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## The last indigenous black-necked pheasant population of Europe

Christos Sokos<sup>1</sup> and Periklis Birtsas<sup>1,2</sup>, <sup>1</sup>Research Division, Hunting Federation of Macedonia and Thrace, 173-175 Ethnikis Antistaseos Str., GR 55134 Thessaloniki, Hellas (Greece) and <sup>2</sup>Laboratory of Wildlife, Department of Forestry and Management of Natural Environment, Applied Science Institute of Larissa, Terma Mavromihali str., GR 431 00, Karditsa, Hellas (Greece). *Email: thiramatologos@hotmail.com*

## Introduction

Black-necked or Caucasus pheasant *Phasianus colchicus colchicus* L. maintains small and isolated populations in countries east of the Black Sea: Armenia, Georgia, Azerbaijan and Iran and west: Hellas (Greece) (Braasch et al. 2011). These populations of black-necked pheasant number a few hundred individuals, and consequently the subspecies has been classified as Vulnerable on the IUCN Red List (Sokos and Birtsas 2005).

Hellas occupies the southeast limit of Europe to Asia, and is a country with rich biodiversity (Blondel et al. 2010). The economic and political situation of Hellas during previous centuries seems to have prevented the overexploitation of nature. These details may have contributed to the conservation of the indigenous black-necked pheasant in

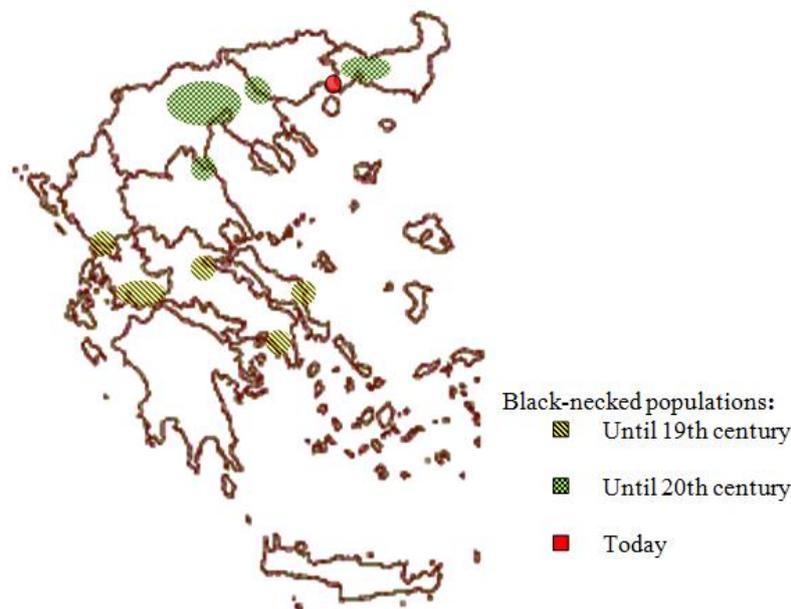
Nestos Delta in North Hellas from the twentieth century, when measures were taken by Hellenic authorities to protect of this population.

Very little information is available on black-necked pheasant status in Europe, and the species is incorrectly considered extinct or introduced by many authors. Here, we write about the species in Hellas, its past distribution and today status and concerns.

### **Black-necked pheasants in Hellas**

Pheasants are known to ancient Hellene writers, like Aristophanes and Aristotle (Pollard 1977). The geographer Agatharchides of Cnidus (second century BC) stated that "great numbers of these birds, known as pheasants, frequent the mouths of the rivers" (Pollard 1977). Ornithologists and hunters of the nineteenth and twentieth centuries gave information about the distribution of subspecies in Hellas. According to them, the black-necked pheasant had wide distribution in continental Hellas (Figure 1).

Until the nineteenth century, black-necked pheasant populations existed in Attica, Euboea and Akarnania (Lindermayer 1860, Powys 1860, Reiser 1905 in Handrinis and Akriotis 1997). Pringale (1972), states that black-necked pheasant was widely distributed and located in the valleys of rivers Pineios of Thessaly, Spercheios and the Gulf of Arta until the nineteenth century. Tsitsas (1965) adds that after the revolution of 1821, there were pheasants in riparian forests of Agrinio, West Hellas.



*Figure 1. Indigenous black-necked pheasant populations in Hellas at past and present according to ornithologists and hunters of the nineteenth and twentieth centuries. The last population exists in Northeast Hellas, in Nestos Delta (red).*

Boev (1997) recorded pheasant bones from archaeological sites, demonstrating the wide distribution of the species in Bulgaria at the past. The oldest finding comes from

Dolnoslav (100 km northeast of the Nestos Delta) and dates from 5530 - 5480 BC. These findings and the fact that black-necked pheasant had a wide distribution in Hellas and Bulgaria, strengthens the view that the bird is a native species of the Balkans.

The establishment of the species following introduction and release belongs probably to mythology (Argonauts, Colchis, Phasis), as the history of establishing galliform populations is characterized by many failures and few successes (Sokos et al. 2008). Ancient Hellenes colonized the Colchian coast in the fifth and sixth centuries BC establishing their trading posts at Phasis. Phasis was a marshy delta created by the Rioni River, where black-necked pheasant bred and still do today (Sokos and Birtsas 2005). Pheasants were introduced into this area and thus received their name in hellenic language: *kolchikos phasianos*.

After the nineteenth century, the distribution of black-necked pheasant gradually reduced despite the prohibition of hunting since 1923. In the first third of the twentieth century, black-necked pheasant was limited to regions of Thrace and Macedonia of North Hellas (Figure 1, Table 1) and in recent decades, the subspecies has bred only in Nestos Delta, Northeast Hellas (Sokos et al. 2011).

Table 1. Regions of Forest Districts in which black-necked pheasant populations were recorded in decade of 1920 (Hunter Calendar, 1927).

Region	Forest Districts
East Macedonia and Thrace	Komotini, Xanthi, Chrysoupoli
Central Macedonia	Serres, Sidirokastro, Nigrita, Goumenissa, Thessaloniki, Edessa, Veroia, Naoussa, Katerini

### **Black-necked pheasants in Nestos Delta**

Nestos Delta is the last refuge of black-necked pheasant in Europe. Paralikidis et al. (1997) found pure black-necked pheasants in Nestos Delta, where releases had not occurred in the area as they were prohibited for the protection of subspecies from genetic introgression. Moreover, no male pheasant with white on its neck has been recorded in the area.



Figure 2. Male black-necked pheasant in the Nestos Delta, May 2007.

Nestos is one of the larger rivers in Hellas, and is the natural boundary between Macedonia and Thrace. The climate is coastal Mediterranean, with mild winters and dry, warm summers. The monthly average temperature varies between 5.5°C (January) and 25.6°C (July). The average annual precipitation for the period 1985–2002 is 425 mm, with a dry season of at least five months.

The plain around Nestos River was covered by one of the biggest riparian forests of Europe, with an area of 12700 ha at the beginning of the twentieth century, opened by the frequent flooding of the river (Efthimiou 2000). Embankments were constructed for the prevention of floods and progressively the natural forested areas were converted to agricultural land and plantations of either poplar or black locust.

Interpretation of aerial photographs from 1960 show a significant landscape transformation compared to that of 1945 (Mallinis et al. 2011). A 76.5% decline of the forested areas was observed because of agricultural expansion. This transition increased landscape heterogeneity until 1960, which may have improved pheasant habitat. However, due to increasing changes, the landscape became less heterogeneous over the following years, as agriculture, forestry and grazing practices all intensified.

Today, the main land types in the lower delta are: 1) farmland, intensively cultivated for maize, rice, cotton and asparagus (41.7%); 2) grasslands and shrublands, mainly covered with *Rubus* species (16%); 3) wetland with riparian, ammophilous and halophytic vegetation (16.2%); and 4) remnants of former riparian forest and abandoned plantations of poplar and black locust (12.4%) (Sokos et al. 2004, Mallinis et al. 2011). In some areas, mainly in previous plantations, local tree species have been planted and converted back to natural forest vegetation.

The Nestos Delta is of great ecological significance because it hosts a large number of important ecotopes, offering habitat for many wildlife species. In 1956, the



Figure 3. Aspects of black-necked pheasant habitat at Nestos Delta

region was nominated to become a wildlife refuge and in 1971, it was included in the Ramsar

Convention. The area is also protected by the Bern Convention, the EC Directives (Natura 2000 Network), and hunting is prohibited (Dafis et al. 1997). Moreover, two fences were constructed in 1982 by the Forest Service on each side of the Nestos River for the protection of natural vegetation and pheasants, where grazing is not usually allowed.

Until the 1980s, there were no population estimations available for the species, with only accounts from hunters and forest wardens suggesting high abundances of black-necked pheasants in the area. In 1985, Papageorgiou (1992) mentions that 200-300 black-necked pheasants were found in the Delta. Jerrentrup and Resch (1989) reported that the presence of 50 males in this area. Paralikidis et al. (1997) established that the population size was between 700 – 1050 individuals in the period 1990-1994.

Over the last ten years (2003 - 2012), the population has been monitored using the call count method every May, using 84 systematically selected points to cover the majority of the Delta. During this time, we have counted 31 - 92 cock territories. According to Burger (1966), this means a total spring population of 100 – 250 individuals. In 2003,

we also evaluated whether the Nestos Delta was potential habitat for pheasant using a habitat suitability index (Sokos et al. 2004).

We found that the habitat is degraded or unsuitable in areas where intensive agriculture



Figure 4. Call counts during the spring in Nestos Delta

and grazing are practiced, vegetation is sparse, the soil is infertile and stables and building installations are present. These activities together occupy 85% of the Nestos Delta. In the remaining 15% of the area, the suitability of the habitat is further reduced by the lack of openings into woody vegetation and the advanced succession of herbaceous vegetation (Sokos et al. 2004).

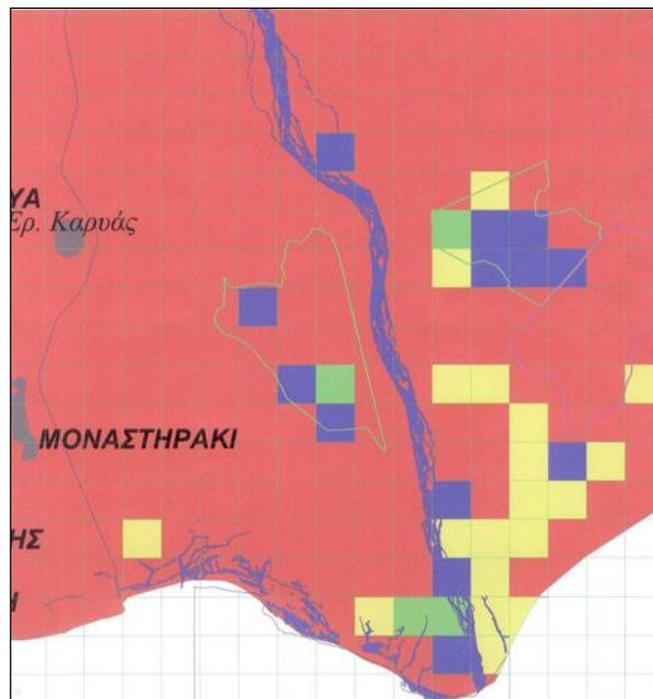


Figure 5. Habitat suitability for pheasant in 183 500 × 500 m surface of the Nestos Delta. The value of the habitat suitability index is Red: 0–0.25 unsuitable, Yellow: 0.26–0.5 degraded, Blue: 0.51–0.75 adequate, Green: 0.76–1 good.

Pheasant predators maintain good populations in the Nestos Delta. These species are wildcat (*Felis silvestris*), beech marten (*Martes foina*) and golden jackal (*Canis aureus*), whilst fox (*Vulpes vulpes*) has low density. Raptors may also cause serious losses. Paralikidis (2005) released 30 captive reared black-necked pheasants in the area equipped with radio transmitters: 50% were eliminated by predators in the first week and 36.67% survived only a month. The main predators were fox and marten with 63.33% and raptors with 23.33%. Moreover, golden jackal, wild boar, corvids and gulls may predate pheasant nests (Paralikidis 2005).

### Conservation actions

The existence of the subspecies only in the Nestos Delta and its low population abundance, place the black-necked pheasant as Critically Endangered on a national level (Handrinos 2009). This unique genetic stock in Nestos Delta is susceptible to numerous threats (e.g. unsuitable habitat, predators, sheep dogs, intensive agriculture, poaching). A population collapse will have consequences as this could result in the extinction of the last indigenous population of black-necked pheasant in Europe, particularly as birds from this population are not reared in captivity.



Figure 6. Female black-necked pheasant found killed in Nestos Delta, probably by beech marten

The Hunting Federation of Macedonia and Thrace has been taking measures to help the species by improving habitat quality in the Nestos Delta, using wardens, monitoring the population and publishing an action plan (Sokos and Birtsas 2005).

These efforts should be encouraged and be combined with re-introduction efforts in areas with suitable habitat and proper management of human activities.



Figure 7. Hybridized black-necked pheasants reared by the Forest Service in Chrysoupoli



Figure 8. Opening of gaps and cereal crops for pheasant habitat improvement in Nestos Delta by the Hunting Federation of Macedonia and Thrace

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### **The Ecological Requirements of the Spotted Wood-quail *Odontophorus guttatus* in Noj K'a'ax Meen Elijio Panti National Park**

Roni Martinez, Conservation Officer, Blancaneaux Lodge, Belize and  
Jack Clinton Eitniear, Director, Center for the Study of Tropical Birds, Inc. USA



*Figure 1. Spotted wood-quail Odontophorus guttatus Photograph by Paul Scarff*

The Spotted wood-quail (SWQ) (*Odontophorus guttatus*; Figure 1) is widespread in forest from Mexico to Panama (Johnsgard 1978-1979). Despite its large range our level of biological knowledge is considered only "fair", with the nest yet to be described (Leopold 1959, Gutierrez and Gutierrez 1997). Information collected through communication with field ornithologists familiar with the species in Belize, the published literature, and information accessible from the Belize Biodiversity Information System indicate that the species is widely distributed throughout broadleaf forest (Meerman and Clabaugh 2012, Eitniear 2004).

As a continuation of our studies on the quail of Belize (Eitniear and Guy 2012, Eitniear et al. 2009) we are documenting the home range (breeding and non-breeding), population