



Review of *Nychia marshalli* in the Western Palearctic, with new records and distributional notes (Hemiptera: Heteroptera: Notonectidae)

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Abstract

The backswimmer *Nychia marshalli* (Scott, 1872) (Hemiptera: Heteroptera: Notonectidae) is reported for the first time from Italy on the island of Sardinia. A new record of *N. marshalli* from Corsica (the first from the eastern coast) is provided and the distribution of the species in the Western Palearctic region is summarized. Although records of *N. marshalli* continue to be documented around the western Mediterranean, its distribution in the remaining part of its range can still be improved and the relationship of the Palearctic population to sub-Saharan populations of *Nychia* needs to be further investigated.

Key words: Corsica, distribution, France, Italy, Mediterranean, Nepomorpha, Sardinia

Introduction

Nychia marshalli (Scott, 1872) is a species of backswimmer that was originally described as *Antipalocoris marshalli* (Scott, 1872) in Marshall (1872b: 245) by the English entomologist John Scott (1823–1888) (Carrington 1888). Scott’s description was based on several specimens collected in 1870 (Marshall 1872a) at the mouth of the river Gravona, in western Corsica, by the English cleric and entomologist Thomas Ansell Marshall (1827–1903) (McLachlan 1903). This species (sometimes misidentified as *N. limpida* Stål, 1860), was subsequently extensively recorded in tropical Africa where it is widespread across Sub-Saharan Africa, reaching as far as South Africa (e.g., Hutchinson 1929, 1933; Jaczewski 1933; Lundblad 1933; Poisson 1948, 1951, 1957, 1966; Bertrand 1962; Linnavuori 1971; Sallier Dupin 1974; Lansbury 1985).

Until recently, *N. marshalli* had not been recorded in Corsica (Hutchinson 1933; Poisson 1957; Polhemus 1995; Chen & Nieser 2011) since the type series was collected in 1870 (Marshall 1872a, b). Moubayed-Breil *et al.* (2013), in an ecological study based on material sampled between 1995 and 2012, reported a new site for *N. marshalli* on the island. This species was indicated as “rare, N < 5 individuals” at the estuary of the Fango River, in western Corsica.

Concerning the presence of *N. marshalli* in North Africa, Poisson (1957, 1966) noted its occurrence in “Afrique méditerranéenne” but without specifying any records or localities. Records from Algeria were included in a thesis by Tebibel (1991), but this grey literature was subsequently overlooked (e.g., Polhemus 1995; Chen & Nieser 2011). Annani *et al.* (2012) published the first records for eastern Numidia in northeastern Algeria and also included records from Tebibel’s (1991) thesis. In a subsequent thesis, Annani (2013) included the records from Annani *et al.* (2012) and combined them in a map with the previous records from other areas of Algeria included in the thesis by Tebibel (1991). Aouadi (2022), in his thesis, reported several specimens (n = 75) of *Nychia* sp. collected in the peri-urban marshland of Bousseadra, at Annaba (Numidia, Algeria).

During the 2010s, L’Mohdi *et al.* (2016) provided the first record of *N. marshalli* from Morocco and summarised the distribution references from Europe and Maghreb. They included a map (including the sites from the theses) but

erroneously illustrated previous records from Corsica on Sardinia. Chakour *et al.* (2017) included the same record as L'Mohdi *et al.* (2016) in a contribution on the aquatic insects of the central plateau of Morocco.

Lundblad (1933) and Lansbury (1985) confirmed that the specimens from the type series (Corsica) and those from some localities in the Afrotropical region are conspecific, i.e., *N. marshalli*. Chen & Nieser (2011) redescribed the Oriental species *N. limpida* on the basis of new material from southern China and confirmed its distinctness from the Australasian species *N. sappho* Kirkaldy, 1900, with which *N. marshalli* had been confused in the past (see Hutchinson 1929; Lundblad 1933; Lansbury 1985). However, the genus in the Indian subregion is still poorly known (Hutchinson 1933; Basu *et al.* 2016) and the status of *N. infusca* Paiva, 1918 is still ambiguous (Lansbury 1985), while records of *Nychia* (sub *N. marshalli*) from Sri Lanka remain unverified and doubtful (Distant 1910; Hutchinson 1929, 1933; Lansbury 1985).

In this contribution, new records of *N. marshalli* for the Mediterranean islands of Sardinia (first country record for Italy) and Corsica (France) were provided, together with an updated and corrected map of the distribution of this species in the Western Palaearctic region.

Material and methods

All of the records are ordered as follows: country, administrative divisions, locality, water body, elevation (metres above sea level), georeferencing (geographic coordinates in decimal degrees; *datum*: WGS84), date, collector/observer, number of specimens, sex and (possibly) wing morph, repository, bibliographic reference/s with original citations (in quotation marks). Deduced data are in square brackets. Uncertainty of georeferenced sites (in metres) is indicated according to the point-radius method (Wieczorek *et al.* 2004).

Habitus images of the Corsican specimen were taken with a Leica M205 C stereomicroscope and dedicated software (Leica LAS v. 4.3) for Z-stacking at the Natural History Museum of the University of Florence. Post-processing of the figures was performed with Adobe Photoshop CS3 Extended (v. 10.0). The map (Fig. 1) was prepared using Google Earth Pro software (v. 7.3.6). The record for Sardinia is available from the platform “iNaturalist”, the system for sharing biodiversity records (www.inaturalist.org) and archived on GBIF (iNaturalist contributors, iNaturalist, 2024).

Abbreviations: brach. = brachypterous; CAM = Collection Andrea Marata, Monte San Giusto (Macerata), Italy; CFC = Collection Fabio Cianferoni, Firenze, Italy; BMNH = Natural History Museum, London, United Kingdom.

Results

Nychia marshalli (Scott, 1872)

Antipalocoris marshalli Scott, 1872 in Marshall (1872a: 191), “The new species here published were taken by me in the summer of 1870”, “*Antipalocoris* abundantly, swimming in small shoals, like fishes, against the current”; Scott in Marshall (1872b: 245), “Several specimens were taken at the mouth of the Gravone river, in company with *Anisops niveus*”. Puton (1875: 102), “Cors.”, Puton (1880: 247), “Corse dams le Gravone par M. le Rev. Marshall”, Puton (1886: 65), “Cors.”, quotations of Scott in Marshall (1872b).

Nychia limpida Stål, 1860. Horváth (1918: 143). “Corsica”, quotation of Scott in Marshall (1872b). Synonymisation of *Antipalocoris marshalli* Scott with *Nychia limpida* Stål; Stichel (1955: 88), “Korsika”, quotation of Scott in Marshall (1872b); Servadei (1967: 18), “Corsica”, quotation of Scott in Marshall (1872b).

Nychia limpida limpida Stål, 1860. Hutchinson (1929: 412), “Corsica”, quotation of Scott in Marshall (1872b).

Nychia marshalli (Scott, 1872). Oshanin (1909: 972), “Corsica”; Oshanin (1912: 91), “Co [= Corsica]”, quotations of Scott in Marshall (1872b); Lundblad (1933: 155), “[...] Jahre 1872 wurde von Scott [...] Korsika”, quotation of Scott in Marshall (1872b); Poisson (1957: 147), “Corse (la Gravone) (Marshall)”, quotation of Scott in Marshall (1872b); Lansbury (1985: 2), “Corsica”, quotation of Scott in Marshall (1872b); Polhemus (1995: 73), “FR (Corsica)”, quotation of Scott in Marshall (1872b); Chen & Nieser (2011: 228), “Corsica [...] in 1870 [...] (Marshall, 1872)”. quotation of Scott in Marshall (1872b); Tebibel (1991: 141), “[...] 10 Km [sic!] Sud Barika”; “Mare à l'Oued Arbatache”; “Oued Mouzaia” (records included in the species map by Annani (2013: 167); Annani *et al.* (2012: 427), “O. Kebir”, “Aïn Smara [...]”, “Ben Yahia Abderrahmane [...]”; Annani (2013: 138), “O. Kebir”, “Aïn Smara (mare)”, “Ben Yahia Abderrahmane (Château d'eau)”; Moubayed-Breil *et al.* (2013: 44), “estuary of the Fango River”. L'Mohdi *et al.* (2016: 80), “Rabat-Oued Grou [...]”; Chakour *et al.* (2017: 309), “Oued Boumakla [...]”, quotation of L'Mohdi *et al.* (2016).

Nychia marshalli marshalli (Scott, 1872). Poisson (1966: 743), “Afrique éthiopienne et méditerranéenne ; Corse, etc.”, in part quotation of Scott in Marshall (1872b).

Note: Selected references for the quotations of Scott in Marshall (1872b).

Published records in the Palearctic region. FRANCE: Western Corsica, Gulf of Ajaccio, mouth of river Gravona, [41.90649° N 8.799064° E; uncertainty = 300 m], [0 m a.s.l.], summer of 1870, T.A. Marshall legit, several specimens, BMNH (Marshall 1872a; Scott in Marshall 1872b; Puton 1875, 1880, 1886; Oshanin 1909, 1912; Horváth 1918, Hutchinson 1929, Lundblad 1933; Stichel 1955; Poisson 1957, 1966; Servadei 1967; Lansbury 1985; Polhemus 1995; Chen & Nieser 2011; etc.). Western Corsica, Haute-Corse, mouth of Fango River, [42.41940° N 8.662006° E, uncertainty = 350 m], [1–2 m a.s.l.], [1995–2012], (Moubayed-Breil *et al.* (2013): “estuary of the Fango River (Scandola Nature Reserve), zone C, freshwater”). **ALGERIA:** Batna Province, 10 km south of Barika, agricultural reservoir, [35.29527° N 5.36964° E, uncertainty = 3 km], [ca. 460 m a.s.l.], (Tebibel (1991): “Retenue collinaire à 10 Km [sic!] Sud Barika”; Annani (2013): record included in the species map). Boumerdès Province, pond at Oued [= wadi] Arbatache, [36.60740° N 3.35172° E, uncertainty = 6 km], [80–220 m a.s.l.], (Tebibel (1991): “Mare à l’Oued Arbatache”; Annani (2013): record included in the species map). Médéa Province, Oued [= wadi] Mouzaïa, [36.33339° N 2.76126° E], [350–480 m a.s.l.], (Tebibel (1991): “Oued Mouzaïa”; Annani (2013): record included in the species map). Eastern Numidia, el Taref Province, Oued [= wadi] Kebir, [36.62558° N 7.98235° E, uncertainty = 24 km], [1989–1999], (Annani *et al.* (2012): “E34, O. [= Oued] Kebir”; Annani (2013): “E34, Oued Kebir”). Constantine Province, Aïn Smara, pond on wadi, [36.28386° N 6.51439° E, uncertainty = 30 m], 609 m a.s.l., [1989–1999], (Annani *et al.* (2012): “O2 [=C2], Aïn Smara (36° 16’ 54.17”N, 6° 30’ 54.96”E, altitude: 598 m): a wadi with residual pools”; Annani (2013): “C4, Aïn Smara (mare), 36° 17’ 01.92”N, 6° 30’ 51.82”E Altitude: 609 m”). Mila Province, Benyahia Abderrahmane “Château d’eau”, permanent pond, [36.23591° N 6.01085° E, uncertainty = 10 m], 969 m a.s.l., [1989–1999], (Annani *et al.* (2012): “O3 [=C3], Ben Yahia Abderrahmane (36°14’05.16”N, 6°00’43.28”E, altitude: 965m): a shallow pond covered by *Lemna* sp.”; Annani (2013): “C11, Ben Yahia Abderrahmane (Château d’eau), 36° 14’ 09.14”N, 6° 00’ 38.87”E Altitude: 969 m”). Eastern Numidia, Annaba Province, Annaba municipality, marshland of Boussedra at Annaba, [36.84623° N 7.72791° E, uncertainty = 450 m], [5 m a.s.l.], (Aouadi (2022): “Boussedra [...] *Nychia* sp.”). **MOROCCO:** Khémisset Province, Moulay Driss Aghbal municipality, Oued [= wadi] Boumakla (lower course), [33.75608° N 6.53818° W, uncertainty = 50 m], 117 m a.s.l., 20.VI.2013, 1 female and 1 male brach., (L’Mohdi *et al.* (2016): “Rabat-Oued Grou, GC: 33°45’21.92” N, 6°32’17.45” W, 20/06/2013, 1 ♀ and 1 ♂ brachypterous”; Chakour *et al.* (2017): “G3 | Oued Boumakla | Moulay Driss Aghbal | Khémisset | 33°45’21,92” | 6°32’17,45” | 117 | OCI [curso inferior del rio] || G3: 20-VI-2013 (2)”).



FIGURE 1. Distribution of *Nychia marshalli* (Scott, 1872). White circles: published records; red circle: new records (Image Landsat / Copernicus. Data SIO, NOAA, U.S. Navy, NGA, GEBCO. © 2024 Google).

New records. Material examined. ITALY: Sardinia, Nuoro Province, Villanova Strisaili municipality, Bau Mela (torrent), pools on the stream, 39.99276° N 9.4171° E (uncertainty = 65 m), 823 m a.s.l., 9.VIII.2021, photo by Daniel Linzbauer, mating specimens (iNaturalist, observation ID 93079455; Fig. 2), M.R. Pintar & F. Cianferoni det. **FRANCE:** Corsica, Haute-Corse department, Solaro municipality, river Solenzara, near U Ponte Grossu, residual pond, 41.83532° N 9.32155° E; uncertainty = 5 m, 110 m a.s.l., [outside the Parc naturel régional de Corse], 1.IV.2018, Andrea Marata legit, “Corsica, Sari Solenzara | U ponte grossu | 01.IV.2018 Leg. A. Marata”, 1 male, 4 females brach. (CAM); *idem*, 3 males, 3 females brach., Fig. 3, (CFC), F. Cianferoni det.



FIGURE 2. Specimens of *Nychia marshalli* (Scott, 1872) from Sardinia (photo by Daniel Linzbauer; CC-BY 4.0; cropped).

Discussion

Keys to the genera and species of Notonectidae rely on a combination of dorsal, ventral, and genital characteristics for identification (e.g., Nieser 2004). However, we were able to identify this observation as *N. marshalli* using a single ventral photo (Fig. 2) based on the following combination of distribution and characters. First, only three genera of Notonectidae occur within the Mediterranean region: *Anisops*, *Notonecta*, and *Nychia*. Both *Anisops* and *Nychia* are smaller (length typically < 6 mm) and with proportionally narrower bodies than the larger *Notonecta* (*Notonecta* s. str. adult lengths are typically > 9 mm). *Nychia* can be distinguished from *Anisops* based on the relative lengths of the segments of the hind legs (Hutchinson, 1929). In *Nychia*, the hind femur, tibia, and tarsus are subequal in length whereas in *Anisops* these segments are unequal, with the tarsus being noticeably shorter than the other segments. Additionally, the head width of *Nychia* is distinctly narrower than the posterior width of the pronotum; the three species of *Anisops* that occur in the Mediterranean (Polhemus 1995) region do not have such distinctly narrower heads (Brooks 1951). Of the three currently valid species of *Nychia*, only *N. marshalli* occurs in Africa and the Mediterranean (Chen & Nieser 2011).

Until the end of the twentieth century, the distribution of *Nychia marshalli* appeared to be discontinuous: widespread in tropical Africa but with a single record in the Western Palaearctic region (i.e., Corsica, from the original description of the species). Hutchinson (1933) tried to explain this distribution by considering the Corsican specimens as a relict population “bearing witness to a former wide dispersal”, with the additional justification that “the countries abutting on the north of the Mediterranean have been adequately studied and Nord Africa in [sic] extremely well known”.



FIGURE 3. Female brachypterous specimen of *Nychia marshalli* (Scott, 1872) from Corsica, in dorsal (on the left) and ventral (on the right) view. Scale bar = 1 mm. (photo by Fabio Cianferoni).

Considering the scarcity of data across northern Africa in particular, we cannot definitively describe the distribution of *N. marshalli* in relation to the Sub-Saharan population. However, the recent records in Maghreb and those from Sardinia and Corsica suggest that this species at least has a much wider distribution across the Mediterranean region. A continuous distribution of this species from southern Africa to the Mediterranean is possible, but the lack of suitable habitat across much of the vast Sahara may create a barrier to maintaining a continuous distribution. Hence, the Mediterranean population may be disjunct and a result of changing habitat across northern Africa since the last glacial maximum. A wide distribution across the Mediterranean but separated from the distribution in Sub-Saharan Africa is a distinct concept from Hutchinson's (1933) idea of the occurrence of *N. marshalli* on Corsica being a relict population. However, due to the lack of data across northern Africa, it remains possible that the distribution of *N. marshalli* is continuous from Corsica to South Africa if there are corridors that support dispersal and gene flow (e.g., along the Nile). Indeed, a similar common notonectid species, *Anisops sardeus* Herrich-Schäffer 1849, has a similar but better-known distribution from southern Europe to southern Africa.

Even after centuries of investigations, there is a notable lack of research in both North Africa (*cf.*, Slimani *et al.* 2015, 2016) and Sardinia (Carapezza *et al.* 2023). Also, misidentifications of *Nychia* with *Anisops* spp. or even with immature specimens of other Notonectidae cannot be totally excluded. In fact, the two genera can co-occur, as noted by Scott in Marshall (1872) who wrote in the description of *Antipalocoris marshalli* (= *N. marshalli*) that the “specimens [...] were taken [...] in company with *Anisops niveus*” (= *A. sardeus* suspected misidentification). However, a recent expansion cannot be ruled out, as detected in other nepomorphans in the W-Palaeartic (e.g., Cianferoni 2013; Reduciendo Klementová & Svitok 2014; Cianferoni & Cianfanelli 2015; Cianferoni & Mazza 2023).

Concerning the new records, the Sardinian observation represents the first record for Italy of *N. marshalli*, expected given its presence in Corsica and Africa (F. Cianferoni, pers. obs.) but so far never found on the Italian

island (Cianferoni 2021). The new Corsican record is the first one for eastern Corsica (overlooking the Tyrrhenian Sea), since so far, the only known records (Marshall 1872; Moubayed-Breil *et al.* 2013) were for western Corsica (overlooking the Corsican Sea). The specimens listed as *Nychia* sp. in the thesis of Aouadi (2022) for northeastern Algeria, are considered here as *N. marshalli*, since it is the only species of the genus occurring in the area and since this taxon is listed together with the other two genera of Notonectidae (*Anisops* sp. and *Notonecta* sp.) present in North Africa, leading to the assumption of correct genus identification.

As already observed by Lundblad (1933) and Lansbury (1985) comparing the type series from Corsica with material from East Africa, the new material from Corsica did not reveal any relevant difference (in habitus, arrangement of comb of bristles, hairs and spines in the front legs, shape of parameres and aedeagus) when compared with individuals from tropical Africa (F. Cianferoni, unpublished data). Therefore, it is possible to confirm that the Mediterranean populations belong to the same species of those from the Afrotropics. However, the affinities within the Afro-Mediterranean populations of *N. marshalli* and between the latter and other congeneric species need to be further investigated and they will be treated in a dedicated contribution. At present, many older specimens from tropical Africa in collections often bear labels of various names that have since been redefined; such identification should be treated with caution and revisited following a review of the genus in Africa.

Considering the currently known distribution of *N. marshalli* in the Western Palearctic, which more or less coincides with a W-Mediterranean chorotype (*sensu* Vigna Taglianti *et al.* 1999), the species should be searched for at least in the Mediterranean portion of Spain and France and perhaps also on the Tyrrhenian coast of mainland Italy. In fact, a record of *N. marshalli* for southern France exists on the Global Biodiversity Information Facility (GBIF). This species, according to this source (Inventaire National du Patrimoine Naturel 2023 – www.gbif.org/occurrence/4085479320), was observed (“human observation”) by Claire Mouquet and François Dusoulie in 2017 (1 September) and identified by F. Dusoulie in 2021 from the surroundings of Évenos, in the department of Var. However, the identification is registered as “douteux” (doubtful) and indeed the site (43.15388° N 5.85699° E, uncertainty = 25 m), on a slight elevation (107 m a.s.l.), does not seem very compatible with the sites where the species was recorded in the Mediterranean (see above). Unfortunately, it was not possible to obtain further information from the identifier. Therefore, we consider this record dubious and we exclude it from the map pending further research (also necessary because if confirmed, it would represent the northernmost record of the species as well as the first record for continental Europe). A further observation from northwestern Corsica is available in GBIF (Inventaire National du Patrimoine Naturel 2017 – www.gbif.org/occurrence/2498754685), very close to the site of the estuary of the Fango River (see Material and methods). It is a “human observation” by Sébastien Damoiseau of 2017 (7 September). However, since the identification (by the observer) is listed as “probable” and the coordinates (42.40796° N 8.70711° E) and elevation (190 m) are not consistent, we preferred to also consider this record doubtful (at the scale used in the map [Fig. 1] it is nevertheless more or less coincident with the record of the estuary of the Fango River).

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