Carps are fishes from Eurasia and China that have been widely introduced around the world for aquaculture and weed control purposes (Welcomme 1988). Although carps were first introduced in Brazil in the nineteenth century, they were introduced in large numbers only in the early 1970’s (Agostinho & Julio 1996). According to Poli et al. (2000), four species have been cultivated in the Rio Grande do Sul state in southern Brazil: the bighead Aristichthys nobilis (Richardson, 1845), grass carp Ctenopharyngodon idellus (Valenciennes, 1844), and common carp Cyprinus carpio carpio Linnaeus, 1758, and the silver carp Hypophthalmichthys molitrix (Valenciennes, 1844). These exotic species have been cultivated in ponds scattered around the Patos Lagoon’s drainage basin, and polyculture of carps in rice-field seemed to be increasing in number along this region (Cotrim 1998), particularly at the Mirim Lagoon area.

Since 1998 we have record the occurrence of carp species in the wild at Rio Grande do Sul (Fig. 1), which were captured by artisanal fishers or during our monthly shallow-waters monitoring sampling. All collected specimens were identified and preserved in the Ichthyological Collection of the Federal Rio Grande University (FURG). Our first record was a common carp (25 cm total length TL; 3.302 g) captured during a field survey at the Mirim Lagoon in February 1998. One year later, an adult bighead carp (105 cm total length, TL; 14.750 g) was caught by artisanal fishers at the estuarine area of Patos Lagoon. In May 2001, an adult silver carp (88 cm TL; 8.900 g) was caught at the estuarine area also by artisanal fishers. Recently (May 2003), a fourth species, an adult grass carp (99 cm TL; 10.570 g) was found dead at the surf-zone of the adjacent marine coastal area close to the estuary’s mouth. With the exception of the bighead carp specimen that was not dissected, all specimens had no distinguishable food items in their stomachs.

Considering that there is no sampling effort in this region designed to document the occurrence of large exotic species, we believe that the low number of individuals reported here probably underestimates the abundance of carps in those areas. It seems likely that these exotic fishes have escaped from overflowed ponds and lakes into the Mirim-Patos Lagoon and then estuarine area. Recent studies have provided increasing evidence supporting this hypothesis. Garcia et al. (2003) showed that freshwater fishes inhabiting the northern reaches of Patos Lagoon and its tributaries are carried into the lower reaches of the estuary.
Several studies elsewhere have documented the escape of introduced carps from aquaculture into natural habitats (see Naylor et al. 2001 for further references), including some cases in southeastern Brazil (Agostinho & Julio 1996, Orsi & Agostinho 1999). Silver and bighead carps, which have already established as reproducing populations elsewhere, have been associated with the following threats to native fish communities: (a) they are powerful filter-feeders and they have the potential to out-compete native filter-feeder fishes (b) they consume a broad food spectrum, and can reduce zooplankton abundance, (c) they are fast growing and can reproduce quickly (Xie & Chen 2001). Grass carp can have negative effects on native fauna because they remove vegetation from habitats where many organisms find food resources, shelter, and spawning substrates (Bain 1993).

The establishment of breeding carp populations in the Mirim-Patos Lagoon is a viable hypothesis. This large aquatic system has a diverse fish fauna, including several species of commercial value that support important artisanal and industrial fisheries (Chao et al. 1985, Malabarba 1989, Vieira & Castello 1996). During their young stages many of these fishes are associated with vegetated habitats, such as seagrass mead-
ows and salt marshes, which are widespread along the area of
the Mirim-Patos Lagoon. Seagrass meadows, for example, play
an important role as nursery grounds for commercial shrimps

There is no evidence, however, that introduce carps have
already established breeding population in the Mirim-Patos
Lagoon. In fact, these fishes seemed to have strict breeding
requirements that are lacking in most of the waters into which
it has been introduced (Welcomme 1988). In their natural habi-
tats in China, silver and bighead carp require long rivers for
successful reproduction. These carps migrate between river
and lakes, and during the monsoon flood season they lay pelagic
eggs, that, along with newly hatched fry, drift with the current
(Xie & Chen 2001). Nevertheless, breeding populations have
been already become established outside their native range
(e.g. Mississippi River Basin – Check & Pegg 2001).

Triploid carps, which are considered to be sterile, are
commonly used in aquaculture. Use of triploids prevents re-
production in natural environments by individuals that es-
tape from aquaculture ponds. Nevertheless, techniques used
to induce triploidy are not always effective, and every indi-
vidual needs to be genetically screened. In the United States all
carp released for vegetation control in lakes are required to be
triploid. Nonetheless, carp have escaped, reproduced in the wild,
and spread throughout the Mississippi Basin (Naylor et al.
2001). The feasibility of the use of triploid carps to prevent
an eventual reproduction in natural environments of the Rio
Grande do Sul should be considered by the decision makers.

Carps cultivated in rice-fields and ponds can be a signifi-
cant source of income for agriculture and fishing sectors in
Rio Grande do Sul. Poly culture of carps in rice-fields is consid-
ered “environmentally friendly” because it generally improves
soil fertility (Cotrim 1998). Yet decision makers regulating such
activities should also take in account the risks and potential
long-term effects of non-indigenous fishes on native fauna
and ecosystems.

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REFERENCES

Ciência Hoje, Rio de Janeiro, 21: 36-44.
Bain, M.B. 1993. Assessing impacts of introduced aquatic species:
grass carp in large systems. Environmental Management,
Toronto, 17: 211-224.
Chao, L.H., L.E. Pereira & J.P. Vieira. 1985. Estuarine fish commu-
nity of the dos Patos Lagoon, Brazil. A baseline study, p.
429-450. In: A. Yanez-Arancibia (Ed.) Fish Community
Ecology in Estuaries and Coastal Lagoons: Towards an
Ecosystem Integration. Mexico, UNAM Press.
Check, J.H. & M.A. Pegg. 2001. Invasive carp in the Mississippi
Cotrim, D. 1998. Manual prático de psicultura. EMATER,
Porto Alegre. 38p.
assembleia de peixes dentro e fora de uma pradaria de Ruppia
maritima L., no estuário da Lagoa dos Patos (RS-Brasil).
Abundância e diversidade da assembleia de crustáceos
decapodes dentro e fora de uma pradaria de Ruppia
maritima L., no estuário da Lagoa dos Patos (RS-Brasil).
Garcia, A.M.; M.B. Raseira; J.P. Vieira; K.O. Winemiller & A.M.
Grimm. 2003. Spatiotemporal variation in shallow-water
freshwater fish distribution and abundance in a large
subtropical coastal lagoon. Environmental Biology of
Fishes, Netherlands, 68: 215-228.
Malabarba, L.R. 1989. Histórico sistematico e lista comentada
das espécies de peixes de água doce do sistema da Laguna
dos Patos, Rio Grande do sul, Brasil. Comunicações do
Museu de Ciência e Tecnologia da PUCRS, Série Zoó-
Oksi, M.L. & A.A. Agostinho. 1999. Introdução de espécies de
peixes por escapes acidentais de tanques de cultivo em rios
da Bacia do Rio Paraná, Brasil. Revista Brasileira de Zoo-
logia, Curitiba, 16: 557-560.
aqüicultura na região sul, p. 323-352. In: W.C. Valenti; C.R.
Poli; J.A. Pereira & J.R. Borgheetti (Eds). Aquicultura no Bra-
sil: bases para um desenvolvimento sustentável.
Brasília, CNPq/MCT, 399p.
Seeliger; C. Odrebrecht & J.P. Castello (Eds). Subtropical
convergence marine ecosystem. The coast and the sea
in the warm temperate southwestern atlantic.
aquatic species. Roma, Fisheries Technical Paper, vol. 294,
318p.