GLOBAL BIODIVERSITY AND GEOGRAPHICAL DISTRIBUTION OF
DIAPAUSING AQUATIC INVERTEBRATES: THE CASE OF THE
COSMOPOLITAN BRINE SHRIMP, *ARTEMIA*
(BRANCHIOPODA, ANOSTRACA)

BY

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ABSTRACT

The genus *Artemia* comprises passively dispersed anostracan species with a distribution all around the world, except in Antarctica. We used both published and personal data to assess and update existing knowledge on the diversity and distribution of *Artemia*, in particular compiling also genetic and geographic information. Our results indicate there are three *Artemia* complexes, *A. franciscana*, *A. tibetiana* and *A. salina*, suggesting at least three undescribed, and one unidentified to date, highly isolated lineages, to be re-evaluated taxonomically. Additionally, at a global scale, our data set shows two large, poorly explored geographic regions in Central East Asia, which in future studies could provide interesting information on geographic speciation, the origin of parthenogenesis, and range expansion in this group. We also discuss the implications for conservation as derived from knowledge on the biodiversity (native and invasive species) and geographic distribution (i.e., identification of species/lineages, and regions occupied), which have major relevance for conservation management at the level of wetland ecosystems.

RESUMEN

El género *Artemia* está constituido por anostrácodos dispersados de forma pasiva con una distribución alrededor de todo el mundo, excepto en la Antártica. Utilizamos tanto datos propios como publicados para investigar y actualizar la información existente sobre la diversidad y distribución de *Artemia*, en concreto compilamos datos genéticos y geográficos. Nuestros resultados indican que existen tres complejos de *Artemia*, *A. franciscana*, *A. tibetiana* y *A. salina*, sugiriendo al menos tres linajes aislados no determinados, y uno no descrito hasta ahora, para ser re-evaluados taxonómicamente. Así mismo, y a una escala global, nuestros datos muestran dos grandes regiones geográficas

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pobablemente exploradas en el Este Central de Asia, que en futuros estudios podrían proporcionar una información interesante sobre la especiación geográfica, el origen de la partenogénesis y la expansión de rango en este grupo. También discutimos las implicaciones para la conservación derivadas del conocimiento de la biodiversidad (especies nativas e invasoras) y la distribución geográfica (i.e., identificación de especies/linajes y regiones que ocupan), lo cual tiene una gran relevancia para el manejo de la conservación a nivel de ecosistemas de humedales.

INTRODUCTION

Recording global biodiversity, in terms of the number of species, represents one of the main challenges for biologists. That challenge, however, becomes utopian because of, e.g., differences in collecting activities, like lower efforts in as yet unexplored areas (Sánchez-Fernández et al., 2008), the complications in identifying ‘sibling/cryptic’ species (Weaver et al., 2008), etc. Nonetheless, efforts have been made during the last decades to record global diversity and to compile biogeographical information (Edwards, 2004; Wheeler, 2004).

Also, the role of human-mediated dispersal in increasing the geographical distribution range of some species, and in enhancing the chances of invasion events is well known (Suarez & Tsutsui, 2008). Because of the ecological impact invasions may have, species identification and knowledge of their geographical distribution, of both native and invasive taxa, constitute essential issues in ecology today.

The use of a DNA ‘barcode’, i.e., an inventory of DNA sequences from the standardized genomic region of the mitochondrial gene for cytochrome *c* oxidase subunit I — COI (Hebert et al., 2003, but see also the Consortium for Barcode Life Website: <http://www.barcoding.si.edu/>), has been proposed to assign an unknown sample to a known species, and/or to detect previously unsampled species as distinct, assisting traditional identification methods. Though this has allowed the discovery of new species in several taxa, it has also been criticized and it currently is considered a controversial method, but well supported in general (Meyer & Paulay, 2005; Strugnell & Lindgren, 2007; Wiemers & Fiedler, 2007). The use of the COI mitochondrial gene has only been tested in a few taxa of the Crustacea (cf. DeWaard et al., 2006; Costa et al., 2007; Muñoz et al., 2008).

Among crustaceans, the brine shrimp, *Artemia* (Branchiopoda, Anostraca) is a well-known, extremely halophilic organism with a worldwide distribution. The genus has been quite well described taxonomically, and is composed of a few species with sexual reproduction and some parthenogenetic lineages. The species inhabit saline and hypersaline lakes and wetlands, for a large part related to human activities (i.e., saltworks) for several millennia, which implies that the current distribution of various *Artemia* species could be derived from deliberate or accidental inoculation.

The actual aim of our present study was to investigate if detailed knowledge on the taxonomic status and geographic distribution of the species and lineages of *Artemia* could be of use in (a) evaluating the state of our knowledge on the biodiversity of the genus on saline and hypersaline wetland ecosystems on a global scale; (b) identifying possibly existing relevant gaps in our knowledge on the geographic distribution in *Artemia*; and possibly; (c) deriving measures that could be instrumental in a proper management of the wetlands under concern.

Specifically, we focus on the following questions: (1) Does the taxonomy of *Artemia* need re-evaluation in the light of molecular data? (2) Does the updated, known geographical distribution of *Artemia* show any relevant gap of information that should be filled as soon as possible?

MATERIAL AND METHODS

Study organism

Artemia spp. have rather extensively been described in several books, with regard to their toxicology, physiology, genetics, ecology, biogeography, and applications in aquaculture (Persoone et al., 1980; Sorgeloos et al., 1987; Abatzopoulos et al., 2002), to the extent that it has been labelled the ‘aquatic *Drosophila*’ due to its advantages for use as a model organism (Gajardo & Beardmore, 2001). This genus inhabits hypersaline (45–370 g/L) patchy habitats around the world, except Antarctica (Triantaphyllidis et al., 1998). However, the persistence of endemic lineages and native *Artemia* species is affected by loss of their habitats and by the introduction of the American species, *A. franciscana* Kellogg, 1906 in Europe and on other continents (Amat et al., 2007; McMaster et al., 2007).

The genus currently comprises six sexual species: *A. franciscana* Kellogg, 1906; *A. persimilis* Piccinelli & Prosdocimi, 1968; *A. salina* (Linnaeus, 1758); *A. urmiana* Gunther, 1900; *A. sinica* Cai, 1989; and *A. tibetiana* Abatzopoulos, Zhang & Sorgeloos, 1998; as well as several *A. parthenogenetica* Bowen & Sterling, 1978 lineages (only present in the Old World and Australia) with different ploidy (2n, 3n, 4n, 5n). Additionally, several genetically differentiated lineages have recently been uncovered, suggesting a taxonomic re-evaluation of the genus might be required (Hou et al., 2006; Tizol-Correa, 2006; Muñoz et al., 2008).

Genetic data and analyses

We used nine haplotypes (i.e., different sequences) of a fragment of the mitochondrial COI gene from six sexual *Artemia* species and one diploid parthenogenetic lineage. *Artemia* COI sequences were downloaded from GenBank and

aligned (576 base pairs) using the Sequencher™ v4.5 software (Gene Codes Corp.) in order to assess their interspecific phylogenetic relationships. We also added a new sequence, obtained in our laboratory, from Cape Verde (see table I for details). We focused on two different objectives: (1) to investigate the phylogenetic relationships of the various *Artemia* species including all available COI data to shed light on the true biodiversity of the group; and (2) to explore the usefulness of the COI gene as a DNA ‘barcode’ in *Artemia*.

The evolutionary history among the *Artemia* sequences was inferred using the Neighbor-Joining method. Phylogenetic analyses were conducted in MEGA4 (Tamura et al., 2007) using evolutionary distances computed with the Maximum Composite Likelihood method and the Tamura-Nei substitution model. The robustness of the branches was assessed with 2000 bootstrap pseudo-replicates.

Geographic data

Localities were recorded from both published (33 references in total) and personal data (see Supplementary Information: Suppl. Inf., in the online version of this paper, at: www.brill.nl/cr). The locality coordinates were obtained through the Alexandria Digital Library Gazetteer services (see <http://clients.alexandria.ucsb.edu/globetrotter/>), by introducing the site name and checking the results with images of Google Earth to assess the presence of water bodies. Subsequently, the locations with their correct coordinates were entered into Excel tables, which were subsequently imported by ArcGis Desktop package (Quantum GIS Development Team, 2009). Spatial data obtained through this procedure were used to map the distribution of *Artemia* species around the world by creating an independent layer for each species (specific maps not included in this paper, but available on request).

Our present study includes only those maps where undescribed *Artemia* and *A. franciscana* occur, in order to visualize the overlapping between unknown or invasive species and the main ‘hotspots’ identified on Earth (i.e., geographic areas characterized both by containing a large number of endemic species and having serious levels of habitat loss; see Website: <http://www.biodiversityhotspots.org/Pages/default.aspx>).

Van Stappen (2002) listed the most recent inventory of localities where *Artemia* can be found, which included previously described sites and those obtained through personal and informal communication, correspondence, or trip reports (see Van Stappen, 2002 for details). Here, we removed those sites reported only through personal communication if they could not be localized geographically with the method described above. The present data also correct geographical coordinates that were incorrectly stated in previous reports (see Suppl. Inf. for details).

TABLE I
Data set of cytochrome *c* oxidase subunit I (COI) sequences used in the phylogenetic analyses. Described and undescribed species, localities, codes, GenBank accession numbers, and references where the published sequences can be found, are indicated. The asterisk indicates the most frequent haplotype in the diploid parthenogenetic *Artemia* lineage, ranging from Spain to Kazakhstan

Described species	Locality/Country	Code	GenBank Acc. Num.	Reference
<i>A. franciscana</i> Kellogg, 1906	Utah/U.S.A.	AFUTAH	DQ119645	Hou et al., 2006
<i>A. franciscana</i>	San Francisco Bay/U.S.A.	AFSFCO	DQ119646	Hou et al., 2006
<i>A. franciscana</i>	Camaguey/Cuba	AFCUBA	DQ401270	R. Tizol-Correa et al., unpubl.
<i>A. salina</i> (Linnaeus, 1758)	Oualidia/Morocco	ASMOR	EU543452	Muñoz et al., 2008
<i>A. salina</i>	Ain Beïda/Algeria	ASALG	EU543467	Muñoz et al., 2008
<i>A. tibetiana</i> Abatzopoulos, Zhang & Sorgeloos, 1998	China	ATIB	EF615588	W. Wang & Q. Luo, unpubl.
<i>A. urmiana</i> Gunther, 1900	Urmia Lake/Iran	AUR	DQ119651	Hou et al., 2006
<i>A. persimilis</i> Piccinelli & Prosdocimi, 1968	Buenos Aires/Argentina	APER	DQ119647	Hou et al., 2006
<i>A. sinica</i> Cai, 1989	Shui Quan Zi/Mongolia	ASIN	DQ119650	Hou et al., 2006
<i>A. parthenogenetica</i> Bowen & Sterling, 1978	*Extensive	APD	DQ426825	J. Muñoz et al., unpubl.
Undescribed brine shrimp — <i>Artemia</i> spp.				
<i>Artemia</i> sp. 'Cape Verde'	Pedra de Lume/Cape Verde	A. sp. CV	No available	This study
<i>Artemia</i> sp. 'Mexico'	Yucatan/Mexico	A. sp. MX	DQ401277	R. Tizol-Correa et al., unpubl.
<i>Artemia</i> sp. 'Tibet'	Tibet/China	A. sp. TIB	DQ119652	Hou et al., 2006
<i>Artemia</i> sp. 'Veldrif'	Veldrif/South Africa	A. sp. VEL	EU543485	Muñoz et al., 2008
<i>Artemia</i> sp. 'Kazakhstan'	Kazakhstan	A. sp. KAZ	DQ119653	Hou et al., 2006

RESULTS

Phylogenetic relationships

Our phylogenetic reconstruction using COI (fig. 1) is congruent with the pattern of evolutionary relationships reported previously for *Artemia* (see Muñoz et al., 2008 and references therein). Similar results were found with other molecular markers, such as the nuclear Internal Transcribed Spacer 1 (ITS1) or the mitochondrial 16S rDNA unit (Baxevanis et al., 2006; Hou et al., 2006). However, with the addition of all available sequences, our results show the presence of three isolated *Artemia* complexes with one highly isolated lineage within each one: the *A. franciscana* complex, *A. tibetiana* complex, and *A. salina* complex. The *A. franciscana* and *A. salina* complex are both monophyletic, while the *A. tibetiana* complex shows an undescribed lineage (*A. sp. TIB*) as a paraphyletic unit. The *A. tibetiana* species cluster, in their turn, in a monophyletic way with the parthenogen and other Central Asian species (AUR; *A. sp. KAZ*).

In addition, our results show the presence of three undescribed and highly isolated *Artemia* lineages (*A. sp. CV* from Cape Verde; *A. sp. TIB* from Tibet; *A. sp. KAZ* from Kazakhstan), and one unidentified lineage (ASVEL from Veldrif — South Africa).

Geographic distribution

The *Artemia* data here presented show our lack of knowledge on biodiversity (undescribed and unidentified species), and subsequently on biogeographical information (distribution range), in a large part of the world: Africa, Europe, Asia, Australia, and South America (see fig. 2a, b). This information shortage includes almost all American hotspots (fig. 2b), such as the Caribbean, the California coast, Mesoamerica or Western Ecuador, and five hotspots in the rest of the continents (fig. 2a).

Additionally, our results indicate that non-hotspot areas are in need of more scientific attention through further study. Two large regions, in Central and Central-East Asia could be categorized as ‘unknown areas’, comprising a high number of sites where *Artemia* occurs, but where species invariably remain undescribed currently. From the total of our listed geo-referenced localities where *Artemia* can be found ($N = 499$; 78 in North America, 92 in Africa, 153 in Asia, 124 in the Caribbean, Central & South America, 172 in Europe, and 14 in Australia & New Zealand; see details in Suppl. Inf., in the online version of this paper, at: www.brill.nl/cr), the number of localities with undescribed species ranges from 6 to 111 (see table II). Asia shows 111 localities, while the region of Australia and New Zealand shows six. However, the percentage of localities with undescribed

Fig. 1. Phylogenetic tree (Neighbor-Joining) showing the evolutionary relationships between *Artemia* forms represented by sequences using a fragment of the subunit I of the cytochrome *c* oxidase (COI) mitochondrial gene. Symbols next to the codes indicate the undescribed *Artemia* species, and the new one unidentified to date from Cape Verde, proposed to be re-evaluated. Codes of sequences are indicated in table I.

Fig. 2. a, Distribution of undescribed *Artemia* in Europe, Africa, Asia, and Australia; stars correspond to localities holding *Artemia* with unknown reproductive mode (?); squares correspond to localities holding sexual *Artemia* (? (B)); circles correspond to localities holding parthenogenetic *Artemia* (? (P)); open circles correspond to those hotspots described by Myers et al. (2000) where undescribed *Artemia* has been recorded; grey circles correspond to those large regions where a substantial lack of information exists on *Artemia* biodiversity; b, distribution of undescribed *Artemia* in America; stars correspond to localities holding *Artemia* with unknown reproductive mode (?); circles filled correspond to localities holding sexual *Artemia* (? (B)).

TABLE II

Number of localities with undescribed *Artemia* species all around the world. ?(B) = undescribed sexual *Artemia*; ?(P) = undescribed parthenogenetic *Artemia*; ? = undescribed *Artemia* and unknown reproductive mode. The percentage values of localities with undescribed species were calculated taking into account the total number of localities (described and undescribed; N = 499) as is listed in Suppl. Inf. on Website www.brill.nl/cr

Country/area	?(B)	?(P)	?	Total localities	% localities with undescribed species
North America	58	0	0	78	78.4
Africa	5	8	57	92	76.0
Asia	5	59	47	153	72.5
Caribbean, Central & South America	59	0	3	124	50.0
Europe	9	35	35	172	46.0
Australia & New Zealand	0	4	2	14	42.9

Artemia is higher in North America (78.4%). The lowest percentage was found in Australia and New Zealand (42.9%).

Finally, our data set indicates an important overlap between the areas currently invaded by *A. franciscana* and several hotspots (see Supplementary Map: Suppl. Map, in the online version of this paper, at: www.brill.nl/cr), which could be interesting in future studies on saline and hypersaline wetland conservation issues.

DISCUSSION

Taxonomic re-evaluation

Though genetic studies have revealed a few candidate cryptic species in intensively studied vertebrate groups (Hebert et al., 2004a), the potential for detecting new species is much higher in invertebrates (e.g., Gómez et al., 2002; Hebert et al., 2004b), but these are as yet understudied. It is well known, that the number of species as well as the taxonomy of aquatic invertebrates currently are insufficiently clear, and far from reality (IUCN, 2004; Martens et al., 2008). Additionally, recent studies suggest that geographic speciation in small invertebrates is a commoner phenomenon than in large invertebrates and in vertebrates, especially in those with worldwide distribution (Mills et al., 2007), such as aquatic invertebrates.

Combining the above data with our results, we propose three *Artemia* complexes, and suggest four *Artemia* lineages to be re-evaluated (see fig. 1). This work represents the first approach that analyses all available COI sequences in *Artemia* (geographically and phylogenetically representative) and identifies, at a global scale, new highly isolated lineages using the molecular marker COI as a DNA ‘barcode’ tool.

Within the proposed *A. salina* complex, the genetic divergence among the Mediterranean *A. salina* populations and the South African *A. salina* population suggests that the lineage ASVEL (symbol * in fig. 1) could be a different sexual species, as has recently been discussed by Muñoz et al. (2008). This finding has major implications for the conservation status of Anostraca in the Western Cape, South Africa, where *A. salina* is not considered endemic (De Roeck et al., 2007). On the other hand, within the proposed *A. tibetiana* complex, a situation similar to that in the *A. salina* complex is found. Hou et al. (2006) identified a not yet formally described sexual lineage *A. sp.* TIB (symbol ‡ in fig. 1), but it was poorly discussed. They concluded that the Tibetan *Artemia* belongs to *A. urmiana*. However, our analyses indicate that a differentiated lineage exists in Tibet (ATIB — cf. W. Wang & Q. Luo, unpubl. data) suggesting a paraphyletic relationship in the *A. tibetiana* lineages.

Additionally, the sexual *Artemia* species from Kazakhstan (Pilla & Beardmore, 1994) (symbol # in fig. 1), which clusters with a parthenogen and Central Asian *Artemia* (*A. urmiana*, *A. tibetiana*), remains taxonomically undescribed to date (Hou et al., 2006; Muñoz et al., 2008). Specifically, *A. sp.* KAZ shows COI sequences identical to those of diploid parthenogens (J. Muñoz, unpubl. data) suggesting that, although a few authors have used it, either a possible identification error has occurred, or this undescribed sexual species is the likely diploid ancestor of the parthenogen.

The most relevant and surprising find in our survey, is the presence of a highly differentiated lineage identified as *A. franciscana* from Cape Verde (*A. sp.* CV — symbol ¶ in fig. 1). Tizol-Correa (2006) described a relatively high genetic isolation in Central American populations (Cuba and Mexico) with respect to North American populations (see also Muñoz et al., 2008). However, Cape Verde is out of the native distribution range of *A. franciscana*. We could hypothesize that population originated through deliberate commercial inoculations in a similar way as it has invaded Europe and other continents (Amat et al., 2007; Muñoz et al., 2009). Nevertheless, the genetic divergence of the lineage from Cape Verde when compared to other American populations is much higher than that of any other haplotype of *A. franciscana* from the invaded areas (Spain, Portugal, France, Morocco, Italy — J. Muñoz, unpubl. data). An alternative hypothesis is an introduction from a South American population (e.g., Chile, which shows high genetic divergence when compared to other American populations through allozyme analysis; Gajardo et al., 1995), but unfortunately there are no COI data available from South America to test that hypothesis. Another possibility, non-investigated to date, is that the original geographic distribution range of *A. franciscana* was not exclusively America. This could explain the close phylogenetic relationships among *A. franciscana* and Asian *Artemia* species (*A. sinica*, *A. tibetiana*, and *A. urmiana*), and some parthenogenetic lineages (Baxevanis et al., 2006).

Lack of biogeographic information

Although substantial efforts through field trips and expeditions show the presence of *Artemia* throughout the world, our current knowledge of the biodiversity and subsequent geographic distribution of units of the genus is only limited. Our updated biogeographic data set provides, for the first time, the maps of all the identified and undescribed *Artemia* species around the world (see Suppl. Inf., in the online version of this paper, at: www.brill.nl/cr).

To avoid a large number of maps in this paper, we include those really relevant to show the shortage of species identification over extensive geographic areas (fig. 2a, b; specific maps can be provided on request). However, not only the information on the biodiversity and the distribution of the species are important for ecology, speciation, and conservation. Biological invasion, especially in those areas characterized both by containing large numbers of endemic species and having serious levels of habitat loss (i.e., hotspots), constitute one of the main causes of species extinction (local or general) in nature (Clavero & García-Berthou, 2005). Therefore, we also include the map that shows the spread of the invasive species, *A. franciscana*, in the rest of the world (see Suppl. Map, in the online version of this paper, at: www.brill.nl/cr).

The origin of parthenogenesis in *Artemia* has been supposed to be located in the Mediterranean Basin. However, recent evidence shows that this location can be wrong, and that it can be referred to Central Asia (J. Muñoz, unpubl. data). The close phylogenetic relationships among the sexual *Artemia* from Kazakhstan and other Asian *Artemia* species (*A. urmiana*, *A. tibetiana*) support this view. Additionally, Asia is the geographic area in the world where a higher number of parthenogenetic populations is present (see table II and fig. 2a). As in other studies at a global scale (Mills et al., 2007), research focused on Central and Central-East Asia might well uncover new lineages, helping to understand the evolutionary aspects of the asexual reproduction in this group.

Implications for conservation

Thirteen years ago, New (1995) published the first book considering invertebrates in conservation biology at a global scale. Wetlands (i.e., worldwide aquatic ecosystems) are considered for conservation by the Ramsar Convention (Convention on Wetlands, 1971) if they support endangered species of vertebrates or the presence of large plant communities. On the other hand, Belk (1998: 149) stated: "In practical terms, habitat is often conserved as a result of its importance to some species or group of species that have become the focus of human concern". However, in many cases species exploited by humans are not conservation targets, and one example of that is *Artemia*.

Artemia franciscana is currently considered an invasive species in hypersaline aquatic habitats around the world, mainly introduced for the aquaculture business (Amat et al., 2007). In the last 40 years, it has been recorded in Australia, China, Iran, Japan, Kenya, Madagascar, the Mediterranean Basin, New Zealand, and Vietnam (Muñoz et al., 2009; Ruebhart et al., 2008). Our results show an important coincidence between the areas currently invaded by this anostracan and several hotspots described by Myers et al. (2000) (see Suppl. Map, in the online version of this paper, at: www.brill.nl/cr). Nevertheless, we want to emphasize those regions not to be recognized as hotspots, where the presence of *Artemia* is known, but specific identification is still lacking (and consequently their uncertain geographic distribution) (fig. 2a). The presence of the invasive *A. franciscana* in the Old World implies both local and/or regional extinction of autochthonous *Artemia* species (Amat et al., 2007) and, thus, the inherent disequilibrium of the invaded aquatic ecosystems. It has been suggested, for instance, that the presence of *A. franciscana* could decrease the abundance of waterfowl due to the lack of parasitism affecting the invasive species, and this species being more evasive as a food source for those birds (Sánchez et al., 2009).

Sala et al. (2000) argued that ecosystems with a Mediterranean climate (including aquatic systems) will experience the greatest proportional change in biodiversity because of the substantial influence of general biotic exchange. Additionally, anthropogenic activities accelerate the extinction of species by means of the transformation and fragmentation of habitats and landscapes (see Pertoldi et al., 2007, for a review) and by the introduction of allochthonous species (see Mooney & Hobbs, 2000, for a review). In ways similar to *A. franciscana*, used in aquaculture (Amat et al., 2007), other aquatic invertebrates such as *Daphnia lumholtzi* G. O. Sars, 1885 have spread via human intervention (Havel et al., 2000). Mergeay et al. (2005) identified the presence of a single American clone of *Daphnia pulex* Leydig, 1860 in Kenya, likely introduced accidentally by humans, which has become to dominate this region as an invasive lineage.

Finally, the incorrect identification of species in regions with high biodiversity, and the spatial scale at which wetlands are surveyed (Angeler et al., 2008), can lead to confusing management and conservation strategies. For example, *A. salina* has been described in South Africa in a survey about the status of conservation of wetlands in this area (De Roeck et al., 2007), but as Muñoz et al. (2008) reported, and the present study shows, the *Artemia* population recorded from South Africa should be considered a new species, probably endemic to that region. Therefore, discoveries like these will invariably imply the reinforcement of conservation measures, most of them involving protection of the wetland habitat at issue, as a whole.

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ONLINE APPENDICES

We have listed six different areas all around the world where *Artemia* is present. Coordinates are given in decimal degrees. Locality indications in red are those found by authors (see Material and Methods for details) and not indicated in references. ?(B) = undescribed sexual *Artemia*; ?(P) = undescribed parthenogenetic *Artemia*; ? = undescribed *Artemia* and unknown reproductive mode. Asterisk indicates wrong coordinates in references.

AFRICA

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Algeria	Chegga Oase	34.48	5.88	?	[16]
	Chott Djeloud	34.05	6.33	?	[16]
	Chott Merouan	34.00	6.17	?(B)	[16]
	Chott Ouargla	31.95	5.33	?	[16]
	Dayet Morselli	35.50	−0.77	?	[16]
	El-Menaceria	35.69	−0.22	?	[16]
	Garaet et Tarf Salt Lake	35.67	7.15	<i>A. salina</i> (B)	J. Muñoz, unpubl.
	Gharabas Lake	35.58	−0.42	?	[16]
	Mellaha Guergour El-Amri	35.98	5.25	?(B)	[16]
	Salin de Bethioua	35.80	−0.22	?	[16]
	Sebkhet Djendli	35.72	6.53	?	[16]
	Sebkhet Ez Zemouk	35.88	6.55	?	[16]
	Sebkhet Oran	35.53	−0.80	?	[16]
	Sebkha Azrew	35.72	−0.13	?(B)	[16]
	Sebkha N'zouri	35.83	6.58	?(B)	[16]
	Sebkha Sidi Bouzian	35.87	0.58	?(B)	[16]
	Tougourd	33.10	6.12	?	[16]
Cape Verde	Pedra de Lume, Sal Island	16.77	−22.88	<i>A. franciscana</i> (B)	[28]
	Santa Maria, Sal Island	16.55	−22.90	<i>A. franciscana</i> (B)	[28]
Egypt	Bourg El-Arab	30.92	29.53	?(P)	[16]
	El Max Saline (Alexandria)	31.12	29.83	?(P)	[16]
	Ismailia	30.60	22.25	?	[16]
	Port Fouad	31.25	32.32	?(P)	[16]
	Port Said	31.25	32.28	?(P)	[16]
	Qarun Lake	29.45	30.68	?(P)	[16]
	Solar Lake (Sinai)	29.17	34.83	?(P)	[16]
	Wadi Natron	30.17	30.45	<i>A. salina</i> (B)	[16]
Kenya	Elmenteita	−0.45	36.25	?	[16]
	Fundisha	−3.03	40.13	<i>A. salina</i> (B)	[16]
	Fundisha	−3.03	40.13	<i>A. franciscana</i> (B)	J. Muñoz, unpubl.

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Libya	Gabr Acun (Fezzan)	27.00	13.00	?	[16]
	Mandara	26.67	13.33	<i>A. salina</i> (B)	J. Muñoz, unpubl.
	Quem el Ma	26.68	13.37	?	[16]
	Trouna	26.83	13.50	?	[16]
Madagascar	Ankiembe Saltworks (Tulear)	−23.35	43.65	<i>A. parth.</i> 3n (P)	[26]
	Ifaty Saltworks	−23.15	43.62	<i>A. franciscana</i> (B)	[16]
	Salins de Diego Suarez	−12.32	49.28	?	[16]
Mocambique	Lagua Quissico	−24.68	34.77	? (P)	[16]
Morocco	Larache	35.20	−2.33	<i>A. parth.</i> 2n (P)	[4]; [16]
	Larache	35.20	−2.33	<i>A. parth.</i> 4n (P)	[4]; [16]
	Mar Chica Lagoon	35.10	−2.73	<i>A. parth.</i> 2n (P)	[8]
	Mar Chica Lagoon	35.10	−2.73	<i>A. franciscana</i> (B)	[8]
	Moulaya Estuary	35.12	−2.33	?	[16]
	Oualidia	32.73	−9.02	<i>A. salina</i> (B)	[7]
	Qued Ammafatma	28.30	−12.00	?	[16]
	Qued Chebeica	28.42	−11.83	?	[16]
	Sebket Bon Areg	35.17	−2.83	?	[16]
	Sebket Zima	32.08	−8.67	?	[16]
	Souzama and Marocaines Salterns	32.73	−9.02	<i>A. salina</i> (B)	[7]
	Souzama and Marocaines Salterns	32.73	−9.02	<i>A. parth.</i> 2n (P)	[7]
Namibia	Henties Bay Salt Refin.	−22.00	14.27	?	[16]
	Vineta Swakopmund Saltworks	−22.67	14.57	<i>A. parth.</i> 2n (P)	[16]; [30]
	Vineta Swakopmund Saltworks	−22.67	14.57	<i>A. parth.</i> 4n (P)	[16]; [30]
	Walvis Bay	−22.93	14.50	?	[16]
Niger	Teguidda In Tessoun	17.43	6.65	?	[16]
Senegal	Dakar	14.57	−17.48	?	[16]
	Lake Kayar	14.92	−17.18	?	[16]
	Lake Retba	14.83	−17.33	?	[16]
South Africa	Brandtville Saltworks	−30.37	20.22	?	[16]
	Coega Salt Flats	−33.77	25.67	? (P)	[16]
	Driehoekspan	−29.75	23.23	?	[16]
	Hayfield Saltpan	−29.25	24.22	?	[16]
	Holpan Saltworks	−30.37	20.50	?	[16]
	Jonkerwater Saltworks	−30.08	22.60	?	[16]
	Kaalpan Saltworks	−30.00	20.05	?	[16]
	Klein Soutpan	−30.45	22.40	?	[16]
	Klipfontein Saltworks	−32.95	18.22	?	[16]
	Missionvale Salina	−33.87	25.53	?	[16]
	Paternoster Salt Pan	−33.78	17.92	?	[16]
	Rietfontein se Pan	−30.27	20.12	?	[16]
	Reynekespan Saltworks	−33.68	25.78	?	[16]
	Reynekespan	−29.72	24.25	?	[16]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
	Saldanha Steel	−33.00	18.03	?	[16]
	Salt Lake	−29.28	24.00	?	[16]
	Sodium Saltworks	−30.17	23.13	?	[16]
	Soutpan area	−28.70	26.05	?	[16]
	Soutpan Saltworks	−28.73	26.07	?	[16]
	Sundays River Saltworks	−33.63	25.72	?	[16]
	Swartkops	−33.87	25.60	<i>A. salina</i> (B)	[16]
	Uniesoutpan	−29.60	24.43	?	[16]
	Velddrif Saltworks	−32.72	18.20	<i>A. salina</i> (B)	[16]
	Vermeulenspan	−29.75	24.33	?	[16]
	Wintersdam Farm	−28.75	26.13	?	[16]
	Witkraal Saltpan	−28.97	25.52	?	[16]
	Witpan Saltworks	−29.88	24.05	?	[16]
	Yzerfontein Saltworks	−33.32	18.17	?	[16]
	Zoutaar Saltworks	−30.32	23.08	?	[16]
Tunisia	Bekalta	36.80	10.33	<i>A. salina</i> (B)	[16]; [30]
	COTUSAL salterns	35.75	10.75	<i>A. salina</i> (B)	J. Muñoz, unpubl.
	Chott Ariana	36.90	10.30	<i>A. salina</i> (B)	[16]
	Chott El Djerid	33.70	8.43	?	[16]
	Megrine	36.78	10.23	<i>A. salina</i> (B)	[16]
	Mines Maghreb Salterns	33.10	11.32	<i>A. salina</i> (B)	J. Muñoz, unpubl.
	Sebkhet Kowezia	36.43	9.77	?	[16]
	Sebkhet Mta Moknine	35.65	10.88	<i>A. salina</i> (B)	[16]
	Sebkhet Sidi El Hani	35.52	10.45	?	[16]
	Sfax	35.75	10.72	<i>A. salina</i> (B)	[16]

ASIA

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Abu Dhabi	Al Wathba Lake	24.25	54.63	?	[30]
Corea	Pusan	35.08	129.03	?	[24]
PR China	Aibi	44.92	83.88	<i>A. parth.</i> 2n (P)	[27]
	Aibi	44.92	83.88	<i>A. parth.</i> 4n (P)	[27]
	Aletai	48.00	88.00	? (B)	[27]
	Balikun	43.50	93.00	<i>A. parth.</i> 2n (P)	[27]
	Balikun	43.50	93.00	<i>A. parth.</i> 4n (P)	[27]
	Bange	31.67	89.67	?	[27]
	Bayannor	44.00	116.00	<i>A. sinica</i> (B)	[27]
	Beidachi	38.00	107.50	<i>A. sinica</i> (B)	[27]
	Chagannor	40.00	110.00	<i>A. sinica</i> (B)	[27]
	Chaka	37.67	99.00	? (P)	[27]
	Chengkou	38.17	117.67	<i>A. parth.</i> 2n (P)	[27]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
	Dabancheng	43.00	88.00	<i>A. parth.</i> 2n (P)	[27]
	Dabancheng	43.00	88.00	<i>A. parth.</i> 3n (P)	[27]
	Dabancheng	43.00	88.00	<i>A. parth.</i> 4n (P)	[27]
	Dabancheng	43.00	88.00	<i>A. parth.</i> 5n (P)	[27]
	Dacaidan	37.80	95.33	? (P)	[27]
	Dagenor	42.50	116.00	<i>A. sinica</i> (B)	[27]
	Daqinghe	39.83	118.83	? (P)	[27]
	Dingbian	37.67	107.50	?	[27]
	Dongcou	32.17	84.67	?	[27]
	Dongfang	19.03	108.92	? (P)	[30]
	Dongfeng	36.08	120.17	<i>A. parth.</i> 2n (P)	[27]
	Dongfeng	36.08	120.17	<i>A. parth.</i> 5n (P)	[27]
	Dongjiagou	39.33	122.00	<i>A. parth.</i> 2n (P)	[27]
	Ejinor	45.33	112.50	<i>A. sinica</i> (B)	[27]
	Erendabusen	44.00	111.00	<i>A. sinica</i> (B)	[27]
	Fuzhouwan	39.50	121.50	? (P)	[27]
	Gahai	37.03	97.78	<i>A. parth.</i> 2n (P)	[27]
	Gaize	32.33	84.17	<i>A. tibetiana</i> (B)	F. Amat, unpubl.
	Gaotai	39.73	99.17	? (B)	[32]
	Geji	32.40	81.17	?	[27]
	Guangdong	22.87	113.47	? (P)	[27]
	Hangjinqi	40.00	101.00	<i>A. sinica</i> (B)	[27]
	Hangu	39.42	117.83	<i>A. parth.</i> 2n (P)	[27]
	Haolebaoji	38.90	108.50	<i>A. sinica</i> (B)	[27]
	Haotongyin Chagan	39.17	108.92	<i>A. sinica</i> (B)	[27]
	Huanghua	38.33	117.67	<i>A. parth.</i> 2n (P)	[27]
	Huanghua	38.33	117.67	<i>A. franciscana</i> (B)	[31]
	Huhetaolergai	37.00	110.00	<i>A. sinica</i> (B)	[27]
	Jibuchaka	32.00	84.17	?	[27]
	Jilantai	39.80	103.60	<i>A. sinica</i> (B)	[27]
	Jimo	36.38	120.45	? (P)	[30]
	Jinzhou	40.80	121.00	? (P)	[27]
	Kangbao	41.80	114.60	<i>A. sinica</i> (B)	[27]
	Keke	37.00	98.00	<i>A. parth.</i> 4n (P)	[27]
	Lagkor Co	32.05	84.22	<i>A. tibetiana</i> (B)	[2]
	Lianyungang	34.67	119.50	? (P)	[27]
	Luannan	39.17	118.50	? (P)	[31]
	Luannan	39.17	118.50	<i>A. franciscana</i> (B)	[31]
	Luannan	39.17	118.50	<i>A. sinica</i> (B)	[31]
	Lushun	30.83	121.33	<i>A. parth.</i> 2n (P)	[27]
	Lushun	30.83	121.33	<i>A. parth.</i> 4n (P)	[27]
	Lushun	30.83	121.33	<i>A. parth.</i> 5n (P)	[27]
	Nanpu	39.08	118.33	<i>A. parth.</i> 2n (P)	[27]
	Nanwan	32.15	113.98	? (P)	[30]
	Pulandian	39.00	122.00	<i>A. parth.</i> 2n (P)	[27]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
	Sanggendalai	42.33	116.00	<i>A. sinica</i> (B)	[27]
	Shangyi	41.10	114.68	<i>A. sinica</i> (B)	[27]
	Shanyao	25.13	118.88	? (P)	[27]
	Shenzha	31.00	88.67	? (B)	[27]
	Shunmu	29.83	122.25	? (P)	[27]
	Suban	39.00	94.00	? (P)	[27]
	Taigemiao Chagan	39.08	109.92	<i>A. sinica</i> (B)	[27]
	Tangu	39.00	117.67	<i>A. franciscana</i> (B)	[31]
	Tangu	39.00	117.67	<i>A. sinica</i> (B)	[31]
	Tangu	39.00	117.67	? (P)	[31]
	Tuosu	37.17	96.90	? (P)	[27]
	Wumacou	32.50	83.17	?	[27]
	Wuqiangi	41.00	109.00	<i>A. sinica</i> (B)	[27]
	Xiaocaidan	37.00	95.10	? (P)	[27]
	Xiaotan	22.67	113.22	? (P)	[30]
	Xigang	23.42	117.92	? (P)	[27]
	Xuyu	34.60	113.60	? (P)	[27]
	Yangkou	37.33	119.00	<i>A. parth.</i> 2n (P)	[27]
	Yanjing	29.00	98.50	? (B)	[27]
	Yinggehai	18.50	108.60	<i>A. parth.</i> 2n (P)	[27]
	Yinggehai	18.50	108.60	<i>A. parth.</i> 4n (P)	[27]
	Yinggehai	18.50	108.60	<i>A. parth.</i> 5n (P)	[27]
	Yingkou	40.67	122.00	<i>A. parth.</i> 2n (P)	[27]
	Yingkou	40.67	122.00	<i>A. parth.</i> 4n (P)	[27]
	Yingkou	40.67	122.00	<i>A. parth.</i> 5n (P)	[27]
	Yuncheng	35.00	111.00	<i>A. sinica</i> (B)	F. Amat, unpubl.
	Zhangbei	41.17	114.70	<i>A. sinica</i> (B)	[27]
	Zhangchaka	32.78	82.38	?	[27]
	Zhanmao	30.52	122.30	? (P)	[27]
	Zhujiajian	29.83	122.38	? (P)	[27]
	Zhunsaihannor	43.00	115.00	<i>A. sinica</i> (B)	[27]
India	Balamba Salterns	23.40	70.28	? (P)	[27]
	Bhayander	18.92	72.83	? (P)	[24]
	Didwana	27.05	74.08	?	[27]
	Gulf of Kutch	23.33	71.00	? (P)	[27]
	Jamnagar	22.50	70.13	?	[27]
	Karsewar Island	8.83	78.17	?	[27]
	Kelambakkam	13.08	79.12	?	[27]
	Mithapur	23.00	70.17	? (P)	[27]
	Pattanamruther	8.92	78.13	?	[27]
	Sambhar Lake	26.90	75.17	?	[30]
	Spic Nagar and Thiespuram	8.83	78.13	<i>A. franciscana</i> (B)	F. Amat, unpubl.
	Thamaraikulam	8.08	77.52	? (P)	[27]
	Vadala and Bahinder	18.92	72.83	?	[27]
	Vedaranyam	10.02	79.83	?	[27]
	Veppalodai	8.98	78.13	<i>A. franciscana</i> (B)	F. Amat, unpubl.

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Iraq	Abu-Graib,	33.33	44.50	<i>A. parth.</i> 2n (P)	F. Amat, unpubl.
	Basra	30.42	47.85	<i>A. franciscana</i> (B)	F. Amat, unpubl.
	Dayala	33.50	44.50	?	[27]
	Mahmoodia	33.00	44.00	?	[27]
Iran	Athlit	32.70	34.93	?	[27]
	Bakhtegan Lake	29.67	53.83	? (P)	[1]*
	Gaav Khooni Lake	32.33	52.97	? (P)	[1]*
	Houze Sultan Lake	34.83	51.33	? (P)	[1]*
	Incheh Lake	37.40	54.60	? (P)	[1]*
	Kale Shoor Hashtgerd	36.50	51.30	? (P)	[1]*
	Kale Shoor, Gonabad	35.17	57.83	? (P)	[1]*
	Kale Shoor, Khorram Abad	32.67	48.90	? (P)	[1]*
	Lagoons around Urmia Lake	37.83	46.67	? (P)	[1]*
	Maharlu Lake	29.95	52.23	? (P)	[1]*
	Mighan Lake	34.33	50.33	? (P)	[1]*
	Nough Catchment	31.00	56.83	? (P)	[1]*
	Nough Catchment	31.00	56.83	<i>A. franciscana</i> (B)	[1]*
	Qom Salt Lake	34.67	52.33	? (P)	[1]*
	Schor-Gol	37.05	45.53	? (P)	[27]
	Shor Lake	37.42	54.68	? (P)	[1]*
	Shurabil Lake	38.42	48.92	? (P)	[1]*
	Tashk Lake	30.00	53.83	? (P)	[1]*
	Urmia Lake	37.33	45.67	<i>A. urmiana</i> (B)	[27]
	Urmia Lake	37.33	45.67	? (P)	[1]*
	Varmal Catchment	31.33	61.83	? (P)	[1]*
Israel	Eilat North	29.53	34.93	? (P)	[27]
	Eilat South	29.47	34.93	?	[27]
Japan	Chang Dao	34.00	132.00	?	[27]
	Tamano	34.88	133.98	?	[27]
	Yamaguchi	34.17	131.53	?	[27]
Kazakhstan	Bjurliu lake	51.75	78.00	<i>A. parth.</i> 2n (P)	J. Muñoz, unpubl.
	Bolshoy Sarichaganack, Aral Sea	46.50	61.25	?	[20]
	Borli	51.82	78.00	? (P)	[20]
	Horbatoye	45.50	73.50	? (P)	[20]
	Kalibek	53.87	70.63	?	[20]
	Miraldi	52.32	77.78	? (P)	[20]
	Severo-zapadnoye	45.50	73.33	? (P)	[20]
	Seyten	51.93	78.12	? (P)	[20]
	Shoshkakol	49.17	70.50	?	[20]
	Tastubeck, Aral Sea	46.83	60.75	?	[20]
	Teke	53.83	72.93	?	[20]
	Tenhiz	50.42	69.00	?	[20]
	Tuz	51.32	78.65	?	[20]
	Yuzhnoye	44.92	74.17	? (P)	[20]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Kuwait	?	29.00	47.00	?	[27]
Mongolia	Shar Burd	43.37	111.07	?	[30]
Pakistan	Karachi Saltworks	24.80	66.97	? (P)	[27]
Saudi Arabia	Dhahran	17.65	43.50	?	[30]
	Sabkhat al Fasl	27.03	49.50	?	[30]
South Korea	Pusan	35.08	129.03	?	[27]
Sri Lanka	Bundala	6.20	81.25	?	[27]
	Hambantota	6.12	81.12	?	[27]
	Palavi	7.97	79.85	?	[27]
	Putallam	8.03	79.83	? (P)	[27]
Taiwan	Beimen	23.33	121.12	? (B)	[27]
Turkey	Ayvalik, Balikesir	39.30	26.70	?	[30]
	Burdur Lake	37.75	30.25	?	[30]
	Camalti, Izmir	38.42	27.13	? (P)	[27]
	Gökçeada, Imroz	40.17	25.83	?	[30]
	Konya Lake	37.87	32.47	?	[30]
	Meke Salt lake	37.68	33.63	?	[30]
	Tuz Lake	38.75	33.37	? (P)	[10]
Turkmenistan	Karabogaz Lake	40.98	52.95	? (P)	[30]
Uzbekistan	Adzibay Bight, Aral Sea	43.97	58.58	?	[20]
	Cape Aktumsyk, Aral Sea	44.60	58.30	<i>A. parth.</i> 2n (P)	[19]
	Karshi, Hashkadarya	38.82	65.82	? (P)	[30]
	Navruz, Syrdarya	40.82	68.67	? (P)	[30]
	Nazurok	41.50	60.17	?	[20]
	Ulugshurkul	41.33	60.50	?	[20]

AUSTRALIA AND NEW ZEALAND

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
New Zealand	Lake Grassmere	−41.63	174.08	<i>A. franciscana</i> (B)	[27]
Australia	Bowen	−20.00	148.27	?	[27]
	Dampier	−20.58	116.85	<i>A. franciscana</i> (B)	[27]
	Dry Creek, Adelaide	−34.92	138.33	? (P)	[27]
	Goodmallang	−31.08	117.03	<i>A. parth.</i> 2n (P)	[18]
	Hutt River	−28.20	114.30	<i>A. franciscana</i> (B)	[18]
	Lake Hayward	−28.43	114.77	<i>A. parth.</i> 2n (P)	[18]
	Lake Mc Leod	−23.98	113.67	?	[27]
	Lake Ninan	−30.93	116.63	<i>A. parth.</i> 2n (P)	[18]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
	Port Alma	−23.37	150.53	<i>A. franciscana</i> (B)	[27]
	Port Hedland	−20.42	118.58	? (P)	[27]
	Quairading	−32.00	117.40	<i>A. parth.</i> 2n (P)	[18]
	Rottnest Island	−32.00	115.45	? (P)	[27]
	Shark Bay	−25.25	113.33	<i>A. franciscana</i> (B)	[27]
	Shark Bay	−25.25	113.33	? (P)	[27]

CARIBBEAN_CENTRAL_SOUTH AMERICA

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Caribbean and Central America					
Bahamas	Great Inagua	21.00	−75.33	? (B)	[27]
	Long Island	23.33	−75.12	? (B)	[27]
	San Salvador	24.00	−74.58	? (B)	[27]
Brit. Virgin Islands	Anegada	18.75	−64.40	? (B)	[27]
Caribbean Islands	Antigua	17.00	−61.75	? (B)	[27]
	South Caicos	21.52	−71.53	? (B)	[27]
	St. Kitts	17.33	−62.75	? (B)	[27]
	St. Martin	18.07	−63.10	? (B)	[27]
Costa Rica	Gulfo Nicova	10.00	−84.82	? (B)	[27]
	Bahia Salinas, Guanacaste	10.02	−85.67	<i>A. franciscana</i> (B)	[22]
Dominican Republic	Isla Cabra	19.88	−71.67	? (B)	[27]
	Las Calderas	18.20	−70.55	? (B)	[30]
	Monte Cristi	19.87	−71.65	? (B)	[27]
	Punta Salinas	18.33	−71.07	? (B)	[27]
Haiti	Grandes Salines	18.00	−72.00	<i>A. franciscana</i> (B)	[27]
Mexico	Bahia de Ceuta	24.08	−107.00	<i>A. franciscana</i> (B)	[27]
	Carretas/Pereyra/Chanchuto	15.50	−93.22	? (B)	[27]
	Celestun	20.87	−90.37	? (B)	[25]
	Chuburna	21.25	−89.80	? (B)	[25]
	Guerrero Negro	28.10	−114.05	<i>A. franciscana</i> (B)	[27]
	Isla del Carmen	26.00	−111.67	<i>A. franciscana</i> (B)	[27]
	La Joya y Buenavista	27.45	−106.25	? (B)	[27]
	Laguna de Yavaros	26.72	−109.55	<i>A. franciscana</i> (B)	[27]
	Laguna del Mar Muerto	16.00	−94.00	? (B)	[27]
	Las Coloradas	21.60	−87.98	? (B)	[25]
	Pichilingue	24.28	−110.33	<i>A. franciscana</i> (B)	[27]
	Ponds W. Salina Cruz	16.17	−95.17	? (B)	[27]
	Salinas de Hidalgo	22.67	−101.70	? (B)	[27]
	San Crisanto	24.08	−107.00	<i>A. franciscana</i> (B)	[27]
	San Quintin	30.47	−115.97	<i>A. franciscana</i> (B)	[27]
	Xtampu	21.38	−88.88	? (B)	[25]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Netherlands Antilles	Aruba	12.50	−70.00	? (B)	[27]
	Bonaire Duinmeer	12.07	−68.22	<i>A. franciscana</i> (B)	[27]
	Curaçao Fuik	12.05	−68.85	? (B)	[27]
	Gotomeer	12.23	−68.33	? (B)	[27]
	Martinus	12.15	−68.28	? (B)	[27]
	Pekelmeer	12.07	−68.27	? (B)	[27]
	Rifwater	12.13	−68.33	? (B)	[27]
	Slagbaai	12.27	−68.42	? (B)	[27]
Nicaragua	Salinas Grandes, Leon	12.25	−85.85	<i>A. franciscana</i> (B)	[30]
Puerto Rico	Bahia Salinas	17.95	−67.20	<i>A. franciscana</i> (B)	[27]
	Bogueron	18.02	−67.17	? (B)	[27]
	Cabo Rojo and Fortuna saltern	17.93	−67.13	? (B)	[17]; [27]
	La Parguera and Bastoncillo	17.98	−67.05	? (B)	[17]; [27]
	Ponce	19.10	−66.63	? (B)	[27]
	Tallaboa Salterns	17.97	−66.70	<i>A. franciscana</i> (B)	[27]
South America					
Argentina	Algarrobo	−40.60	−62.93	<i>A. persimilis</i> (B)	[23]
	Bahia Blanca	−38.72	−62.25	<i>A. persimilis</i> (B)	[27]
	Caleta Olivia	−46.45	−67.53	<i>A. persimilis</i> (B)	[23]
	El Ingles	−40.72	−62.47	<i>A. persimilis</i> (B)	[23]
	El Saladillo	−28.33	−63.17	<i>A. franciscana</i> (B)	[23]
	Gualicho	−40.40	−65.22	<i>A. persimilis</i> (B)	[23]
	Laguna Callaqueo	−38.57	−63.53	<i>A. persimilis</i> (B)	[13]; [23]
	Las Tunas	−33.75	−62.53	<i>A. franciscana</i> (B)	[23]
	Mar Chiquita	−30.33	−62.17	<i>A. franciscana</i> (B)	[23]
	Palos Blancos	−39.47	−62.75	<i>A. persimilis</i> (B)	[23]
	Piedras	−40.68	−62.67	<i>A. persimilis</i> (B)	[23]
	Ruta 3	−47.47	−67.27	<i>A. persimilis</i> (B)	[23]
	Salina Colorada Chica	−38.38	−63.60	<i>A. persimilis</i> (B)	[23]
	Salina Colorada Grande	−38.30	−63.70	<i>A. persimilis</i> (B)	[23]
	Salinas Chicas	−38.72	−62.93	<i>A. persimilis</i> (B)	[23]
	Salinas Grandes de Anzoátequi	−38.98	−63.87	?	[30]
	Salinas Grandes de Hidalgo	−37.22	−63.43	<i>A. persimilis</i> (B)	[23]
	Salitral de la Vidriera	−38.70	−62.67	<i>A. persimilis</i> (B)	[23]
	Salitral Negro	−38.73	−63.22	<i>A. persimilis</i> (B)	[23]
	San Julian	−49.28	−67.77	<i>A. persimilis</i> (B)	[23]
	Valcheta, Rio Negro	−40.68	−66.12	?	[30]
Bolivia	Chulluncani	−16.37	−67.50	? (B)	[24]; [29]
	Lake Kanapa	−16.87	−68.87	? (B)	[30]
	Lake Poopo	−18.38	−66.97	? (B)	[27]
	Papel Pampa, Oruro	−17.82	−67.77	? (B)	[30]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Brazil	Aracati, Ceará	−4.53	−37.75	<i>A. franciscana</i> (B)	[27]
	Areia Branca	−10.75	−37.07	<i>A. franciscana</i> (B)	[11]*
	Cabo Frio	−22.85	−42.05	<i>A. franciscana</i> (B)	[27]
	Camocim, Ceará	−2.90	−40.83	<i>A. franciscana</i> (B)	[30]
	Fortaleza	−3.75	−38.58	?	[24]
	Galinhos	−5.10	−36.27	<i>A. franciscana</i> (B)	[11]
	Guamaré	−5.08	−36.32	<i>A. franciscana</i> (B)	[11]
	Grossos	−4.97	−37.15	<i>A. franciscana</i> (B)	[11]
	Icapuí, Ceará	−4.70	−37.35	<i>A. franciscana</i> (B)	[27]
	Macau	−5.00	−36.67	<i>A. franciscana</i> (B)	[11]
	Mundau	−3.25	−39.40	<i>A. franciscana</i> (B)	[24]; [27]
	Sao Bento do Norte	−5.10	−35.97	<i>A. franciscana</i> (B)	[30]
Chile	Cejas Lagoon	−23.03	−68.22	<i>A. franciscana</i> (B)	[33]
	La Pampilla	−29.97	−71.42	<i>A. franciscana</i> (B)	[27]
	Laguna Amarga	−50.97	−72.75	<i>A. persimilis</i> (B)	[12]
	Los Vilos	−31.85	−71.42	<i>A. franciscana</i> (B)	[14]
	Palo Colorado	−31.97	−71.42	<i>A. franciscana</i> (B)	[27]
	Pampilla	−29.83	−71.37	<i>A. franciscana</i> (B)	[14]
	Pichilemu	−34.80	−72.17	<i>A. franciscana</i> (B)	[33]
	Playa Yape	−20.67	−70.25	<i>A. franciscana</i> (B)	[27]
	Puerto Viejo	−27.33	−70.95	<i>A. franciscana</i> (B)	[27]
	Salar de Atacama	−23.17	−68.17	<i>A. franciscana</i> (B)	[27]
	Salar de Llamara	−21.30	−69.62	<i>A. franciscana</i> (B)	[27]
	Salar de Pintados	−21.50	−69.67	<i>A. franciscana</i> (B)	[27]
	Salar de Surire	−18.80	−69.07	<i>A. franciscana</i> (B)	[33]
	Salina El Convento	−33.87	−71.73	? (B)	[14]
	Salinas de Cahuil	−34.42	−72.17	<i>A. franciscana</i> (B)	[27]
	Salinas de Constitución	−35.15	−72.35	<i>A. franciscana</i> (B)	[27]
Colombia	Galerazamba	−10.42	−74.67	<i>A. franciscana</i> (B)	[27]
	Manaure	−12.15	−71.92	<i>A. franciscana</i> (B)	[27]
Ecuador	Galapagos	0.00	−89.00	<i>A. franciscana</i> (B)	[27]
	Pacoa	−2.00	−80.83	? (B)	[27]
	Salinas	−2.33	−80.97	? (B)	[27]
Peru	Ancash	−9.38	−77.70	<i>A. franciscana</i> (B)	[30]
	Caucato	−13.67	−76.08	? (B)	[27]
	Chicama	−7.70	−80.20	? (B)	[27]
	Chilca	−12.58	−76.68	? (B)	[27]
	Estuario de Virrila	−5.83	−80.83	? (B)	[27]
	Guadalupe	−7.28	−79.47	? (B)	[27]
	Pampa de Salinas y Playa Chica	−11.23	−77.58	? (B)	[27]
	Puerto Huarney	−10.05	−78.13	? (B)	[27]
	Tumbes	−3.62	−80.45	? (B)	[27]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Venezuela	Boca Chica	10.95	−64.43	? (B)	[27]
	Coya Sal	10.93	−68.25	? (B)	[27]
	Coche	10.68	−63.97	? (B)	[27]
	Coro Coastline	11.50	−69.75	? (B)	[27]
	Cumaná	10.45	−64.17	? (B)	[30]
	La Orchila	11.82	−66.00	? (B)	[27]
	Las Aves	12.00	−67.28	? (B)	[27]
	Los Roques	11.83	−66.63	? (B)	[27]
	Maracaibo Lake	10.63	−71.63	? (B)	[30]
	Port Araya	10.65	−64.28	? (B)	[27]
	Tucacas	10.80	−68.32	? (B)	[27]

EUROPE

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Bulgaria	Burgas	42.55	27.48	<i>A. parth.</i> 2n (P)	F. Amat, unpubl.
	Pomorye	42.43	27.68	?	[27]
Croatia	Secovlje, Portoroz	45.48	13.60	<i>A. parth.</i> 4n (P)	[27]
	Strunjan	45.53	13.60	? (P)	[27]
Cyprus	Akrotiri Lake	34.57	32.97	?	[27]
	Larnaka Lake	34.93	33.58	<i>A. salina</i> (B)	[27]
France	Aigües Mortes	43.57	4.18	<i>A. parth.</i> 2n (P)	[8]
	Aigües Mortes	43.57	4.18	<i>A. franciscana</i> (B)	[7]
	Carnac-Trinité sur Mer	47.60	−3.08	?	[27]
	Guérande-le Croisic	47.33	−2.43	<i>A. parth.</i> 4n (P)	[4]
	Guérande-le Croisic	47.33	−2.43	<i>A. franciscana</i> (B)	[7]
	La Palme	42.83	3.00	?	[27]
	Lavalduc	43.40	4.93	<i>A. parth.</i> 4n (P)	[4]
	Mesquer-Assérac	47.43	−2.48	?	[27]
	Porte La Nouvelle	42.95	3.03	?	[27]
	Salin de Berre	43.40	5.08	<i>A. franciscana</i> (B)	[8]
	Salin de Fos	43.43	4.93	<i>A. franciscana</i> (B)	[8]
	Salin de Giraud	43.40	4.73	<i>A. parth.</i> 2n (P)	[4]
	Salin de Giraud	43.40	4.73	<i>A. franciscana</i> (B)	[7]
	Salins d'Hyères and des Pesquiers	43.12	6.20	<i>A. franciscana</i> (B)	[7]
	Sète	43.42	3.70	? (P)	[8]; [27]
	Sète-Villeroiy	43.38	3.62	? (B)	[27]
	Villeneuve	43.53	3.83	? (B)	[27]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Greece	Citros, Pieria	40.37	22.60	<i>A. parth.</i> 4n (P)	[27]
	Kalloni	39.17	26.30	<i>A. parth.</i> 4n (P)	[27]
	Megalon Embolon	40.47	22.82	<i>A. parth.</i> 4n (P)	[27]
	Messolonghi	38.30	21.60	? (P)	[27]
	Milos	36.58	24.50	? (P)	[27]
	Polychnitos	39.02	26.15	<i>A. parth.</i> 4n (P)	[27]
Italy	Carloforte	39.13	8.28	<i>A. salina</i> (B)	[27]
	Cervia	44.25	12.33	<i>A. parth.</i> 3n (P)	[7]
	Cervia	44.27	12.35	<i>A. parth.</i> 4n (P)	[27]
	Commachio	44.68	12.17	<i>A. parth.</i> 4n (P)	[27]
	Contivecchi	39.22	9.03	<i>A. salina</i> (B)	[7]
	Contivecchi	39.22	9.03	<i>A. parth.</i> 2n (P)	[7]
	Isola Longa	37.87	12.43	<i>A. salina</i> (B)	[30]
	Margherita di Savoia	41.42	16.08	<i>A. parth.</i> 4n (P)	[27]
	Margherita di Savoia	41.37	16.08	<i>A. parth.</i> 2n (P)	[7]
	Margherita di Savoia	41.37	16.08	<i>A. franciscana</i> (B)	[7]
	Mari Ermi	39.95	8.40	<i>A. salina</i> (B)	[30]
	Maria Stella	37.98	12.53	<i>A. salina</i> (B)	[7]
	Molentargius	39.22	9.20	<i>A. parth.</i> 2n (P)	[7]
	Molentargius	39.22	9.20	<i>A. salina</i> (B)	[7]
	Notteri	39.12	9.52	<i>A. salina</i> (B)	[30]
	Notteri	39.12	9.52	<i>A. parth.</i> 2n (P)	F. Amat, unpubl.
	Quartu	39.22	9.13	<i>A. salina</i> (B)	[27]
	Sale Porcus	40.02	8.43	<i>A. salina</i> (B)	[30]
	Sant' Antioco	39.03	8.50	<i>A. salina</i> (B)	[27]
	Santa Gilla	39.23	9.10	<i>A. parth.</i> 2n (P)	[27]
	Siracuse	37.07	15.30	?	[27]
	Su Pallosu	40.03	8.40	<i>A. salina</i> (B)	[30]
	Tarquinia	42.48	11.75	<i>A. salina</i> (B)	[27]
	Tarquinia	41.30	13.33	<i>A. salina</i> (B)	[7]
	Torre Colimena	40.30	17.72	<i>A. parth.</i> 2n (P)	[7]
	Torre Nubia	37.97	12.65	<i>A. salina</i> (B)	[30]
Portugal	Alcochete	38.73	-8.97	<i>A. franciscana</i> (B)	[7]
	Aveiro, Esmolas	40.65	-8.68	<i>A. franciscana</i> (B)	[7]
	Aveiro, Senitra	40.63	-8.65	<i>A. parth.</i> 2n (P)	[7]
	Bom Fim and Rio Frio	38.40	-8.57	<i>A. franciscana</i> (B)	[7]
	Castro Marim	37.22	-7.43	<i>A. franciscana</i> (B)	[7]
	Olhao	37.02	-7.87	<i>A. franciscana</i> (B)	[7]
	Ria de Faro	37.03	-7.92	<i>A. franciscana</i> (B)	[8]
	Rio Maior	39.35	-8.93	<i>A. parth.</i> 2n (P)	[7]
	Sado Estuary	38.42	-8.72	<i>A. franciscana</i> (B)	[8]
	Tavira	37.10	-7.63	<i>A. franciscana</i> (B)	[7]
	Tejo Estuary	38.83	-9.00	<i>A. franciscana</i> (B)	[7]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Romania	Lacul Sârat, Brâila	45.22	27.90	? (P)	[30]
	Lake Techirghiol	43.07	28.57	? (P)	[27]
	Movila Miresii	45.22	27.62	?	[30]
	Ocna Sibiului	45.87	24.05	?	[30]
	Sovata	46.58	25.08	?	[30]
Russia	Astrakhan	46.35	48.05	?	[30]
	Bain-Tsahan	50.25	115.03	?	[20]
	Barun-Torey	50.03	115.53	?	[20]
	Baskuntchack	48.33	46.92	?	[20]
	Bolshoye Shklo	52.58	79.25	? (P)	[27]
	Bolshoye Yarovoye	52.83	79.75	? (P)	[27]
	Buazonsor	52.67	79.50	? (P)	[27]
	Ebeiti	54.67	71.67	?	[20]
	Elton	49.13	46.67	?	[20]
	Gorkoye	54.17	77.50	?	[20]
	Karatchi Lake	55.33	76.92	? (P)	[20]
	Krutoberegovoye	54.58	75.67	?	[20]
	Kuchukskoye	52.63	79.50	? (P)	[27]
	Kulundinskoye	52.92	79.67	? (P)	[20]
	Kulundinskoye	52.92	79.67	? (B)	[20]
	Kurichye	52.08	79.50	? (P)	[27]
	Lechebnoye	54.67	76.25	?	[20]
	Malinovoye	51.92	79.83	? (B)	[20]
	Maloye Yarovoye	53.00	79.25	? (P)	[27]
	Medvezheye	55.30	67.92	?	[20]
	Mirabilit	52.50	79.08	? (P)	[27]
	Mirabilit	52.50	79.08	? (B)	[20]
	Mormishanskoye	52.50	81.33	? (P)	[27]
	Ostrovnoye	54.33	75.67	?	[20]
	Petuchovo	52.17	79.50	? (P)	[27]
	Schekulduk	52.45	79.00	? (P)	[27]
	Seledniyovo	55.67	69.08	? (P)	[20]
	Siverga	55.50	68.67	?	[20]
	Solyenoye	52.75	81.83	? (B)	[27]
	Tanatar	51.58	79.58	? (B)	[27]
	Tinaki Lake	46.40	47.93	?	[30]
	Tuchloye	54.57	75.20	?	[20]
	Tus	54.58	90.08	?	[20]
	Ulzhai	54.33	75.12	?	[20]
	Voniyucheye	54.25	78.97	?	[20]
	Zun-Torey	50.05	115.75	?	[20]
Spain	Añana	42.80	−2.97	<i>A. parth.</i> 4n (P)	[30]
	Arcos de las Salinas	39.98	−1.05	<i>A. parth.</i> 4n (P)	[5]
	Armalla	40.90	−1.98	<i>A. parth.</i> 4n (P)	[27]
	Ayamonte	37.22	−7.40	<i>A. parth.</i> 2n (P)	[27]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
	Bonmati	38.22	-0.58	<i>A. parth.</i> 2n (P)	[27]
	Bonmati	38.22	-0.58	<i>A. parth.</i> 4n (P)	[27]
	Bonmati and Bras de Port	38.22	-0.58	<i>A. salina</i> (B)	[27]
	Bras de Port	38.22	-0.58	<i>A. parth.</i> 2n (P)	[5]
	Burajaloz	41.48	-0.17	<i>A. parth.</i> 4n (P)	[27]
	Cabo de Gata	36.80	-2.23	<i>A. parth.</i> 2n (P)	[24]; J. Muñoz, unpubl.
	Calpe	38.65	0.05	<i>A. parth.</i> 2n (P)	[27]
	Campos del Puerto, Mallorca	39.43	3.02	<i>A. salina</i> (B)	[27]
	Cerrillos Salterns	36.68	-2.67	<i>A. salina</i> (B)	[21]
	Delta del Ebro	40.57	0.67	<i>A. parth.</i> 4n (P)	[7]
	Delta del Ebro	40.57	0.67	<i>A. salina</i> (B)	[7]
	Delta del Ebro	40.57	0.67	<i>A. franciscana</i> (B)	[7]
	Don Benito	37.80	-3.72	<i>A. salina</i> (B)	[5]
	Doñana National Park Salterns	36.87	-6.35	<i>A. salina</i> (B)	[21]
	El Bosque	36.78	-5.55	<i>A. parth.</i> 2n (P)	[7]
	Encarnacion	37.48	-4.60	<i>A. parth.</i> 4n (P)	[5]
	Fuente de Piedra	37.10	-4.75	<i>A. salina</i> (B)	[5]
	Fuente de Piedra	37.10	-4.75	<i>A. franciscana</i> (B)	[7]
	Gerri de la Sal	42.33	1.07	<i>A. franciscana</i> (B)	J. Muñoz, unpubl.
	Gerri de la Sal	42.33	1.07	? (P)	[24]
	Imon	41.17	-2.75	<i>A. parth.</i> 4n (P)	[27]
	Isla Cristina, BIOMARIS	37.22	-7.32	<i>A. franciscana</i> (B)	F. Amat, unpubl.
	Janubio, Lanzarote	28.93	-13.83	<i>A. parth.</i> 2n (P)	[27]
	Jumilla	38.48	-1.35	<i>A. salina</i> (B)	[5]
	La Malaha	37.10	-3.72	<i>A. salina</i> (B)	[5]
	La Mata	38.03	-0.68	<i>A. salina</i> (B)	[6]
	La Mata	38.03	-0.68	<i>A. parth.</i> 2n (P)	[30]
	Laguna de Quero	39.57	-3.28	?	[24]
	Lepe	37.25	-7.20	<i>A. parth.</i> 2n (P)	[27]
	Lerin	42.48	-1.98	?	[24]
	Los Rosales Saltern	37.88	-4.77	<i>A. salina</i> (B)	[21]
	Medinaceli	41.20	-2.50	<i>A. parth.</i> 4n (P)	[27]
	Molina del Segura	38.05	-1.18	<i>A. salina</i> (B)	[27]
	Odiel	37.25	-6.98	<i>A. parth.</i> 2n (P)	[7]
	Odiel	37.25	-6.98	<i>A. parth.</i> 4n (P)	[7]
	Olmeda and Rienda	41.10	-2.57	<i>A. parth.</i> 4n (P)	[27]
	Peralta de la Sal	42.00	0.40	? (P)	[27]
	Petrola	38.83	-1.55	<i>A. parth.</i> 4n (P)	[7]
	Pinilla	38.75	-1.67	<i>A. parth.</i> 4n (P)	[5]
	Portuguesas Saltern	36.87	-6.33	<i>A. salina</i> (B)	[21]
	Poza de la Sal	42.67	-3.50	<i>A. parth.</i> 4n (P)	[4]
	Puente Montilla	37.52	-4.65	<i>A. parth.</i> 4n (P)	[5]
	Puerto Real, Dolores	36.50	-6.15	<i>A. franciscana</i> (B)	[7]
	Puerto Sta. Maria, La Tapa	36.58	-6.22	<i>A. franciscana</i> (B)	[7]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
	Rolda	42.17	0.12	<i>A. parth.</i> 4n (P)	[5]
	Sal. Catalana	37.62	−0.85	<i>A. salina</i> (B)	[24]; [30]
	Sal. Punta Galera	37.70	−0.90	<i>A. salina</i> (B)	[24]; [30]
	Salada de Chiprana	41.23	−0.18	<i>A. parth.</i> 4n (P)	[15]
	Salinera Española, Formentera	38.67	1.43	<i>A. salina</i> (B)	[27]
	Salinera Española, Ibiza	38.92	1.58	<i>A. salina</i> (B)	[27]
	San Carlos	37.88	−3.67	<i>A. salina</i> (B)	[5]
	San Felix	36.50	−6.33	<i>A. salina</i> (B)	[27]
	San Fernando, El Estanquillo	36.42	−6.20	<i>A. franciscana</i> (B)	[7]
	San Fernando, El Pilar	36.48	−6.15	<i>A. franciscana</i> (B)	[7]
	San Juan del Puerto	37.33	−6.83	<i>A. salina</i> (B)	[27]
	San Pedro del Pinatar	37.83	−0.83	<i>A. salina</i> (B)	[27]
	Sanlucar de Barrameda	36.87	−6.32	<i>A. parth.</i> 2n (P)	[7]
	Sanlucar de Barrameda	36.87	−6.32	<i>A. salina</i> (B)	[7]
	Sigüenza	41.07	−2.63	?	[24]
	Villena	38.65	−0.87	<i>A. salina</i> (B)	[27]
Ukraine	Adzhigol	45.08	35.42	? (P)	[20]
	Arabatskaya Strelka	45.67	35.00	? (P)	[20]
	Bolshoye Otra Moynakskoye	45.00	33.00	?	[27]
	Dolgoye	46.50	35.58	? (P)	[20]
	Dzharylhatch	45.57	30.57	? (P)	[20]
	Ghenicheskoye Lake	46.25	34.67	?	[27]
	Kinburgski peninsula	46.42	31.67	?	[20]
	Kizil-Yar	45.05	33.92	? (P)	[20]
	Kizil-Yar	45.05	33.92	<i>A. salina</i> (B)	[20]
	Kujalniczky Liman	46.72	30.58	<i>A. parth.</i> 2n (P)	[20]; J. Muñoz, unpubl.
	Odzhigol	46.42	32.22	?	[20]
	Otar-Moinakskoye	45.20	33.50	? (P)	[20]
	Popovskoye	45.28	33.08	? (P)	[20]
	Popovskoye	45.28	33.08	<i>A. salina</i> (B)	[20]
	Sakshoye Lake	45.17	33.50	? (P)	[20]
	Sasik-Sivash	44.83	33.42	? (P)	[20]
	Sasik-Sivash	44.83	33.42	<i>A. salina</i> (B)	[20]
	Shtormovoye	45.33	53.08	<i>A. salina</i> (B)	[20]
	Sivashskoye	46.38	34.55	? (B)	[30]
	Sredneye	46.50	35.50	? (P)	[20]
	Tchokrakskoye	45.42	36.25	? (B)	[9]
	Tchokrakskoye	45.42	36.25	? (P)	[20]
	Tchongar	46.00	34.58	? (P)	[20]
	Tobechikskoye	45.17	36.33	? (P)	[27]
Montenegro	Ulcinj	41.92	19.20	? (P)	[27]

NORTH AMERICA

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
Canada	Akerlund Lake	52.30	−109.25	? (B)	[27]
	Alsask Lake	51.33	−109.87	? (B)	[27]
	Aroma Lake	51.30	−108.55	? (B)	[27]
	Berry Lake	52.12	−105.50	? (B)	[27]
	Boat Lake	50.28	−109.98	? (B)	[27]
	Burn Lake	49.82	−105.45	? (B)	[27]
	Ceylon Lake	49.45	−104.60	? (B)	[27]
	Chain Lake	50.50	−108.72	? (B)	[27]
	Chaplin Lake	50.42	−106.63	<i>A. franciscana</i> (B)	[27]
	Churchill	58.75	−94.00	? (B)	[27]
	Coral Lake	49.85	−102.35	? (B)	[27]
	Drybore Lake	49.72	−105.50	? (B)	[27]
	Enis Lake	52.17	−108.32	? (B)	[27]
	Frederick Lake	49.98	−105.63	? (B)	[27]
	Fusilier Lake	51.83	−109.73	? (B)	[27]
	Grandora Lake	52.10	−107.00	? (B)	[27]
	Gull Lake	50.10	−108.45	? (B)	[27]
	Hatton Lake	50.03	−109.83	? (B)	[27]
	Horizon Lake	49.53	−105.28	? (B)	[27]
	Ingebright Lake	50.37	−109.32	? (B)	[27]
	La Prouse	55.23	−98.00	? (B)	[27]
	Landis Lake	52.22	−108.45	? (B)	[27]
	Little Manitou Lake	51.80	−105.50	<i>A. franciscana</i> (B)	[27]
	Lydden Lake	52.15	−108.22	? (B)	[27]
	Mawer Lake	50.77	−106.37	? (B)	[27]
	Meacham Lake	52.12	−105.78	? (B)	[27]
	Muskiki Lake	52.33	−105.75	? (B)	[27]
	Neola Lake	52.05	−107.82	? (B)	[27]
	Oban Lake	52.15	−108.15	? (B)	[27]
	Richmond Lake	52.02	−108.02	? (B)	[27]
	Shoe Lake	49.92	−105.45	? (B)	[27]
	Snakehole Lake	50.50	−108.50	? (B)	[27]
	Sybouts Lake-East	49.03	−104.40	? (B)	[27]
	Sybouts Lake-West	49.03	−104.45	? (B)	[27]
	Verlo West	50.32	−108.62	? (B)	[27]
	Vincent Lake	50.22	−108.95	? (B)	[27]
	Wheatsone Lake	49.82	−105.40	? (B)	[27]
	Whiteshore Lake	52.13	−108.28	? (B)	[27]
USA					
Arizona	Kiatuthlana Green and Red Pond	34.83	−109.43	<i>A. franciscana</i> (B)	[27]

Country	Locality	Latitude	Longitude	Species (reproductive mode)	Reference
California	Carpineteria Slough	34.40	−119.50	? (B)	[27]
	Chula Vista	32.60	−117.08	? (B)	[27]
	Mono Lake	38.00	−119.00	<i>A. monica</i> (B)	[27]
	Moss Landing, Monterey Bay	36.80	−121.77	<i>A. franciscana</i> (B)	[27]
	Owens Lake	36.42	−117.93	? (B)	[27]
	San Diego	32.83	−117.17	? (B)	[27]
	San Francisco Bay	37.47	−122.50	<i>A. franciscana</i> (B)	[27]
	San Pablo Bay	38.00	−122.27	<i>A. franciscana</i> (B)	[27]
	Vallejo West Pond	38.20	−122.25	? (B)	[27]
Hawaii	Christmas Islands	1.83	−157.33	? (B)	[27]
	Hanapepe	21.90	−159.50	? (B)	[27]
	Laysan Atoll	25.50	−167.00	<i>A. franciscana</i> (B)	[27]
Nebraska	Alkali Lake	43.53	−100.63	? (B)	[27]
	Antioch (Potash) Lake	42.07	−102.57	<i>A. franciscana</i> (B)	[27]
	Ashenburger Lake Complex	42.00	−102.00	? (B)	[27]
	Jesse Lake	42.10	−102.65	<i>A. franciscana</i> (B)	[27]
	Sturgeon Lake	41.98	−102.67	<i>A. franciscana</i> (B)	[27]
Nevada	Fallon Pond	39.52	−118.87	<i>A. franciscana</i> (B)	[27]
North Dakota	Miller Lake	48.83	−103.95	? (B)	[29]
	Stink (Williams) Lake	48.63	−104.00	? (B)	[29]
New Mexico	Laguna del Perro	34.53	−106.02	? (B)	[27]
	Loving Salt Lake	32.28	−104.07	? (B)	[27]
	Quemado	34.28	−108.47	<i>A. franciscana</i> (B)	[27]
	Zuni Salt Lake	34.45	−108.77	<i>A. franciscana</i> (B)	[27]
Oregon	Lake Abert	42.58	−120.25	? (B)	[27]
Texas	Cedar Lake	34.80	−102.27	<i>A. franciscana</i> (B)	[27]
	McKenzies Playa	32.68	−102.17	? (B)	[27]
	Mound Playa	33.17	−101.93	? (B)	[27]
	Playa Thahoka	33.20	−101.57	? (B)	[27]
	Raymondville	26.17	−97.80	? (B)	[27]
	Rich Playa	33.22	−102.05	? (B)	[27]
	Snow drop Playa	32.98	−101.67	? (B)	[27]
Utah	Great Salt Lake	41.00	−112.50	<i>A. franciscana</i> (B)	[27]
Washington	Cameron Lake	48.30	−119.53	<i>A. franciscana</i> (B)	[27]
	Deposit Thirteen	48.22	−119.50	<i>A. franciscana</i> (B)	[27]
	Hot (Bitter) Lake	48.97	−119.48	<i>A. franciscana</i> (B)	[27]
	Omak Plateau	48.42	−119.40	? (B)	[27]
	Penley Lake	48.28	−119.53	<i>A. franciscana</i> (B)	[27]
	Soap Lake	47.55	−119.42	? (B)	[27]

Supplementary Map

Fig. 3. Distribution of *Artemia franciscana* Kellogg, 1906 localities (red circles) around the world, indicating native and invasive areas (upper map) comparing the identified hotspots in the exact map as reported by Myers et al. (2000) (lower map).

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Updates for the data here presented can be found at: http://www.ebd.csic.es/quini/QuiniPersonal_E.htm