

Past and present distribution of the Common Myna *Acridotheres tristis* in Italy: a review

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Abstract – Biological invasions represent one of the main causes of the current biodiversity loss. Assessing distribution of invasive species is therefore pivotal to design effective management plans. In this work, we reviewed the current distribution of the Common Myna *Acridotheres tristis* in Italy. The Myna is recorded as an invasive species in many other countries worldwide. We used citizen-science and online platforms, to obtain a reliable map of the distribution of breeding populations, as very few data have been published on the distribution of this bird in Italy. We found 34 occurrences of the Common Myna in Italy, and breeding has been confirmed in two areas in Campania (Southern Italy), i.e. in the provinces of Salerno and Caserta. To prevent this species to become invasive in Italy, given the current limited distribution of breeding populations, a rapid removal of free-ranging individuals should be recommended in the short-term period.

Key-words: *Acridotheres tristis*; biological invasions; distribution; invasive alien species; impacts.

INTRODUCTION

Biological invasions represent one of the main causes of the global biodiversity crisis (Genovesi 2011; Bellard *et al.* 2016). Alien species may outcompete native ones through predation, direct competition, resource competition and/or disease transmission (Broughton 2019; Cripps *et al.* 2019). Furthermore, they may alter native environments, as well as the human economy and wellness, thus limiting the effectiveness of ecosystem services (Vilà & Hulme 2017; White *et al.* 2019). Amongst alien species, invasive species (hereafter, IAS) are those who exert the strongest impacts on native ecosystems following a fast spread in the invaded range after being released (Russell & Blackburn 2017; Mori *et al.* 2019). Since 2014, a “blacklist” of IAS of European concern has been provided within the European Regulation 1143/2014 (Carboneras *et al.* 2018; Nentwig *et al.* 2018). The list has been updated twice in 2017 and 2019 and now includes a total of 49 IASs. Among those, only 5 bird species are mentioned: the Aegyptian Goose *Alopochen aegyptiacus*, the Sacred Ibis *Threskiornis aethiopicus*, the Ruddy Duck *Oxyura jamaicensis*, the Indian House Crow *Corvus splendens*, and the Common My-

na *Acridotheres tristis*. To limit impacts and distribution range of these species, it is paramount to preserve the native biodiversity and to improve effective management plans, including numerical control and eradication (e.g. Genovesi 2011; Mori *et al.* 2018a; Magory Cohen *et al.* 2019). After prevention, the early detection of new introduction events and rapid intervention are the main strategies to prevent establishment and impacts by IAS on native species and ecosystems (Vander Zanden *et al.* 2010).

The Common Myna is considered as one of the worst alien species introduced worldwide as its establishment may affect the breeding success of native bird species through competition for nesting sites (e.g. Grarock *et al.* 2012; Orchan *et al.* 2013), as in the case of the Noisy Miner *Manorina melanocephala* in Australia (Haythorpe *et al.* 2014). As to Europe, Biondi *et al.* (2005) reported that the Common Myna may compete with the European Starling *Sturnus vulgaris* and with the Jackdaw *Corvus monedula*: in Castelfusano (Rome), a breeding pair of Common Mynas in 1987 was repeatedly mobbed by native Starlings. Moreover, the Common Myna may be responsible for serious crop damages (Martin 1996), and tree damages (Peacock *et al.* 2007). Alien Mynas may also represent reser-

voirs of human psittacosis, listeriosis, salmonellosis and erysipelas, also provoking severe dermatoses by polluting the environment by dropping their faecal material under nocturnal roosts (Mori *et al.* 2018b).

The Common Myna is included in the category E4 (alien species with confirmed breeding events) by the Italian checklist of breeding birds (Baccetti *et al.* 2014) and Brichetti & Fracasso (2015) considered it as “near naturalized” on the national territory. However, data on the presence of this species in Italy are scattered and they have never been reviewed (Magory Cohen *et al.* 2019). Once introduced, Mynas may rapidly become invasive after a short “lag” phase, i.e. a period of little or no increase in species occurrence followed by an increase phase in which species occurrence rises rapidly (Crooks 2005). If not controlled, Mynas may locally become the most abundant bird species, outcompeting native ones (Magory Cohen & Dor 2019). In this note, we collected published and unpublished information available for the Common Myna in Italy and we summarized the current knowledge on its status and distribution.

MATERIALS AND METHODS

We first searched for occurrences of Common Myna in Italy published between 1970 and 2020 within online databases (i.e. ISI Web of Science, Scopus, Google Scholar). Search terms included combinations of the following words (both in English and Italian): Myna*, *Acridotheres tristis*, *Acridotheres*, alien population*, introduction*. We also reviewed national ornithological journals and ornithological congress proceedings in the same time range (1970-2020). Additional occurrences were obtained from Social Networks with public photos (Facebook, Instagram and Twitter), photo and video-sharing websites (Flickr and YouTube), and citizen-science based databases (iNaturalist.org, ornitho.it, observation.org, and eBird.org). Owners of data uploaded on these databases were directly contacted for further information on their observations if needed. Additionally, local experts were interviewed to ask for past and present distribution records of this species.

We estimated a minimum number alive for each area, which was represented by the highest number of individuals recorded in a single observation session.

RESULTS

A total of 34 Myna occurrences were collected. Two stable nuclei of the species occur in Campania (Southern Ita-

ly: Fig. 1; Table 1), in Salerno and Caserta provinces (30-45 individuals in 2015-2019, with no data on population abundance before 2015) in a total area of about 3,500 hectares. Breeding success in these last areas has been confirmed by public photos on Social Networks (Facebook) showing juvenile individuals amongst adults.

Other 17 observations referred to one or few individuals in other places, and to four currently extinct breeding populations (provinces of Roma, Castelfusano, Livorno, and Messina).

DISCUSSION

Our results confirmed the Common Myna as a fully naturalized species in Italy, with at least two breeding populations, in Caserta and Salerno provinces. However, observations of Common Mynas in Italy have occurred throughout the whole country, including the largest islands, suggesting that liberation events are common even if involving few individuals and might occur throughout a wide geographical range. Despite their dispersal abilities (over 300 km a year: Holzapfel *et al.* 2006; Peneaux & Griffin 2015), we suggest that single individuals observed in Italy did not derive from the invasive wild breeding populations yet, but from local escapes (Biondi & Pietrelli 2005; Pizzalis *et al.* 2005; Monaco 2014).

IAS should be ideally eradicated from their alien range to limit their spread and their impacts on native species, this meaning the complete removal of all individuals from the

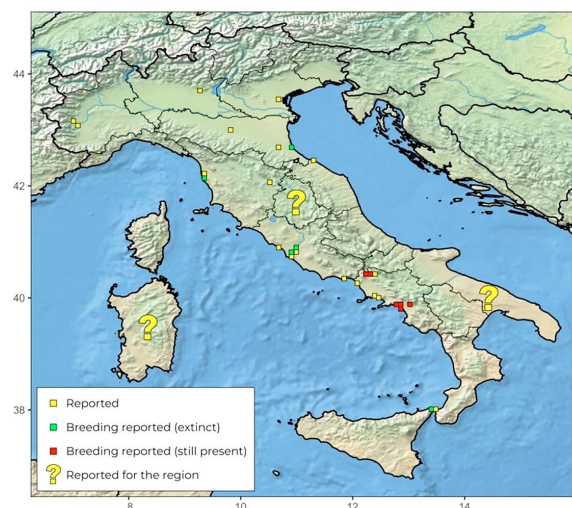


Figure 1. Maps of occurrences of the Common Myna in Italy. Question marks (“?”) are put in those regions where exact locations of single sightings of Common Mynas are unknown.

Short communications

Table 1. Occurrences of Common Mynas in Italy with details on year(s), minimum number of observed individuals (!: precise number, ≈: approximate number), location (? : exact location unknown), current status (breeding: *: still present; †: extinct) and references.

Year	Min number	Location	References
1987	Unknown	Castelfusano, Roma	Biondi et al. 1995; Andreotti et al. 2001; Biondi et al. 2005
1988	1!	Bosco di Palo, Ladispoli	Fulvio Fraticelli in www.ornitho.it , accessed on 13.11.2019
1992; 2003	Unknown	Roma	Brunelli 1996; Pitzalis et al. 2003; Biondi & Pietrelli 2005; Monaco 2014
1995	Unknown	Villa Carpegna, Roma	Andreotti et al. 2001
2000-2019	20≈	Torre Picentina, Salerno	Mancuso 2003
2000-2017	15≈	Eboli, Salerno	Fraissinet et al. 2001
2002-2019	15≈	Vairano Patenora, Caserta	O. Janni e G. Posillico in www.ornitho.it , accessed on 13.11.2019
2002-2008	5!	Messina - Località Margi	Giacobbe & Restivo 2009
2002	3!	Castanea delle Furie (Messina)	Brichetti & Fracasso 2013
2002	Unknown	Castanea, Messina	Corso in Brichetti & Fracaso 2015
2002	Unknown	Puglia (?)	Brichetti et al. 2003
2003	Unknown	Umbria (?)	Brichetti & Occhiato 2004
2003	Unknown	Modena	Bagni et al. 2003
2004	1!	Bonifica di Coltano, Pisa	Arcamone & Puglisi 2006
2004	1!	Napoli	Fraissinet 2005
2006	1!	Mondragone, Caserta	Brichetti & Fracasso 2013
2006	3≈	Cervia, Ravenna	Brichetti & Fracaso 2015
2007	3≈	Livorno	Arcamone & Puglisi 2008
2007	1!	Staffarda, Cuneo	Sighele 2007
2007	1!	Forli	Restivo & Giacobbe 2010
2008	Unknown	Sardegna (?)	Grussu 2008
2008	1!	Marechiaro, Napoli	Filippo Tatino in www.ornitho.it , accessed on 13.11.2019
2011- 2019	15!	Presenzano, Caserta	Various obs. in www.ornitho.it , accessed on 13.11.2019
2013	1!	Arezzo	Elena Grasso and Luca Puglisi, personal communication
2014	2!	Osasco, Torino	Emiliano Mori, private observation
2012	1!	Vigonovo, Venezia	Antonino di Lucia & Renzo Ientile in www.ornitho.it , accessed on 13.11.2019
2012	1!	Gaeta, Latina	Elvire Laurens in www.ornitho.it , accessed on 13.11.2019
2013	2!	Monte Brisighella, Pesaro-Urbino	Carlo Chiari in www.ornitho.it , accessed on 13.11.2019
2013	1!	Brescia	Ivano Caldon in www.ornitho.it , accessed on 13.11.2019
2016-2019	14!	Pontecaiano Faiano, Salerno	A. Beccucci, C. Mancuso et al. in www.ornitho.it , accessed on 13.11.2019
2016-2017	2!	Battipaglia, Salerno	C. Mancuso in www.ornitho.it , accessed on 13.11.2019
2017-2019	2≈	Marzano Appio, Caserta	O. Janni e G. Capobianco in www.ornitho.it , accessed on 13.11.2019
2017	1!	Sant' Angelo d'Alife, Caserta	A. Motta in www.ornitho.it , accessed on 13.11.2019

natural environment, including rural and urban areas (Carboneras *et al.* 2018; Nentwig *et al.* 2018). The removal of free-ranging individuals should be coupled with an addressed program of conservation communication, involving all the potential stakeholders from local citizens to animal right groups, to limit complaints and boycotts to management interventions (Crowley *et al.* 2017; La Morgia *et al.* 2017; Cerri *et al.* 2019). Furthermore, before any Common Myna removal effort is even thought, the Italian Government should apply the EU Regulation 1143/2014 in order to

ban importation, detention, breeding, exhibition, and commerce of this bird in the whole country, so that eradication could be conducted and be effective in the long term (Margoluis *et al.* 2009). Any eradication program should also rely on local governments, who should ban trade and private detention, to be effective in the long term (cf. La Morgia *et al.* 2017). Despite the trade ban, the Common Myna is still present in both commercial and private sectors, therefore increasing the risk of reinvasions and limiting the success of eradication programs (Adriaens *et al.* 2015).

Currently, populations of Mynas present in Italy can still be eradicated to prevent impact on native species and environments (Grarock *et al.* 2012; Orchan *et al.* 2013; Mori *et al.* 2018b). A management strategy might bring ahead local communities' responsibility for local releases (awareness campaign) and could fix the governmental gap of its detention as a pet. Present breeding records, all within the Campania region, suggest working directly on Salerno and Caserta provinces, to remove simultaneously the populations of both provinces, alongside with an important awareness public campaign. Both breeding populations in Italy are small (together, probably 30-45 individuals in a small total area), but they may be getting through the "lag phase" (Crooks 2005). Therefore, this may be the best moment to act and remove all free-ranging individuals, as recommended by the EU Regulation 1143/2014. If that does not happen, Italy will be facing the spread of "one of the worst 100 invasive species". This would also foster the risk of European invasion by this species, together with Turkey and Portugal, where *Acridotheres* spp. are not managed (Costa *et al.* 1997; Saavedra *et al.* 2015). There is still a good chance for the successful removal of free-ranging Mynas from Italy, but the removal of the current population needs to be implemented alongside strategies for preventing and sanctioning their keeping, so to avoid further releasing within the country.

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REFERENCES

- Adriaens T., Baert K., Breyne P., Casaer J., Devisscher S., Onkelinx T., Pieters S. & Stuyck J., 2015. Successful eradication of a suburban Pallas's squirrel *Callosciurus erythraeus* (Pallas 1779) (Rodentia, Sciuridae) population in Flanders (northern Belgium). *Biol. Invasions* 17: 2517–2526.
- Andreotti A., Baccetti N., Perfetti A., Besa M., Genovesi P. & Guberti V., 2001. Mammiferi ed Uccelli esotici in Italia: analisi del fenomeno, impatto sulla biodiversità e linee guida gestionali. Quaderni di Conservazione della Natura 2. Ministero dell'Ambiente Istituto Nazionale per la Fauna Selvatica, Roma, Italia.
- Arcamone E. & Puglisi L., 2006. Cronaca Ornitologica Toscana. Osservazioni relative agli anni 1992-2004. *Alula* 13: 3–124.
- Arcamone E. & Puglisi L., 2008. Cronaca Ornitologica Toscana. Osservazioni relative agli anni 2005-2007. *Alula* 15: 3–121.
- Baccetti N., Fracasso G. & Gotti C., 2014. La lista CISO-COI degli Uccelli Italiani – Parte seconda: le specie naturalizzate (Cat. C) e le categorie "di servizio" (cat. D,E,X). *Avocetta* 38: 1–21.
- Bellard C., Cassey P. & Blackburn T.M., 2016. Alien species as a driver of recent extinctions. *Biol. Lett.* 12: 20150623.
- Bagni L., Sighele M., Passarella M., Premuda G., Tinarelli R., Cocchi L. & Leoni G., 2003. Check-list degli uccelli dell'Emilia-Romagna dal 1900 al giugno 2003. *Picus* 29: 85–107.
- Biondi M., De Vita S., Pietrelli L., Guerrieri G. & Demartini, L., 1995. Uccelli esotici in libertà: distribuzione, adattamento e riproduzione sul litorale romano. *Uccelli d'Italia* 20: 33–39.
- Biondi M., Guerrieri G., De Vita S. & Pietrelli L., 2005. Gli uccelli esotici sul litorale romano (1978-2004): status, distribuzione ed annotazioni ecologiche. *Alula* 12: 23–30.
- Biondi M., Pietrelli L., 2005. Revisione recente sullo status degli uccelli esotici nella città di Roma e lungo il suo litorale. *Atti dei Convegni Lincei* 218: 547-552.
- Brichetti P. & Fracasso G., 2015. Ornitologia italiana. Vol. 9 - Emberizidae-Icteridae - Aggiornamenti e Check-list. Edizioni Belvedere, Latina.
- Broughton R.K., 2019. Current and future impacts of nest predation and nest site competition by invasive eastern grey squirrels *Sciurus carolinensis* on European birds. *Mammal Review* <https://doi.org/10.1111/mam.12174>.
- Brichetti P. & Occhiato D., 2004. Commissione Ornitologica Italiana (COI). Report 17. *Avocetta* 28: 41–44.
- Brunelli M., 1996. Maina comune *Acridotheres tristis*. In: Cignini B., Zapparoli M., (Eds) Atlante degli Uccelli nidificanti di Roma. Fratelli Palombi Editori, Roma, Italia.
- Carboneras C., Genovesi P., Vilà M., Blackburn T.M., Carrete M., Clavero M., D'hondt B., Orueta J.F., Gallardo B., Galdes P., González-Moreno P., Gregory R.D., Nentwig W., Paquet J.-Y., Pysek P., Rabitsch W., Ramirez L., Scalera R., Tella J.L., Walton P., Wynde R., 2018. A prioritised list of invasive alien species to assist the effective implementation of EU legislation. *J. Appl. Ecol.* 55:539–547.
- Cerri J., Mori E., Zozzoli R., Gigliotti A., Chirco A. & Bertolino S., 2019. Managing invasive Siberian chipmunks *Eutamias sibiricus* in Italy: a matter of attitudes and risk of dispersal. *Biol. Invasions* <https://doi.org/10.1007/s10530-019-02115-5>
- Costa H., Elias G. L. & Farinha J. C., 1997. Exotic birds in Portugal. *British Birds* 90: 562–567.
- Cripps J. K., Pacioni C., Scroggie M. P., Woolnough A. P. & Ramsey D. S., 2019. Introduced deer and their potential role in disease transmission to livestock in Australia. *Mammal Rev.* 49: 60–77.
- Crooks J.A., 2005. Lag times and exotic species: The ecology and management of biological invasions in slow-motion. *Ecoscience* 12: 316–329.
- Crowley S. L., Hinchliffe S. & McDonald R. A., 2017. Conflict in invasive species management. *Front. Ecol. Environm.* 15: 133–141.
- Fraissinet M., Cavaliere V., Conti P., Milone M., Moschetti G., Picocchi S. & Scebba S., 2001. Check-list degli uccelli della Campania. *Riv. Ital. Ornitol.* 71: 9–25.
- Fraissinet M., 2005. Nuovo progetto Atlante degli Uccelli nidificanti e svernanti nella città di Napoli (2001-2005): dati preliminari a una stagione dalla conclusione. *Alula* 12: 148–154.
- Genovesi P., 2011. Are we turning the tide? Eradications in times of crisis: how the global community is responding to biological invasions. *Island invasives: eradication and management* 1: 5–8.
- Giacobbe D. & Restivo S., 2009. Dati sulla Maina comune, *Acridotheres tristis*, in Sicilia. *Riv. Ital. Ornitol.* 79: 66–69.
- Gillings S., 1997. *Acridotheres tristis* Common Myna. In: Hage-meijer W. & Blair M. (Eds.) *The EBCC Atlas of European Breeding Birds*. T & AD Poyser Editions, London, UK.
- Grarock K., Tidemann C.R., Wood J. & Lindenmayer D. B., 2012. Is it benign or is it a pariah? Empirical evidence for the impact of the common myna (*Acridotheres tristis*) on Australian birds. *PLoS One* 7: e40622.
- Grussu M., 2008. Gli uccelli alloctoni in Sardegna: una checklist

- aggiornata. In: Galasso G., Chiozzi G., Azuma M. & Banfi E., (Eds.). Le specie alloctone in Italia: censimenti, invasività e piani di azione. Memorie della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 36: 65.
- Haythorpe K. M., Burke D. & Sulikowski D., 2014. The native versus alien dichotomy: relative impact of native noisy miners and introduced common mynas. *Biol. Invasions* 16: 1659–1674.
- Holzäpfel C., Levin N., Hatzofe O. & Kark S., 2006. Colonisation of the Middle East by the invasive Common Myna *Acridotheres tristis* L., with special reference to Israel. *Sandgrouse* 28: 44–51.
- La Morgia V., Paoloni D. & Genovesi P., 2017. Eradicating the grey squirrel *Sciurus carolinensis* from urban areas: an innovative decision making approach based on lessons learnt in Italy. *Pest Manage. Sci.* 73: 354–363.
- Margoluis R., Stem C., Salafsky N., Brown M., 2009. Using conceptual models as a planning and evaluation tool in conservation. *Eval. Progr. Plann.* 32: 138–147.
- Magory Cohen T., McKinney M., Kark S. & Dor R., 2019. Global invasion in progress: modeling the past, current and potential global distribution of the common myna. *Biol. Invasions* 21: 1295–1309.
- Magory Cohen T. & Dor R., 2019. The effect of local species composition on the distribution of an avian invader. *Sci. Reports* 9: 15861.
- Martin W. K., 1996. The current and potential distribution of the common myna *Acridotheres tristis* in Australia. *Emu* 96: 166–173.
- Mancuso C., 2003. Nidificazioni di Maina comune, *Acridotheres tristis*, in Campania. *Riv. Ital. Ornitol.* 73: 86–88.
- Monaco A., 2014. Alieni - La minaccia delle specie alloctone per la biodiversità del Lazio. Palombi Edizioni, Roma, Italy.
- Mori E., Zozzoli R. & Menchetti M., 2018a. Global distribution and status of introduced Siberian chipmunks *Eutamias sibiricus*. *Mammal Rev.* 48: 139–152.
- Mori E., Meini S., Strubbe D., Ancillotto L., Sposimo P. & Menchetti M., 2018b. Do alien free-ranging birds affect human health? A global summary of known zoonoses. In: Mazza G., Tricarico E. (Eds.) *Invasive species and human health*. CABI International Edition, New York: pp. 120–129.
- Mori E., Menchetti M., Zozzoli R. & Milanese P., 2019. The importance of taxonomy in species distribution models at a global scale: the case of an overlooked alien squirrel facing taxonomic revision. *J. Zool.* 307: 43–52.
- Nentwig W., Bacher S., Kumschick S., Pysek P. & Vila M., 2018. More than ‘100 worst’ alien species in Europe. *Biol. Invasions* 20: 1611–1621.
- Orchan Y., Chiron F., Shwartz A. & Kark S., 2013. The complex interaction network among multiple invasive bird species in a cavity-nesting community. *Biol. Invasions* 15: 429–445.
- Peacock D. S., van Rensburg B. J. & Robertson M. P., 2007. The distribution and spread of the invasive alien common myna, *Acridotheres tristis* L. (Aves: Sturnidae), in southern Africa. *S. Afr. J. Sci.* 103: 465–473.
- Peneaux C. & Griffin A. S., 2015. Opportunistic observations of travel distances in common mynas (*Acridotheres tristis*). *Canberra Bird Notes* 40: 228–234.
- Pitzalis M., Marangoni C. & Bologna M.A., 2005. Analisi di progressi di dispersione e colonizzazione tramite un GIS in tre specie di uccelli alloctoni nella fauna di Roma (Italia Centrale). *Alula* 12: 193–205.
- Restivo S. & Giacobbe D., 2010. Le invasioni di specie in Italia: il caso della maina comune (*Acridotheres tristis*). *Atti del I Convegno del Forum Natura Mediterraneo, Selva di Paliano (FR)* 20-21 Marzo 2010: 1–5.
- Russell J. C. & Blackburn T. M., 2017. Invasive alien species: denialism, disagreement, definitions, and dialogue. *Trends Ecol. Evol.* 32: 312–314.
- Saavedra S., Maraver A., Anadon J.D. & Tella J.L., 2015. A survey of recent introduction events, spread and mitigation efforts of mynas (*Acridotheres* sp.) in Spain and Portugal. *Animal Biodiversity and Conservation* 38: 121–128.
- Scalera R., 2001. Invasioni biologiche. Le introduzioni di vertebrati in Italia: un problema tra conservazione e globalizzazione. *Collana verde*, 103. Corpo Forestale dello Stato. Ministero delle Politiche Agricole e Forestali. Roma, Italy.
- Sighele M., 2007. Fotonotizie. *Quaderni di Birdwatching* 9: 17.
- Vander Zanden M. J., Hansen G. J., Higgins S. N. & Kornis M. S., 2010. A pound of prevention, plus a pound of cure: early detection and eradication of invasive species in the Laurentian Great Lakes. *J. Great Lakes Res.* 36: 199–205.
- Vilà M. & Hulme P.E., 2017. *Impact of biological invasions on ecosystem services* (Vol. 12). Springer Editions, Cham, Switzerland.
- White R., Strubbe D., Dallimer M., Davies Z.G., Davis A.J.S., Edelaar P., Groombridge J., Jackson H.A., Menchetti M., Mori E., Nikolov B.P., Parau L.G., Pečnikar Ž.F., Pett T.J., Reino L., Tollington S., Turbè A. & Shwartz A., 2019. Assessing the ecological and societal impacts of alien parrots in Europe using a transparent and inclusive evidence-mapping scheme. *Neobiota* doi: 10.3897/neobiota.@@.34222

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