

Breeding Waterbirds in Temporally Flooded Wetlands in Northern Bulgaria

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Abstract: Breeding populations of waterbirds were counted in 10 temporally flooded wetlands in Northern Bulgaria in wet year 2010. A total of 28 species of waterbirds were recorded. New colonies and breeding localities of the following species were discovered: the Black – winged Stints (*Himantopus himantopus*) – 8 localities with 46 breeding pairs, the Avocets (*Recurvirostra avosetta*) – 6 localities with 18 pairs, the White-winged Terns (*Chlidonias leucoptera*) – one colony with 55 pairs, and the Whiskered Terns (*Chlidonias hybrida*) – 5 colonies with 108 pairs. New localities of solitary pairs were reported for other species of conservation or scientific concern, such as the Black-necked Grebe (*Podiceps nigricollis*), the Mute Swan (*Cygnus olor*), the Ruddy Shelduck (*Tadorna ferruginea*), the Ferruginous Duck (*Aythya nyroca*), the Teal (*Anas crecca*), the Shoveler (*Anas clypeata*), the Corncrake (*Crex crex*), and the Redshank (*Tringa totanus*). Conservation measures for the widely unprotected and highly endangered temporally flooded wetlands are discussed.

Key words: waterbirds, flooded meadows, waders, numbers, Northern Bulgaria.

Introduction

Breeding distribution of water birds in Bulgaria was studied mainly in the large permanent wetlands at the Black Sea coast and along the Danube River (NANKINOV *et al.* 1997, IVANOV 1998, VASSILEV 2003, DIMITROV *et al.* 2005, SHURULINKOV *et al.* 2005). The inland wetlands and especially the temporally flooded meadows, pastures and abandoned lands have been still poorly studied. All the recent data on the distribution of water birds in Bulgaria were combined in the Bulgarian Breeding Bird Atlas (IANKOV (ed) 2007), and for many species, especially waders such as the Black-winged Stint and the Avocet, it is obvious that inland nesting was reported on very rare occasions. Whether this is the true picture even dur-

ing the wet years, or the lack of data for nesting localities of these species in large parts of the Danube Plain, the Dobroudzha and the Thracian valley could be just a consequence of a bad investigation effort?

Temporally flooded meadows, pastures and other inundations were widely distributed in Bulgaria before the massive drainage activities starting from the middle of 20th century. Now, they are endangered habitats included in the Red Data Book of Bulgaria as "Shallow drying-up water bodies with floating vegetation" (TZONEV, VULCHEV 2011). Their distribution depends on the surrounding wetlands (rivers, marshes, etc.) or rivers and rainfall. Some of them are also habitats of salt meadows (Natura 2000 code 1530

Pannonic salt marshes and salt steppes), because of their salinization after the summer evaporation.

The aim of the present study was to gather ornithological data on the breeding birds of the poorly studied temporally flooded meadows and pastures in Northern Bulgaria during a wet year. Most of these wetlands are still not protected by the law and the future of their birdlife is not secured. Thus the knowledge on their breeding bird fauna is urgently needed.

Material and Methods

The study was conducted on ten temporary flooded wetlands in Northern Bulgaria during spring and summer of 2010. That year was characterized by high overall rainfall during the late winter and early spring. Thus many relief inundations were filled with water for a very long period. Six of the studied wetlands were visited twice in the period 4.05.2010 and 4.07.2010 and the other four (Chairharman, Baley, Gabrovnitsa and Polsko Kosovo) were visited once. We made transects walking around the shores of each studied wetland. In the largest wetlands (Chairya, Yakimovo) we made transects inside the wetland with the aim to obtain more precise data on the numbers of breeding birds. It was difficult to do this from the shores as the water surface was partially occupied by dense water vegetation.

Studied wetlands

All studied wetlands are temporarily flooded natural basins (Fig.1). These inundations of the terrain are usually flooded only during the spring period, but during the wet years (such as 2010) they hold shallow water until late summer (August-September). During the dry years they can be completely dry year-round. Part of the flooded meadows studied by us is included in the most complete inventory of the Bulgarian Wetlands published recently (MICHEV, STOYNEVA 2007). The study included the following wetlands:

Chairya – shallow flooded meadow situated in a closed inundation in South Dobroudzha, in close vicinity to the east part of General Kolevo village, Dobrich district (geographic coordinates of the central part of the wetland – N 43°38'43.17" E 27°57'25.66", UTM NJ73). The altitude is 224 m a.s.l. In dry years it has characteristics of a wet meadow or pasture. In 2010 it was completely flood-

ed until September. The length of the wetland was 3.5 km, the width – about 1.5 -1.7 km and the total flooded surface was about 600 ha. The Chairya wetland was covered partially by dense water vegetation represented by *Rorripa amphibia*, *Juncus articulatus* and *Carex sp.* The maximal depth of the wetland was about 70 cm in the central part, but much smaller in the periphery. It is the only wetland studied by us included in the Natura-2000 protected area (and IBA) –“Chairya”.

Senokos – flooded pastures situated in the south and south-east of Senokos village, Dobrich district with geographic coordinates: N 43°31'7.94" E 28°2'14.10"; UTM- NJ81. The altitude is 248 m a.s.l. The length of the wetland was 2,0 km, the width – about 0.5 -0.6 km and the total flooded surface area was about 120 ha. There was no water vegetation coverage on the water surface. The wetland and its surroundings were used as intensive pastures.

Chairharman – flooded area situated among the agricultural lands between the villages Bezvoditsa and Odartsi, Dobrich district, with geographic coordinates: N43°28'25.65" E27°58'31.95", UTM- NJ71. The altitude is 261 m a.s.l. The water surface was covered by *Carex sp.* The neighboring agricultural lands seeded with wheat were also flooded. The flooded area was 0,7 km long and 0,5 km wide, with a total surface of 35 ha.

Ivata – floodplain locked among drainage channels in Karaboaz lowland, close to the Danube River, between the villages Dabovan and Zagrazhden, Pleven district (geographic coordinates: N43 43 19.2 E024 34 27.3; UTM-LJ04). The altitude is 22 m a.s.l. The flooded area was 1,15 km long and 0,3 km wide, with surface area of about 35 ha. The flooded area was already almost dry in mid-June. The vegetation was represented by ruderals on abandoned agricultures and single shrubs of *Tamarix ramosissima*.

Dolno Tserovene (Tsurkovnite Lokvi locality)– Flooded area among the agricultural lands, situated at 1,7 km to the south-southwest from Dolno Tserovene village, Montana district. It is divided in two parts by the main road linking Montana and Lom. Geographic coordinates: eastern part – N43°33'51.47" E23°14'15.45"; western part – N43°34'1.78" E23°13'51.20"; UTM (both parts)- FP82. The altitude is 180 m a.s.l. The eastern part had a total surface of about 12 ha and the western part –about 5 ha. Part of the water of the eastern wetland is covered by vegetation.

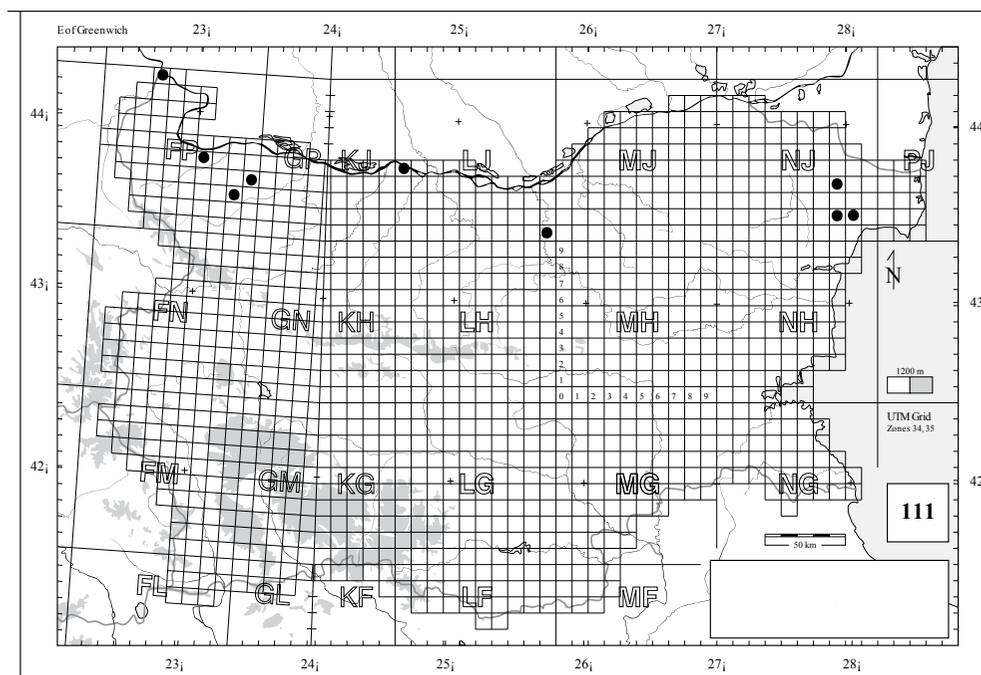


Fig. 1. Map of the temporally flooded meadows and other wetlands included in the present work. UTM grid taken from MICHEV (1999).

Yakimovo (Sultanitsa locality) – Flooded inundation situated at 2,3 km to the south of Yakimovo village, Montana district. Geographic coordinates: N43°36'15.23" E23°20'30.45"; UTM-FP93. The altitude is 158 m a.s.l. The length of the wetland was 1,2 km, the width – about 0,8 km and the total flooded surface area was about 100 ha. The greater part of the water surface was covered by vegetation of *Carex sp.*, *Juncus sp.*, *Poa pratensis* and *Festuca pratensis* and also flooded agricultures.

Gabrovnitsa – Small flooded area, at 1,7 km to the north-west of Gabrovnitsa village, Montana district. Geographic coordinates: N43°33'0.79" E23°17'35.49"; UTM-FP82. The altitude is 182 m a.s.l. The total surface area of the flooding is about 14 ha.

Dobri Dol-Slivata – Marshy floodplain situated between the villages Dobri Dol and Slivata, close to the Danube, Montana district. The geographic coordinates of the western part of the marsh are as follows: N43°46'13.70" E23° 0'52.67"; UTM- FP64. It is about 4 km long and 0,3 – 0,9 km wide, with approximate flooded surface area of 240 ha. It is covered by dense water vegetation of *Typha angustifolia*, *Carex sp.*, *Salvinia natans* and *Phragmites australis* on more than 80% of its territory. During the last 10 years this wetland obtained some more or less permanent characteristics probably because

of the ceasing of the work of some pumping stations that were responsible for the drainage of the area.

Baley – Small flooded area among the agricultural lands in the north-east of Baley village, Vidin district, close to the mouth of the Timok River in the Danube. Geographic coordinates: N 44°11'28.08" E 22°39'9.28"; UTM- FP39. The wetland occupies about 14 ha. It was not covered by water vegetation but some of the agricultural plants around were flooded.

Polsko Kosovo – Small flooded inundations on the left terrace of the Yantra River, at 1,5 km to the north of Polsko Kosovo village, Ruse district. Geographic coordinates: N43°26'39.77" E25°39'38.43"; UTM- LJ90. The old river beds of the Yantra River are situated in close vicinity. The altitude is 32 m a.s.l., the surface area – about 10 ha. It was not covered by water vegetation but some of the agricultural plants around were flooded.

Results

A total of 28 species of water birds with different level of breeding probability were recorded in the studied wetlands. Their species composition and breeding numbers are presented in Table 1.

Remarks on the breeding biology of some of the species of conservation concern.

Mute Swan (*Cygnus olor*)

A pair with eight juveniles was observed at Dobri Dol-Slivata wetland on 9.06.2010. In the same place, a pair also nested successfully in 2006 (SHURULINKOV, TSONEV 2009).

Black-winged Stilt (*Himantopus himantopus*)

Two nests with incubating females were observed on 4.05.2010 on a small island, surrounded by water vegetation, in the western parts of the Yakimovo wetland. On the 8th June eight pairs were seen at the same wetland, all of them leading chicks or showing aggressive defense of their juveniles against us and the Marsh Harriers flying nearby.

Among 16 pairs recorded in the Chairya wetland on 23.05.2010, seven were incubating their eggs in a colony together with three pairs of the Avocets. Most of the other nine pairs of the Black-winged Stilts, breeding solitary in different parts of the wetland, showed defensive behavior indicating the presence of already hatched juveniles. A nest of the Black-winged Stilts with four eggs was found in Chairya wetland on 5.06.2010 (Fig. 2). The nest was built on a small islet among shallow water using dry leaves of water plants. The nest had a length of 210 mm, width of 200 mm and height of 50 mm. The measurements of the eggs were: (1) 45,2 X 30,6 mm (2) 44,2 X 31,3 mm (3) 44,3 X 31,1 mm (4) 43,9 X 31,6 mm. The adult birds showed aggressive behavior against us – flying in circles, attacking us from the air and crying.

Pied Avocet (*Recurvirostra avosetta*)

A nest with an incubating adult bird was found on a small island in Dolno Tserovene wetland on



Fig. 2 Nest of Black-winged Stilt (*Himantopus himantopus*), Chairya, Dobrich district, 5.06.2010.

4.05.2010. The pair was actively defending their nest territory against two Garganeys (*Anas querquedula*). Another pair was observed in the same place but without indications of incubation. Three pairs were incubating their eggs in a colony together with the Black-winged Stilts in the Chairya wetland on 23.05.2010. The nests were situated on small elongated islets. Incubating Pied Avocets were observed also in the Chairharman wetland, on 6.06.2010.

Two recently hatched juvenile birds, led by their parents, were observed in the Senokos wetland on 6.06.2010. One pair performed attacks against us in the “Ivata” flooded area on 7.06.2010 clearly indicating the presence of already hatched chicks.

Whiskered Tern (*Chlidonias hybrida*)

A nest with one egg was found among a colony of White-winged Terns in the Chairya wetland on 23.05.2010. Another nest, again with one egg, was found in the same colony on 5.06.2010. The egg was 38,9 mm in length and 30,0 mm in width. A third pair was also observed there, but its nest was not found. The nests were situated in dense vegetation of *Rorripa amphibia* in the central parts of the wetland where the water depth was about 50-60 cm. The nests were built with leaves of water plants, mainly Jointleaf Rush (*Juncus articulatus*). In the same period – in the beginning of June, nest building was recorded also in other wetlands – in Senokos on 6.06.2010; in Dolno Tserovene, where on 8.06.2010 only a few pairs were incubating eggs and most of them were still building their nests; and in Yakimovo on 8.06.2010. In Dobri Dol – Slivata marsh two closely situated colonies with a total of 52 pairs were all already incubating their eggs on 9.06.2010.

White winged Tern (*Chlidonias leucopterus*)

A colony of 55 breeding pairs was found in the Chairya wetland in May, 2010. Data on the breeding biology of the White-winged Tern (*Chlidonias leucopterus*) in Chairya was already presented in our previous work (SHURULINKOV *et al.* 2010).

Discussion

Data on the breeding birds in the temporary flooded wetlands and meadows in Northern Bulgaria are scarce. All wetlands presented in this work have not been an object of ornithological research and thus all of them except Chairya are not protected neither by the Bulgarian law for the protected territories nor by the Natura-2000 network. The Chairya wetland has

Table 1 Breeding numbers of waterbirds in ten temporary flooded wetlands in Northern Bulgaria (numbers presented in breeding pairs) in 2010. The level of probability of breeding is given in brackets for each number as follows: co – confirmed breeding; pr - probable breeding and po –possible breeding.

Locality	Chairya	Senokos	Chairharman	“Ivata”	Dolno Tserovene	Yakimovo	Dobri dol-Slivata	Baley	Gabrovitsa	Polsko Kosovo	TOTAL (confirmed possible and probable breeding pairs)
Species / dates	23.05. 5.06.	6.06	6.06.	16.05. 7.06.	4.05. 7.05. 8.06.	4.05. 7.05. 8.06.	9.06.	16.06.	7.05.	20.05.	
Mute Swan <i>Cygnus olor</i> GMELIN,1789							1 (co)				1
Ruddy Shelduck <i>Tadorna ferruginea</i> PALLAS,1764	2 (co)		2 (co)								4
Teal <i>Anas crecca</i> L.1758						2 (po)					2
Mallard <i>Anas platyrhynchos</i> L.1758	5 (co)				4 (co)	7 (co)	9 (co)			7 (co)	32
Garganey <i>Anas querquedula</i> L.1758	4 (po)	7 males (po)					3 (pr)				7
Shoveler <i>Anas clypeata</i> L.1758							3 (pr)				3
Common Pochard <i>Aythya ferina</i> L.1758						2 (po)	6 (co)				8
Ferruginous Duck <i>Aythya nyroca</i> GÜELDENSTAEDT, 1769						3 (po)	3 (co)	1(po)			7
Little Grebe <i>Tachybaptus ruficollis</i> PALLAS,1764					1 (co)	2 (co)					3
Great crested Grebe <i>Podiceps cristatus</i> L.1758							1 (co)				1
Black-necked Grebe <i>Podiceps nigricollis</i> BREHM,1831							2 (co)				2
Little Bittern <i>Isobrychus minutus</i> L.1766						1 (co)	2 (co)				3

been designated as Natura-2000 protected area (SPA – special protected area) and an Important bird area in Bulgaria (KOSTADINOVA, GRAMATIKOV 2007). This site was designated for the winter concentrations of geese and for the White Storks concentrations during summer and migration. None of the various breeding water birds recorded by us, including many rare and endangered species, were mentioned in the book of KOSTADINOVA, GRAMATIKOV 2007 and they were not included in the standard form of the SPA “Chairya” (http://natura2000bg.org/natura/UserFiles/File/SDF/SDF_BG0002085.pdf). Therefore, the existence of breeding populations or pairs of Ruddy Shelduck, Black-winged Stilt, Avocet, White-winged and Whiskered Terns in Chairya should be included in the standard form of the SPA. There is no doubt that these birds nest in Chairya only in wet years. Nevertheless, the standard forms of the SPA should be updated as they must show the great potential of that area for the breeding water birds.

A total of 46 pairs of the Black-winged Stilts (*Himantopus himantopus*) were counted in eight out of the ten investigated wetlands. These concrete breeding localities were not reported until now in the ornithological literature, except for the “Ivata” locality where breeding of one pair was reported by DALAKCHIEVA (2011). The species was mapped as a breeding bird in the Orsoya- Dobri Dol area in the Bulgarian Breeding Bird Atlas but without concrete data in the text (IANKOV (ed) 2007). At the end of the 19th and during the first half of the 20th century, the Black-winged Stilt nested along the Danube – in former Svishtov and Karaboaz marshes (REISER 1894, NANKINOV *et al.* 1997) and in Kaykusha marsh (STANEVDALAKCHIEVA 1956). Beginning in 1970 and until the 1990s, the species nested only along the Black Sea coast at Bourgas, Pomorie and Varna (DARAKCHIEV, NANKINOV 1978, NANKINOV *et al.* 1997, MICHEV *et al.* 2004, DIMITROV *et al.* 2005). After 1994-1995 the species was found to nest again along the Danube – at Kalimok fishponds and Persina Nature Park (own unpublished data), in Srebarna reserve (PETKOV *et al.* 2007) and Mechka fishponds (VASSILEV *et al.* 2007). In the same period the species nested also in Shablenska Tuzla Lake (IVANOV 1998). Out of the Danube and its floodplain as well as the Black Sea coast, the species was found to nest in Obnova-Bulgarene floodplain, Pleven district (SHURULINKOV *et al.* 2005; SHURULINKOV, TSONEV 2009), in Chernogor Reservoir (pig farm), Silistra

district (PAVEL ZEHTINDJIEV, MICHAELA ILIEVA- pers. comm.) and in Hadzhidimitrovo fishponds (TODOROV, CHESHMEDJIEV 2007). The national population of the Black-winged Stilt in Bulgaria was estimated at 350-430 pairs (IANKOV (ed.) 2007) or 200-250 pairs (NANKINOV *et al.* 2004). Thus in the new localities reported in the present study, we recorded between 12% and 20% of the already known national population of the species. This fact underlines the importance of the investigated wetlands for the protection of the Black-winged Stilt in Bulgaria. The review of the data between 1980 and the present day leads us to the conclusion that there is a moderate increase in the numbers of the Black-winged Stilt in Northern Bulgaria for this period although they remain highly fluctuating.

According to the existing published data, the incubation of the Black-winged Stilts in Bulgaria starts after mid April and the first juveniles appear no earlier than the 10th-15th of May (DARAKCHIEV, NANKINOV 1978, NANKINOV *et al.* 1997). The terms of the reproductive period of the species in Bourgas district are quite elongated with the first full clutches being found on the 24th April and the last – on the 14th June (PROSTOV 1964). Our results from the Chairya wetland also showed a considerable asynchrony in terms of reproduction of the Black winged Stilts. On the 23rd May part of the pairs had already hatched juveniles while on the 5th June we found a full clutch of one pair which could be accepted as a comparatively late clutch.

A total of 18 pairs of the Avocets (*Recurvirostra avosetta*) were counted in six out of the ten investigated wetlands. The Avocet nesting population in Bulgaria is concentrated mainly in two lakes close to Bourgas, on the Black Sea coast – Atanasovsko and Pomorie lakes (NANKINOV *et al.* 1997; MICHEV *et al.* 2004) and it is accepted as an “incidental” breeder inland (DIMITROV 2011). This species has very rarely been reported as a breeding bird in Northern Bulgaria. In that region it nests regularly only at two sites on the Northern Black Sea coast – Varnensko-Beloslavsko lake complex and Shablenska Tuzla (IVANOV 1998, DIMITROV *et al.* 2007). Irregular breeding occurred at the Kalimok fishponds (DIMITROV *et al.* 2007) and probably in Slivo Pole floodplain (Ruse district), as well as to the west of Belene, in “Persina” Nature Park (SHURULINKOV, TSONEV 2009). It was reported during the nesting period close to Dobrich (NANKINOV *et al.* 1997) and along

the Iskar River (DIMITROV 2011). The last localities have characteristics similar to those reported in the present work.

The terms of reproduction of the Pied Avocets recorded by us in Northern Bulgaria in 2010 showed that the start of incubation and the period of hatching were approximately a month later compared to data reported for the Bourgas lakes, Southeastern Bulgaria, where the first laying dates were in the first 10 days of April and hatching started at the end of the same month (NANKINOV, DARAKCHIEV 1978, NANKINOV *et al.* 1997).

A breeding colony of the White-winged Tern (*Chlidonias leucopterus*) was not detected in Bulgaria before the finding of a colony in the Chairya wetland (SHURULINKOV *et al.* 2010). The species breeding numbers increased substantially also in other parts of Europe during the wet year 2010 (LAWICKI *et al.* 2011).

The Whiskered Tern (*Chlidonias hybrida*) is a common breeding species along the Bulgarian-Romanian sector of the Danube River (NANKINOV *et al.* 1997, KUTSAROV, STEFANOV 2007, VASSILEV, IVANOV 2011), but it is a very rare and irregular breeding bird outside the Danube floodplain. Therefore, the findings of breeding colonies or pairs in new localities such as Yakimovo and Dolno Tserovene (Northwestern Bulgaria) and Chairya and Senokos (Dobroudzha) are of great importance. Similar cases of breeding of the species outside of the Danube River were recorded after 1995-1996 at Novachene, Pleven district, Totleben Reservoir, Pleven district, Dragomirovo Reservoir and Hadzhidimitrovo fishponds, Veliko Turnovo district (SHURULINKOV *et al.* 2005, TODOROV, CHESHMEDJIEV 2007). The newly found localities presented here lead us to the conclusion that the whole territory of Northern Bulgaria should be included in the breeding distribution of

this species, although the breeding places are not regular and are highly dependent on the water levels in particular years. As the breeding population of the Whiskered Tern in Bulgaria was estimated in a range between 220 and 800 pairs, an average of 510 pairs (KUTSAROV, STEFANOV 2007), the population reported in the present work (108 pairs) represented about 21% of the average national population.

The observation of a Black-tailed Godwit (*Limosa limosa*) at the "Ivata" wetland on the 16th May and 7th June most probably refers to a summering solitary bird. The species had not been proven to be a breeding bird in Bulgaria until now, but a pair was supposed to have been nesting in a colony of the Black-winged Stilts at the Kalimok fishpond (KUTSAROV 2007).

Breeding of significant numbers of protected species of water birds in the Yakimovo and Dobri Dol-Slivata wetlands (Table 1) should be taken in consideration and these unprotected territories should be protected adequately. In our opinion, the Yakimovo wetland should be designated rapidly as a protected area and Dobri Dol –Slivata should be included in an enlargement of the Natura-2000 special protected area "Orsoya Fishponds", situated in the close vicinity. The Yakimovo wetland is highly threatened by the agricultural activities in the area. The Senokos flooded pastures were ploughed in 2011 and are threatened by the construction of a photovoltaic park and wind farms in the vicinity. This area should also be protected adequately.

Acknowledgements. We are grateful to the following colleagues and friends who helped us during the field research or supplied valuable data for the present work: Ivailo Angelov, Andrey Ralev, Vessela Elenkova, Tsvetomira Yotsova, Stoycho Stoychev, Hristinka Panovska, Rumén Trifonov, Velizara Nashkova, Jordan Hristov.

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Received: 29.03.2012

Accepted: 05.02.2013

