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Short communications - *Brevi note*

The multidimensional value of long-term individual-based studies: more than lots of data

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With the present rate of biodiversity loss and the profound effects of global changes, population and conservation ecologists face new questions (Oro 2013). Many of these are related to how fast individuals can adapt to the strength and pace of environmental variability and can only be answered using individual data collected over long-term (Long Terms Individual Based Studies; Clutton-Brock & Sheldon 2010). Here, we argue that the value of LTIBS is multidimensional and it grows steadily with time. Beside the scientific values, a 20-30 years study is likely to have trained several generations of scientists, fostered collaborations between a large number of research institutes and promoted public awareness on scientific themes and wildlife conservation problems. With current public systems providing funds for 3 to 4 years, it is increasingly difficult to initiate and maintain a long-term individual based study. As a consequence, many field studies end before time, without reaching the number of years or the amount of data needed to meet current scientific challenges and to demonstrate their educational value.

How and when does a long-term field study become important? Even though finding a metric that captures the multiple values of a long-term study is difficult, we tried to answer this question by analyzing the progression of three real LTIBS on bird species: Greater Flamingos Phoenicopterus roseus (Johnson 1970), Storm Petrels *Hydrobates pelagicus* (Mínguez 1994) and Audouin's gulls *Larus audouinii* (Oro & Martinez 1992; Table 1). We considered two simple measures: the scientific production, measured as the yearly average impact factor (AIF) of papers in SCI journals, and the 'educational' value, measured as the cumulative number of new authors in these publications (CNNA). For each study we also recorded the number of volunteers who participated in ringing operations and in ring resightings. For the analysis we considered the period from the first publication on SCI journal to 2012. We calculate the AIF and CNNA for 2014 to validate predictions. The three studies considered showed a similar temporal pattern in scientific output (Fig. 1). The observed AIF in 2014 confirmed the positive trends with an average yearly linear increase of 9.5%, which is above the 3.4% calculated for papers published in biological journals (Karageorgopoulos *et al*. 2011). The increase in the AIF is likely the consequence of addressing questions of more general interest, partially reflected in the continuously increasing number of new authors (Table 1). By 2012 more than 80 different scientists have been involved in studying the Flamingos and the Audouin's gulls and more than 30 the Storm petrel with an average annual increase of new collaborators of 22% per year. But the value of LTIBS goes beyond the strictly academic metrics: 2830 different volunteers have collaborated with at least one of the study (59

Table 1. Metrics of LTIBS. AIF = average impact factor per year.

Species	**Location** (Country)	Years	SCI Publications	AIF	Number of co-authors	Number of volunteers involved in ringing
Greater Flamingo	Camargue (France)	1966-2012	56	1.74	84	1452*
Storm Petrel	Benidorm Is. (Spain)	1994-2012	24	2.10	31	312
Audouin's gull	Ebro Delta (Spain)	1992-2012	65	2.12	85	1066

* from 2002

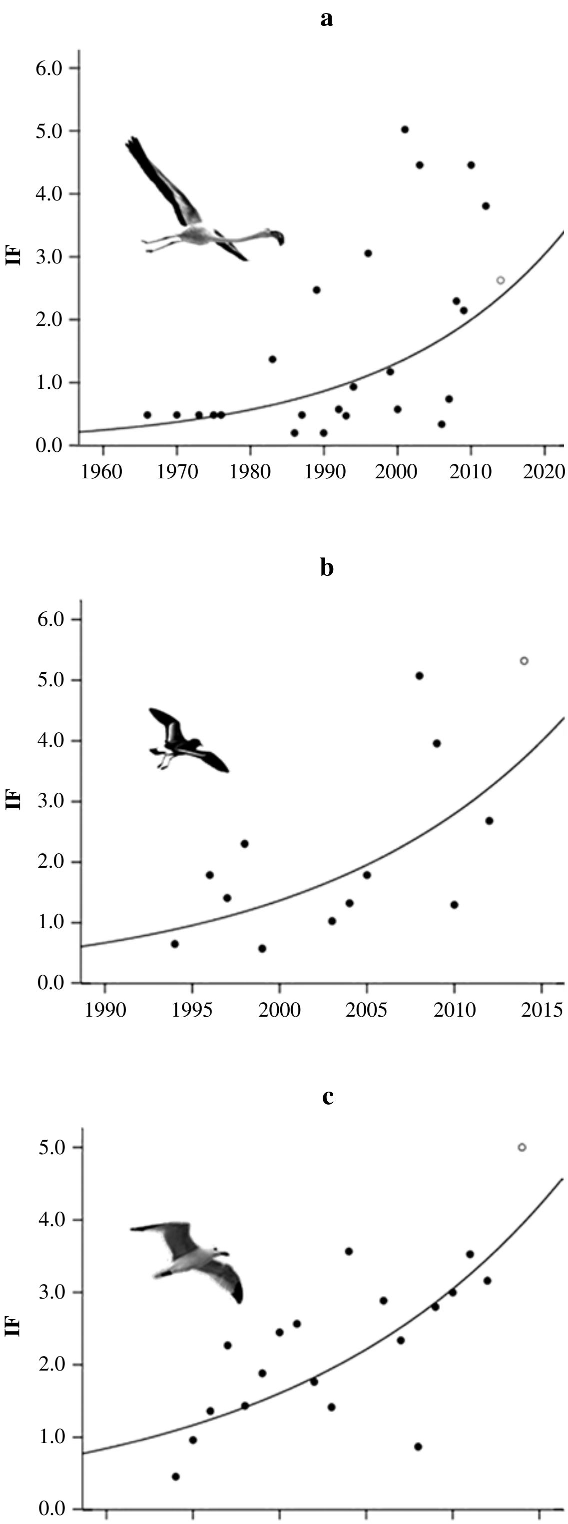

Figure 1. Average impact factors of publications for Greater Flamingos (**a**), Storm petrel (**b**) and Audouin's gull (**c**). The white dot (2014) was not considered in the exponential model (solid line).

per year, Table 1) and, since 1977, 4445 different persons worldwide have reported the resighting of the ring of a Flamingo born in the Mediterranean. Other actual dimensions of LTIBS such as the number of articles in journals other than SCI, the number of Ph.D. thesis completed, documentary films and citizen science projects have not been quantified here. Citizen-science projects in particular are now playing an important role in large-scale and long-term ecological studies (Silvertown 2009). There are of course other long-term detailed studies available at different geographical locations, for different periods and on different taxa (e.g. Clutton-Brock & Sheldon 2010 and references therein). We expect however results to be similar to those found here across many of these studies.

National and international networks (e.g., the Long Term Ecological Research), or institutions (e.g., Societé Française d'Ecologie, the Centre for Population Biology or the European Science Foundation) are now promoting LTIBS. However, long-term funding is still a major challenge and nearly all LTIBS are or have been threatened by extinction (Mills *et al*. 2015) . We do not suggest financing LTIBS by ceasing to promote short-term ones, but the multidimensional values of long-term studies should be recognized and better considered. Swaisgood *et al*. (2010) envisage a funding method to maintain alive those projects that are too valuable to be ended, but this would need a change in the funding system that most countries are unwilling to make. In this scenario, existing long-term detailed datasets should be treasured. They represent an 'insurance policy' to face forthcoming scientific challenges and an invaluable educational tool.

This text is in honor of Dr. Alan Roy Johnson (1941-2014, Photo), Dr. Heinz Hafner (1940-2003) and other pioneers of LTIBS. By focusing the attention on the multidimensional value of LTIBS we aimed to pay a tribute to them and to those people who, thanks to their passion, personal sacrifices and tenacity are keeping alive these projects.

REFERENCES

Clutton-Brock T. & Sheldon B.C., 2010. "Individuals and Populations: The Role of Long-Term, Individual-Based Studies of Animals in Ecology and Evolutionary Biology." Trends in Ecology & Evolution, Special Issue: Long-term ecological research, 25 (10): 562–73.

Karageorgopoulos D.E., Lamnatou V., Sardi T.A., Gkegkes I.D. & Falagas M.E., 2011. Temporal Trends in the Impact Factor of European versus USA Biomedical Journals. PLoS ONE 6 (2): e16300. doi:10.1371/journal.pone.0016300.

Mills J.A., Teplitsky C., Arroyo B., Charmantier A., Becker P.H., Birkhead T.R., Bize P., Blumstein D.T., Bonenfant C., Boutin S., Bushuev A., Cam E., Cockburn A., Côté S.D., Coulson J.C., Daunt F., Dingemanse N.J., Doligez B., Drummond H., Espie R.H., Festa-Bianchet M., Frentiu F., Fitzpat-

Photo 1. Dr. A. Johnson during the annual ringing of Greater flamingoes (photo: Hervé Hôte).

rick J.W., Furness R.W., Garant D., Gauthier G., Grant P.R., Griesser M., Gustafsson L., Hansson B., Harris M.P., Jiguet F., Kjellander P., Korpimäki E., Krebs C.J., Lens L., Linnell J.D., Low M., McAdam A., Margalida A., Merilä J., Møller A.P., Nakagawa S., Nilsson J.Å., Nisbet I.C., van Noordwijk A.J., Oro D., Pärt T., Pelletier F., Potti J., Pujol B., Réale D., Rockwell R.F., Ropert-Coudert Y., Roulin A., Sedinger J.S., Swenson J.E., Thébaud C., Visser M.E., Wanless S., Westneat D.F., Wilson A.J. & Zedrosser A., 2015. Archiving Primary Data: Solutions for Long-Term Studies. Trends in Ecology & Evolution 30 (10): 581–89.

Mínguez E., 1994. Censo cronología de puesta y éxito reproductor del paiño común (*Hydrobates pelagicus*) en la Isla de Benidorm (Alicante E de España). Ardeola 41: 3-11.

Oro D. & Martinez A., 1992. The Audouin's gull (*Larus audouinii*) colony at the Ebro Delta. Avocetta 16: 98-101.

Oro D., 2013. Grand Challenges in Population Dynamics. Population Dynamics 1: 2.

Silvertown J., 2009. A new dawn for citizen science. Trends in Ecology & Evolution 24: 467–471.

Swaisgood R.R., Terborgh J.W. & Blumstein D.T., 2010. Funding Should Come to Those Who Wait. Science 329 (5989): 276.

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Sighting and unusual behaviour of a short-billed Woodcock *Scolopax rusticola* in Oslo Fjord (Norway)

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During an ornithological survey of the inner Oslo Fjord from Rolfstangen in Akershus county, to the west of Oslo, on 23th October 2013 one of the authors (Rix) had an interesting sighting, which is reported here.

A brown coloured bird was seen flying out low over the water with a Crow *Corvus* sp. chasing it. At first it looked like a Sparrowhawk, but then the brown bird splashed down into the sea, an unusual behaviour for a Sparrowhawk. Through the binoculars it was clearly identified as a Woodcock *Scolopax rusticola*, but this was not normal behaviour for that species either. The bird sat on the water for a few minutes and then managed to take off and flew low and weakly towards land. It disappeared into a small bay not far from the viewing point and a couple of Crows started calling and had clearly seen it. The two Crows flew up from the water's edge ahead but it was not possible to see anything else, as the view was obstructed by a rocky outcrop. A short while later a couple of brown feathers were noticed in the water. Climbing down towards the water there was this amazing view of the Woodcock cowering at the water's edge and visibily shaken but still alive. This bird was clearly not in good shape and had a bill that was only half the length it should be. At the attempt to pick it up, it tried to swim away, but clearly was not liking it. It came back into land, adopted a strange posture with its tail raised and allowed to be handed and picked up. It was extremely light and thin and not in a good shape. Soon after it was placed under a thorny bush, safe from the Crows. It was still there 30 minutes later but without showing much sign of life.

This report is quite interesting, because, as a rule, shorebirds do not swim (cf. Del Hoyo *et al*. 1996), whereas in this case the woodcock landed in the sea, swam and took off again easily (see Figs 1-3). It would seem strange, however, that terricolous birds whose habitat is often in close proximity to streams and/or water sheets, couldn't swim if necessary, even if they do not belong to the swimmers.

Undeniably is the documentation of such an unusual

Figure 1. Woodcock flying off from the water.

Figure 2. Woodcock just after its flying off from the water.

Figure 3. Short-billed Woodcock observed on 23th October 2013 in the inner Oslo Fjord from Rolfstangen in Akershus county

behaviour, together with the unusual morphology of the same woodcock (with a very short bill, half of what is considered normal, never photographed in nature, but of which a noteworthy case study exists) a rare opportunity, to which appears appropriate to add some more brief information, based on a pool of 528 birds captured between 1960 and 1992, interval in which the information in this regard has grown almost exponentially every 5 years (Burlando *et al*. 1994). The first capture of a short-billed specimen has officially taken place in Brittany in 1933, followed sporadically by others until 1960 (Fraguglione 1983) and now it is possible to state that they involve basically all the Countries of the Western Palearctic where the species is hunted.

Statistic elaboration of a casual sub-sample of 78 Woodcocks matched to another equivalent taken from a "population" of 411 normal Woodcocks, has expressed a bimodal frequency curve (mean: 44 and 69 mm, respec-

Figure 4. Distribution of bill length in samples of short-billed and normal-billed Woodcock.

tively). Bhattacharya's method shows two gaussians, indicating a discontinuity in the variability of the bill's length between Woodcocks with short bills and those with normal bills Fig. 4). Among the short-billed Woodcocks, no sex or age related differences could be seen, which in the contrary has been observed among the normal-billed Woodcock (Aradis *et al*. 2015)

The most plausible hypothesis about the origin of this phenomenon is related to the teratogenic or mutagenic effects of some yet unknown substances present in the environment, as yet still unknown are the regions from where these individuals originate; not to be underestimated is the very high frequency of shape anomalies (maxillary and mandibular prognathism, deformations around the middle of the upper rhamphotheca), that also reduce the ability to catch the prey.

Furthermore, it is now established in birds that significant changes in other key structures associated with foraging can occur at very short time scales. It has been shown that bill structure can change in merely decades, driven by differences in foraging opportunities and subtle changes to the foraging task (cf.Grant & Grant 2014 in Martin 2017).

REFERENCES

Aradis A., Landucci G., Tagliavia M. & Bultrini M., 2015. Sex determination of Eurasian woodcock *Scolopax rusticola* a molecular and morphological approach. Avocetta 39: 83-89.

Burlando B., Fadat C. & Spanò S., 1994. Hypothèse de travail sur le problème des bécasses à bec court. Pp.61-65 in: Kalchreuter H. (ed.), 4th European Woodcock & Snipe Specialist Group, Saarbrücken (D). IWBR Publication 31.

Del Hoyo J., Elliott A. & Sargatal J. (eds), 1996. Handbook of the birds of the world. Vol.3. Hoatzin to Auks. Lynx ed., Barcelona

Fraguglione D., 1983. La Bécasse des Bois. De l'Orée ed., Bordeaux.

Martin G.R., 2017. The Sensory Ecology of Birds. Oxford University Press, Avian Biology Series.

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Barn swallow *Hirundo rustica* nest attached to the plastic body of a video surveillance camera

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The Barn swallow *Hirundo rustica* nests in urban and rural areas on buildings (houses, barns, other rural buildings, etc.) and structures (bridges, viaducts, etc.) where it builds the nest in a sheltered position (inside rooms and under roofs, porticoes, cornices, balconies, etc.), sometimes exploiting the presence of projecting architectural elements and various supports (lamps, various types of cables and tubes, hooks, etc.) (von Vietinghoff-Riesch 1955, Møller 1983, Cramp 1988, Rassati *pers. obs.*). Mud and plant fragments are used to build the nest, which is attached to substrates generally assuring strong adhesion due to their rough texture (concrete, stone and brick walls, wooden beams and objects, etc.). The construction of mud nests is an evolutionary innovation that allowed the occupation of habitats lacking cavities or diggable substrates (Winkler & Sheldon 1993). The choice of the nesting site is based on various factors, e.g. availability of mud for nest construction and of food (particular for the chicks), protection from storms and changing weather conditions, low predator accessibility, high substrate adhesion (Denniston Snapp 1976, Møller 1983, Winkler & Sheldon 1993, Gorenzel & Salmon 1994, von Hirschheydt *et al.* 2006).

During the 2011 breeding period, a pair of Barn swallow reared two broods in a nest built on the back of the plastic body of a video surveillance camera of a bank situated in the central square (Piazza XX Settembre) of Tolmezzo (Carnic Alps, Friuli-Venezia Giulia, 323 m a.s.l.; Fig. 1). The nest was not in contact with the nearby masonry substrates; it was 340 cm above the ground, beneath the portico (height: 355 cm) of a historic building at a distance of 5 cm from the ceiling, 15 cm from the external wall and 18 cm from a beam crossing the portico.

Both the nest's position (back of a video surveillance camera) and the substrate to which it was attached appear to be particular, also according to what is reported in the literature (see for example, Gorenzel & Salmon 1994, Bonvicini & Ornaghi 1999, Giacchini *et al*. 1999, Maranini & Parodi 2002). Monitoring of nests under the porticoes in the city centre of Tolmezzo since the 1980s has never revealed breeding on substrates of that type or position (a nest suspended on a smooth surface with high slope) even though there are various plastic and/or metal elements available (signs, light fixtures, video surveillance cameras, etc.).

The breeding site also seems unusual because there is no excessive competition, due both to the population decline (1980s: 3-4 pairs every year vs 2010: 2-3 pairs every year) and to the presence of a good number of suitable architectural elements and "protrusions" on which to build the nest. The porticoes are not used by the other two Hirundinidae species that breed in the Tolmezzo city centre: the Eurasian Crag Martin *Ptyonoprogne rupestris*, which in the Carnic Alps has begun to breed in synanthropic conditions since 2000 (Rassati 2003), and the House Martin *Delichon urbicum*.

House martin breeding in recently found nests located between a metal platform and a metal bar of a video surveillance camera in conditions of poor substrate adhesion was attributed to compensation behaviour (Ferri *et al.* 2016).

In the case reported herein, there is no strong competition for nest sites and the position (beneath a portico) is the same as that of the other nests; hence it does not make the conditions for breeding substantially more favourable. Therefore, it is plausible that a pair of Barn swallows exploited a substrate situated in an excellent position (protected from bad weather and marked temperature changes) and in a favourable area (central zone with porticoes) where one of its main predators, the domestic cat (cf. Møller 1983), is virtually absent. Moreover, the position, at the back of a video surveillance camera that hid the nest from passers-by, combined with the proximity of a beam crossing the portico that protected the nest on three sides, would seem to favour security and reduce human interference.

Therefore, in the case described here, the species exploited strong adherent material to nest in sites that otherwise would not be usable (Winkler & Sheldon 1993).

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Figure 1. Unusual Barn swallow breeding site. (**a**): position of the video surveillance camera. (**b**): close-up of the nest.

REFERENCES

Bonvicini P. & Ornaghi F., 1999. Dati preliminari sulla biologia riproduttiva di una popolazione di Rondine *Hirundo rustica* negli anni 1986-1995 a Macherio (Milano). Avocetta 23 (1): 131.

Cramp S. (Ed.), 1988. Handbook of the Birds of Europe, the Middle East and North Africa. The birds of the Western Palearctic, Vol. V. Oxford University Press, Oxford.

Denniston Snapp B., 1976. Colonial breeding in the Barn Swallow (*Hirundo rustica*) and its adaptive significance. Condor 78: 471-480.

Ferri V., Battisti C., Brunelli M. & Soccini C., 2016. An unusual nest location in House Martin *Delichon urbicum*: A case of compensation behaviour? Avocetta 40 (1): 43-45.

Giacchini P., Piangerelli M., Gambelli P. & Giusini U., 1999. Dati sull'ecologia della nidificazione della Rondine *Hirundo rustica* nella provincia di Ancona. Avocetta 23 (1): 136.

Gorenzel W.P. & Salmon T.P., 1994. Swallows. The Handbook: Prevention and Control of Wildlife Damage. Paper 73. University of Nebraska, Lincoln.

Maranini N. & Parodi M., 2002. Censimento di nidi di Rondine *Hirundo rustica* e di Balestruccio *Delichon urbica* nell'area urbana della città di Genova. Biennio 1998-1999. Picus 28: 29-36.

Møller A.P., 1983. Breeding habitat selection in the Swallow *Hirundo rustica*. Bird Study 30: 134-142.

Rassati G., 2003. Nidificazioni di Rondine montana *Ptyonoprogne rupestris* su abitazioni a Tolmezzo (Alpi Carniche, Friuli-Venezia Giulia). Picus 55: 33-35.

von Hirschheydt J., Schaub M. & Del Fante F., 2006. La Rondine (*Hirundo rustica*) nella Bassa Riviera (Ticino): sviluppo degli effettivi, successo riproduttivo e tasso di sopravvivenza negli anni 1997–2004. Boll. Soc. ticinese Sc. nat. 94: 25-38.

von Vietinghoff-Riesch A., 1955. Die Rauehsehwalbe. Duncker & Humblot, Berlin.

Winkler D.W. & Sheldon F.H., 1993. Evolution of nest construction in swallows (Hirundinidae): A molecular phylogenetic perspective. Proc. Nat. Acad. Sci. USA 90: 5705-5707.