

Coturnix coturnix (Linnaeus, 1758) - the common known bird? Part III. Common quail hybridization aspects

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Abstract. The common quail (*Coturnix coturnix* Linnaeus, 1758) belongs to a genus with a small variety of species, inhabiting a huge area, which has given the opportunity to distinguish several subspecies. An important element for the common quail's population diversity, which is relatively poorly studied, is the possibility of inter-species hybridization and intraspecies crossbreeding. The main scientific focus is in the direction of relationship between common and Japanese quail. The analysis of possible other possibilities of interaction between the different species of the genus *Coturnix* and the separate subspecies gives serious grounds for a far broader consideration of the common quail hybridization issue.

Key words: Common quail, taxonomy, hybridization.

Introduction

The common quail is the most widespread member of the genus, and shows a great variety of subspecies, with possible contact with other *Coturnix* representatives. This is due to the overlap of the common quail distribution area with some of the other genus members (Lukanov 2020). On the other hand, intraspecific contact is possible, especially between the Eurasian one (*C. c. coturnix* Linnaeus, 1758) with other subspecies. There is also a serious problem with the release of domestic quails in many countries within the range of the common quail (EC 2009). These factors rightly raise questions about the possibilities for hybridization and maintenance of genetic purity of some *Coturnix* species, as well as the actual intraspecific diversity in common quail.

Common quail x Japanese quail hybridization problem

The possibility of crossing common quails with Japanese quails (*Coturnix japonica* Temminck & Schlegel, 1848) is one of the serious problems for maintaining the genetic purity of the species (Derégnacourt 2000, Derégnacourt *et al.* 2005, Barilani *et al.* 2005, Huisman 2006, Charaza *et al.* 2010). There are two main possibilities for such crossbreeding: natural hybridization with wild Japanese quails in the areas of common habitat and natural hybridization with domestic quails in the habitat of the common quail. The first possibility is with a minimized human factor, mainly theoretical, and could not have a serious impact on the two wild populations: the common quail and the Japanese quail. The second is far more disturbing, which can occur mainly in two directions, one related to the resettlement of Japanese quails as a hunting ground in some southern European countries, and the other is the accidental or deliberate release of surplus males

from farms to obtain of quail eggs for consumption. The resettlement of domestic quails has been practiced since the second half of the last century in some parts of Europe, where the common quail is a valuable hunting object. The purpose is to hunt them during periods when the number of wild quails is decreasing (EC 2009). Similar practices are known in France, Italy, Greece, Montenegro, Serbia, Romania and Bulgaria (EC 2009, Sanchez-Donoso *et al.* 2012, Nankinov 2016). It has been established that in game breeding farms for quails for resettlement over 85% of the population has a predecessor *Coturnix japonica*, despite the use of the main species *Coturnix coturnix* (Sanchez-Donoso *et al.* 2012). A genetic study conducted in Catalonia (Spain) found that about 5% of all wild quails tested (n = 160) carried genetic material from Japanese quails (Puigcerver *et al.* 2000). Despite the resettlement, there is no tendency to increase the share of Japanese quail or hybrid birds in Spain, with a total share of 4.7% (Puigcerver *et al.* 2007). Another possibility of "contamination" of the genome of wild common quails involves the release of domestic quails, especially redundant males, from farms. It is not to be neglected at all, due to the growth of domestic quail farming over the last three decades, especially in countries part of the range of the common quail. In many European and Asian countries (Spain, Portugal, Italy, France, Ukraine, Russia, Turkey, China, India and others) there is a serious quail farming. In recent years, one of FAO's programs to tackle hunger in the world's poorest regions has been to fund non-profit-oriented quail farming, the main beneficiaries of which are mainly African countries (OECD/FAO 2016).

Other hybridization opportunities

It seems that the main focus is on the common quail in Europe and especially the hybridization of the Western European part of the population with the Japanese quail. In fact, in continental Europe this is the main opportunity for inter-species crossbreeding. This is not the case with the common quail in Africa and Asia. Crossbreeding can occur between the common quail and the harlequin quail (*Coturnix delegorguei* Delegorgue, 1847) found in Africa (bbb.vingolato.be). Although there is no confirmed hybridization between the rain quail (*Coturnix coromandelica* Gmelin, 1789) and the common quail, the appearance of such hybrids in the areas of natural overlap of their habitats is possible (McCarthy 2006). At this point, the possibility of crossing wild quail from different species of *Coturnix*, has significant ambiguities. Such a wider exchange of genetic material between species in areas of common habitat could be studied using modern methods of genetic analysis of wild populations inhabiting Europe, Asia and Africa.

Intra-species crossing

Another interesting point that still lacks serious debate is about the individual subspecies of *Coturnix coturnix*, the possibilities for subspecies crosses and their actual existence. In common habitat areas of the two African subspecies there is a possibility for their meeting with the Eurasian subspecies, which may lead to their crossing (Lukanov 2020). Island populations are also not completely isolated. There is an opportunity for them to meet with the main subspecies, and even with Japanese quails (Puigcerver *et al.* 2001).

Conclusion

Common quail hybridization has been studied too one-sidedly, emphasizing mainly the influence of Japanese (domestic) quails on the Western European population of the species. It is desirable to pay attention to the rest of the population living in Africa and Southeast Asia, where there is the opportunity of contact with other members of the genus. The possibilities for the exchange of genetic material between representatives of individual subspecies of common quail calls into question the intra-specific taxonomy.

References

- Barilani, M., Deregnacourt S., Gallego S., Galli L., Mucci N., Piombo R., Puigcerver M., Rimondi S., Rodrigues-Teijero J., Spanò S. & Randi E. (2005) Detecting hybridization in wild (*Coturnix c. coturnix*) and domesticated (*Coturnix c. japonica*) quail populations. *Biological Conservation*, 126: 445-455.
- Charaza, O., Minvielle, F., Roux D., Bed'hom, B., Fève, K., Coville, J., Kayang, B., Lumineau, S., Vignal, A., Boutin, J. & Rognon, X. (2010) Evidence for introgressive hybridization of wild common quail (*Coturnix coturnix*) by domesticated Japanese quail (*Coturnix japonica*) in France. *Conservation Genetics*, 11: 1051-1062.
- Derégnaucourt, S., Guyomarc'h, J. & Belhamra, M. (2005) Comparison of migratory tendency in European quail *Coturnix c. coturnix*, domestic Japanese quail *Coturnix c. japonica* and their hybrids. *Ibis*, 147: 25-36.
- Derégnaucourt, S. (2000) *Hybridation entre la Caille des blés (Coturnix coturnix coturnix) et la Caille japonaise (Coturnix coturnix japonica). Mise en évidence des risques de pollution génétique des populations naturelles par les cailles domestiques*. Ph.D. Thesis, University of Rennes, France, 260 pp. (In French).
- EC (European Commission) (2009) *Common quail Coturnix coturnix. European Union Management Plan 2009-2011*. Natura 2000, Luxembourg: Office for Official Publications of the European Communities, 71 pp.
- Huisman, J. (2006) *Hibridization between European quail (Coturnix coturnix) and released Japanese quail (C. japonica)*. Degree project in biology, Biology Education Centre and Department of Evolutionary Biology, Uppsala University, 22 pp.
- Lukanov, H. (2020) *Padpadatsite ot rod Coturnix v prirodata i selskoto stopanstvo*. Alfa Visia, Stara Zagora, Bulgaria, 154 pp. (In Bulgarian).
- McCarthy, E. (2006) *Handbook of Avian Hybrids of the World*. Oxford University Press. New York.
- Nankinov, D. (2016) *Padpadakat (Coturnix coturnix) – unikalna ptitsa i populyaren loven objekt*. Sofia, 52 pp. (In Bulgarian).
- OECD/FAO (2016) *OECD-FAO agricultural outlook 2016-2025*. Paris: OECD Publishing, 136 pp.
- Puigcerver, M., Gallego S., Rodríguez-Teijeiro J., D'Amico S. & Randi E. (2000) Hybridization and introgression of Japanese Quail mitochondrial DNA in common quail populations: a preliminary study. *Hungarian Small Game Bulletin*, 5: 129-136.
- Puigcerver, M., Rodríguez-Teijeiro J. & Gallego S. (2001) The problem of the subspecies in *Coturnix coturnix* quail. *Game and Wild Science*, 18 (3-4): 561-572.
- Puigcerver, M., Vinyoles D. & Rodríguez-Teijeiro J. (2007) Does restocking with Japanese quail or hybrids affect native populations of common quail *Coturnix coturnix*? *Biological Conservation*, 136 (4): 628-635.
- Sanchez-Donoso, I., Vilà C., Puigcerver M., Butkauskas D., Caballero de la Calle J., Morales-Rodríguez P. & Rodríguez-Teijeiro J. (2012) Are farm-reared quails for game restocking really common quails (*Coturnix coturnix*)?: A Genetic Approach. *PLoS ONE*, 7 (6): e39031.