

# Records of Great Bustards *Otis tarda* in the Balearic Islands during the 19th century

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This note reviews the historical information available concerning the irregular occurrence during winter of the Great Bustard *Otis tarda* in the Balearic Islands. It also documents the presence of the species on the island of Menorca in the 19th century (an adult female or an immature male in December 1807 and another on January 1830) based on an unpublished manuscript by Josep Sanxo. The analysis of observations within the biogeographical context of winter irruptions by central European Great Bustards suggests that this region is the probable origin of these vagrant birds in the Balearic Islands.

Key words: Great Bustard, *Otis tarda*, winter occurrence, 19<sup>th</sup> century, Menorca, Balearic Islands.

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The Great Bustard *Otis tarda* is a Palaearctic bird found in steppe zones whose distribution in Europe has declined since the 18th century (Collar 1985, Del Hoyo *et al.* 1996, Chan & Goroshko 1998). Its Asiatic populations of the subspecies *Otis tarda dybowski*, as well as most of the oriental ones of the nominal subspecies *Otis tarda tarda*, are migratory (Cramp & Simmons 1980, Potapov & Flint 1989). Although traditionally the species' western and southern populations are considered to be sedentary (Glutz *et al.* 1973, del Hoyo *et al.* 1996), recent studies have revealed that it is partially migratory in the Iberian Peninsula, where sedentary and migratory individuals of both sexes coexist in the same populations (Alonso *et al.* 2000, 2001, 2009; Morales *et al.* 2000). On the other hand, the Central European populations perform facultative movements of varying distance that are associated with harsh winters and heavy snow (Hummel & Berndt 1971, Dornbusch 1981, Hummel 1983a, b, 1990; Faragó 1990). The range of these movements is very variable and birds disperse in

harsh winters to almost all western and southern European countries including Denmark, Belgium, Great Britain, France, Italy and Greece (Gewalt 1959, Joiris *et al.* 1963, Moltoni 1968, Hummel 1985, 1990). However, research done by Palacín (2007) in Spain on the migratory behaviour of this species in the Iberian Peninsula provides no data regarding the presence of Great Bustards outside their traditional winter quarters.

The objectives of the present note are as follows: 1) to discuss the presence in winter of the Great Bustard in the 19th century in the Balearic Islands and 2) to analyse the winter observations of this species within the biogeographical context of irruptive movements of central European Great Bustards.

## Material and Methods

In the literature review, various catalogues, inventories and local publications (both national

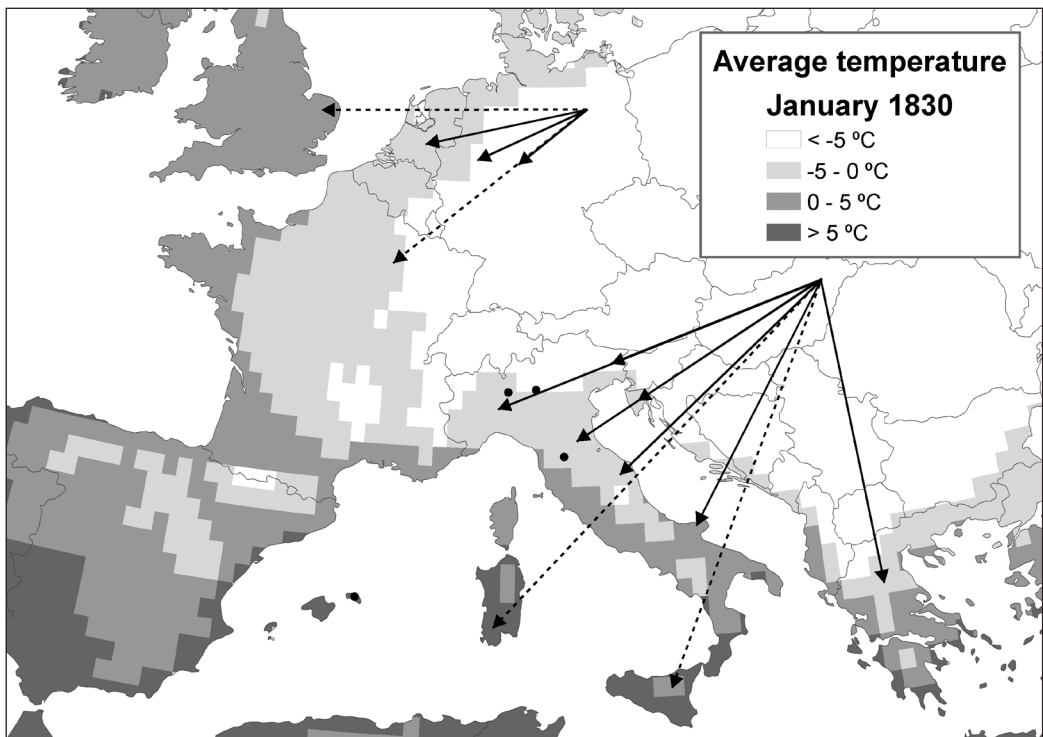
and international) were consulted, of which of particular importance was the journal *Ibis*. All issues of *Ibis* from 1859 onwards were examined, along with various treatises of European ornithology dating from the 19th and 20th centuries. The unpublished work *Memories for the Natural History of the island of Minorca* (Sanxo ca. 1845) and its first draft written in Catalan in 1814 were also reviewed.

The author's manuscript, Josep Sanxo i Sanxo (1776–1847) –also known by the Spanish spelling of his name as *Sancho*– was priest of the Santa Maria de Maó parish (Menorca). He was a prolific writer and historian (Martín 2005, Vidal 2006) and one of his works is the extensive and unpublished *Natural History of the island of Minorca* (Sanxo ca. 1845) written in Spanish, which collated records from 1780

until November of 1845. Sanxo was rigorous in his scientific writings, a good observer and meticulous with the details and origin of each observation he recorded, most of which came from hunters and local informers.

## Results

The results of the historical review carried out provide little information about the presence of Great Bustards in the Balearic Islands. The most recent catalogue of the birds of the Balearic Islands is the collective work published by the GOB (2011), in which the Great Bustard is not present despite this publication's collation of all the records of wild bird species since 1801. From a much earlier period, Florit *et al.* (1989) report



**Figure 1.** Average temperature recorded in Europe in January 1830 and winter migration patterns of Great Bustards from eastern Germany and Hungary (taken from Streich *et al.* 2006). The dotted lines represent the accidental observations registered at extreme distances from breeding populations; the dots correspond to records in the winter of 1830 for Italy (Moltoni 1968) and Menorca.

*Promedio de temperaturas registradas en Europa en enero de 1830 y direcciones de migración invernal de avutardas procedentes de Alemania oriental y Hungría (tomadas de Streich et al. 2006). Las líneas punteadas corresponden a observaciones accidentales registradas a distancias extremas, y los puntos a las citas del invierno de 1830 en Italia (Moltoni 1968) y en Menorca.*

a Great Bustard fossil at Es Pouàs in Ibiza from the Upper Pleistocene.

Sanxo (*ca.* 1845) mentions the presence of a specimen of Great Bustard from Menorca from December of 1806 or 1807, which, due to its size, must have been either an adult female or an immature male, and a second record in January 1830. The original description states: *Solamente tengo noticia de una muerta en Deziembre de 1806, o, 1807. Era de la grosaria de una polla de India, y pesó 13 terzas [5,2 kg]. El color era de cenisa blanquesina, el vientre blanco, las alas y espaldas con rayas negras, y roxas, el plumaje pequeño rubio, o, de rosa (...)* En el mismo Invierno riguroso de 1830 en el mes de Enero mataron otra.

The ornithological monographs of Menorcan birds (Muntaner & Congost 1984 and Escandell 1997) do not mention the Great Bustard even though Escandell (1997) had access to J. Sanxo's works.

According to the climatic reconstruction by Luterbacher *et al.* (2004), the 19th century in Europe was the coldest century of the second half of the millennium and coincided with the end of the period generally known as the Little Ice Age. Specifically, the month of January of 1830 was especially harsh in central and eastern Europe. Figure 1 shows a map of Europe with the mean January temperatures for that year taken from a model by Casty *et al.* (2007). Also indicated are the winter migratory patterns of Great Bustards from eastern Germany and Hungary (Streich *et al.* 2006), as well as the locations of the specimens found on Menorca (Sanxo *ca.* 1845) and observations made in Italy in the winter of 1830 (Moltoni 1968). The latter records correspond to a male and a female in Brescia, an adult male in Florence, and two other specimens from Porta-Tosa di Milan, all of them presumably Central European in origin as the Great Bustard was by then extinct in Italy. Based on the climate reconstruction of Casty *et al.* (2007), the European maps of temperature and precipitation for December 1806 and December 1807 are compared with the climatological patterns of periods in which Great Bustards were recorded in the Mediterranean (e.g. January 1935, January 1871 and January 1885). The review of these cartographic patterns suggests that the winter irruption into Menorca occurred in December of 1807.

Various authors have described the westward or south-westward migration of central Euro-

pean Great Bustards in extremely hard winters (Hummel & Berndt 1971, Hummel 1983a, b, 1985, 1990; Farago 1990). For instance, Hummel & Berndt (1971) describe how in the winter of 1969–70 around 300 Great Bustards, mostly from eastern Germany, were seen in the north-west of Germany and Holland, with some birds even reaching the German region of Bavaria, Denmark, Scotland and France.

Records of dispersive movements were especially frequent in the 19th century, which is consistent with the severity of the winters in that period, as postulated by Luterbacher *et al.* (2004). Thus, Hartert *et al.* (1912) note the arrival in the British Isles of important contingents of bustards in the winters of 1870–71, 1879–80 and 1890–91, periods in which many individuals were also recorded in Belgium (van Havre 1928) and in the Indre region in central France (Martin & Rollinat 1912). In Italy, a large number of observations are available from these periods, above all from north (see Moltoni 1968). The most remote winter locations for Central European bustards correspond to the islands of Sardinia (Moltoni 1968) and Malta, where Great Bustards have been seen on a number of different occasions (Despott 1917). The nearest records to Spain of central European Great Bustards (besides those of Sardinia) correspond to birds recorded in Nice (Gurney 1901) and La Camargue (Glegg 1943, Blondel & Isenmann 1981) in Mediterranean France.

## Discussion

Two of the factors that determine the tendency to undertake dispersive movements in winter are sex and age since females and immature individuals are more likely to migrate than adult males (Ludwig 1983). In their study of factors that trigger facultative winter movements in Great Bustards, Streich *et al.* (2006) concluded that heavy snow affects this species' energetic balance, in part by limiting access to food, but also due to the fact that bustards' plumage lack an uropygial gland and so these birds are unable to adequately waterproof their feathers. According to these authors, this factor together with the smaller size of females would explain their tendency to undertake more facultative migrations in winter. In addition, Dornbusch

(1987) indicates that females generally disperse further than males and describes the case of a female bustard ringed at the German breeding station of Steckby that travelled 640 km west-southwest to Reims (France). The greatest-ever distance recorded for migration in Europe by a Great Bustard corresponds to a female ringed in spring 1999 in the Russian region of Saratov that was recovered in October in the south of Ukraine having travelled 1,000 km west-south-westwards in four days (Watzke *et al.* 2001). In China, Great Bustards are known to disperse up to 2,000 km (Del Hoyo *et al.* 2013). Although we have no record of the sex of the bird captured on Menorca in 1830, the bustard killed in 1807 was almost certainly a female or an immature male, which gives further credit to the ideas outlined above.

The records in 1830 from Italy and Menorca (Fig.1), two locations whose geographical positions coincide with the known direction of movements of central European Great Bustards in severe winters, is the best evidence for the presence in winter of central European Great Bustards in Spain. Another argument that supports the presence of central European Great Bustards in the Balearic Islands is the geographic position of Menorca, the most north-easterly island and the nearest island to central Europe. The most important European population of this species is in Spain, where it is widely distributed (Del Hoyo *et al.* 2013). If the Balearic birds had come from the Iberian Peninsula, we would expect records from Ibiza and Mallorca because of their geographical proximity to the continent and their larger surface area that would make them better target for errant individuals. Indeed, Mallorca and Ibiza cover a total of 4,211 km<sup>2</sup> as opposed to the 702 km<sup>2</sup> of Menorca. As well, Mallorca had a much more extensive tradition of ornithological literature than Menorca in the 19th and 20th centuries. Nevertheless and in spite of these considerations, there is still a lack of records of Great Bustard from these other Balearic Islands.

Finally, Menorca is in a favourable geographical position for receiving birds dispersing from France. The Great Bustard bred in France up to 1863 (Birdlife International 2013) and so the records of Great Bustard on Menorca from 1807 and 1830 could refer to French birds. However, the temperature map of 1830 (Figure 1) suggests that central Europe suffered from a much harsher winter in that year than France. In addition,

the French Great Bustard population was much smaller than the Spanish and central Europe populations (Del Hoyo *et al.* 2013).

## Resum

### Citacions de Pioc Salvatge *Otis tarda* a les Illes Balears durant el segle XIX

Es revisa la informació històrica disponible sobre la presència hivernal del Pioc Salvatge *Otis tarda* a les illes Balears, i basada en (Sanxo *ca.* 1845), documenta la seva presència en el segle XIX a l'illa de Menorca (una femella adulta o un mascle immadur el desembre de 1807, i un altre exemplar el gener de 1830). També l'anàlisi de les observacions en el context biogeogràfic de les fugides per fredorades hivernals dels Plocs centreeuropeus suggereixen Centreeuropa com a possible origen dels exemplars.

## Resumen

### Citas de Avutarda *Otis tarda* en las Islas Baleares durante el siglo XIX

Se revisa la información histórica disponible sobre la presencia invernal de la Avutarda Común *Otis tarda* en las islas Baleares, y basada en (Sanxo *ca.* 1845), documenta su presencia en el siglo XIX en la isla de Menorca (una hembra adulta o un macho inmaduro en diciembre de 1807, y otro ejemplar en enero de 1830). Además, el análisis de las observaciones en el contexto biogeográfico de fugas de tempero de avutardas centroeuropeas sugiere a Centroeuropa como posible origen de los ejemplares.

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## References

- Alonso, J.C., Morales, M.B. & Alonso, J.A. 2000. Partial migration, and lek and nesting area fidelity in female Great Bustards. *Condor* 102: 127-136.
- Alonso, J.C., Palacín, C., Alonso, J.A. & Martín, C.A. 2009. Post-breeding migration in male great bustards: low tolerance of the heaviest Palaearc-

- tic bird to summer heat. *Behavioral Ecology and Sociobiology*. DOI: 10.1007/s00265-009-0783-9.
- Alonso, J.A., Martín, C.A., Alonso, J.C., Morales, M.B. & Lane, S.J.** 2001. Seasonal movements of male Great Bustards in Central Spain. *J. Field Ornithol.* 72: 504–508.
- BirdLife International.** 2013. Species factsheet: *Otis tarda*. Available on line at: <http://www.birdlife.org>
- Blondel, J. & Isenmann, P.** 1981. *Guide des oiseaux de Camargue*. Neuchâtel-Paris: Delachaux et Niestlé
- Casty, C., Raible, C.C., Stocker, T.F., Wanner, H. & Luterbacher, J.** 2007. A European pattern climatology 1766-2000. *Climate Dynamics* 29 (7-8): 791–805.
- Collar, N.J.** 1985. The world status of the Great Bustard. *Bustard Studies* 2: 1–20.
- Chan, S. & Goroshko, O.** 1998. *Action Plan for the Great Bustard Otis tarda in Asia*. Tokyo: BirdLife International.
- Cramp, S. & Simmons, K.E.L.** (eds.). 1980. *The Birds of the Western Palearctic*. Vol 2. Oxford: Oxford University Press.
- Del Hoyo, J., Elliott, A., & Sargatal, J.** 1996. *Handbook of the Birds of the World*. Vol. 3. Barcelona: Lynx.
- Del Hoyo, J. (ed.)** 2013. Species factsheet: *Otis tarda*. *Handbook of the Birds of the World. Alive*. Available on line at: <http://www.hbw.com>
- Despott, G.** 1917. Notes on the Ornithology of Malta. *Ibis* IV: 466–526.
- Dornbusch, M.** 1981. Bestand, Bestandsförderung und Wanderungen der Großtrappe (*Otis tarda*). *Naturschutzarbeit Berlin-Brandenburg* 17: 22–24.
- Dornbusch, M.** 1987. Zur Dispersion der Grosstrappe (*Otis tarda*). *Berichte der Vogelwarte Hiddensee* 8: 49–54.
- Escandell, A.** 1997. *Atles dels ocells nidificants de Menorca*. Maó: GOB Menorca.
- Farago, S.** 1990. The effect of heavy winters on Bustard (*Otis tarda*) populations in Hungary. *Alatt Közl* 76: 51–62.
- Florit X., Mourer-Chauviré C. & Alcover J.A.** 1989. Els ocells pleistocènics d'es Pouàs, Eivissa. Nota preliminar. *Butll. Inst. Cat. Hist. Nat.* 56 (Sec. Geol., 5): 35–46.
- Gewalt, W.** 1959. *Die Großtrappe*. Wittenberg: A. Ziemsen Verlag.
- Glegg, W.E.** 1943. The Birds of l'Ile de la Camargue et la Petite Camargue.- Early Records. *Ibis* 85: 300–307.
- Glutz, U.N., Bauer, K.M. & Bezzel, E.** 1973. *Handbuch der Vögel Mitteleuropas*, vol. 5. Frankfurt am Main: Akademische Verlagsgesellschaft.
- GOB.** 2011. Annex II: Estatus de l'avifauna balear. *Anuari ornitològic de les Balears* 25: 259–270
- Gurney, J.H.** 1901. On the ornithology of the Var and the adjacent districts. *Ibis* 3: 361–407.
- Hartert, E. Jourdain, F.C.R., Ticehurst, N.F. & Witherby, H.F.** 1912. *A Hand-list of British Birds*. London: Witherby.
- Hummel, D.** 1983a. Der Einflug der Großtrappe (*Otis tarda*) nach West-Europa im Winter 1978/79. *Vogelwelt* 104: 41–53.
- Hummel, D.** 1983b. Der Einflug der Großtrappe (*Otis tarda*) nach West-Europa im Winter 1978/79. *Vogelwelt* 104: 81–95.
- Hummel, D.** 1985. A note on the invasion of western Europe by the Great Bustard in the winter seasons 1969/1970 and 1978/1979. *Bustard Studies* 2: 75–76.
- Hummel, D.** 1990. Der Einflug der Großtrappe *Otis tarda* nach West-Europa im Winter 1986/87. *Limicola* 4: 1–21.
- Hummel, D. & Berndt, R.** 1971. Der Einflug der Grosstrappe (*Otis tarda* L.) nach West-Europa im Winter 1969/70. *J. Ornithol.* 112(2): 138–157.
- Joiris, Cl., Rappe, A. & Devillers, P.** 1963. Observation de l'Outarde barbue, *Otis tarda*, Linné, en Belgique pendant l'hiver 1962-63. *Le Gerfaut* 53: 323–333.
- Ludwig, B.** 1983. Bestandsentwicklung, Ökologie und Schutz der Großtrappe (*Otis tarda* L.) in der Notte-Niederung. *Naturschutzarbeit in Berlin und Brandenburg* 6: 16–28.
- Luterbacher, J., Dietrich, D., Xoplaki, E., Grosjean, M. & Wanner, H.** 2004. European seasonal and annual temperature variability, trends, and extremes since 1500. *Science* 303: 1499–1503.
- Martín Martínez, F.X.** 2005 "Josep Sancho i Sancho (1776-1847)", *Enciclopèdia de Menorca*. Vol 5, Vertebrats. Mahón: Ed. Obra Cultural de Menorca.
- Martin, R. & Rollinat, R.** 1912. *Description et Mœurs des Mammifères, Oiseaux, Reptiles, Batraciens et Poissons de la France Centrale*. Paris: Éditions Lechevalier.
- Moltoni, E.** 1968. Notizie sull'Otarda, L.- in Italia. *Rivista Italiana di Ornitologia* 38: 223–234.
- Morales, M.B., Alonso, J.C, Alonso, J.A. & Martín, E.** 2000. Migration patterns in male Great Bustards (*Otis tarda*). *Auk* 117: 493–498.
- Muntaner, J. & Congost, J.** 1984. *Avifauna de Menorca*. Treballs del Museu de Zoologia 1. 2ª edició. Barcelona: Museu de Zoologia.
- Palacin, C.** 2007. *Comportamiento migratorio de la Avutarda Común en la Península Ibérica*. Tesis doctoral. Madrid: Universidad Complutense.
- Potapov, R.L. & Flint, V.E.** (eds.). 1989. *Handbuch der Vögel der Sowjetunion*, vol. 4. Wittenberg: A. Ziemsen Verlag.
- Sanxo, J.** circa 1845. *Memoria para la Historia Natural de la isla de Menorca compuesta por el Dr. Josep Sancho Pbro. y Beneficiado de la Parroquia de la Junta de Mahón*. Tomo 2º. *Contiene las aves*. Año 1822. Manuscript preserved in the seminar library of Ciutadella (Menorca).
- Smith, A.C.** 1892. Smith on the Great Bustard in Wilts. *Ibis* IV: 574.
- Streich, W.J., Litzbarski, H., Ludwig, B. & Ludwig, S.** 2006. What triggers facultative winter migration of Great Bustard (*Otis tarda*) in Central Europe? *European Journal of Wildlife Resources* 52: 48–53.
- Van Havre, G.** 1928. *Les Oiseaux de la Faune Belge*. Bruxelles: Lamertin.
- Vidal Hernández, J.M.** 2006. Els naturalistes locals i la biologia marina al segle XIX. In P. Oliver (ed.): *La recerca marina a les illes Balears. Els orígens de l'oceanoografia espanyola*. Govern de les Illes Balears
- Watzke, H. Litzbarski, H., Oparina, O.S. & Oparin, M.L.** 2001. Der Zug von Großtrappen *Otis tarda* aus der Region Saratov (Russland) - erste Ergebnisse der Satellitentelemetrie im Rahmen eines Schutzprojektes. *Vogelwelt* 122: 89–94.