

On the presence of a breeding population of rainbow trout (*Onchorhynchus mykiss*) in the Rio Tovanella

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ABSTRACT

The water bodies of the Val Tovanella Nature Reserve host a fish community with a low species diversity, represented by a large acclimated and breeding population of one salmonid species, the rainbow trout *Onchorhynchus mykiss*. This allocthonous species, introduced from North America, reproduces in Italy only in rare cases, and thus the population of Val Tovanella, together with a few other sites, is an exception in the biology of this species for the Alpine, and in general for the Italian waters. Other European breeding populations of rainbow trout are known from some sites in Austria, Liechtenstein, Denmark, Norway and Sweden.

Key words: Val Tovanella, *Onchorhynchus mykiss*, freshwater fish, alien species.

RIASSUNTO

Le acque della Riserva Naturale Orientata Val Tovanella ospitano un popolamento ittico povero in termini di diversità specifica e costituito da una sola specie di salmonide. Queste acque ospitano infatti un popolamento monospecifico di trota iridea, *Onchorhynchus mykiss*, che è presente con una buona popolazione acclimatata e riproduttiva. Questa specie alloctona, originaria del Nord America, solo in casi eccezionali è in grado di riprodursi naturalmente nelle nostre acque e quindi la Val Tovanella, insieme a pochi altri siti noti, costituisce una eccezione nella biologia di questa specie nelle acque alpine e più in generale in quelle italiane. Altri casi di riproduzione in natura della trota iridea sono noti per l'Austria, il Liechtenstein, la Danimarca, la Norvegia e la Svezia.

INTRODUCTION

Monitoring of the fish of the Rio Tovanella was conducted during the LIFE Project LIFE04NAT/IT/000190. This research revealed the presence of a mono-specific community of rainbow trout (*Onchorhynchus mykiss*). This information is important, because the rainbow trout, an allocthonous species introduced from North America, only in very rare cases breeds in Italian waters. A few cases of breeding populations of rainbow trout are known from Italy, such as those recorded in Veneto (Belluno Dolomites areas) (E. Marconato, pers. com.), Trentino (Paneveggio) and Abruzzo (Val di Sangro) (Turin et al. 1998). Breeding populations of rainbow trout are also known in other European countries such as Austria (Berg 2005; Jungwirth 2003; Schmutz 1995), Liechtenstein (Kindle 1993), Denmark (Larsen 1983), Norway (Hindar et al. 1996) and Sweden (Landergren 1999).

STUDY AREA

The study area is the Rio Tovanella (Ruì de le Toanèle),

left tributary to the Piave River, running through the small lateral valley of the Val Tovanella, a nature reserve in the Ospitale di Cadore municipality (BL). This little stream originates at Monte Rocchetta, runs for 4 km, and joins the Piave downstream of Davestra at about 470 m a.s.l. It is characterized by strong mean slope; it flows downstream in a very incised valley characterized by the presence of canyons, gorges and jumps. The main geological substrates of the valley are a variety of calcareous layers (Dal Cortivo et al. 2007). Fish were sampled in a straight, 100 m long reach, at 550 m a.s.l.

MATERIALS AND METHODS

Fish populations were sampled by electro-fishing using a continuous current with adjustable voltage (3.8-7 Ampere, 300-500 Volt, 1500 W). Fish sampling was conducted on 29.XI.2006 and was semi-quantitative, an abundance index (Moyle & Nichols 1973), modified as shown in tab. 1, and a population structure index (Turin et al. 1999) listed in tab. 2, were calculated.

Tab. 1. Moyle & Nichols abundance index (modified).

Abundance index	Number of individuals recorded in a straight 50 m long stream reach
1	1 – 2
2	3 – 10
3	11 – 20
4	21 – 50
5	> 50

Tab. 2. Population structure index.

Population structure index	Population structure level
1	Structured population
2	Non structured population – young individuals dominant
3	Non structured population – adult individuals dominant

RESULTS

The results of the fish sampling are listed in tab. 3. The sampled population was well-structured, with individuals distributed in 4 age-classes, and relative dominance of young and sub-adult individuals. Several male individuals were sexually mature and ready to spawn. Based on information provided by agents of the Corpo Forestale dello Stato who have been working in the area, the only species present before

Tab. 3. Fish assemblage of the Rio Tovanella.

Species present	Scientific name	Abundance index	Population structure index
Rainbow trout	<i>Oncorhynchus mykiss</i>	5	1

the '80s was the brown trout *Salmo [trutta] trutta* (M. Dalla Riva, pers. com.).

DISCUSSION

The rainbow trout was introduced in Italy from North America; only in exceptional cases this species can naturally breed in Italian waters. The rainbow trout has a great importance for angling and secondarily for management: when the rainbow trout is introduced in waters where populations of the most valuable marble trout are subject to strong pressure from angling, the presence of rainbow trout can reduce such pressure on the latter. Such a management choice is supported by the fact that the rainbow trout does not reproduce in nature and, generally, does not hybridize with the marble trout, thus avoiding the risk of crossbreeding (which occurs when the brown trout is introduced in waters where the marble trout is present).

However, Val Tovanella and a few other sites in Italy represent an exception in the biology of this species in Alpine waters and, more generally, in Italian waters. This ichthyological peculiarity will have to be assessed and carefully monitored in order to control the possible diffusion of a reproductive population of this alien species.

It is important to underline that even if the Rio Tovanella is in direct contact with the Piave River, those individuals of rainbow trout which are transported downstream from the Tovanella Stream during floods into the Piave have never been recorded to breed there. This observation suggests that the natural reproduction of the rainbow trout in Italian water is the result of a synergy of environmental and microclimatic factors, which only in very rare cases occur in Italian riverine habitats.

REFERENCES

- Berg K., 2005. Fish stocks examinations in the Nationalpark Kalkalpen considering in particular the development and evaluation of the reduction of the rainbow trout (*Oncorhynchus mykiss* Walbaum). Diplomarbeit an der Universität für Bodenkultur Wien.
- Dal Cortivo M., Gatti E., Nascimbene J. & Sommacal M. (eds.), 2007. Guida alla Riserva Naturale Orientata Val Tovanella. Ministero alle Politiche Agricole Alimentari e Forestali, Corpo Forestale dello Stato, Tipolitografia Editoria DBS, Rasai di Seren del Grappa, 239 pp.
- Hindar K., Fleming I.A., Jonsson N., Breistein J., Sægrov H., Karlsbakk E., Gammelsæter M. & Dønnum B.O., 1996. Regnbueørret i Norge: forekomst, reproduksjon og etablering. NINA Oppdragsmelding, 454: 1–32.
- Jungwirth M., 2003. Habitatverhältnisse und mögliche Konkurrenz Bachforelle/ Regenbogenforelle in Österreich Informationsveranstaltung Alpenrhein: vier internationale Experten stellen ihre Berichte vor, 15.1.2003, Hochschule für Technik in Buchs, SG, Schweiz.

- Kindle T., 1993. Zur Entwicklung der Regenbogenforelle im Liechtensteiner Binnenkanal. Bericht der botanisch-zoologischen Gesellschaft Liechtenstein-Sargans-Werdenberg, 20: 159–161.
- Landergren P., 1999. Spawning of anadromous rainbow trout, *Oncorhynchus mykiss* (Walbaum): a threat to sea trout, *Salmo trutta* L., populations? Fisheries Research, 40 (1): 55–63.
- Larsen K.L., 1983. Selvreproducerende regnbueørreder i danske vandløb. Sportsfiskeren, 58 (2): 4–5.
- Moyle P.B. & Nichols R.D., 1973. Ecology of some native and introduced fishes of the Sierra Nevada foothills in Central California. Copeia, 3: 478–490.
- Schmutz S., 1995. Zonierung und Bestandsprognose von Bachforelle (*Salmo trutta* f. *fario*, L.), Regenbogenforelle (*Oncorhynchus mykiss*, WAL.) und Äsche (*Thymallus thymallus*, L.) anhand von Makrohabitatparametern in österreichischen Rhithralgewässern. Abteilung für Hydrobiologie, Fischereiwirtschaft und Aquakultur, Institut für Wasserversorge, Gewässerökologie und Abfallwirtschaft, Wien, Universität für Bodenkultur, 127 pp.
- Turin P., Maio G., Zanetti M., Bilò M.F., Rossi V. & Salviati S., 1999. Carta ittica della Provincia di Rovigo. Ed. Provincia di Rovigo, Assessorato alla Pesca, 324 pp.
- Turin P., Ruggieri L., Zanetti M., Bilò M.F., Rossi V. & Loro R., 1998. Carta ittica della Provincia di Chieti. Cogecstre Edizione, 184 pp.

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