

The management of Marble trout [*Salmo (trutta) marmoratus* Cuvier, 1817] in the province of Belluno (North-Eastern Italy)

La gestione della trota marmorata in Provincia di Belluno

Upravljanje s soško postrvijo v provinci Belluno

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Key words

Belluno (North Eastern Italy) marble trout (*Salmo trutta marmoratus*) management.

Summary

Ever since the creation of the first Provincial Fish Distribution Map (1989-1992), the protection of the marble trout in the context of a more general wildlife preservation plan has been one of the objectives posed by the Province of Belluno.

A series of studies has been conducted and various standards have been applied for the protection and fishing of the species. The protection measures adopted include the establishment of a minimum catch size (35 cm) that permits each breeder to reproduce at least twice, maximum catch limits (both daily and annually), the creation of special no-fishing areas reserved for breeding and low-impact fishing areas (no kill, C. & R, and trophy catch areas) and in 2000, the complete prohibition against catching the fish in its native environment.

The studies performed also regard limiting the phenomenon of hybridism, the creation of small hatcheries for the reproduction and selection of autochthonous varieties, and the struggle against the principal factors that prevent the greater diffusion of the marble trout in the Province of Belluno, such as the water shortage, the modification of bodies of water, the proliferation of fish-eating birds, and environmental pollution in general.

Riassunto

Dalla creazione della prima Carta Provinciale di Distribuzione Ittica (1989-1992) la protezione della trota marmorata, nel contesto più generale della preservazione della fauna selvatica, è stato uno degli obiettivi posti dalla Provincia di Belluno.

È stata condotta una serie di studi e sono stati applicati vari standard per la protezione e la pesca della suddetta specie. Le misure di protezione adottate prevedono l'introduzione di una taglia minima di cattura (35 cm) che permette ad ogni esemplare di riprodurre almeno due volte, il limite massimo di cattura (sia giornaliero che annuale), la creazione di speciali aree di non-pesca riservate per la riproduzione ed aree di basso impatto di pesca (no-kill, cattura e rilascio) e nel 2000 il divieto completo di cattura dei pesci nel suo ambiente nativo.

Gli studi svolti riguardano pure la limitazione del fenomeno dell'ibridazione, la creazione di piccoli allevamenti per la riproduzione e la selezione di varietà autoctone come pure il combattere i fattori che prevengono la maggiore diffusione della trota marmorata nella Provincia di Belluno, quali la mancanza d'acqua, la modifica dei corpi idrici, la proliferazione degli uccelli ittiofagi e l'inquinamento ambientale in generale.

Povzetek

Prva karta razširjenosti ribjih vrst tega območja je bila izdelana v obdobju 1989-1992. Varstvo soške postrvi je bil eden izmed ciljev v naravno varstvenem programu province Belluno.

Izvedena je bila cela vrsta raziskav in uporabljeni različni standardi tako za varstvo kot za ribolov posameznih vrst. Postavljeni so bili naslednji varstveni mehanizmi:

- določitev najmanjše dovoljene lovne mere na 35 cm, kar omogoča najmanj 2 drsti,
- dnevna in letna omejitev uplena, določitev območij namenjenih razmnoževanju, kjer je ribolov prepovedan,
- postavitve območij s posebnim ribolovnim režimom (ujemi in spusti, trofejni deli),
- ter v letu 2000 popolno prepoved ribolova v naravnem okolju.

Raziskava obravnava tudi problem križanja, postavitve majhnih valilnic ter selekcijo autohtonih varietet. Obenem študija obravnava tudi način borbe proti različnim dejavnikom, ki onemogočajo večjo številčnost soške postrvi kot so: krajšanje vodnih tokov, spreminjanje vodnih ekosistemov, širjenje ribojedih ptic in splošno onesnaževanje okolja.

Introduction

The history of fish management in the Province of Belluno can be summarised in the following few important dates:

1988: creation of the first Provincial Fish Distribution Map, 1992: the division of all the bodies of water in the entire Province and the concession of 11 fishing areas; the approval of the Fish Distribution Map by the Provincial Authorities,

1998: revision of the Provincial Fish Distribution Map, 2000 Presentation and approval of the revised Fish Distribution Map.

Provincial waters are currently managed as divided into 11 fishing basins over which the Province exercises technical and control functions, while the fishing basins are each responsible for their own financial administration.

Materials and methods

The evaluation of the distribution of the marble trout in the Province of Belluno proceeded through the collection and processing of existing data and the appropriate extrapolations from the Provincial Fish Distribution Map (see these extrapolations for the methods used).

Results

The Province of Belluno has conducted numerous studies for the preservation and defence of the marble trout; a research program for the limitation of the phenomenon of uncontrolled hybridism was implemented from 1995 to 1997 for the purpose of eliminating the risk of interbreeding with the brown trout. Another study received funding from 1996 to 1999 for the purpose of studying controlled hybridism and isolating autochthonous marble trout varieties.

There are presently 3 small marble trout hatcheries in the Province of Belluno located in Bolzano Bellunese, Tomo, and Cellarda.

Figure 1 illustrates the current distribution of this salmonid in the Belluno area, which suggests that all the Province's largest bodies of water were most probably originally colonised by this semi-species.

Figure 2 illustrates the marble trout's theoretical growth curves in three water basins in the Province of Belluno, which suggest that while these curves are practically identical for the Piave and Cordevole Rivers, the curve for the Cismon Stream – a tributary to the Brenta River – reveals lower growth values.



Red = frequent
Yellow = rare

Fig. 1 - Distribution of *Salmo (trutta) marmoratus* in the Piave river basin

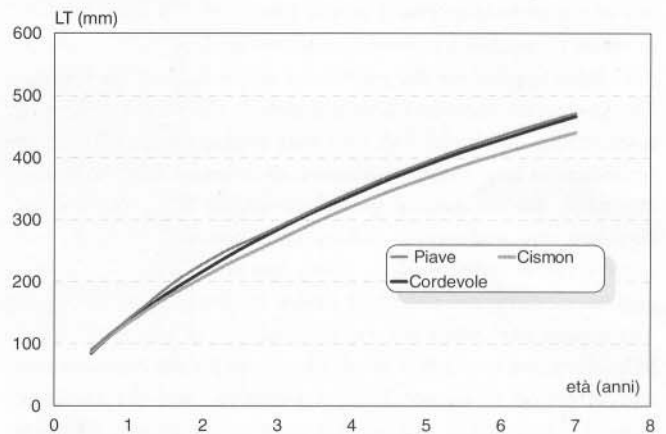


Fig. 2 - Theoretical growth curve V.B.G.E. of *Salmo (trutta) marmoratus* in the leading river basin in the Province of Belluno

Figure 3 and Table 1 summarise the data on catches of marble and hybrid trout *Salmo (trutta) marmoratus* x *Salmo (trutta) trutta*, for the mid-low Piave River Valley, from Basin 8 outside the City of Belluno to Basin 10 that extends to the Treviso Province border.

These data reveal the dramatic decrease in catches of this salmonid, which in percentage values translates into an average decrease of 87%.

TOTAL CATCHES

Salmo (trutta) marmoratus

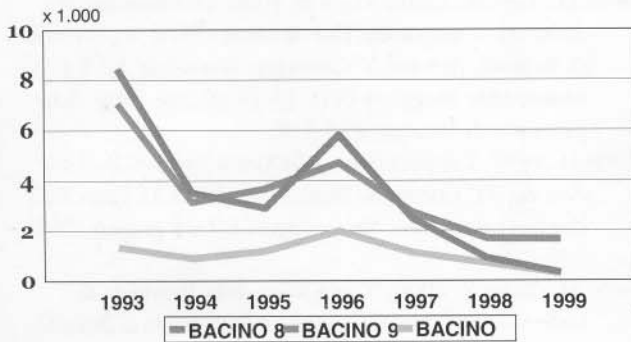


Fig. 3 - Catches of *Salmo (trutta) marmoratus* in the middle section of the Piave River (TOTAL CATCHES)

CATCHES

Salmo (trutta) marmoratus

	BACINO 8	BACINO 9	BACINO 10
1993	8446	7058	1330
1994	3509	3135	894
1995	2905	3671	1178
1996	5801	4703	1979
1997	2479	2719	1109
1998	890	1686	698
1999	303	1657	274

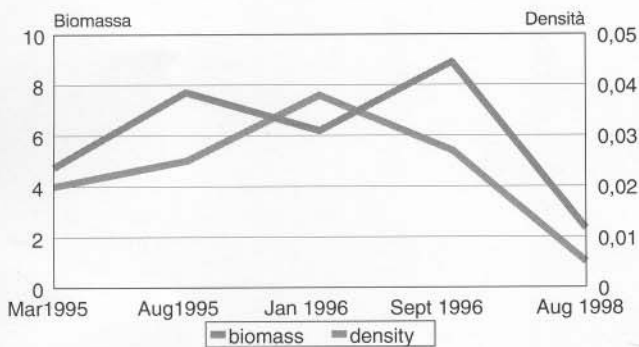
Fig. 4 - Estimated density and biomass of *Salmo (trutta) marmoratus* in a typical station in the middle section of Piave river

<i>Marble trout</i>		
YEAR	BIOMASS	DENSITY
March 1995	4,75	0,020
August 1995	7,70	0,025
January 1996	6,19	0,038
September 1996	8,90	0,027
August 1998	2,33	0,005

Tab. 2 - Estimated biomass of *Salmo (trutta) marmoratus* in a typical station in the middle section of Piave river

PIAVE river

San Pietro in Campo (BL)



Tab. 1 - Catches of *Salmo (trutta) marmoratus* in the middle section of the Piave River

By considering the biomass and density data of a typical station that exemplifies the entire section (San Pietro in Campo) slightly upstream from the City of Belluno listed in Figure 4, these values reflect the same values obtained through the analysis of the catch.

Conclusion

The data above indicate a considerable decrease in the stock of marble trout in the waters of the Province of Belluno over the past few years despite all the measures taken for its protection and proliferation.

The principal causes for this decrease may be summarised as follows:

- the water shortage, with the failure to apply and respect the M.F.D (minimum flow discharge),
- the failure to establish and respect catch limits until the mid 1990s,
- the effect of pollution, a phenomenon which although not yet reaching alarm levels still requires efficient solutions,
- modifications in the water bodies and river beds that tend to eliminate the areas of refuge and shade necessary for reproduction,

fish-eating birds, which as shown by a recent study (Zanetti, 2000) remove 18 tons of fish from the Piave River basin each year, 5.04 tons of which represented by marble trout.

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