Aquatic Invasions (2011) Volume 6, Issue 1: 1–5
doi: 10.3391/ai.2011.6.1.01

Open Access

Editorial

Open-access journal *Aquatic Invasions*: An important part of the developing European information and early warning system on invasive alien species

Vadim E. Panov[1], Stephan Gollasch[2] and Frances Lucy[3]
[1]*REABIC, Helsinki, Finland, and St. Petersburg State University, St. Petersburg, Russian Federation*
[2]*GoConsult, Hamburg, Germany*
[3]*Institute of Technology, Sligo, Ireland*
E-mail: editor@aquaticinvasions.net (VEP), sgollasch@aol.com (SG), lucy.frances@itsligo.ie (FL)

Published online: 8 March 2011

Introduction

Ongoing economic globalization has resulted in accelerated rates of introductions of invasive alien species (IAS) in Europe and worldwide with deleterious consequences to biological diversity (Genovesi and Shine 2004; DAISIE 2009). The serious challenges posed by mass human-mediated introductions of invasive alien species induced the strengthening of international cooperation in research, information exchange and management of invasive species during the last two decades, specifically targeting biological invasions in aquatic ecosystems (see Panov et al. 2002, Panov and Gollasch 2004, Gollasch 2007 for reviews). The International Society of Limnology (*SIL*) Working Group on Aquatic Invasive Species (*SIL WG AIS*) since its establishment in 1998, has focused on the development of information tools for the management of aquatic invasive species and in the facilitation of relevant experts networking worldwide (*http://www.reabic.net/SIL.aspx*). On the Pan-European level, these activities catalyzed, in 2001, the development of the European Research and Management Network on Aquatic Invasive Species, which was first recognized by the European Commission (EC) in 2002 (*ERNAIS*, *http://www.reabic.net/ERNAIS.aspx*). In 2005, *ERNAIS* initiated the establishment of the European open-access journal of applied research of invasive species in aquatic ecosystems with early warning functions, i.e. *Aquatic Invasions*. During 2006-2008 the European Commission provided start-up support for *Aquatic Invasions* through the EC Sixth Framework Programme for research and technological development projects *ALARM* (*http://www.alarmproject.net*), *DAISIE* (*http://www.europe-aliens.org*) and *IMPASSE* (*http://ec.europa.eu/research/fp6/ssp/impasse_en.htm*).

Recently, the Environment Council of the EC adopted conclusions on the mid-term assessment of implementing the EU Biodiversity Action Plan and developing an EU Strategy on Invasive Alien Species, which underlines the urgent need for the Commission and the Member States to jointly develop an appropriate information system for early warning and rapid response towards invasive species (*http://ec.europa.eu/environment/nature/invasivealien/index_en.htm*). In the recent European Environment Agency report "Towards an early warning and information system for invasive alien species (IAS) threatening biodiversity in Europe", *Aquatic Invasions* is considered as an example of an effective information sharing tool, currently helping to increase prompt reporting of records of new invasive species threatening European biodiversity (Genovesi et al. 2010).

Early warning functions of *Aquatic Invasions*

A complete and effective early warning system (EWS) comprises of four inter-related elements: data collection and risk assessment (1), monitoring and warning service (2), dissemination and communication (3) and response capability (4) (see in UN Global Survey of Early Warning Systems 2006). Currently *Aquatic Invasions* contributes to the first three of these elements of EWS, serving as a cost-effective tool for collecting and transferring essential primary

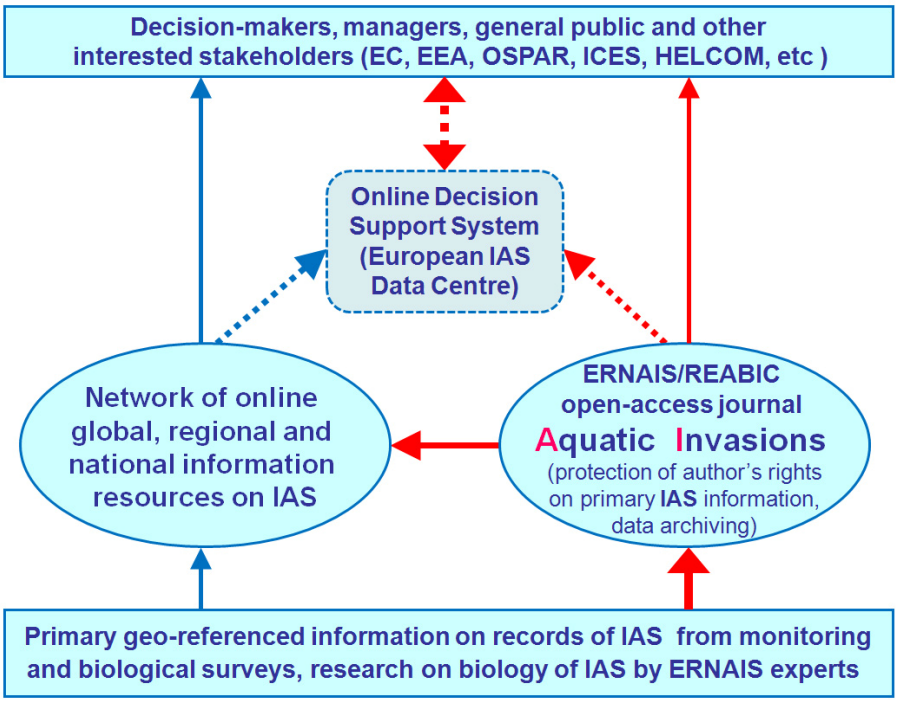

Figure 1. Role of open-access journal *Aquatic Invasions* in developing regional and European information and early warning systems on invasive alien species (IAS), modified from Panov and Gollasch (2006). ERNAIS – European Research and management Network on Aquatic Invasive Species (*http://www.reabic.net/ERNAIS.aspx*), REABIC – Regional Euro-Asian Biological Invasions Centre information system (http://www.reabic.net), EC – European Commission (*http://ec.europa.eu*), EEA – European Environment Agency (*http://www.eea.europa.eu*), OSPAR - OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic (*http://www.ospar.org*), HELCOM – Baltic Marine Environment Protection Commission (*http://www.helcom.fi*). Arrows indicate flow of IAS-related information. The online Decision Support System for the Black Sea region is under development (with support from the EC FP7 collaborative project *enviroGRIDS*, *http://www.envirogrids.net*).

information on aquatic invasive species to the level of decision-makers, general public and other interested stakeholders (Figure 1).

The concept of the open-access journal *Aquatic Invasions* as an essential part of the developing European early warning system on aquatic invasive species was first presented in the editorial paper of the first issue of *Aquatic Invasions* published five years ago (Panov and Gollasch 2006). As we initially suggested, *Aquatic Invasions* is already playing an important specific role in the development of a network of internet-based global, regional and national databases on IAS, while simultaneously protecting the authors' rights on primary geo-referenced data of aquatic invasive species records from monitoring and biological survey efforts, and by providing information on the biology and impacts of these species, the flow of essential information needed for decision-making processes is facilitated (Figure 1).

The first 5 volumes of *Aquatic Invasions* were published during 2006-2010, totaling 20 issues, and are freely available on-line (*http://www.aquaticinvasions.net*). They included 350 research articles and short communications with more than 4000 new geo-referenced records of aquatic alien species in European inland and coastal waters (Figure 2). The 5th volume of *Aquatic Invasions* (2010) included numerous contributions on new records of IAS in European regional seas and inland waters (953 geo-referenced records, with selected records provided in Figure 3).

Publication of primary geo-referenced record data along with high quality pictures of collected alien species is a part of the editorial policy of *Aquatic invasions* as an applied journal, focused on the protection of authors' rights to this valuable information, for further use in open information systems and in decision-making processes. The obligatory submission of pictures

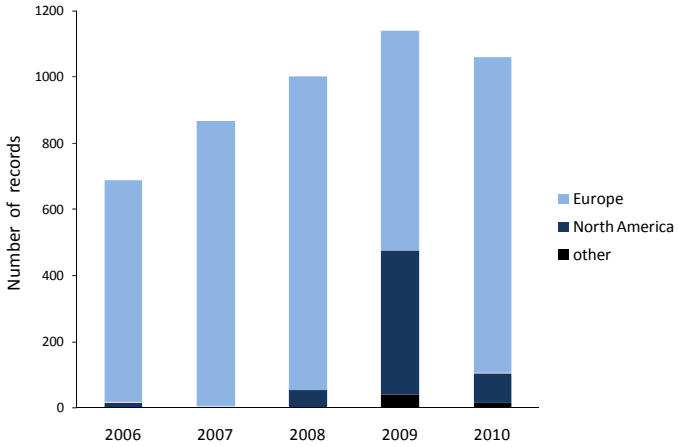

Figure 2. Number of geo-referenced records of non-native aquatic species, published in *Aquatic Invasions* in 2006-2010.

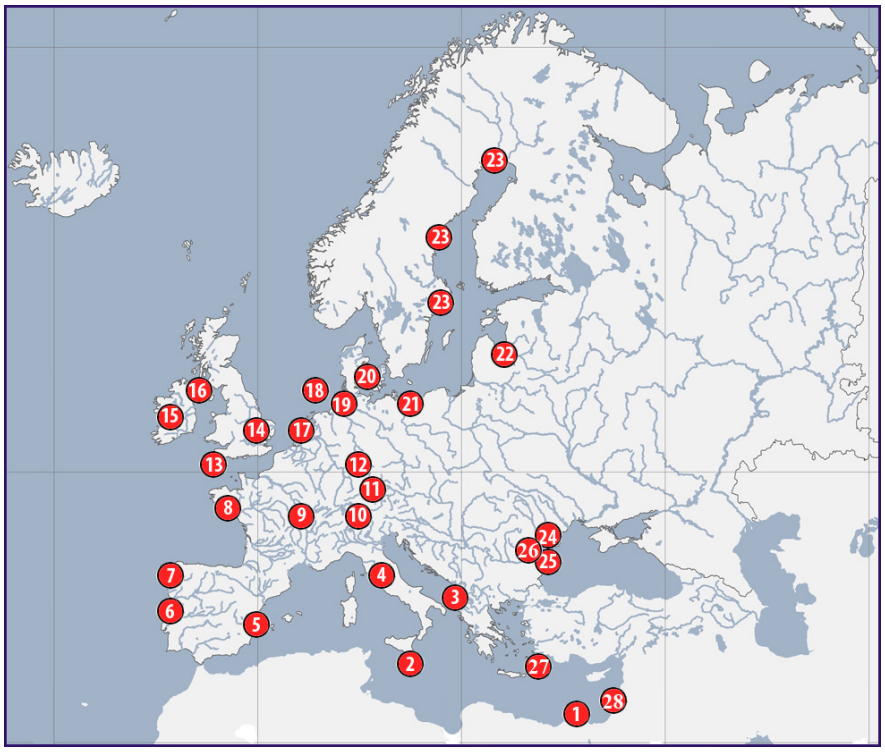

Figure 3. Selected new geo-referenced records of invasive alien species in European coastal and inland waters, published in the 5th volume of *Aquatic Invasions* during 2010: 1 – Atlantic crab *Percnon gibbesi* (Azzurro et al. 2010), 2 – Atlantic tripletail *Lobotes surinamensis* (Deidun et al. 2010), 3 and 19 – blue crab *Callinectes sapidus* (Beqiraj and Kashta 2010; Nehring and van der Meer 2010), 5 – South Atlantic spiny slipper limpet *Bostrycapulus odites* (Collin et al. 2010a), 6 and 13 – ascidian *Corella eumyota* (Nagar et al. 2010; Collin et al. 2010b), 8 and 26 – oriental shrimp *Palaemon macrodactylus* (Lavesque et al. 2010; Raykov et al. 2010), 16 – slipper limpet *Crepidula fornicata* (McNeill et al. 2010), 17 – polychaete worm *Marphysa sanguinea* (Wijnhoven and Dekker 2010), 18 – angular crab *Goneplax rhomboides* (Neumann et al. 2010), 20 – the North-American comb jelly *Mnemiopsis leidyi* (Riisgård et al. 2010), 21 – the Ponto-Caspian round goby *Neogobius melanostomus* (Czugała and Woźniczka 2010), 22 – the Ponto-Caspian amphipod *Pontogammarus robustoides* (Kalinkina and Berezina 2010), 23 – the Chinese mitten crab, *Eriocheir sinensis* (Drotz et al. 2010), 25 – the Japanese shore crab *Hemigrapsus sanguineus* (Micu et al. 2010), 27 – ascidian *Phallusia nigra* (Kondilatos et al. 2010), 28 – jellyfish *Marivagia stellata* (Galil et al. 2010), 4 and 14 – the Ponto-Caspian amphipod *Dikerogammarus villosus* (Tricarico et al. 2010; MacNeil et al. 2010), 7, 9 and 24 – Asian clams *Corbicula* spp. (Lois 2010; Marescaux et al. 2010; Munjiu and Shubernetski 2010), 10 – the Ponto-Caspian mysid *Katamysis warpachowskyi* (Hanselmann 2010), 11 – the North-American crayfish Marmorkrebs (Martin et al. 2010; Chucholl and Pfeiffer 2010), 12 – the Ponto-Caspian quagga mussels *Dreissena bugensis* (Bij de Vaate 2010), 15 – the Ponto-Caspian mysid *Hemimysis anomala* (Minchin and Boelens 2010).

of collected alien species also ensures verification of species identification during the reviewing process organized by the Editorial Board of *Aquatic Invasions*, which currently includes 32 recognized international experts in taxonomy, ecology and management of aquatic invasive species. The journal facilitates timely submission and publication of extended datasets on geo-referenced species records of IAS and provides data archiving services both at the journal website and at the Regional Euro-Asian Biological Invasions Centre information system (*REABIC*) website (*http://www.reabic.net*). These data are easily accessible for potential users both in a tabular format on the journal website and also in GIS interactive format on the *REABIC* website as part of the development of early warning services (*http://www.reabic.net/EWS.aspx*).

In conclusion, one of the key benefits of the open access journal *Aquatic Invasions* is a timely and readily accessible publication of primary scientific information (including the proceedings of relevant international meetings), which feeds into aquatic invasive species management efforts and informs experts in decision and policy making processes. *Aquatic Invasions* may also contribute to timely and coordinated eradication efforts of newly-found IAS. Manuscript publication, including a comprehensive review process, takes on average less than two months, thereby reducing the publication time lag typical of many peer review international journals and provides a cost-effective early warning service, specifically for European countries. Information transfer is specifically timely in case of "*Aquatic Invasions Records*" papers to be published in the electronic journal supplements (see for example the 5th journal volume supplement at *http://www.aquaticinvasions.net/2010/supplement1.html*). The fast and comprehensive review process of manuscripts serves as an effective data quality insurance mechanism, which is generally lacking in most open IAS databases. Currently we are working on the development of additional web services for contributing authors, including online interfaces for automated upload of IAS record data series and the provision of online management for these datasets. Finally, with support of the EC Seventh Framework Programme for research and technological development collaborative project *enviroGRIDS* (*http://www.envirogrids.net*), we are currently developing mechanisms for the more effective transfer of scientific information from publications in *Aquatic Invasions* upwards to the level of decision-making, focusing on the Black Sea basin as a model region.

References

Azzurro E, Milazzo M, Maynou F, Abelló P, Temraz T (2010) First record of *Percnon gibbesi* (H. Milne Edwards, 1853) (Crustacea: Decapoda: Percnidae) from Egyptian waters. *Aquatic Invasions* 5, Suppl. 1: S123–S125, doi:10.3391/ai.2010.5.S1.025

Beqiraj S, Kashta L (2010) The establishment of blue crab *Callinectes sapidus* Rathbun, 1896 in the Lagoon of Patok, Albania (south-east Adriatic Sea). *Aquatic Invasions* 5: 219–221, doi:10.3391/ai.2010.5.2.16

Bij de Vaate A (2010) Some evidence for ballast water transport being the vector of the quagga mussel (*Dreissena rostriformis bugensis* Andrusov, 1897) introduction into Western Europe and subsequent upstream dispersal in the River Rhine. *Aquatic Invasions* 5: 207–209, doi:10.3391/ai.2010.5.2.13

Chucholl C, Pfeiffer M (2010) First evidence for an established Marmorkrebs (Decapoda, Astacida, Cambaridae) population in Southwestern Germany, in syntopic occurrence with *Orconectes limosus* (Rafinesque, 1817). *Aquatic Invasions* 5: 405–412, doi:10.3391/ai.2010.5.4.10

Collin R, Ramos-Esplá AA, Izquierdo A (2010a) Identification of the South Atlantic spiny slipper limpet *Bostrycapulus odites* Collin, 2005 (Caenogastropoda: Calyptraeidae) on the Spanish Mediterranean coast. *Aquatic Invasions* 5: 197–200, doi:10.3391/ai.2010.5.2.11

Collin SB, Oakley JA, Sewell J, Bishop JDD (2010b) Widespread occurrence of the non-indigenous ascidian *Corella eumyota* Traustedt, 1882 on the shores of Plymouth Sound and Estuaries Special Area of Conservation, UK. *Aquatic Invasions* 5: 175–179, doi:10.3391/ai.2010.5.2.07

Czugała A, Woźniczka A (2010) The River Odra estuary – another Baltic Sea area colonized by the round goby *Neogobius melanostomus* Pallas, 1811. *Aquatic Invasions* 5, Suppl. 1: S61–S65, doi:10.3391/ai.2010.5.S1.014

DAISIE (2009) Handbook of alien species in Europe. Invading Nature - Springer Series in Invasion Ecology, Vol. 3, Springer, Dordrecht, 400 pp

Deidun A, Vella P, Sciberras A, Sammut R (2010) New records of *Lobotes surinamensis* (Bloch, 1790) in Maltese coastal waters. *Aquatic Invasions* 5, Suppl. 1: S113–S116, doi:10.3391/ai.2010.5.S1.023

Drotz MK, Berggren M, Lundberg S, Lundin K, von Proschwitz T (2010) Invasion routes, current and historical distribution of the Chinese mitten crab (*Eriocheir sinensis* H. Milne Edwards, 1853) in Sweden. *Aquatic Invasions* 5: 387–396, doi:10.3391/ai.2010.5.4.08

Galil BS, Gershwin L-A, Douek J, Rinkevich B (2010) *Marivagia stellata* gen. et sp. nov. (Scyphozoa: Rhizostomeae: Cepheidae), another alien jellyfish from the Mediterranean coast of Israel. *Aquatic Invasions* 5: 331–340, doi:10.3391/ai.2010.5.4.01

Genovesi P, Shine C (2004) European strategy on invasive alien species. Nature and Environment 137. Council of Europe, Strasbourg, 66 pp

Genovesi P, Scalera R, Brunel S, Roy D, Solarz W (2010) Towards an early warning and information system for invasive alien species (IAS) threatening biodiversity in Europe. EEA Technical report No 5/2010. Luxembourg: Office for Official Publications of the European Union, 52 pp

Gollasch S (2007) International collaboration on marine bioinvasions – The ICES response. *Marine Pollution Bulletin* 55: 353–359, doi:10.1016/j.marpolbul.2006.11.009

Hanselmann AJ (2010) *Katamysis warpachowskyi* Sars, 1877 (Crustacea, Mysida) invaded Lake Constance. *Aquatic Invasions* 5, Suppl. 1: S31–S34, doi:10.3391/ai.2010.5.S1.008

Kalinkina NM, Berezina NA (2010) First record of *Pontogammarus robustoides* Sars, 1894 (Crustacea: Amphipoda) in the Gulf of Riga (Baltic Sea). *Aquatic Invasions* 5, Suppl. 1: S5–S7, doi:10.3391/ai.2010.5.S1.002

Kondilatos K, Corsini-Foka M, Pancucci-Papadopoulou MA (2010) Occurrence of the first non-indigenous ascidian *Phallusia nigra* Savigny, 1816 (Tunicata: Ascidiacea) in Greek waters. *Aquatic Invasions* 5: 181–184, doi: 10.3391/ ai.2010.5.2.08

Lavesque N, Bachelet G, Béguer M, Girardin M, Lepage M, Blanchet H, Sorbe J-C, Modéran J, Sauriau P-G, Auby I (2010) Recent expansion of the oriental shrimp *Palaemon macrodactylus* (Crustacea: Decapoda) on the western coasts of France. *Aquatic Invasions* 5, Suppl. 1: S103–S108, doi:10.3391/ai.2010.5.S1.023

Lois S (2010) New records of *Corbicula fluminea* (Müller, 1774) in Galicia (Northwest of the Iberian Peninsula): Mero, Sil and Deva rivers. *Aquatic Invasions* 5, Suppl. 1: S17–S20, doi:10.3391/ai.2010.5.S1.005

MacNeil C, Platvoet D, Dick JTA, Fielding N, Constable A, Hall N, Aldridge D, Renals T, Diamond M (2010) The Ponto-Caspian 'killer shrimp', *Dikerogammarus villosus* (Sowinsky, 1894), invades the British Isles. *Aquatic Invasions* 5: 441–445, doi:10.3391/ai.2010.5.4.15

Marescaux J, Pigneur L-M, Van Doninck K (2010) New records of *Corbicula* clams in French rivers. *Aquatic Invasions* 5, Suppl. 1: S35–S39, doi:10.3391/ai.2010.5.S1.009

Martin P, Shen H, Füllner G, Scholtz G (2010) The first record of the parthenogenetic Marmorkrebs (Decapoda, Astacida, Cambaridae) in the wild in Saxony (Germany) raises the question of its actual threat to European freshwater ecosystems. *Aquatic Invasions* 5: 397–403, doi:10.3391/ai.2010.5.4.09

McNeill G, Nunn J, Minchin D (2010) The slipper limpet *Crepidula fornicata* Linnaeus, 1758 becomes established in Ireland. *Aquatic Invasions* 5, Suppl. 1: S21–S25, doi:10.3391/ai.2010.5.S1.006

Micu D, Niţă V, Todorova V (2010) First record of the Japanese shore crab *Hemigrapsus sanguineus* (de Haan, 1835) (Brachyura: Grapsoidea: Varunidae) from the Black Sea. *Aquatic Invasions* 5, Suppl. 1: S1–S4, doi:10.3391/ai.2010.5.S1.001

Minchin D, Boelens R (2010) *Hemimysis anomala* is established in the Shannon River Basin District in Ireland. *Aquatic Invasions* 5, Suppl. 1: S71–S78, doi:10.3391/ai.2010.5.S1.016

Munjiu O, Shubernetski I (2010) First record of Asian clam *Corbicula fluminea* (Müller, 1774) in the Republic of Moldova. *Aquatic Invasions* 5, Suppl. 1: S67–S70, doi:10.3391/ai.2010.5.S1.015

Nagar AE, Huys R, Bishop JDD (2010) Widespread occurrence of the Southern Hemisphere ascidian *Corella eumyota* Traustedt, 1882 on the Atlantic coast of Iberia. *Aquatic Invasions* 5: 169–173, doi:10.3391/ai.2010.5.2.06

Nehring S, van der Meer U (2010) First record of a fertilized female blue crab, *Callinectes sapidus* Rathbun, 1896 (Crustacea: Decapoda: Brachyura), from the German Wadden Sea and subsequent secondary prevention measures. *Aquatic Invasions* 5: 215–218, doi:10.3391/ai.2010.5.2.15

Neumann H, Ehrich S, Kröncke I (2010) Establishment of the angular crab *Goneplax rhomboides* (Linnaeus, 1758) (Crustacea, Decapoda, Brachyura) in the southern North Sea. *Aquatic Invasions* 5, Suppl. 1: S27–S30, doi:10.3391/ai.2010.5.S1.007

Panov V, Gollasch S, Leppäkoski E, Olenin S (2002) International cooperation in aquatic invasive species research, information exchange and management in Europe. *Aquatic Invaders* 13 (4): 1–5

Panov V, Gollasch S (2004) Informational resources on aquatic alien species in Europe on the internet: present developments and future perspectives. In: Vanden Berghe E, Brown M, Costello MJ et al. (eds) Proceedings of "The Colour of Ocean Data" Symposium, pp 115–124. IOC Workshop Report 188, UNESCO, Paris

Panov V, Gollasch S (2006) *Aquatic Invasions* – the new European journal of applied research on biological invasions in aquatic ecosystems. *Aquatic Invasions* 1: 1–3, doi:10.3391/ai.2006.1.1.1

Raykov VS, Lepage M, Pérez-Domínguez R (2010) First record of oriental shrimp, *Palaemon macrodactylus* Rathbun, 1902 in Varna Lake, Bulgaria. *Aquatic Invasions* 5, Suppl. 1: S91–S95, doi:10.3391/ai.2010.5.S1.019

Riisgård HU, Barth-Jensen C, Madsen CV (2010) High abundance of the jellyfish *Aurelia aurita* excludes the invasive ctenophore *Mnemiopsis leidyi* to establish in a shallow cove (Kertinge Nor, Denmark). *Aquatic Invasions* 5: 347–356, doi:10.3391/ai.2010.5.4.03

Tricarico E, Mazza G, Orioli G, Rossano C, Scapini F, Gherardi F (2010) The killer shrimp, *Dikerogammarus villosus* (Sowinsky, 1894), is spreading in Italy. *Aquatic Invasions* 5: 211–214, doi:10.3391/ai.2010.5.2.14

Wijnhoven S, Dekker A (2010) Records of a new alien polychaete worm species, *Marphysa sanguinea* (Montagu, 1815) (Eunicidae) in the Eastern Scheldt, the Netherlands. *Aquatic Invasions* 5: 431–436, doi:10.3391/ai.2010.5.4.13

UN Global Survey of Early Warning Systems (2006) An assessment of capacities, gaps and opportunities towards building a comprehensive global early warning system for all natural hazards. A report prepared at the request of the Secretary–General of the United Nations. United Nations, 46 pp