

BIODIVERSITÀ DELLA LAGUNA DI VENEZIA E DELLA COSTA
NORD ADRIATICA VENETA
SEGNALAZIONI (226 - 228)

*BIODIVERSITY OF THE LAGOON OF VENICE AND OF THE VENETIAN
NORTHERN ADRIATIC COAST
RECORDS (226 - 228)*

Ctenophora
Tentaculata, Bolinopsidae

226 - *Mnemiopsis leidyi* A. Agassiz, 1865: first notes about an invasive diffusion along the West Adriatic coast

Specimens. Over twelve hundred specimens caught in Venice lagoon and in some coastal marine sites off Venice in September 2016. Quantitative sampling for a preliminary abundance estimation was carried out in the Canale delle Navi in the Venice Lagoon and on two sites localized 0.5 and 2 miles off the Venetian coasts respectively (Gulf of Venice - North Adriatic Sea) on September 13th 2016 in the first cubic meter below the surface.



Fig. 1. Some specimens of *Mnemiopsis leidyi* caught in the Venice lagoon. Photo taken in the laboratory.

Observations. In July 2016 while some surveys on jellyfish spread off the Venetian coast were being carried out by the MSNVE staff some specimens of unknown ctenophore were collected. Subsequent examination in the laboratory has allowed us to identify the species as *Mnemiopsis leidyi*, with individuals of all sizes, from 10 up to 100 mm. The presence and diffusion of *M. leidyi* in this area has increased progressively up to nowadays

invasive situation. Swarms of this species are at the moment reported for the coastal area of Croatia off Parenzo and Novigrad in the Eastern Gulf of Venice, and in many areas of Italian Coasts in the West part of the Gulf and south as far as Riccione (RN). Currently (October 2016) *M. leidyi* is widespread everywhere off the Venetian Coast with a mean of 6 individuals/m³ and 95 g/m³ of WW. A quantitative study concerning the abundance of this species in Venetian waters is in progress and will be published afterwards. In some areas of the lagoon the massive presence of this species determines serious problems for the fishermen, clogging the nets and hindering the fishing operations.

M. leidyi is an indigenous species of Western Atlantic coast of North and South America (GESAMP, 1997). It has spread since 1982 into the Black Sea (VINOGRADOV et al., 1989) where it arrived via ballast waters and had strong ecological and economical impact (SHIGANOVA, 1998), and subsequently on the Caspian Sea (IVANOV et al., 2000). Afterwards it expanded to Eastern Mediterranean from the Black Sea through the Sea of Marmara (SHIGANOVA et al., 2001). In October 2005 a swarm of this species was observed with an underwater video-camera in the southeastern part of the Gulf of Trieste (North Adriatic Sea) and some individuals were collected in the Bay of Piran (Slovenia) (SHIGANOVA & MALEJ, 2009).

Since 2005 *M. leidyi* has established in several lagoons along the French shore of the Mediterranean Sea (THIBAULT et al., 2014) and swarms of this species were observed in 2009 off the Mediterranean Coast of Spain (FUENTES et al., 2010) and Israeli coast by GALIL et al. (2009). In the same summer of 2009 BOERO et al. (2009) reported the appearance of this species in many areas of the West Coast of Italy, in the Ligurian, Tyrrhenian and Ionian Seas.

In 2006 this invasive species was first recorded in northern European waters by JAVIDPOUR et al. (2006), in the Baltic Sea with a rapid spread of Mnemiopsis in all Baltic areas (LEHTINIEMI et al., 2007), Norwegian fjords (OLIVEIRA, 2007), in Danish (TENDAL et al., 2007), Netherlands (FAASSE & BAYHA, 2006) and Belgian coastal waters (DUMOULIN, 2007). Since 2009 *M. leidyi* has been reported from the North Sea (ANTAJAN et al., 2010) and along the English Channel and the French North Sea coasts where it seems well established (ANTAJAN et al., 2014).

The Gulf of Venice is the northernmost part of the Mediterranean Sea and is characterized by rather peculiar physiographic features such as shallow bathymetry, strong wind stress and wide annual range of thermal cycle and salinity, strongly influenced by the western coast rivers inflow (COSSARINI et al., 2008). Nevertheless the productivity of this area is one of the highest of the whole Mediterranean and virtually suitable for such a euryhaline and eurythermic invasive species as *M. leidyi*.

Although the thermal seasonal range of North Adriatic surface waters is between 7°C in winter to 27°C in summer and surface salinity can show a similar strong variability (from less than 30.00 to 38.50 ‰) (RUSSO et al., 2012), these selective conditions may be tolerated by this species. Indeed *M. leidyi* in native habitat is found in an extremely wide range of environmental conditions such as winter low and summer high temperatures of 2 and 32°C, respectively, and salinities of <2-38 ‰ (PURCELL et al., 2001). Furthermore the peak of biomass in the global diffusion of this invasive species is shown between 45°-50° latitudinal range in the North and South hemisphere (COSTELLO et al., 2012), exactly where the North Adriatic Sea is located.

Despite its tolerance of a wide range of environmental conditions has allowed the success of this species as opportunistic settler, *M. leidy* is a holoplanktonic species for which no benthic resting eggs or other specialized overwintering stages are known (BRUSCA & BRUSCA, 2003). This reproductive feature leads to seasonal elimination of the species in the temperate native areas, where only few individuals survive in overwintering refugia such as coastal embayment and coastal low water inlets. From these sites when temperature rises in favorable season the survivors origin a new population (COSTELLO et al., 2006). Fecundity, high-rate and short cycle of reproduction as well as simultaneous and self-compatible hermaphroditism determine a strong population growth capacity (COSTELLO et al., 2012).

However, in our case, the low winter temperatures of northern Adriatic lagoons, often significantly lower than those of marine waters, may not allow the overwintering of this species. Moreover, the presence in the North Adriatic of predator species of *Mnemiopsis* such as two other species of Beroidae (SHIGANOVA & MALEJ, 2009) could hinder a re-invasive growth of *Mnemiopsis* in the Adriatic waters in the next spring.

At the moment of writing this paper (October 2016) we are engaged in monitoring the overwintering and the possible establishment success of this aggressive invader in our waters.

We acknowledge Barbara Favaretto for the useful assistance in the sampling activity and Ferdinando Boero for his confirmation of the identification of the species.

Keywords: non-indigenous species, *Mnemiopsis leidy*, North Adriatic Sea

References

- ANTAJAN E., BASTIAN T., RAUD T., BRYLINSKI J.M., HOFFMAN S., BRETON G., CORNILLE V., DELEGRANGE A., VINCENT D., 2014. The invasive ctenophore *Mnemiopsis leidy* A. Agassiz, 1865 along the English Channel and the North Sea French coasts: another introduction pathway in northern European waters? *Aquatic Invasions*, 9(2): 167-173.
- ANTAJAN E., DELESMONT R., DEWARUMEZ J-M., LEFEBVRE A., LUCZAK C., WAREMBOURG C., 2010. Surveillance écologique et halieutique du site de Gravelines, Novembre 2008-Octobre 2009. *IFREMER Technical report*, 151 pp.
- BOERO F., PUTTI M., TRINITO E., PRONTERA E., PIRAINO S., SHIGANOVA T., 2009. First record of *Mnemiopsis leidy* (Ctenophora) from the Ligurian, Thyrrenian and Ionian Seas (Western Mediterranean) and first record of *Phyllorhiza punctata* (Cnidaria) from the Western Mediterranean. *Aquatic Invasions*, 4(4): 675-680.
- BRUSCA R.V., BRUSCA G.J., 2003. Invertebrates. *Sianauer Associated*. Sunderland, USA.
- COSSARINI G., TREVISANI S., BANDELI V., SALON S., SOLIDORO C., 2008. Classification and drivers of spatial pattern of thermohaline features of the northern Adriatic sea. Meteo-oceanographic conditions and coastal zone water quality. In: Campostrini P. (ed.), CORILA Scientific Research and Safeguarding of Venice 2007. Research Programma 2004-2006. Vol. VI, 2006 results. *Multigraf*, Spinea (VE): 359-369
- COSTELLO J.H., BAYHA K.M., MIANZAN H.W., SHIGANOVA T.A., PURCELL J.E., 2012. Transitions of *Mnemiopsis leidy* (Ctenophora: Lobata) from native to an exotic species: a review. *Hydrobiologia*, 690: 21-46.
- COSTELLO J.H., SULLIVAN B.K., GIFFORD D.J., VAN KEUREN D., SULLIVAN L.J., 2006. Seasonal refugia, shoreward thermal amplification, and metapopulation dynamics of the ctenophore *Mnemiopsis leidy* in Narragansett Bay, Rhode Island. *Limnol. Oceanogr.* 51(4): 1819-1831.
- DUMOULIN E., 2007. De Leidy's ribkwal *Mnemiopsis leidy* (A. Agassiz, 1865) al massaal in het havengebied Zeebrugge-Brugge, of: exoten als de spiegel van al tē menselijk handelen. *De Strandvlo*, 27(2): 44-60.
- FAASSE M.A., BAYHA K.M., 2006. The ctenophore *Mnemiopsis leidy* A. Agassiz 1865 in coastal waters of the Netherlands: an unrecognized invasion? *Aquatic Invasions*, 1(4): 270-277.
- FUENTES V.L., ANGEL D.L., BAYHA K.M., ATIENZA D., EDELST D., BORDEHORE C., GILI J.M., PURCELL J.E., 2010. Blooms of invasive ctenophore, *Mnemiopsis leidy*, span the Mediterranean Sea in 2009. *Hydrobiologia*, 645: 23-37.
- GALIL B.S., KRESS N., SHIGANOVA T., 2009. First record of *Mnemiopsis leidy* A. Agassiz, 1868 (Ctenophora; Lobata; Mnemiidae) off the Mediterranean coast of Israel. *Aquatic Invasions*, 4(2): 357-360.

- GESAMP IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), 1997. Opportunistic settlers and the problem of the ctenophore *Mnemiopsis leidyi* invasion in the Black Sea. GESAMP reports and studies N° 58. *International Maritime Organization*, London, 86 pp.
- IVANOV V.P., KAMAKIN A.M., USHIVTZEY V.B., SHIGANOVA T., ZHUKOVA O., ALADIN N., WILSON S.I., HARBISON G.R. & DUMONT H.J., 2000. Invasion of the Caspian Sea by the comb jellyfish *Mnemiopsis leidyi* (Ctenophora). *Biological Invasions* 2: 255-258.
- JAVIDPOUR J., SOMMER U., SHIGANOVA T., 2006. First record of *Mnemiopsis leidyi* A. Agassiz 1865 in the Baltic sea. *Aquatic Invasions*, 1(4): 299-302.
- LEHTINIEMI M., PÄÄKKÖNEN J.-P., FLINKMAN J., KATAJISTO T., GOROKHOVA E., KARJALAINEN M., VIITASALO S., BJÖRK H., 2007. Distribution and abundance of the American comb jelly (*Mnemiopsis leidyi*) - A rapid invasion to the northern Baltic Sea during 2007. *Aquatic Invasions*, 2(4): 445-449.
- OLIVEIRA O.M.P., 2007. The presence of the ctenophore *Mnemiopsis leidyi* in the Oslofjorden and considerations on the initial invasion pathways to the North and Baltic Seas. *Aquatic Invasions*, 2(3): 185-189.
- PURCELL J.E., SHIGANOVA T.A., DECKER M.B., HOUE E.D., 2001. The ctenophore *Mnemiopsis* in native and exotic habitats: U.S. estuaries versus the Black Sea basin. *Hydrobiologia*, 451: 145-176.
- RUSSO A., CARNIEL S., SCLAVO M., KRZELJ M., 2012. Climatology of the Northern-Central Adriatic Sea. In: Wang Shih-Yu (Ed.), *Modern Climatology*. ISBN: 978- 953-51-0095-9. InTech, <http://dx.doi.org/10.5772/34693>. Available from: <http://www.intechopen.com/books/modern-climatology/climatology-of-the-northern-central-adriatic-sea>
- SHIGANOVA T., 1998. Invasion of the Black Sea by the ctenophore *Mnemiopsis leidyi* and recent changes in pelagic community structure. *Fisheries Oceanography*, 7:3/4:305-310.
- SHIGANOVA T., MALEJ A., 2009. Native and non-native ctenophores in the Gulf of Trieste, Northern Adriatic Sea. *Journal of Plankton Research*, 31(1): 61-71.
- SHIGANOVA T.A., MIRZOYAN A.A., STUDENIKINA E.A., VOLOVIK S.P., SIOKOU-FRANGOU I., ZERVOUDAKI S., CHRISTOU E.D., SKIRTA A.Y., DUMONT H.J., 2001. Population development of invader ctenophore *Mnemiopsis leidyi*, in the Black sea and in other seas of the Mediterranean basin. *Marine Biology*, 139: 431-445.
- TENDAL O.S., JENSEN K.R., RIISGÅRD H.U., 2007. Invasive ctenophore *Mnemiopsis leidyi* widely distributed in Danish waters. *Aquatic Invasions*, 2(4): 455-460.
- THIBAULT D., DELPY F., BLANCHOT J., GUILLOUX L., LÉON S., PAGANO M., 2014. *Mnemiopsis* in the Barre Lagoon, what are the main triggers for its expansion? ICES Report of the Joint CIESM/ICES Workshop on *Mnemiopsis* Science (JWMS), 18-20 September 2014, Spain. *SSGHIE*, 14: 25-27
- VINOGRADOV M.E., SHUSHKINA E.A., MUSAIEVA I.E., SOROKIN P.Yu., 1989. Ctenophore *Mnemiopsis leidyi* (a. Agassiz) (Ctenophora: Lobata) - new settlers in the Black Sea. *Oceanology*, 29: 293-298.

Author

Luca Mizzan - Museo di Storia Naturale di Venezia, S. Croce 1730, I-30135 Venezia, Italy; luca.mizzan@fmcvenezia.it

Reference: Mizzan L., 2017. 226 - *Mnemiopsis leidyi* A. Agassiz, 1865: first notes about an invasive diffusion along the West Adriatic coast. Biodiversità della Laguna di Venezia e della costa nord adriatica veneta. Biodiversity of the Lagoon of Venice and of the Venetian northern Adriatic coast. *Bollettino del Museo di Storia Naturale di Venezia*, 67: 153-156.

Chordata Thaliacea, Salpida, Salpidae

227 - *Salpa maxima* Forskål, 1775: segnalazione di specie infrequente per le coste veneziane

Reperti. 1 es. adulto di 15 cm raccolto il 1.06.2016 in laguna di Venezia, nei pressi dell'Isola della Certosa, canale delle Navi (N 45°25.860'; E 12°22.087') in condizioni di marea crescente.



Osservazioni. *Salpa maxima* è un tunicato oloplanctonico dal corpo cilindrico, trasparente e gelatinoso, circondato da bande muscolari circolari con sifone inalante ed esalante alle estremità opposte. Si muove a propulsione pompando acqua nel corpo e si nutre di fitoplancton che viene filtrato e trattenuto sulle superfici mucose.

È una specie che ha un complesso ciclo vitale costituito da due fasi, una solitaria asessuata e una coloniale sessuata. L'esemplare asessuato e solitario, chiamato oozoid, produce per gemmazione dei cloni che creano una catena, di lunghezza variabile dai 10 ai 50 metri, di centinaia di individui che invece si riproducono sessualmente, conosciuta come blastozoid. Vive in acque temperate; nel Mediterraneo sembra maggiormente segnalata nella porzione occidentale (CARDONA et al., 2012; BILECENOGLU et al., 2013; PETRESCU & PETRESCU, 2016) dove è comune in superficie soprattutto nei mesi freddi mentre nell'Adriatico centrale e meridionale durante i mesi primaverili (RIEDL, 1991: 601).

S. maxima è quindi una specie non rara che però viene generalmente poco segnalata soprattutto nella fase solitaria di oozoid mentre, nella fase coloniale di blastozoid, quando forma lunghe catene di individui molto appariscenti, suscita un maggior interesse. Come nel caso delle meduse e degli ctenofori, con cui condividono la denominazione comune di plancton gelatinoso (gelatinous zooplankton o semplicemente jellyfish) la sua presenza è legata a cicli riproduttivi profondamente influenzati dalle condizioni ambientali, quali correnti salinità, temperatura e nutrienti e pertanto soggetta a fluttuazioni demografiche estremamente ampie. A periodi esplosivi e grandi concentrazioni di individui, in aree localizzate o al contrario molto ampie, seguono spesso periodi in cui la sua presenza diventa molto meno evidente. Questa specie viene quindi spesso notata e riportata solo in occasione di esplosioni demografiche, come nel caso del marzo del 2013, in cui viene segnalata lungo le coste della Puglia una straordinaria concentrazione di questi organismi (BOERO et al., 2013).

Pur rimanendo quindi una specie effettivamente comune in Mediterraneo ed anche in Adriatico, segnalazioni di *S. maxima* rimangono molto scarse e si ritiene quindi utile registrarne la presenza nel Golfo di Venezia, e addirittura in laguna con questa nota.

Keywords: *Salpa maxima*, North Adriatic Sea

Bibliografia

- BILECENOGLU M., ALFAYA J.E.F., AZZURRO E., BALDACCONI R., BOYACI Y.Ö., CIRCOSTA V., COMPAGNO L.J.V., COPPOLA F., DEIDUN A., DURGHAM H., DURUCAN F., ERGÜDEN D., FERNÁNDEZ-ÁLVAREZ F.Á., GIANGUZZA P., GIGLIO G., GÖKOĞLU M., GÜRLEK M., İKHTİYAR S., KABASAKAL H., KARACHLE P.K., KATSANEVAKIS S., KOUTSOGIANNOPOULOS D., LANFRANCO E., MICARELLI P., ÖZVAROL Y., PEÑA-RIVAS L., POURSANIDIS D., SALIBA J., SPERONE E., TIBULLO D., TIRALONGO F., TRIPEPI S., TURAN C., VELLA P., YOKES M.B., ZAVA B., 2013. New Mediterranean marine biodiversity records (December, 2013). *Mediterranean Marine Science*; 14(2): 463-80.
- BOERO F., BELMONTE G., BRACALE R., FRASCHETTI S., PIRAINO S., ZAMPARDI S., 2013. A salp bloom (Tunicata, Thaliacea) along the Apulian coast and in the Otranto Channel between March-May 2013 [version 1; referees: 2 approved]. *F1000Research* 2013, 2: 181 (doi: 10.12688/f1000research.2-181.v1).
- CARDONA L., ÁLVAREZ DE QUEVEDO I., BORRELL A., AGUILAR A., 2012. Massive Consumption of Gelatinous Plankton by Mediterranean Apex Predators. *PLoS ONE* 7(3): e31329. doi:10.1371/journal.pone.0031329.
- PETRESCU I., PETRESCU A., 2016. Invertebrate Collection Donated by Professor Dr. Ion Cantacuzino to "Grigore Antipa" National Museum of Natural History from Bucharest. *Travaux du Muséum National d'Histoire Naturelle «Grigore Antipa»*, 59(1): 7-30.
- RIEDL R., 1991. Fauna e flora del Mediterraneo. *Franco Muzzio Editore*, Padova, 777 pp.

Authors

Cecilia Vianello, Luca Mizzan - Museo di Storia Naturale di Venezia, S. Croce 1730, I-30135 Venezia; cecilia.vianello@fmcvenezia.it, luca.mizzan@fmcvenezia.it

Reference: Vianello C., Mizzan L., 2017. 227 - *Salpa maxima* Forskål, 1775: segnalazione di specie infrequente per le coste veneziane. Biodiversità della Laguna di Venezia e della costa nord adriatica veneta. Biodiversity of the Lagoon of Venice and of the Venetian northern Adriatic coast. *Bollettino del Museo di Storia Naturale di Venezia*, 67: 156-158.

Reptilia, Squamata, Gekkonidae

228 - *Hemidactylus turcicus* (Linnaeus, 1758): third gecko species in the surroundings of Venice (Veneto, Italy)

Records. Two juvenile specimens found inside the locomotive depot of the train station of Mestre-Marghera (Venice, VE) (45.4815846, 12.2107917) by Francesco Spolaor, on March 9th (fig. 1a) and September 9th (fig. 1b), 2014, respectively. The specimens, both photographed and released on site, are recognized as different based on colour pattern and size. Two other juveniles, one slightly larger and one smaller than the 2014 ones, were found and photographed by the same observer in the same building on February 9th and September 7th 2016 respectively.

Two specimens found in Chioggia (VE), Isola Saloni, on September 14th (adult) and October 10th (juvenile) 2016 respectively, by Andrea Comparato, in an apartment in via Saloni Marittima (45.220525, 12.274964), near the harbor; reported by A. Comparato and D. Scarpa. Further communications with local citizens allowed to establish the presence of a population in that district of the town since around the year 2000 at least, with regular sightings of about 10 individuals (including 2-3 small juveniles) per year. The presence of the species is also reported for the nearby districts of Brondolo (at least since 2012) and Sottomarina. Sightings in all areas are supported by videorecordings and photographs of some specimens (Mariangela Gianni, Nico Destro, pers. comm.).

One juvenile (fig. 1c) found in the town of Spinea (VE) on September 19th, 2014, by a



Fig. 1. Three specimens of *H. turcicus* reported in the present note. Photo: F. Spolaor (a, b), M. Bano (c).

local citizen, on a building near the “Nuove Gemme” public park (45.495434, 12.164842 - about 10 km north-west of the Marghera locality and less than 1 km from nearby rail lines); reported by Martina Bano (WWF Preserve “Cave di Noale”). Specimen also photographed and released back in the same place.

Remarks. In the last fifty years or so, in the area of the Lagoon of Venice and its surroundings, as well as in many other areas of northern Italy (especially urban sites), small populations of geckos have been detected and reported. Some of them could be traced back to voluntary or accidental introductions from captive specimens, whereas others likely originated from “hitchhiking” on commercial vehicles or among transported goods (BRUNO, 1980; LAPINI, 1983, 2007; VISINONI, 1994; LAPINI et al., 1999; SINDACO et al., 2006; NOVARINI & SEMENZATO, 2009; NOVARINI, 2012). In fact, among lizards, geckos are well known colonizers that spread easily especially in urban habitats, often by means of human infrastructures and vehicles (trains, trucks, cargo ships, etc.). This is reflected in the “spreading centres” of such alien populations, which often coincide with railway stations, airports, freight terminals, ports, or with sites of industries that make use of raw materials from the natural range of the species (VISINONI, 1994; MESHAKA et al., 2006; LAPINI, 2007; MCCALLUM et al., 2008; KRAUS, 2009).

The ability of *Hemidactylus turcicus* to expand its range through human-mediated dispersal is well known (KRAUS, 2009; MESHAKA et al., 2006; MCCALLUM et al., 2008; MESHAKA, 2011; SACCHI & DELAUGERRE, 2011). Its “natural” range in Italy spans along the coast from Liguria to Marche (including Sicily, Sardinia and most islands), with inland

populations mainly in the South (Venchi in SINDACO et al., 2006; SACCHI & DELAUGERRE, 2011). In the regions bordering Veneto, however, *H. turcicus* is present with small, alien populations in few urban centres (Brescia and Milan in Lombardy, Trieste in Friuli Venezia Giulia, few towns along SW-Emilia Romagna; LAPINI, 1983; LAPINI et al., 1999; MAZZOTTI et al., 1999; BERNINI et al., 2004).

Evidence-supported records of *H. turcicus* for the Veneto region have never been reported before the year 2000 (cfr. BENÀ et al., 1999; BON et al., 2008), when 2 isolated specimens were found in Altavilla Vicentina (SW of Vicenza), both dead later on and one preserved at the Museo Naturalistico Archeologico in Vicenza (FRACASSO & BONATO, 2000; BENÀ, 2007). Although the Altavilla specimens remained isolated sightings, at least two viable populations were recorded in the following years: one in Rovigo, known on buildings along the railway since 1999, and one in Vicenza, in the eastern outskirts of the town at least from 1998 (BENÀ, 2007; by mistake, the latter was associated to a *Tarentola mauritanica* photograph in this publication, however evidences unambiguously refer to *H. turcicus*). Both populations appear still viable, as suggested by further recent sightings (2012-2015; M. Benà and R. Fiorentin, pers. comm.).

Previous known instances, however unsupported, are represented by a map published by BRUNO & MAUGERI (1976) and BRUNO (1986) (also used, modified, in LAPINI, 1983), where two presence “dots” seem to point to Rovigo and to the mainland of Venice (likely Mestre). However, the text does not mention any Veneto locality, the whole Italian distribution of *H. turcicus* being simply referred to that of *Tarentola mauritanica* in the same book, whose account reports only “some stations” within the “Padano-Venetian Plain” (BRUNO & MAUGERI, 1976; BRUNO, 1986). Therefore, in absence of evidences, such records should be regarded as “presumed”, not ascertained, though the Rovigo one may actually refer to the same population later reported by BENÀ (2007).

In the Marghera site, while no adults have been detected so far, the finding of four juveniles (TL ~ 45-56 mm, as estimated from photographs) at different times, spanning at least 3 years, in the same location suggests the existence of a true small population. In Chioggia, the several sightings reported so far span over fifteen years and includes both adults and juveniles, suggesting at least one or maybe two (sighting sites are about 3-4 km apart) viable populations. The specimen from Spinea, however, may be just an isolated individual. As for many geckos, despite the close proximity of a railway or harbor, the possibility of deliberate introduction or accidental escape to explain their origin cannot be ruled out, especially in Spinea, since the Nuove Gemme park and adjacent educational centre have a past history as “animal shelter”, ran by different environmental/animalist associations over time. In any case, further surveys are needed in all sites to evaluate the extent and distribution of the species.

It is worth reporting that in Marghera, within the same train station building and its surroundings, *T. mauritanica* is also present at least since 2005 (F. Spolaor, pers. comm.), therefore the two species appear syntopic at least in this restricted locality. *T. mauritanica* is also reported from Chioggia (N. Destro, pers. comm.), but so far without unambiguous sightings neither precise locality records.

Keywords: *Hemidactylus turcicus*, urban habitat, Lagoon of Venice, mainland, Veneto.

References

- BENÀ M., 2007. Geco verrucoso - *Hemidactylus turcicus* (Linnaeus, 1758). In: Bonato L., Fracasso G., Pollo R., Richard J., Semenzato M. (eds.), *Atlante degli Anfibi e dei Rettili del Veneto*. Associazione Faunisti Veneti, Nuovadimensione, Portogruaro: 130-132.
- BENÀ M., DAL FARRA A., FRACASSO G., MENEGON M., POLLO R., RICHARD J., SEMENZATO M., 1999. Checklist aggiornata e commentata dell'erpetofauna veneta. *Bollettino del Museo Civico di Storia Naturale di Venezia*, 48[1998](Suppl.): 141-147.
- BERNINI F., BONINI L., FERRI V., GENTILI A., RAZZETTI E., SCALI S. (eds.), 2004. Atlante degli Anfibi e dei Rettili della Lombardia. *Pianura Monografie*, n. 5. Provincia di Cremona, Cremona.
- BON M., SEMENZATO M., FRACASSO G., MARCONATO E., 2008. Sintesi delle conoscenze sui vertebrati alloctoni del veneto. *Bollettino del Museo di Storia Naturale di Venezia*, 58(Suppl.): 37-64.
- BRUNO S., 1980. Considerazioni tassonomiche sui "Gekkonidae" italiani. *Atti del Museo Civico di Storia Naturale di Trieste*, 32(1): 111-134.
- BRUNO S., 1986. Tartarughe e Sauri d'Italia. Giunti Martello, Firenze.
- BRUNO S., MAUGERI S., 1976. Rettili d'Italia vol. 1 - Tartarughe e Sauri. Aldo Martello-Giunti Ed., Firenze.
- FRACASSO G., BONATO L., 2000. Altre specie. In: Gruppo di Studi Naturalistici "Nisoria" e Museo Naturalistico Archeologico di Vicenza, *Atlante degli Anfibi e dei Rettili della provincia di Vicenza*. G. Padovan Ed., Vicenza: 182-185.
- KRAUS F., 2009. Alien Reptiles and Amphibians - A scientific compendium and analysis. Springer Netherlands.
- LAPINI L., 1983. Anfibi e Rettili. C. Lorenzini Ed., Tricesimo (UD).
- LAPINI L., 2007. Stato delle conoscenze sull'erpetofauna attuale. In: AA.VV., *Salvaguardia dell'Erpetofauna nel Territorio di Alpe-Adria*. Regione Autonoma Friuli Venezia Giulia, Udine: 27-57.
- LAPINI L., DALL'ASTA A., BRESSI N., DOLCE S., PELLARINI P., 1999. Atlante Corologico degli Anfibi e dei Rettili del Friuli-Venezia Giulia. Museo Friulano di Storia Naturale, Udine.
- MAZZOTTI S., CARAMORI G., BARBIERI C., 1999. Atlante degli Anfibi e dei Rettili dell'Emilia-Romagna (Aggiornamento 1993/1997). *Quaderni del Museo Civico di Storia Naturale di Ferrara*, 12.
- MCCALLUM M.L., LANGLEY A.R., MESHAKA W.E.J., 2008. Human-Mediated Dispersal of the Mediterranean Gecko (*Hemidactylus turcicus*) in Texas. *Journal of Kansas Herpetology*, 25: 21.
- MESHAKA W.E.J., 2011. A Runaway train in the making: the exotic amphibians, reptiles, turtles, and crocodilians of Florida. *Herpetological Conservation and Biology*, 6(Monogr. 1): 1-101.
- MESHAKA W.E.JR., MARSHALL S.D., BOUNDY J., WILLIAMS A.A., 2006. Status and geographic expansion of the Mediterranean gecko, *Hemidactylus turcicus*, in Louisiana: implications for the Southeastern United States. *Herpetological Conservation and Biology*, 1(1): 45-50.
- NOVARINI N., 2012. 218 - *Cyrtopodion kotschy* (Steindachner, 1870): established population confirmed. Biodiversità della Laguna di Venezia e della costa nord adriatica veneta. Biodiversity of the Lagoon of Venice and of the Venetian northern Adriatic coast. *Bollettino del Museo di Storia Naturale di Venezia*, 63: 178-179.
- NOVARINI N., SEMENZATO M., 2009. 205 - *Tarentola mauritanica* (Linnaeus, 1758) (Reptilia Squamata Gekkonidae). Espansione di areale distributivo. Biodiversità della Laguna di Venezia e della costa nord adriatica veneta. Biodiversity of the Lagoon of Venice and of the Venetian northern Adriatic coast. *Bollettino del Museo di Storia Naturale di Venezia*, 59[2008]: 171-173.
- SACCHI R., DELAUGERRE M., 2011. *Hemidactylus turcicus* (Linnaeus, 1758). In: Corti C., Capula M., Luiselli L., Sindaco R., Razzetti E. (eds.), *Fauna d'Italia, vol. XLV, Reptilia*. Calderini, Bologna: 271-276.
- SINDACO R., DORIA G., RAZZETTI E., BERNINI F. (eds.), 2006. Atlante degli Anfibi e dei Rettili d'Italia. *Societas Herpetologica Italica, Edizioni Polistampa*, Firenze.
- VISINONI A., 1994. L'insediamento di *Tarentola mauritanica* (Linnaeus, 1758) a Venezia (Sauria, Gekkonidae). *Lavori della Società Veneziana di Scienze Naturali*, 19: 89-98.

Author

Nicola Novarini - Museo di Storia Naturale di Venezia, S. Croce 1730, I-30135 Venezia; nicola.novarini@fmcvenezia.it

Reference: Novarini N., 2017. 228 - *Hemidactylus turcicus* (Linnaeus, 1758): third gecko species in the surroundings of Venice (Veneto, Italy). Biodiversità della Laguna di Venezia e della costa nord adriatica veneta. Biodiversity of the Lagoon of Venice and of the Venetian northern Adriatic coast. *Bollettino del Museo di Storia Naturale di Venezia*, 67: 158-161.