

The Database on Introductions of Aquatic Species (DIAS) is the name recently given to the database begun by Dr. Robin Welcomme in the early 80's on a pioneering Amiga computer to store records of aquatic introductions. It was used as the main source for an FAO Technical Paper (Welcomme, 1988) which has served as a standard reference in the field of inland aquatic introductions. In 1991 the responsibility of the database passed to Dr. Devin Bartley who promoted a further collection of data by means of questionnaires to national experts.

from one country to another, excluding movements of species within the same country. Parasites are not included and introductions from ballast water and ship-fouling organisms are considered only when the introduction of an alien organism has had or could have significant effect on fisheries and aquaculture, or when the introduction could seriously affect the environment. The database is still growing and is probably incomplete, especially in the areas of marine organisms, ornamental fishes, and those organisms not used for fisheries and

THE DATABASE ON INTRODUCTIONS OF AQUATIC SPECIES (DIAS): THE WEB SITE

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Exchange and updating of data was subsequently set up between DIAS and FishBase, ICLARM's database on fish, supported by the European Union and FAO. An MS-Access application was then created to better manage and query the database and an analysis of the existing data was carried out and presented to an international congress (Bartley, Garibaldi and Welcomme, in press). In 1997, a Web site, hosted in the FAO Fisheries homepage (where it can be accessed selecting "Databases and Statistics" and then DIAS under "On-line Databases", or directly at <http://www.fao.org/waicent/faoinfo/fishery/statist/fisoft/dias/index.htm>), was created to allow interested people outside FAO to consult the database. "Highlights" pages were prepared to provide basic information to the public on this increasingly important topic.

In September 1998, the DIAS site was revised to include comments received by the users, add new pages and improve the interface. The data set has been updated to include new records from recently published reviews on introductions (i.e., Coad, 1996, on Southwest Asia; De Moor and Bruton, 1996, on southern Africa; Moreau and Costa-Pierce, 1997, on carps in Africa; Bergot and Vigneux, 1997, on French speaking countries; Lever, 1996, global) and other papers on recent introductions accessed through a search of the Aquatic Sciences and Fisheries Abstracts (ASFA). The database now contains about 3150 records of introductions of aquatic species

aquaculture. Users aware of introductions not already included in the database are kindly requested to send the new information through the Input Form provided in the Web site. This information is first checked and validated and then inserted in the next DIAS update.

The home page of the DIAS Web site is organized into two frames. The main frame on the left side contains, apart from brief explanatory texts and a list of related Web sites, the icons to open the **Search Form, Input Form, Statistics and Glossary** pages. The Search Form (Figure 1) allows to query the database by scientific name, country (where the species was introduced or source of the species), year, reason of introduction, introducer, establishment in the wild, use in aquaculture, ecological and socio-economic effects. Each field can be searched alone or in combination with others. The Input Form, as mentioned earlier, has been created to allow users to contribute to the coverage and precision of the database by providing new introduction records or corrections of the existing ones. The Input Form includes the same fields of the Search Form, an additional field for further comments on the introduction, and fields for personal data on the sender. Two other icons lead to the Statistics pages, regularly updated to include new data, and the Glossary page, which provides explanations of some technical terms.

Figure 1.

Search Form

Aquatic Species Introductions Database - last update: October 1999

Genus:	<input type="text"/>	Species:	<input type="text"/>
Introduced to:	<input type="text"/>	Year:	<input type="text"/>
Introduced from:	<input type="text"/>		
Reason 1*:	<input type="text"/>		
Reason 2*:	<input type="text"/>		
Reason 3*:	<input type="text"/>		
Introducer:	<input type="text"/>		
Established in the wild:	<input type="text"/>	Established through:	<input type="text"/>
As aquaculture species:	<input type="text"/>		
Ecological effects:	<input type="text"/>	Type of ecological effects:	<input type="text"/>
Socio-economic effects:	<input type="text"/>	Type of socio-economic effects:	<input type="text"/>

Note: 300 is the maximum number of records retrieved for a single search.

The smaller frame on the right side of the home page is titled **Highlights on Introduction**. It includes, in a modular format that allows easy addition of new items, links to other pages where some basic information on introductions is made available. In formatting this information, a simple and direct style has been used, including maps, charts and tables, adequate to the medium used (the World Wide Web), in order to catch the attention of an audience broader than that of the specialists.

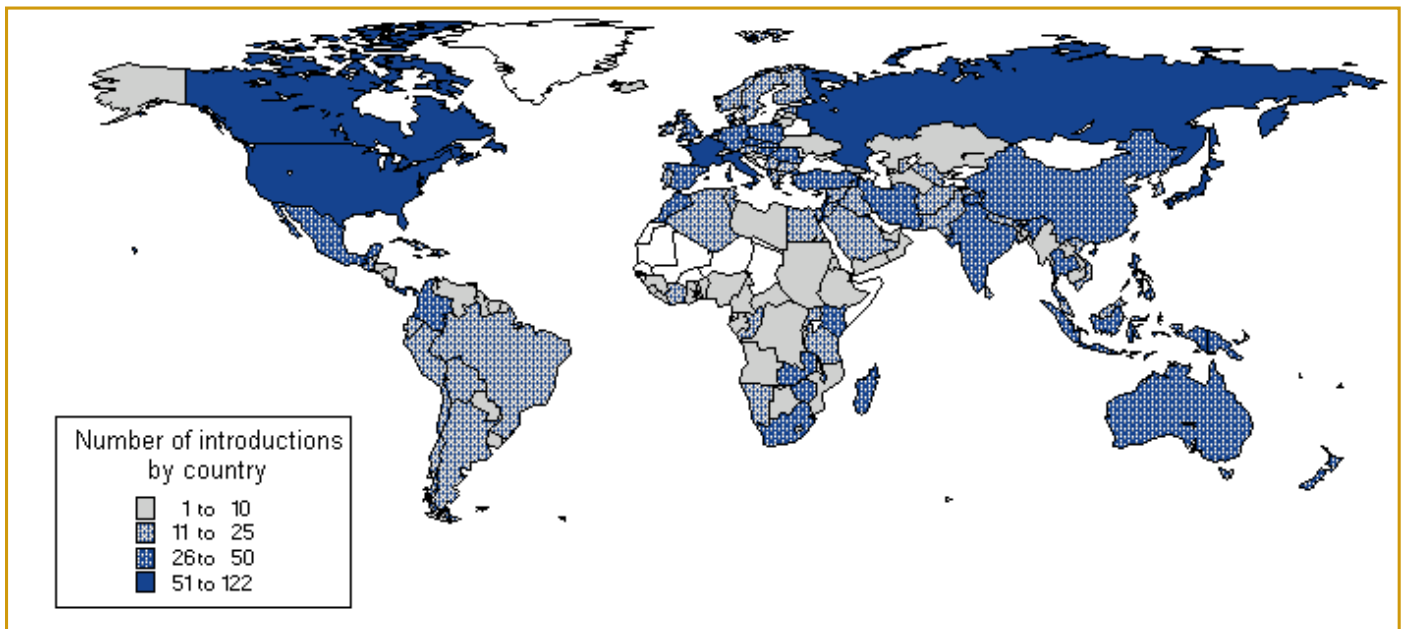


Figure 2 - Number of introductions by country

Under **Controversy**, information is provided on the **Positive effects** and **Negative effects** of Nile perch (*Lates niloticus*) introduction into Lake Victoria. Under the former, data on catch statistics of Nile perch point out the positive effects of the introduction, while in the latter an extract from a scientific paper stresses the serious negative environmental effects produced. Obviously, much more detailed information is available in the literature on this extensively studied matter; over 50 papers have been published on this topic only in the last 10 years (ASFA, 1996, 1998).

Another item under "Highlights" deals with the **Importance for aquaculture**, and shows that aquaculture is the main reason of introduction in 38.7% of the database records and that almost 10% of the world production from aquaculture derives

from introduced species (Garibaldi, 1996). Under **Environmental risks** the abstract of a paper (Bartley and Minchin, 1996) on the use of the precautionary approach on introductions stresses the need to use a code of practice when planning new introductions to minimize possible negative effects on the environment. Finally, a new item has been added under "Highlights" during the recent revision of the DIAS site. This includes four world maps which provide, at a glance, information on the number of introductions by country and introductions for aquaculture purposes (Figures 2 and 4), a chronological record of the spread of *Cyprinus carpio* from its native range (China, Japan, Central Asia; Welcomme, 1988) to almost the entire world (Figure 3), and the countries where the tilapia species *Oreochromis mossambicus* and *O. niloticus* have been introduced (Figure 5).

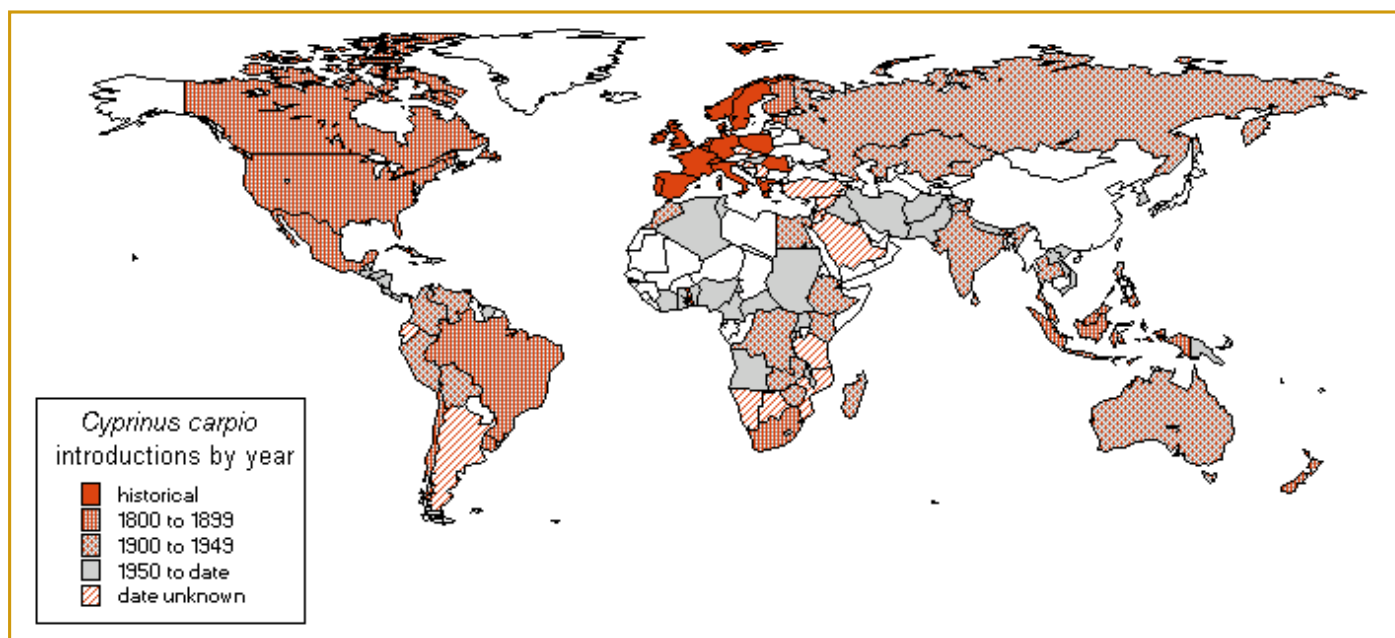


Figure 3 - *Cyprinus carpio* introductions by year

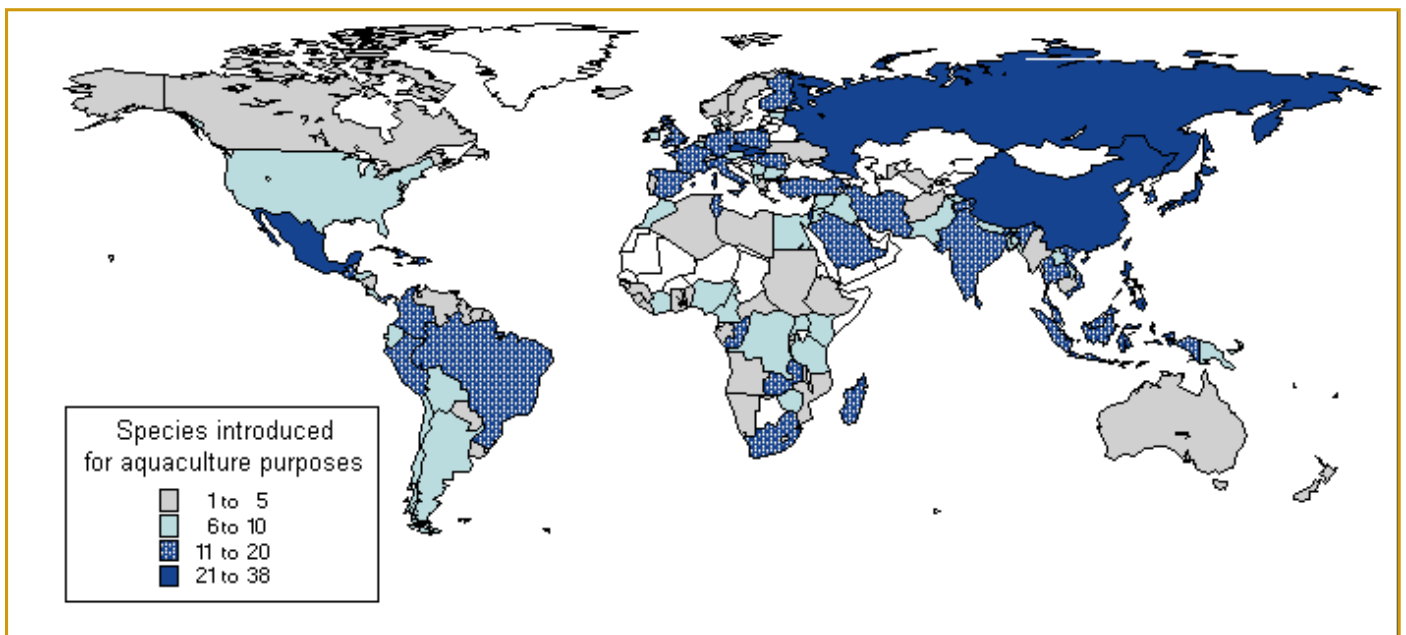


Figure 4 - Species introduced for aquaculture purposes

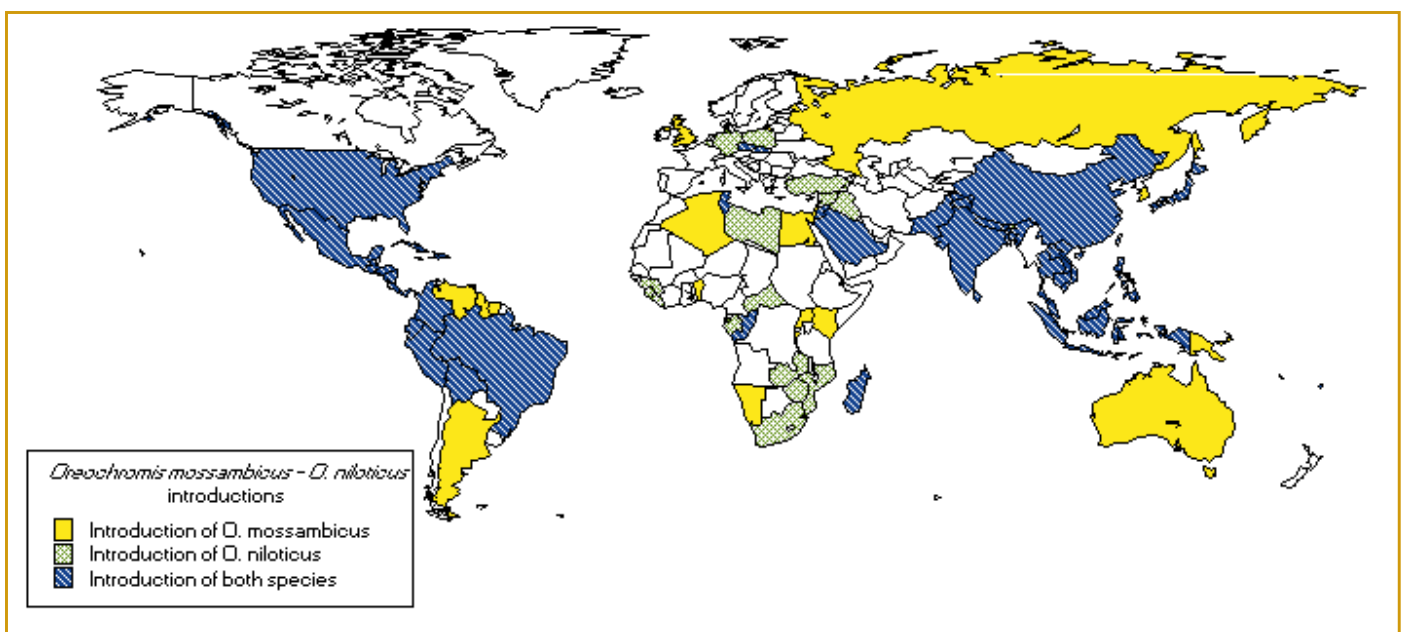


Figure 5 - *Oreochromis mossambicus* and *O. niloticus* introductions

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