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Urednik *Editor*
Marko Tucakov, Marka Oreškovića 9, 25275 Bački Breg, Srbija, mtucakov@eunet.rs

Uređivački odbor *Editorial Board*
Marko Tucakov, Jožef Gergelj, Slobodan Puzović, Ištvan Hulo, Nikola Stojnić,
Voislav Vasić (Srbija), Jenő J. Purger (Mađarska), Milan Vogrin (Slovenija)

Prevod i lektura (engleski jezik) *Translation and English language editing*
Sanda Ocvirk sandaocvirk@yahoo.com i Dragan Latinović drlakicar@yahoo.com

Lektura (srpski jezik) *Language editing (Serbian language)*
Petar Matović petar_matovic@yahoo.com

Ilustracija na prednjim koricama *Front cover drawing*
Javor Rašajski

Prelom *Typesetting*
Karolj Giric

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Adresa *Address*
Radnička 20a, 21000 Novi Sad, Serbia

Predsedništvo *Presidency*
Jožef Gergelj, Marko Tucakov, Slobodan Puzović, Oto Sekereš, Nikola Stojnić, Ištvan Hulo, Dragan
Simić

Žiro račun *Account*
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Akcioni plan za obnovu i zaštitu lešinara Balkana

Lešinari Starog Aegyptiinae i Novog Sveta Cathartidae danas su jedna od najugroženijih grupa živih bića na Zemlji. Glavne opasnosti sa kojima su suočeni izazvane su velikim negativnim neposrednim ili posrednim čovekovim uticajima - trovanjima i zagađenjima hemijskim materijama, proganjanjima ili ubijanjem, velikim siromašenjem izvora hrane, narušavanjem ili gubitkom staništa i drugim činiocima. Populacije evropskih lešinara dramatično su opale u mnogim oblastima njihovih areala tokom 20. veka. Velike akcije zaštite i vraćanja prvobitne brojnosti lešinara započinju u evropskim zemljama (Španija, Francuska, Italija, Švajcarska i Austrija) tek tokom poslednjih decenija 20. veka. Populacije beloglavog supa, crnog strvinara i bradana počinju da rastu u Španiji, a beloglavog supa, crnog lešinara, bele kanje i bradana u Francuskoj. Nakon velikih napora i ulaganja zabeleženi su izuzetni uspesi u reintrodukciji beloglavog supa u Francuskoj i Italiji, crnog strvinara u Francuskoj i bradana u Alpima.

Međutim, opšta situacija u kojoj egzistiraju lešinari na Balkanskom poluostrvu i susednim regionima krajem 20. i početkom 21. veka dostigla je katastrofalne razmere (Tabela 1) i pored pokušaja nekih zemalja ovog regiona da spasu preostale populacije, pojedine parove ili jedinke. Danas se bradan i crni strvinar nalaze na granici izumiranja, dok brojnost bele kanje naglo opada. Takođe, populacija beloglavog supa je desetkovana i ova vrsta je iščezla iz nekih zemalja (Albanija, Bosna i Hercegovina, Crna Gora i Rumunija) i mnogih oblasti u drugim zemljama regiona.

Tabela 1: Pregled savremenog stanja populacija lešinara Aegyptiinae na Balkanu i u Srbiji
Table 1. Review of current status of population of vultures Aegyptiinae on Balkans and in Serbia

Vrsta	Broj gnezdećih parova na Balkanu <i>Number of breeding pairs on Balkans</i>	Broj gnezdećih parova u Srbiji <i>Number of breeding pairs in Serbia</i>
Bradani <i>Gypaetus barbatus</i> <i>Lammergeier</i>	4–6	0
Bela kanja <i>Neophron percnopterus</i> <i>Egyptian Vulture</i>	cca 130	0
Beloglavi sup <i>Gyps fulvus</i> <i>Eurasian Griffon</i>	cca 400	104
Crni strvinar <i>Aegypius monachus</i> <i>Cinereous Vulture</i>	25–30	0

Fondacija za zaštitu crnog lešinara (BVCF), Frankfurtsko zoološko društvo (FZS) i Fondacija za zaštitu bradana (FCBV), uz podršku Lige za zaštitu ptica Francuske (LPO), BirdLife International, Kraljevskog društva za zaštitu ptica (RSPB), IUCN Evrope, Radna grupa za beloglavog supa za istočni Mediteran (EGVWG) u saradnji sa nevladinim i vladinim organizacijama zemalja učesnica projekta sa Balkana organizuju i pokreću „Akcioni plan zaštite i obnove lešinara Balkanskog poluostrva“ koji je zamišljen kao dugoročna strategija kojom će se pokušati usvojiti i primeniti stručna iskustva iz proteklih (zapadnoevropskih) projekata zaštite i obnove lešinara u zemljama Balkana, kroz akcije kratkog, srednjeg i dugog trajanja. Glavni cilj projekta jeste da se napravi plan i razvije strategija zaštite i obnove lešinara

u zemljama Balkana, stvore najbolji mogući uslovi za njihov opstanak, a planirano je da se po potrebi izvrši i reintrodukcija pojedinih vrsta. Nacrt ovog plana donet je 2002. U projekt su do sada uključene Albanija, Bosna i Hercegovina, Bugarska, Crna Gora, Grčka, Hrvatska, Kipar, Makedonija, Rumunija, Srbija, Turska i Ukrajina. Tokom 2003. započnuju prve velike aktivnosti u vidu raznih pojedinačnih projekata ili akcija u Bugarskoj, Makedoniji i Albaniji.

Danas, posle sedam godina intenzivnog rada na ovom velikom projektu, dobijeni su veoma značajni rezultati:

1. organizovanim pregledom i monitoringom utvrđeno je stanje, trend i opasnosti u kojima se nalaze lešinari u mnogim oblastima Balkanskog poluostrva;
2. organizovan je redovan i intenzivan rad hranilišta za lešinare: 4–5 u Srbiji, po 4 u Bugarskoj i Makedoniji, 3 u Grčkoj i jednog u Hercegovini;
3. izvršeno je više programa edukacije (štampana je brošura o zaštiti lešinara, održana su razna predavanja);
4. organizovano je više međunarodnih i nacionalnih stručnih skupova oko zaštite i obnove lešinara na Balkanu i
5. započete su pripreme za reintrodukciju beloglavog supa u Bugarskoj (na 3 lokaliteta) i u Srbiji (Stara planina).

Srbija je u projekt uključena 2004. sa svojim posebnim projektom („Akcioni plan za zaštitu lešinara Srbije“). Nosilac ovog projekta je Zavod za zaštitu prirode Srbije, koji u saradnji sa drugim organizacijama (CPR „Natura“ iz Valjeva, „Rezervat Uvac“ D.O.O. i Fond za zaštitu ptica grabljivica „Beloglavi sup“ iz Nove Varoši, „Natura Balkanika“ iz Dimitrograd i Eparhija vranjska Srpske pravoslavne Crkve) sprovodi planirane aktivnosti na praktičnoj zaštiti i obnovi populacija lešinara. Glavne godišnje aktivnosti u Srbiji se realizuju kroz:

1. monitoring svih gnezdećih kolonija, pojedinačnih parova i jedinki lešinara i problema njihove zaštite (opasnosti i negativnih pojava). Na osnovu dobijenih rezultata prati se postojeće stanje, utvrđuju rezultati zaštite i predlažu nove mere i aktivnosti.
2. Redovan rad hranilišta za lešinare (hrana se doprema najmanje tri puta mesečno). Glavna hranilišta za beloglave supove i druge lešinare u Srbiji nalaze se u klisuri Uvca (Manastirine i Lupoglav), klisuri Trešnjice, na Vidliču i u dolini Pčinje.
3. Suzbijanje negativnih pojava kao što su trovanje i ubijanje. Ostvaruje se kroz radne sastanke posvećene problemu trovanja koji se održavaju u svim važnim mestima za lešinare gde postoje ove negativne pojave. Takođe, organizovana je specijalna služba za prikupljanje uzoraka otrovanih jedinki lešinara koje se šalju na toksikološku analizu u Centar za toksikologiju Vojnomedicinske akademije u Beogradu.
4. Edukacija. Održana je serija predavanja i prezentacija posvećenih Akcionom planu za lešinare Srbije. Takođe, štampan je poseban letak o zaštiti lešinara u 12.000 primeraka koji je podeljen u Srbiji, Bosni i Hercegovini (Republici Srpskoj) i Crnoj Gori. Takođe, letak o problemu trovanja štampan je i distribuiran (1400 primeraka). Objavljeno je više članaka i snimljeno više TV priloga o raznim događajima vezanim za zaštitu lešinara u Srbiji.
5. Reintrodukcija. U okviru projekta planirana je reintrodukcija beloglavog supa na Staroj planini i kasnije crnog strvinara u jugozapadnoj Srbiji. Pripreme za reintrodukciju beloglavog supa započete su i očekuje se njihovo intenziviranje tokom narednih godina (izgradnja volijere i nabavka ptica). Planirana je reintrodukcija i ostalih vrsta (bele kanje i bradana).

U periodu od 2007–2009. akcioni plan za lešinare u Srbiji proširen je i izvodi se u okviru šireg projekta „Ekorazvoj u ruralnim oblastima Bosne i Hercegovine i Srbije“ (faze I-II). Cilj ovog projekta jeste povezivanje interesa zaštite lešinara i prirode i razvoja ruralnih zajednica. Druga faza takvog projekta upravo se izvodi na području klisure Uvca i Mileševke. Zaštita beloglavog supa treba da doprinese razvoju ekoturizma u oblastima Nove Varoši, Sjenice i Prijepolja i obrnuto.

Treba istaći i da je brojnosti beloglavog supa u Srbiji posle mnogo godina stalnog pada 1992–1993. godine dostigla kritičan minimum od samo 12–13 parova. Posle niza preduzetih mera zaštite, od 1995.

zabeležen je stalni rast brojnosti, a 2008. zabeležena je maksimalna brojnost od 104 gnezdeća para (koja su započela inkubaciju). To je najveća brojnost beloglavog supa koja je ikada dosada zabeležena od kako se ova vrsta prati u Srbiji (od 1971–1972). Najveća koncentracija brojnosti ove vrste danas se na centralnom Balkanu nalazi na području Srbije: beloglavi sup postao je simbol zaštite prirode u Srbiji.



Slika 1. Sva četiri evropska lešinara još se gnezde na Balkanu: crni strvinar *Aegypius monachus* (gore levo), beloglavi sup *Gyps fulvus* (gore desno), bela kanja *Neophron percnopterus* (dole levo) i bradani *Gypaetus barbatus* (dole desno). Foto: Bratislav Grubač

*Figure 1: All four European vultures still breed on Balkans: Cinereous Vulture *Aegypius monachus* (left up), Eurasian Griffon *Gyps fulvus* (right up), Egyptian Vulture *Neophron percnopterus* (left down) and Lammergeier *Gypaetus barbatus* (right down)*

Akcionni plan za lešinare Balkana biće dugogodišnji projekt koji će se, zavisno od materijalnih i drugih mogućnosti, razvijati narednih godina. Prvi rezultati projekta su ohrabrujući, imajući u vidu ostvarene akcije, zaustavljen nagli pad brojnosti lešinara, povećanje brojnosti beloglavog supa u Srbiji i Bugarskoj. Ipak, plan se nalazi na početku dugog i teškog puta zaštite i obnove visokougroženih lešinara na Balkanskog poluostrvu, koji se nalaze na ili blizu granice izumiranja. Sudbina njihovih malih i osetljivih populacija je neizvesna u današnjem vremenu punom brojnih opasnosti i rizika.

Action plan for recovery and protection of vultures in Balkans

*Old World vultures *Aegypiinae* and New World vultures *Cathartidae* are one of the most endangered species on Earth nowadays. The main danger they are faced with is caused by great human influence, direct or indirect – poisoning and food chain contamination by chemicals, persecutions or shooting, huge reduction of food sources, habitat destruction or loss and other factors. During the 20th century, populations of European vultures dramatically dropped in many areas of their ranges. As late as in the last decades of 20th century large-scale actions to protect*

and recover the original numbers have been initiated in European countries (Spain, France, Italy, Switzerland and Austria). Populations of Eurasian Griffon, Cinereous Vulture and Lammergeier have begun to grow in Spain, while numbers of Eurasian Griffon, Black Vulture, Egyptian Vulture and Lammergeier increased in France. After enormous efforts and investments, spectacular success has been achieved in reintroduction of Eurasian Griffon in France and Italy, Cinereous Vulture in France and Lammergeier in the Alps.

However, the general situation in which vultures exist on Balkan Peninsula and surrounding regions, reached the disastrous proportions at the end of the 20th and beginning of the 21st century, despite the attempts in some countries in this region to save remaining populations, pairs or individuals (Table 1). Nowadays, Lammergeier and Cinereous Vulture are on the edge of extinction, while the number of Egyptian Vulture declines rapidly. The population of Eurasian Griffon is also reduced and this species has disappeared from many countries (Albania, Bosnia and Herzegovina, Montenegro and Romania), as well as from many areas of other countries in this region.

Black Vulture Conservation Foundation (BVCF), Frankfurt Zoological Society (FZS) and Foundation for Conservation of Bearded Vulture (FCBV), supported by League for Protection of Birds of France (LPO), BirdLife International, Royal Society for the Protection of Birds (RSPB), IUCN Europe, East European/Mediterranean Griffon Vulture Working Group (EGVWG) in cooperation with non-governmental and governmental organizations of participant countries on Balkans, organize and start Balkan Vulture Action Plan (BVAP). The Plan has been conceived as a long-term strategy which will try to adopt and apply experiences from previous (western-European) projects for protection and recovery of vultures in Balkan countries, through short, middle and long-term actions. The main goal of this project is to make a plan and develop the strategy for protection and recovery of vultures in Balkan countries, to create the best possible conditions for their survival, and it has also been planned to start reintroduction of some species if necessary. The draft of this plan was introduced in 2002. Until now, Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Greece, Macedonia, Montenegro, Romania, Serbia, Turkey and Ukraine are included in this project. During 2003, the first intensive activities started in the form of single projects or actions in Bulgaria, Macedonia and Albania.

Today, after seven years of intensive work on this huge project, very significant results have been obtained:

1. status, trend, and threats have been defined in many areas of Balkan peninsula by organized survey and monitoring,
2. regular and intensive work of 4-5 vulture feeding sites in Serbia, 4 in Bulgaria and Macedonia, respectively, 3 in Greece and 1 in Herzegovina has been organized,
3. several educational programs have been realized (a brochure on protection of vultures has been printed, various lectures have been held),
4. several international and national expert's meetings on protection and recovery of vultures on Balkans have been organized and
5. preparations for reintroduction of Eurasian Griffon in Bulgaria (on three sites) and Serbia (Stara Planina Mt.) have been initiated.

With its separate project (Vulture Action Plan in Serbia, VAPS) Serbia was included in the project in 2004. The leading organization in this project is Institute for Nature Conservation of Serbia, which carry out planned activities based on practical protection and recovery of populations of vultures in cooperation with other organizations. The organizations included in this project are: CPR Natura (Valjevo), Uvac Rreserve Ltd, Eurasian Griffon - Bird of Prey Protection Fund (Nova Varoš), Natura Balkanika (Dimitrograd) and Eparchy of Vranje of Serbian Orthodox Church. The main annual activities in Serbia are carried out through:

1. Monitoring of all breeding colonies, pairs and individuals of vultures and problems concerning their protection (dangers and unfavorable events). According to obtained results, the current state is being monitored, results of protection are being established and new measures and activities are being proposed.
2. Regular functioning of feeding places (the food is being delivered at least three times per month). The main feeding places for Eurasian Griffon and other vultures in Serbia are in Uvac (Manastirine and Lupoglav) Trešnjica River gorges, on Vidlič (Stara Planina Mt.) and in Pčinja river valley.

3. *Fight with negative circumstances such as poisoning and shooting. It is being carried out through the meetings dedicated to the problem of poisoning which are held in all places important for vultures, where these threats occur. Moreover, a special service for collecting samples of poisoned individuals of vultures is organized. Samples are being sent for a toxicological analysis to the Department of Toxicology on Military Medical Academy in Belgrade.*
4. *Education. Series of lectures and presentations related to VAPS have been held. Also, a leaflet on protection of vultures has been printed in 12000 copies and distributed in Serbia, Bosnia and Herzegovina (Republic of Srpska) and Montenegro. The leaflet about the problem of poisoning has also been printed and distributed (1400 copies). Moreover, many articles have been published and TV programs broadcasted about different events related to protection of vultures in Serbia.*
5. *Reintroduction. Within the project, the reintroduction of Eurasian Griffon at Stara Planina Mt. and later a Cinereous Vulture in southwestern Serbia has been planned. Preparations for reintroduction of Eurasian Griffon have already been started and their intensification is expected in the following years (the construction of cages and supplying of birds). The reintroduction of other species (Egyptian Vulture and Lammergeier) has also been planned.*

In the period between 2007 and 2009, VAPS has been extended and it is carried out through the bigger project: Eco-development in Rural Regions in Bosnia and Herzegovina and Serbia (stages I-II). The aim of this project is to establish the connection between the interests of vulture and nature protection and development of rural communities. The second stage of this project is just being out in the region around Uvac and Mileševka river gorges. The protection of Eurasian Griffon is supposed to contribute to the development of ecotourism in the regions of Nova Varoš, Sjenica and Prijepolje and vice versa.

It should be pointed out that, after many years of constant decrease in the number of Eurasian Griffon, in 1992-1993 it reached the critical minimum of only 12-13 pairs. After series of protection measures, the constant increase in number has been registered since 1995. The maximal number of 104 nesting pairs (which started incubation) was registered in 2008. It is the biggest ever recorded number since this species has been monitored in Serbia (1971-1972). Nowadays, the biggest concentration of this species in Central Balkans lays on the territory of Serbia: Eurasian Griffon became a symbol of nature protection in Serbia.

Action plan for vultures on the Balkans is going to be a longtime project which is to be developed in the following years, depending on financial and other possibilities. The first results of project are encouraging, considering the realized actions, the ceased drastic decline of number of vultures, the increase in number of Eurasian Griffon in Serbia and Bulgaria. However, the plan is at the very beginning of a long and hard way of protection and recovery of these highly endangered species on the Balkan Peninsula, which are close to the edge of extinction. Fate of their small and sensitive populations is questionable in the recent times, full of numerous dangers and risks.

Bratislav Grubač, rukovodilac projekta
Zavod za zaštitu prirode Srbije
dr Ivana Ribara 914, 11070 Novi Beograd
grubacbratislav@gmail.com



Distribution and estimation of the population size of the Black Stork *Ciconia nigra* in Macedonia *Rasprostranjenje i procena veličine populacije crne rode Ciconia nigra u Makedoniji.*

Velevski, M., Grubač, B. & Hallmann, B.

U periodu 2000–2008 zabeleženi su parovi crne rode Ciconia nigra u Makedoniji, a da bi se stekla slika o rasprostranjenju korišćeni su i pojedinačni podaci iz perioda 1980–2000. Istraživan je smeštaj gnezda, visinsko rasprostranjenje i ugrožavajući faktori.

Key words: Black stork, *Ciconia nigra*, Macedonia, distribution, population size

INTRODUCTION

The Black Stork *Ciconia nigra* has the most extensive breeding area of all the representatives of Ciconiidae family, with range extending from the Iberian Peninsula, over Central, Southern and Eastern Europe to North-east China and Korea in the east, and Middle East and Asia Minor (Sackl & Strazds, 1997). Its global population size is estimated to be 32000–44000 individuals (Wetlands International, in BirdLife International, 2008), and it is evaluated as Least Concern (BirdLife International, 2008). Population trends in European countries are different, decreasing in the Baltic countries, increasing in Poland and Western-European countries, with estimated population size of 7800 to 12000 breeding pairs, classified under SPEC category 2, and with European Threat Status assessed as Rare (BirdLife International, 2004). It enjoys full protection in Macedonia under the Law on hunting. In Europe, it is a migratory species; birds from the Czech Republic are known to winter in tropical West Africa, Ethiopia, Central African Republic, Chad and Nigeria (Bobek et al., 2008). It has been known to winter also on the Iberian Peninsula (Cano Alonso, 2006), Bulgaria (Petrov, in Sackl & Strazds, 1997) and occasionally in Greece (Handrinos & Akriotis, 1997). It breeds in all Balkan countries, with most important populations in Croatia and Bulgaria (BirdLife International, 2004), in the later being on a notable increase (Michev et al., 2007).

Primary breeding habitats in Europe are deciduous and coniferous forests with streams, rivers and ponds (Sackl & Strazds, 1997), although in many Mediterranean countries is often found to breed on cliffs (Handrinos & Akriotis 1997; Michev et al., 2007; Cano Alonso et al., 2006).

Black Stork has been known from few breeding localities in Macedonia, although we assume it used to be more common, especially prior to the melioration of the wetlands (started after World War II) and intensification of the forestry. For the first time it was mentioned by McGregor (1906), who found it near Bitola. Fehringier found it in Vardar Valley south of Demir Kapija (Fehringier, 1920) and at Kožuf Mt. somewhere above v. Konjsko (where he observed pairs; Fehringier, 1922). Many data exist for observation of one (e. g. Bodenstern & Kroymann, 1967/68; Geiger et al., 1974) or two pairs (Makatsch 1950; Huges & Sumerfield 1957; Danko & Szilard, 1971) at the gorge of river Babuna, a 'traditional' place where this species was found to breed by many more authors. Other findings include possible breeding in the gorge of river Lepenec north of Skopje (Karaman, 1930), possible breeding at Vardar Valley south of Demir Kapija (Bodenstern & Kroymann, 1967/68; Ganso, 1962), Babuna Mt. (Corti & Simon, 1970), Trubarevo south of Skopje (Jovetić, 1961), surrounding of Struga (Matvejev, 1955), Polog plain (Marčetić, 1961), Treska river gorge (Karaman, 1949) and wider Skopje region (Gengler, 1920; Dimovski, 1967). The few localities where the species was found on migration are Ovče Pole (Karaman, 1929), Taor (Karaman, 1949), Novačani near Veles (Kratzer, 1973) and Prespa Lake (Micevski, 1998). Recent published data are from Ogražden Mt. (Velevski et al., 2002), Demir Kapija

gorge (*Škorpikova et al., 2006*) and Matka canyon (*Veleviski, 2008*) and they have been considered among the other data used for this paper.

METHODS

Collection of data on the Black Stork presence in Macedonia was done during surveys aimed mostly for birds of prey implemented since 1980, but the data before 2000 were taken into consideration only if they were confirmed in the period after 2000 (otherwise were classified as disappeared pairs, see later), and also during surveys of bird fauna of some regions. No special survey for presence of the Black Stork was done. Whenever the species was recorded at possible breeding territory, we tried to locate the nest, or at least, the centre of the territory, and noted the activities of the birds, later classified as:

- breeding - including discovery of active nest, regular presence of a pair or family on one location, or known old (abandoned) nest, as long as birds are still observed in the close surrounding;
- probable breeding - observation of single bird or pair at potentially suitable location for breeding, showing territorial behaviour, or observation of three or more birds in the fledging period at potentially suitable location for breeding, presumed as families;
- possible breeding - one or several observations of single bird(s) in the breeding period in potentially suitable breeding locations;
- movements/foraging - observations of single birds flying or foraging in the breeding period, when their presence can not be justified with known or presumed pairs and therefore classified in one of the earlier categories. These observation very easily indicate on presence of unlocated pair.
- disappeared pairs - in cases when birds were not observed at specific locations where old nests exist.

Data from migration season were not considered for analyses.

All data were presented on topographic map (1:100000) using ArcGIS software, from where elevation was approximately taken.

STUDY AREA DESCRIPTION

Study area included almost the entire territory of Republic of Macedonia, especially lowlands and river valleys. List of regions where most attention was paid is as follows: north (Kumanovo region, Skopje region), central (Veles region, Štip region, Sveti Nikole region, Vardar valley, Tikveš region, Jakupica Mt, Babuna Mt, Prilep region), south (Demir Kapija region, Mariovo region, Pelagonia Plain, Pelister Mt, Nidže Mt, Kožuf Mt.) and east (Ogražden Mt, Osogovo Mt, Plačkovica Mt, Kriva Reka valley) of the country. The Western parts of the country were studied insufficiently, with some exceptions (Bistra Mt, Jablanica Mt, Ilinska-Plakenska Mts, Galičica Mt.). Less attention was paid to Belasica Mt, Strumica valley, Maleševski Mts, Goten Mt., Bilina Mt, Skopska Crna Gora Mt, Žeden Mt, Šar Planina Mt, Čeloica Mt, Bigla Mt, Krčin Mt, Dešat Mt, Korab Mt, Stogovo Mt, Karaorman Mt, Dojran region, Lakes Ohrid and Prespa), but very few of these are almost completely unsurveyed, or, for some of them, literature data for their bird faunas exist, without records of the Black Stork.

RESULTS

In the period after 2000, we confirmed 14 breeding pairs, plus one territory that was abandoned after the unsuccessful breeding season in 2006 and was classified as “disappeared pair”.

Breeding and probably breeding pairs (n=19) are located in northeastern Macedonia (n=5), eastern Macedonia (n=3), central Macedonia (n=2), southern Macedonia (n=8), and one territory in north-western part of the country (Figure 1.). The species breeds solitarily, the closest distance between two

active nests was 4.8 km in southern Macedonia in 2006 (one of the pairs disappeared after that breeding season).

All known nests (from active pairs, old nests from still present pairs and old nests from disappeared pairs, $n = 14$) are positioned on cliffs. Eleven of them are in river valleys (gorges and canyons), while only three are in hills. We have located six more probably breeding pairs, five of them most likely breeding in the river valleys, and one on cliff in hills. This shows clear preference of the Black Stork in Macedonia for the steep river gorges. Four more pairs possibly exist, located in river valleys, and in addition, there are eight records of single birds classified as movements/foraging, possibly belonging to up to six unknown pairs. This brings us to minimum of 20 pairs, but easily can be 30 pairs.

The Black Stork in Macedonia was found to breed on altitudes from 250 to 1140 m a. s. l. (breeding pairs, probably breeding pairs and disappeared pairs, $n=22$, mean=554 m, median=500 m a. s. l.). However, most of the existing nests and probable nests ($n=18$) are under 650 m a. s. l.

During the study period, one pair disappeared after unsuccessful breeding season in 2006. At this location, a house was constructed at ca. 20 m distance from the nest. Also, in 2004 one pair was found breeding at a territory that was surely not occupied in the period 1981-1991.

Having in mind that the entire territory of the country was not sufficiently studied, we estimate the total number of breeding pairs of Black Stork to be no less than 30 breeding pairs, and most likely between 35-45 pairs.

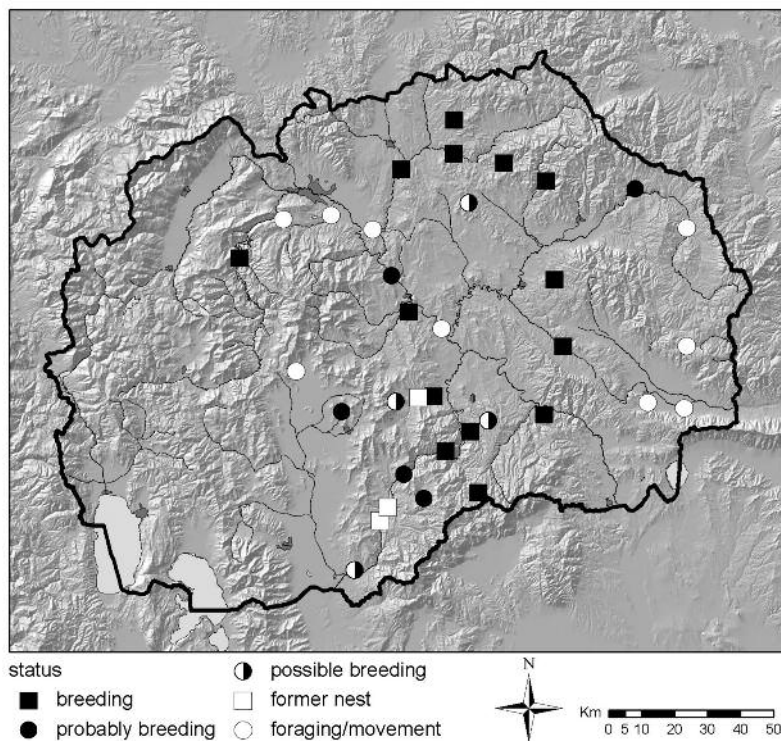


Figure 1: Distribution of the Black Stork *Ciconia nigra* in Macedonia

Slika 1. Rasprostranjenje crne rode *Ciconia nigra* u Makedoniji. Breeding – gneždenje; probably breeding – verovatno gneždenje; possible breeding – moguće gneždenje; former nest – nekadašnje gnezdo; foraging/movement – ishrana/prelet

DISCUSSION AND CONCLUSIONS

There is insufficient number of literature data on the breeding of Black Stork in Macedonia, and those that exist are located mostly along river Vardar, reflecting the uneven coverage with ornithological surveys of territory of the country before 1950's (*Dimovski & Matvejev*, 1955), that also continued until the recent period. Therefore, it is not possible to determine precisely the historical trend of the species in the country. Data from some authors (e. g., *Makatsch*, 1950; *Patev*, 1950; *Matvejev* 1950) have suggested that it has been rare in the countries on the Balkan Peninsula (Macedonia, Greece, Bulgaria and Serbia) in the period before the World War II. Recent increase in numbers in Greece (*BirdLife International*, 2004) and especially in Bulgaria (*Michev et al.*, 2007), might also indicate a positive trend in Macedonia during the last two or three decades. One breeding pair that was discovered in 2004 was surely not present at the same location in the period 1981-1991, thus might being the only evidence for this assumption. Therefore, we might conclude that its trend in the last two decades is at least stabile.

It is not known how the intensive melioration in the period after World War II and intensification of the forestry has affected the Black Stork population in Macedonia. Only two historical records - Trubarevo south of Skopje (*Jovetić*, 1961) and Polog Plain (*Marčetić*, 1961) indicate possible breeding in the lowland forests (although, at both locations suitable cliffs also exist in the close surrounding, i. e. Taor Gorge at river Vardar and at foothills of Šar Planina Mt, respectively). This habitat has suffered strong degradation in Macedonia, and only small patches of forest remain in the lowlands today.

Data from neighbouring Bulgaria, where half of the nests (127) are on exposed cliffs or in caves, and the other half (127 nests) are in forests (temperate deciduous, temperate riverine and swamp, and temperate coniferous; *Michev et al.*, 2007) and breeding in pine forests in Greece (*Handrinos & Akriotis*, 1997) suggest that significant part of the population in Macedonia may still need to be discovered, and that the population estimation given in this paper might be very conservative. The example of Obedska Bara in Serbia (*Puzović et al.*, 1988/89) shows that population size can be heavily underestimated even at a relatively small territory without specially designed study and survey efforts.

Small number of pairs, unfavourable forest management practice (almost complete absence of mature forests or mature trees in forests in the country), and destruction of breeding habitat by construction of new roads and opening of quarries are the reasons why we consider the conservation status of the species in Macedonia as unfavourable. Special conservation measures, especially in protection of the breeding localities, prevention of disturbance and changes in forestry practices are needed in order to maintain and even increase Black Stork population in Macedonia.

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SAŽETAK

Sva poznata gnezda crne rode Ciconia nigra u Makedoniji nalaze se isključivo na liticama, uglavnom u kanjonima, na nadmorskim visinama od 250–1140 m. Poznato je 19 potvrđenih ili verovatnih gnezdećih

parova, četiri verovatna para, a posmatrane su pojedinačne ptice koje ukazuju na postojanje još šest mogućih parova, uglavnom u severozapadnom, istočnom, središnjem i južnom delu zemlje. Kako cela teritorija Makedonije nije potpuno istražena, procenjeno je da ukupan broj parova u zemlji nije manji od 30, a da se verovatno kreće od 35 do 45. Istorijski trend nije poznat, a trend u poslednje dve decenije je verovatno stabilan. U Makedoniji crna roda ima nepovoljan status zaštite, a najznačajniji ugrožavajući faktori su gubitak staništa, uznemiravanje i nepovoljne prakse u šumarstvu.

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Author's addresses:

Metodija Velevski

Macedonian Ecological Society, Institute of Biology, Faculty of Natural Sciences, 1000 Skopje, Macedonia
velevski@mes.org.mk

Bratislav Grubač

Institute for Nature Conservation of Serbia, Voždova 14/2 18000 Niš, Serbia
grubacbratislav@gmail.com

Ben Hallmann

GR 40008, Rapsani, Greece
benhallmann@gmail.com

Brojnost, gustina gneždenja i karakteristike staništa crvenoglavog svračka *Lanius senator* u dolini Pčinje

Numbers, breeding density and habitat characteristics of Woodchat Shrike Lanius senator in Pčinja river valley

Radišić, D., Šćiban, M. & Spremo, N.

This paper provides the results of research of number and territorial distribution of Woodchat Shrike Lanius senator in southwestern part of the river Pčinja (S Serbia) in the period between 2006 and 2008 with a reference to the habitat selection compared to the data collected on other localities on the Balkan Peninsula.

Key words: Woodchat Shrike, *Lanius senator*, Pčinja, numbers, breeding density, habitat

UVOD

Crvenoglavi svračak *Lanius senator* je tipična mediteranska vrsta (Cramp, 1998), čije rasprostranjenje na Balkanu obuhvata delove sa jakim mediteranskim uticajima. Nastanjuje otvorene šumske terene, pseudomakije, prisojne voćnjake i vinograde, maslinjake i rubove reliktnih listopadnih šuma, najčešće u brdskim predelima do 500 m nadmorske visine (Matvejev, 1976).

U Srbiji populacija je uglavnom vezana za krajnji jug zemlje, za Kosovo i Metohiju (100–150 parova), kao i dolinu Pčinje i Preševsku kotlinu (ukupno 30–60 parova; Puzović et al., 2003; Puzović & Grubač, 2000). Povremeno je beležen i u drugim delovima Srbije (Ham, 1989; Medenica, 2006; Stanković, 2000). Trend populacije u Srbiji je ocenjen kao opadajući (Puzović et al., 2003). Sredinom 20. veka populacija u Srbiji ocenjena je kao malobrojna, najviše vezana za gornje tokove Južne Morave, oko Bujanovca i Gnjilana, a u periodu 1947–1949. vrsta je dokazana i u okolini Zlota, Bele Palanke, Surdulice, Niša i Vranja (Matvejev, 1950).

Cilj ovog rada je predstavljanje rezultata istraživanja brojnosti i teritorijalnog rasporeda crvenoglavog svračka u jugozapadnom delu doline Pčinje u savremenom periodu, sa osvrtom na odabir staništa za gnežđenje u odnosu na podatke prikupljene na drugim lokalitetima na Balkanskom poluostrvu.

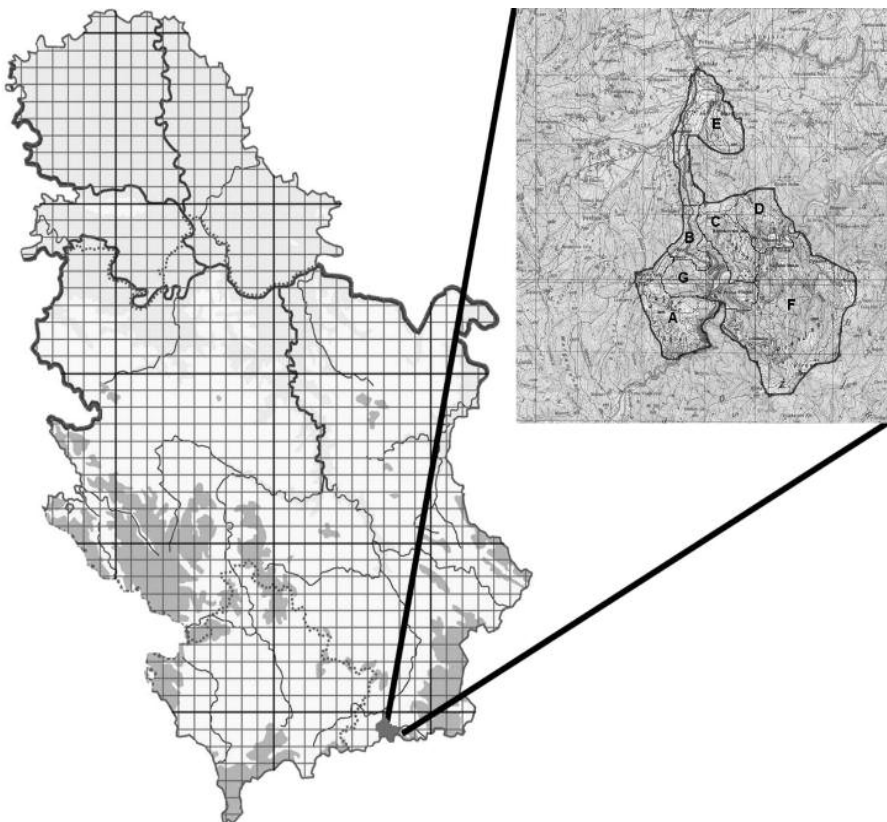
METODE

Istraživanje je vršeno u periodima od 15. do 29. 7. 2006, od 2. do 17. 7. 2007. i od 12. do 22. 7. 2008. tokom kampova NIDSB „Josif Pančić“. Period u kome su podaci prikupljeni predstavlja završnu fazu drugog gnežđenja crvenoglavog svračka u dolini Pčinje (Matvejev, 1950; Nikolov, 2005; Nikolov & Hristova, 2007), tako da se na osnovu njih stiče realan uvid u brojnost parova na tom području, budući da su parovi još uvek vezani za svoje teritorije. Trogodišnja redovnost praćenja istih lokaliteta omogućava sagledavanje trenda brojnosti. Svi zabeleženi parovi kartirani su, a radi jednostavnije analize rasprostranjenja teritorija istraživano područje podeljeno je na šest podlokaliteta (Slika 1).

OPIS ISTRAŽIVANOG PODRUČJA

Dolina Pčinje nalazi se u sistemu rodopske planinske mase (Stevanović & Stevanović, 1995). Nadmorska visina varira između 436 m (Pčinja na granici sa Makedonijom) i 1283 m (planina Kozjak). Pčinja pripada egejskom slivu (Martinović–Vitanović & Kalafatić, 1995). Njenom dolinom na sever se širi mediteranski uticaj, tako da je na području zastupljen submediteransko-egejsko subkontinentalni prelazni oblik zonalne klime. Biogeografski, područje predstavlja najseverniji deo makedonsko-trakijske provincije. Na ovom

području su zbog snažnih kontinentalnih uticaja submediteranski elementi u velikoj meri potisnuti elementima subsrednjeevropskog regiona, odnosno mezijske provincije balkanskih hrastovih šuma.



Slika 1. Istraživano područje podeljeno na podlokalitete: A – Gornji Starac, B – Budovija, C – Jablanica, D – Vogance, E – Barajevac, F – Kozjak, G – bliska okolina manastira Sveti Prohor Pčinjski

Figure 1: Study area divided in sublocalities: A - Gornji Starac, B - Budovija, C - Jablanica, D - Vogance, E - Barajevac, F - Kozjak, G - close surroundings of St. Prohor Pčinjski monastery

Na ovaj način obrazovani su ekosistemi mešovitog sastava geoelemenata, faune i flore, a elementi egejskog Mediterana prisutni su na staništima kakvi su kamenjari i suve „stepolike“ livade nastale degradacijom šuma (Stevanović, 1995). Na istraživanom području zastupljena su sva staništa tipična za dolinu reke Pčinje.

Opis staništa naseljenih od strane crvenoglavog svračka vršen je na osnovu: nadmorske visine, ekspozicije i tipa staništa (tipovi staništa u dolini Pčinje podeljeni su na: degradirane hrastove šume, šume uz Pčinju, bukove šume, kamenjari i litice, naselja, voćnjake i livade). Ukupna površina istraživanog područja bila je 31,1 km².

REZULTATI

Crvenoglavi svračak zabeležen je na pet od osam istraživanih lokaliteta, sa različitim brojnošću (Tabela 1). Nije nijednom zabeležen na Kozjaku i u bližoj okolini manastira Sveti Prohor Pčinjski (niži delovi doline Pčinje). Vrsta je odsustvovala sa istih lokaliteta i u istraživanju 2005. (Ristić, 2005).

Tabela 1. Brojnost i gustina gneždenja crvenoglavog sračka *Lanius senator* na pojedinim lokalitetima u dolini Pčinje
 Table 1: Number and breeding density of Woodchat Shrike *Lanius senator* on localities in Pčinja river valley 2006-2008

Lokalitet <i>Site</i>	Broj parova <i>Number of pairs</i>			Prosečna gustina (p/km ²) <i>Average density</i>
	2006.	2007.	2008.	
Gornji Starac (4,8 km ²)	10	9	8	1,84
Budovija (1,6 km ²)	3	2	2	1,38
Jablanica (2,8 km ²)	2	2	2	0,71
Vogance (2,4 km ²)	0	1	2	0,41
Barajevac (5,2 km ²)	5	5	?	0,95
Kozjak (11,2 km ²)	0	0	0	0
Manastir Prohor Pčinjski (3,1 km ²)	0	0	0	0
Ukupno <i>Total</i> 31,1 km ²	20	19	14	0,59

DISKUSIJA I ZAKLJUČCI

Rasprostranjenje i brojnost

Brojnost parova bila je nešto veća od prethodno procenjene u okolini manastira Sveti Prohor Pčinjski (14–16 parova; *Ristić*, 2005). Populacija u dolini Pčinje čini 33–67% nacionalne populacije ridoglavog sračka (*Puzović et al.*, 2003).

Uočljivo je da brojnost parova po lokalitetima tokom trogodišnjeg perioda slabo varira. Nešto manji broj parova zabeležen 2008. može se objasniti kraćim vremenom istraživanja, što je uslovalo izostanak obilaska lokaliteta Barajevac. I pored toga, populacija je tokom tri godine istraživanja bila stabilna i nije se menjala u brojnosti, što je često odlika populacija na rubu areala vrste.

Variranje gustine gneždenja u zavisnosti od lokaliteta ukazuje na grupisanje populacije na lokacijama sa povoljnim ekološkim uslovima (Tabela 2)

Gustina gneždenja crvenoglavog sračka veoma je promenjiva u odnosu na različite regione u Evropi, a populacija na istraživanom području je srazmerno niska (Tabela 2), što se može objasniti mozaičnim i diskontinuiranim rasporedom povoljnih staništa vrste na istraživanom području.

Tabela 2. Poređenje gustine gneždenja crvenoglavog sračka *Lanius senator* u dolini Pčinje sa drugim područjima u Evropi
 Table 2: The comparison of breeding densities of Woodchat Shrike *Lanius senator* in Pčinja river valley and other areas in Europe

Područje <i>Site</i>	Država <i>State</i>	Gustina parova /km ² <i>Density pairs /km²</i>	Izvor <i>Source</i>
Područje Sofije	Bugarska <i>Bulgaria</i>	3	<i>Nikolov</i> , 2006
Latium	Italija <i>Italy</i>	1,4-2,04 (5)	<i>Guerrieri & Castaldi</i> , 2000
Cazevielle, Pompignan, Blandas	Francuska <i>France</i>	20-40	<i>Isemann & Fradet</i> , 1998
Barcelona	Španija <i>Spain</i>	13 individua	<i>Batllori & Uribe</i> , 1989
Dolina Pčinje	Srbija <i>Serbia</i>	0,59	ovaj rad <i>this paper</i>

KARAKTERISTIKE STANIŠTA

Crvenoglavi svračak u dolini Pčinje pokazuje visok stepen vezanosti za suve livade okružene degradiranim hrastovim šumama ili voćnjacima (Slika 3), na kojima su se nalazile sve zabeležene teritorije. Ovaj tip staništa predstavlja fragmente sa najjačim egejsko-mediteranskim uticajem (Stevanović, 1995), i čine ga livade sa niskom travom okružene žbunovima i pojedinačnim stablima (*Quercus petraea*, *Q. pubescens*, *Juniperus communis*, *J. oxycedrus*, *Crategus monogyna*, *Pirus pyraster* i dr.) ili voćnjacima (*Malus domestica*, *Prunus* sp.)



Slika 3. Stanište ridoglavog svračka *Lanius senator* u dolini Pčinje. Foto: Marko Šćiban
Figure 3: Habitat of Woodchat Shrike *Lanius senator* in Pčinja river valley

Sve zabeležene teritorije nalazile su se na nadmorskim visinama između 520 i 800 m, s tim da su parovi na lokalitetu Barajevac bili na nešto nižim nadmorskim visinama (520–600 m), a na ostalim lokalitetima između 600 m n. v. i 800 m n. v. One se nalaze na livadama sa najjačom insolacijom (južne, jugoistočne i jugozapadne ekspozicije). Iako naizgled pogodna staništa (suve livade okružene žbunjem, voćnjacima i šumama) postoje i na Kozjaku i oko same Pčinje (u nižim delovima doline), ridoglavi svračak izostaje sa tih lokaliteta, a verovatan razlog je upravo nedovoljna insolacija, budući da je vrsta u većem delu Evrope vezana za kserotermna staništa (Nikolov, 2005; Nikolov & Hristova, 2007; Moskát & Fuisz, 2002; Guerrieri & Castaldi, 2000) kakva su na istraživanom području prisutna na terenima izloženim jačoj insolaciji.

Tip staništa u kome je crvenoglavi svračak beležen na istraživanom području dosta se razlikuje od opisa staništa ove vrste koji daje Matvejev (1950): kotline sa bujnom vegetacijom, uglavnom oko izvora i vrela. Pored toga, isti autor navodi da je vrsta vezana za pobrđe planina i nadmorske visine do 500 m, izuzetno do 900 m (Matvejev, 1976), dok su se sve teritorije na istraživanom području u dolini Pčinje nalazile na nadmorskoj visini većoj od 500 m. U istraživanju sprovedenom 2005. teritorije su beležene na sličnim nadmorskim visinama, od 400–700 m (Ristić 2005). Vrsta je zabeležena na sličnim staništima u Bugarskoj u okolini Sofije (Nikolov, 2005; Nikolov & Hristova, 2007), pri čemu se kao važno obeležje navodi i južna ekspozicija padina na kojima se nalaze teritorije, kao i nadmorska visina od 600–750

m. Sa druge strane, populacija na lokalitetu Rupite (donji tok Strume) naseljava drugačija staništa na nižim nadmorskim visinama (do 281 m), ali na drugim lokalitetima u Bugarskoj se gnezdi i znatno više, do 1000–1150 m n. v. (Nikolov et al., 2006). U okolini Aleksandropolisa (severoistočna Grčka) vrsta je zabeležena u pet od šest definisanih tipova staništa (ivice hrastovih šuma, maslinjaci i voćnjaci, njive se žitom, kserotermni pašnjaci sa žbunjem i mezofilni pašnjaci sa žbunjem), iako je u više od 50% slučajeva posmatran na kserotermnim pašnjacima sa žbunjem (Moskát & Fuisz, 2002). U odnosu na podelu iz severoistočne Grčke, stanište u kome su zabeležene sve teritorije ridoglavog svračka u dolini Pčinje može se smatrati kombinacijom ivica hrastovih šuma, voćnjaka i kserotermnih pašnjaka sa žbunjem. Okolina Aleksandropolisa nalazi se na nižoj nadmorskoj visini u odnosu na dolinu Pčinje, do oko 300 m. Za razliku od severoistoka Grčke, crvenoglavi svračci su odsustvovali u mezofilnim delovima, kao i na njivama, dok vrsta na oba lokaliteta izbegava šume uz reke i potoke. Uočljivo je da crvenoglavi svračci u dolini Pčinje naseljavaju manje raznovrsna staništa nego što je to slučaj sa populacijom na severoistoku Grčke.

Poređenje rezultata ovog istraživanja sa rezultatima studija sprovedenih na drugim delovima Balkanskog poluostrva (Nikolov, 2005; Nikolov & Hristova, 2007; Moscat & Fuisz, 2002) ukazuje da vrsta, idući ka severnijim delovima areala, sužava izbor staništa i pokazuje viši stupanj vezanosti za jače osunčana otvorena i mozaična staništa, na brdovitim terenima sa većom nadmorskom visinom i južnom ekspozicijom padina.

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SUMMARY

The maximal numbers of 20 pairs of Woodchat Shrike Lanius senator (between 33% and 67% of national population) was established in Pčinja river valley between 2006 and 2008, while the number of pairs on sublocalities didn't vary significantly during the study period. The average density of territories was 0,59/km². The pairs showed a high level of fidelity to territories and they dwell on the same locations from year to year. The species was recorded exclusively on a very insolated meadows surrounded with degraded forests, bush or orchards, which present a type of habitat with the strongest influence of Aegean Mediterranean. All territories were situated on the slopes exposed to sun, on height between 500 and 800 m above sea level.

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Authors addresses:

Dimitrije Radišić

Momčila Tapavice 12, 21000 Novi Sad

aythyista@yahoo.com

Marko Šćiban

Bate Brkića 18, 21000 Novi Sad

sciban@eunet.yu

Nenad Spremo

Filipa Višnjica 5, 25260 Apatin

nenad.spremo@gmail.com