

COTURNIX COTURNIX CONFISA HARTERT 1917 (AVES: PHASIANIDAE), A REAL ENDEMIC SUBSPECIES OR AN ARTIFACT OF SCIENCE?

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With 2 figures and 1 table

ABSTRACT. Based on recent studies about the European Migratory Quail, *Coturnix coturnix coturnix* (L.), and on the analysis of five specimens identified as Madeiran Quail, *Coturnix coturnix confisa* HARTERT 1917, namely migratory status, measurements and plumage pattern, we present some evidences indicating that *C.c.confisa* could be an artifact of science. In fact, the results did not show consistent differences between these two subspecies.

INTRODUCTION

Quails (genus *Coturnix*) are small and widespread grassland adapted old world galliforms. According to JOHNSGARD (1988) eight species are recognized. In one of these species, *Coturnix coturnix* (L.), five subspecies are considered:

C.c.coturnix (L.) 1758, European Migratory Quail.

C.c.confisa HARTERT 1917, Madeiran Quail (includes *C.c.conturbans* HARTERT 1917, Azorian Quail).

C.c.inopinata HARTERT 1917, Cape Vert Quail.

C.c.erlangeri ZEDLITZ 1912, Ethiopian Quail.

C.c.africana TEMMINCK & SCHLEGEL 1849, African Quail.

C.c.confisa, the Madeiran Quail, was described by HARTERT (1912-21) as an endemic subspecies of some Macaronesian islands: Madeira, Canary and Azores. Since then it has been widely accepted as a real subspecies.

This resident subspecies is confined to the higher ground and it is described as smaller and darker than the European Migratory Quail, *C.c.coturnix*.

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More recently, scientific research about Quail has suffered a strong improvement (PUIGSERVER,1991; GUYOMARC'H,1992; FONTOURA & GONÇALVES,1992). This development is fully justified by the declining in numbers of the quail populations all over the world. Meanwhile our knowledge is still far insufficient. By this reason and in order to contribute to a better conservation and management of this species it is considered of great importance the revision of the doubtful taxonomy of the group.

METHODS

The discussion presented in this study is based on some observations carried out in Madeira (DONATO-CAIRES, pers. comm.) and on the morphometric study of five specimens identified as *C.c.confisa* from the "Museu Municipal do Funchal" (one male and four females). The colour, namely the colour of the male throat, and moulting stage has also been analysed.

The results have been compared with similar data obtained in Portugal (mainland) for *C.c.coturnix* (n=87).

A simulation of migration range of these individuals have been made using the programme of PENNYCUICK (1989) based on wing and body measurements, mass and accumulated fat.

RESULTS AND DISCUSSION

Geographic isolation of *C.c.confisa*

One of the main reasons for speciation is geographic isolation. BANNERMAN (1963) and MARTIN (1987) refers the fact that both resident Madeiran Quail and European Migratory Quail could co-exist and possibly interbreed.

The presence of European Migratory Quail in the archipelago, at least in Porto Santo, was referred by BANNERMAN (1963) and PEREIRA (1967).

More recently, some migratory individuals (just arrived) have been seen in Madeira island - Ponta de S. Lourenço, January 1992- and Desertas, March 1992 (DONATO-CAIRES pers. comm.).

In fact, the results of our migratory simulation study showed that, in theory, some european birds could reach the archipelago. For 11.5% of the analysed individuals we have obtained migration ranges over than 860 km, the distance that separates the two regions.

Another reason that we must consider as a cause for speciation is breeding isolation. The available information is very scarce but indicating that the consistence of this hypothesis is poor. Actually, we know that the breeding season of *C.c.coturnix* is very long - March to October - in Portugal (FONTOURA & GONÇALVES, 1994) and that breeding can occur in higher ground - 1200 m (GALLEGO *et al.*,1990).

Different migratory behaviour of *C.c.confisa*

According to HARTERT (1912-21), the absence of migratory behaviour of the Madeiran Quail is one of the main reasons for the consideration as a subspecies.

Nowadays we know that this behaviour is also common to the European Migratory Quail. This fact has been proved by FONTOURA & GONÇALVES (1992) and GUYOMARCH & FONTOURA (1993) that studied the migratory status of the portuguese population during the year of 1991. The authors concluded that the wintering or sedentary population is important - about 30 %. According with MONTOYA & MESON (without date) the fraction of the population carrying the sedentary fenotype tends to increase in suitable habitats.

It must be stressed out that several authors (TAIT, 1924; REIS jr., 1931 and COVERLEY, 1945) said that, in Portugal, two forms could be found:

- A common variety, that arrives from the south during March - April and leaves in November - December (many leave in September).
- A smaller and darker one (according with the observation reported by HARTERT, 1912-21, for the Madeiran Quail) arriving in November and December.

GUYOMARCH & FONTOURA (1993), based on populational studies (density; age-ratio; physiology and morphometry) had arrived to the conclusion that those hypotheses are not consistent.

It must be pointed out that three of the five specimens analysed were youngs (less than one-year old) and presented a blocked moulting stage and two, although preserved, seemed to have a developed fat layer which could translate a migratory behaviour.

Different colour of *C.c.confisa*

At our point of view, the colour, as a single character, is not enough to distinguish subspecies.

GUYOMARCH (pers.comm.), has noted different tonalities of the ruffous chest in *C.c.coturnix* males collected in two Morocco localities which reflects populational variability rather than speciation.

PUIGSERVER (1991) has studied the different coloration of *C.c.coturnix* subspecies by means of light transmittance. No significative differences have been found.

The comparison of the five specimens identified as *C.c.confisa*, from the "Museu Municipal do Funchal" with some of *C.c.coturnix* do not reveal consistent differences (Figure 1 and 2).

An explanation for the colour differences reported by HARTERT (1912-21) and also for the hypothesis of TAIT (1924); REIS jr. (1931) and COVERLEY (1945) could be found on the conclusions of the recent work of SAINT-JALME (1990). Working with specimens kept in captivity, this author had proved that the colour of the males throat is

related to sexual development. During the breeding season the throat becomes more brownish and darker. During sexual resting the throat is white. In wild birds we had also noted this fact.

Different size of *C.c.confisa*

As we have discussed previously, several authors, not only in Madeira but also in Portugal (mainland) referred morphometric differences as a character to distinguish subspecies.

Meanwhile, the results of the study of GUYOMARC'H & FONTOURA (1993) are contradictory in relation to this hypothesis. They concluded that Autumn body measurement analysis (weight; length of the folded wing; tarsus length) do not confirm the existence of distinct subspecies in Portugal. The population structure and the variability of the recorded measurements resemble those of a quail population shot in Spain.

The analysis of the five specimens identified as *C.c.confisa*, that we have done, showed a similar pattern to *C.c.coturnix* (table 1). Concerning this aspect, it must be noted that in the Iberian peninsula it is possible the occurrence of hybridization with *C.japonica* TEMMINCK & SCHLEGEL 1849, produced in captivity and selected for biomass production but released in the wild for game purposes. So, the occurrence of larger individuals must be considered (RODRIGUEZ-TEIJEIRO *et al.* 1993).

PUIGSERVER (1991), had studied the morphometry of specimens belonging to the five subspecies from The British Museum and he had concluded that differences in size are not significant.

We must note that the European Migratory Quail, when preparing for migration, accumulates fat.

The fat individuals will be, naturally, heavier and will seem bigger than the resident ones. This fact could also explain the small size attributed to the Madeiran Quail.

At our point of view we are in presence of an intra and inter-population variability as proved by SAINT-JALME (1990).

CONCLUSIONS

Although the few amount of data available the following conclusions could be drawn:

- Geographical distribution, migratory status, colour and size seemed to be insufficient criteria in order to consider *C.c.confisa* as a real subspecies. In fact, recent advances in the knowledge of the biology of *C.c.coturnix* showed that these differences reported from the beginning of the century are more related with intra and inter-population variability rather than speciation.

- A deeper study using other criteria such as genetic and ethological characteristics, and a revision of the status of the quail in the Archipelago are strongly recommended once the population of this species is declining in numbers. Therefore the elaboration of a conservation strategy is urgent.

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REFERENCES

BANNERMAN, D. A.:

1963. *Birds of the Atlantic Islands*, I. Oliver & Boyd.

COVERLEY, H. W.:

1945. *Bird Notes*, p.183.

FONTOURA, A. P. & GONÇALVES, D.:

1992. Aquisições recentes sobre a demografia e fisiologia da Codorniz (*Coturnix c. coturnix*) em Portugal. Implicações na gestão cinegética. *Calibre 12*, **16**:6-12.

1994. Agricultura e gestão de recursos zoológicos. O caso das populações de Codorniz (*Coturnix c. coturnix*). *Actas da 4ª Conf. Nac. Qual. Ambiente*, **1**: G11-G20. Univ. Nova de Lisboa.

GALLEGO, S.; RODRIGUEZ-TEIJEIRO, J. D. & PUIGSERVER, M.:

1990. Migratoriedad en la Codorniz? *Trofeo*, **240**:37-41.

GUYOMARC'H, J. C.:

1992. Structure, fonctionnement et microévolution des populations de caille des blés (*Coturnix c. coturnix*) dans le Paléarctique Occidental. *Gibier, Faune Sauvage*, **9**: 387-401.

GUYOMARC'H, J. C. & FONTOURA, A. P.:

1993. Structure et statut etho-physiologique des populations hivernantes de cailles des blés au Portugal. *Gibier, Faune Sauvage*, **10**: 119-134.

HARTERT, E.:

1912-21. *Die Vogel der palaarktischen Fauna*, 2.

JOHNSGARD, P. A.:

1988. *The Quails, Francolins and Partridges of the World*, pp.264. Oxford University Press.

MARTIN, A.:

1987. *Atlas de las aves nidificantes en la isla de Tenerife*. Instituto de Estudios Canarios.

MONTOYA, M. & MESON, M.:

(WITHOUT DATE). *La Tortola y la Codorniz en España. Estado actual de estas espécies cinegéticas*. Federacion Española de Caza.

PENNYCUICK, C. J.:

1989. *Bird Flight Performance*. pp. 153. Oxford Science Publications.

PEREIRA, E. C. N.:

1967. *Ilhas de Zargo. I*. Câmara Municipal do Funchal.

PUIGSERVER, M.:

1991. *Contribucion al conocimiento de la biologia y ecoetologia de la Codorniz (Coturnix coturnix)*. Tesi Doctoral. Universitat de Barcelona.

REIS, J. A. JR.:

1931. *Catalogo sistemático e analítico das aves de Portugal*. Porto.

RODRIGUEZ-TEIJEIRO, J. D.; RODRIGO-RUEDA, F. J.; PUIGSERVER, M.; GALLEGRO, S. & NADAL, J.:

1993. Codornices japonesas en nuestros campos. *Trofeo*, 277: 48-52.

SAINT-JALME, M.:

1990. *La reproduction chez la Caille des Blés (Coturnix coturnix). Études experimen: les des cycles saisonniers et de la variabilité interindividuelle*. These de Doctorat. Université de Rennes.

TAIT, W. C.:

1924. *The Birc. of Portugal*. H.F.WITHERBY ed.:227-228



Figure 1 - European Migratory Quail (*C. c. coturnix*) - left side vs Madeiran Quail (*C. c. confisa*) - right side (dorsal view).

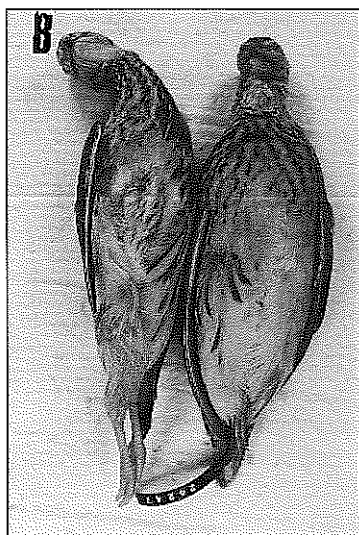


Figure 2 - European Migratory Quail (*C. c. coturnix*) - left side vs Madeiran Quail (*C. c. confisa*) - right side (ventral view).

TABLE 1 - Morphometry of Madeiran Quail (*C.c.confisa*) and European Quail (*C.c.coturnix*). Both sexes have been plotted together on account of the few amount of data available.

Measurements		<i>C. c. confisa</i> (Madeira, n=5)		<i>C. c. coturnix</i> (Portugal, n=79)	
		min	max	min	max.
Body	weight (g)	80.0	90.0	71.8	137.8
	length (cm)	18.0	19.7	16.7	21.1
Wing	length (cm)	10.5	10.9	9.6	11.6
Bill	length (mm)	11.6	12.9	11.0	13.5
	high (mm)	4.1	4.8	4.1	5.5
	width (mm)	3.9	4.6	3.8	6.0
Tarsus	length (mm)	24.0	27.0	22.7	29.9
	diameter (mm)	2.4	2.8	2.2	2.8
Carpus	length (mm)	31.1	36.8	25.3	35.4
Head	with (mm)	11.1	12.2	8.8	13.3
Median finger	length (mm)	22.6	25.0	21.0	26.7