28

Paranocarodes chopardi

Paranocarodes chopardi was described from the extreme southeast of Bulgaria. The species was found near the village of Cerni Rid, between Iyaylovgrad and Kroumovgrad and until quite recently recorded only from this area. This locality is close to the Greek-Bulgarian border and belongs to the eastern offshoots of the Rodhops mountains which pass over into the area of the Dadia Reserve in Greece.

Species close to *P. chopardi* are *straubei* (FIEBER 1853) and *fieberi* (BRUNNER 1882). In a review of Anatolian species (DEMIRSOY 1973) a number of subspecies are recognized, both in *P. straubei* and *fieberi*. Their differentiation, however, is not clear. A revision including the taxa *straubei insularis* and *fieberi mytilenensis*, both described from Greek Aegean islands in RAMME (1951), would be most welcome. In the key to the genera given by Demirsoy (1977) *P. chopardi* runs to *Paranothrotus* rather than to *Paranocarodes*. *Paranothrotus*, however, is distributed east of the Anatolian diagonal (ÇIPLAK et al. 1993) and *Paranocarodes* west of it. Further evaluation is welcome.

Nominate *straubei* is well described in UVAROV (1949). This form is known from some localities near the coast of the Black Sea (Bulgaria), both sides of the Bosphorus near Istanbul (Turkey), the Uludag near Bursa (Northwest-Anatolia) and recorded in DEMIRSOY (1973) also from Çorum-Sungurlu (central northern Anatolia). The differentiation between *chopardi* and nominate *straubei* is pointed out in PEÇEV (1965). Obvious characters are the smaller abdominal tympanum (Fig. 1) and less developed distal prolongation of the keels of the abdominal tergites in *chopardi*. *P. straubei serratus* UVAROV 1949 is described from the peninsula Gelibolu (= Gallipoli) (European Turkey). This taxon was synonymized with *P. fieberi* in RAMME (1951) and considered as a distinct form of *fieberi* in HARZ (1974), but arranged as a subspecies of *straubei* in DEMIRSOY (1973). The last author recorded it also from Izmir-Kula (West-Anatolia). This subspecies differs from *P. chopardi* as the nominate subspecies and besides in the color of the hind tibia which are shiny black in the male and bluish black in the female.

Nominate *fieberi* as understood in DEMIRSOY (1973) is known mainly from West-Anatolia. It differs from *P. chopardi*, like *straubei* does, in a larger tympanum (Fig.

1) and more developed distal prolongation of the keels of the abdominal tergites. Besides the inner side of the hind tibia ranges from dark brown to black in the male and bluish black to black in the female against bright orange red in the male and paler red in the female of *chopardi*.

Fig. 1.: Diagrams of tympanum and spiracle (left side of first abdominal tergite) in *Paranocarodes chopardi* (chop.) (♂♀); nominate *straubei* (straub.-straub.) (♂♀); *straubei serratus* (straub.-serrat.) (♂); *fieberi mytilenensis* (fiebf.-mytil.) (♀); nominate *fieberi* (fiebf.-fiebf.) (♂) and *fieberi tolunayi* KARABAG 1949 (fiebf.-tolun.) (♀); (nominate *straubei* (♂) *straubei serratus* (♂); nominate *fieberi* (♂); *fieberi mytilenensis* (♀); modified after HARZ 1975)

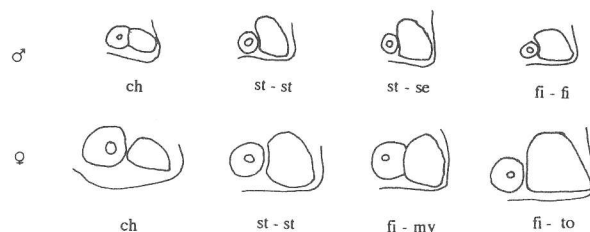


Table 2: Features helpful to differentiate between *Paranocarodes chopardi*, *fieberi fieberi*, *straubei* *straubei* and *straubei serratus*.

Paranocarodes	<i>chopardi</i>	nominate <i>fieberi</i>	nominate <i>straubei</i>	<i>straubei serratus</i>
Size of abdominal tympanum (Fig. 1)	at most slightly larger than spiracle	definitely larger than spiracle	definitely larger than spiracle	definitely larger than spiracle
color of inner side of hind tibia	bright orange red in male, pale red in female	dark brown to black in male, bluish black to black in female	blood-red in male, dirty red in female	shiny black in male, bluish black in female
distal prolongation of dorsal keel of abdominal tergites	first tergites only and but slightly extending	first tergites from slightly to apparently extending	tergites to beyond mid of abdomen apparently extending	tergites to beyond mid of abdomen still more extending

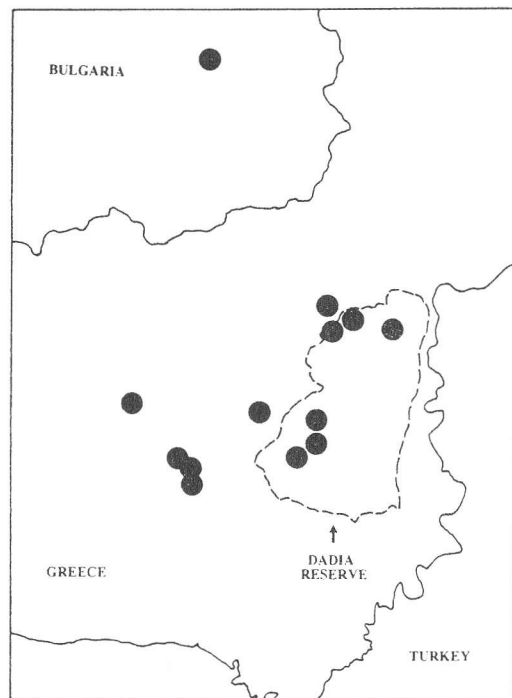
In the Dadia Reserve adults were most abundant from spring to end of June, juveniles later in the season. The altitude of the localities varies between 200-650 m within the Dadia Forest Reserve, up to 900 m outside this area. The habitats were always of a thermophilous oak type, from dense to more open forest with *Quercus frainetto* and/or *cerris*, sometimes mixed with *Pinus brutia* and/or *nigra* with an undergrowth of gramineae, *Phyllirea* or *Erica* bushes and commonly with a litter of dead oak leaves. The species was found frequently in that litter, sometimes at more open spaces.

The species has been reported already previously from Greece but under other names: *P. straubei* in KALTENBACH (1967) and *P. fieberi* in INGRISCH & PAVICEVIC (1985). Kaltenbach's record refers to a single female from the surroundings of Aisimi and the second record to material from the same locality and a site near Nea Sandha. Material of Ingrisch and Pavicevic has been re-examined and compared with fresh material from the Aisimi locality. It was found to be identical to Pechev's species. Kaltenbach's record of *straubei* confidently may also be arranged under *P. chopardi*. Unaware of PECHEV (1965), apparently his diagnosis was based on the red coloration of the hind tibia. Also in INGRISCH & PAVICEVIC (1985) Pechev's species has been overlooked which may be explained as it was not mentioned in HARZ (1974) but memorized only as a short note in its addendum (HARZ & KALTENBACH 1975).

The range of *Paranocarodes chopardi* appears to be small and limited to the oak-forested hills of the eastern Rodhopi mountains in extreme southeastern Bulgaria and northeastern Greek Thraki (Table 3, Map 2).

Table 3: Known localities of *Paranocarodes chopardi* Pechev 1965.

Country	District	Locality	Date	Observer / Reference
Bulgaria	Kardzali	Sarta hills, Cerni Rid, between Ivaylovgrad & Kroumovgrad, 450 m	20.07.1964	G. Pechev (PECHEV 1965)
Greece	Rodhopi	8 km NE of Nea Sanda, 800-900 m	07.07.1981	S. Ingrisch & D. Pavicevic (INGRISCH & PAVICEVIC 1985)
Greece	Evros	5 km N of Aisimi	22.07.1982	S. Ingrisch & D. Pavicevic (INGRISCH & PAVICEVIC 1985)
Greece	Evros	4 km N of Aisimi	23.06.1964	Bauer & Spitzenberger (KALTENBACH 1967)
Greece	Evros	6 km N of Aisimi, 700 m	03.07.2000	V. Kati & F. Willemse
Greece	Evros	30 km W of Dadia village, Tris Vrises, 600 m	05.07.2000	V. Kati & F. Willemse
Greece	Evros	Soufli	06.08.1983	B. Massa
Greece	Evros	13.5 km W of Dadia village (SW of Katratzides), 250 m	23.06.1999 ; 2-3.07.2000	V. Kati ; V. Kati & F. Willemse
Greece	Evros	18 km SW of Dadia village (SE of Pessani), 350 m	25.06.1999 ; 05.07.2000	V. Kati; V. Kati & F. Willemse
Greece	Evros	NE of Pessani bridge, Kamenos Lofos	21.06.1999	V. Kati
Greece	Evros	NW of Yiannouli, Lagos, 350 m	05.08.1999	V. Kati
Greece	Evros	6km NW of Yiannouli village, Ada-tepe (Korifi), 627 m	10.05.1999	V. Kati
Greece	Evros	2.5 km S & 3.5 km W of Yiannouli village, 650 m	15.05.1999	V. Kati



Map 2.: Distribution map of *Paranocarodes chopardi* Pechev, 1965.

Conclusion

The Orthoptera fauna of the Dadia Forest Reserve is poor. Both the number of species and density of their populations are relatively low. This may be explained by the abundance of uniform habitats mainly consisting of pine and oak forests. This type of habitat is known to be not suitable for many species of grasshoppers and crickets. The occurrence of some species is interesting from their biogeographical point of view. Especially the occurrence of the pamphagid *Paranocarodes chopardi* is most interesting. This species has a very small range that is restricted to the oak-forested hills of the eastern Rodhopi mountains. The official protected status of the Dadia Reserve will certainly help to preserve this species.

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Authors:
Vassiliki Kati
28th Octoberstreet 59
GR-41223 Larissa
e-mail: kikikati@hotmail.com

Fer Willemse
Laurastraat 67
NL 6471 JH Eygelshoven
fer.willemse@worldonline.nl

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