

Possibility of hybridization between *Dentex Dentex* and *Pagrus Major*, a transplanted fish species into the Adriatic Sea

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Owing to the factors of ecological and ethological isolation between species, the rate of natural hybridization in fish is very low. However in some cases the frequency of natural hybrids may increase considerably. HUBBS (1955) observed that hybridization is often a function of the integration of the habitat and that species that are segregated in breeding can tend to breed together where the environment is rendered intermediate either through natural causes or through modification by man. Thus, it may be that when there is gametic compatibility, such hybridization does occur between totally allopatric species artificially grouped in the same environment (CHEVASUS, 1979).

This paper reports on artificial hybridization between red sea bream *Pagrus major* and common dentex *Dentex dentex*, as an indication of possible natural hybridization. Red sea bream was transplanted into Adriatic fish farms, as species commercially very interesting and its breeding was successful. They even matured spontaneously in the Adriatic in April-May which confirms their good adaptation to this environment.

Most of the species common dentex and red sea bream parental stock matured spontaneously under ambient conditions in the middle of May, in the Hatchery of the Institute of Oceanography and Fisheries in Split, giving small quantities of ripe eggs and milt. Therefore they were stripped of gametes. Results of the trials on artificial reproduction and larval rearing of common dentex, red sea bream and their reciprocal hybrids are given in Table 1.

Table 1. Results of trials on artificial reproduction of *Dentex dentex*, and *Pagrus major* and their reciprocal hybrids.

	fecundity (number of eggs)	Number of fertilized eggs	Fertilization (%)	Hatching (%)	Mean hatching time (hours)	Total length of larvae (mm) \pm SD			Survival after 30 days (%)
						newly hatched	after yolk sac absorption	30 days old larvae	
<i>Dentex dentex</i>	45 000	20 000	83	62	60.15	2.28 \pm 0.02	3.49 \pm 0.02	6.08 \pm 0.11	8.1
<i>D. dentex</i> q x <i>P. major</i> ♂		20 000	77	56	58.00	2.31 \pm 0.03	3.55 \pm 0.02	6.15 \pm 0.84	6.5
<i>Pagrus major</i>	161 000	20 000	90	40	53.30	2.19 \pm 0.02	3.37 \pm 0.02	4.65 \pm 0.08	11.2
<i>P. major</i> q x <i>D. dentex</i> ♂		20 000	82	50	53.45	2.19 \pm 0.08	3.51 \pm 0.05	4.67 \pm 0.07	9.0

Percentage of fertilization and hatching in hybrids slightly disagree with that of the parental species and showed high gametic compatibility between studied species. The duration of the embryo development and the length of newly hatched larvae showed evident maternal effect in both hybrid combinations. After hatching four studied combinations were placed in two larval tanks each. The larval rearing method was described by JUG-DUJAKOVIC and GLAMUZINA (1988).

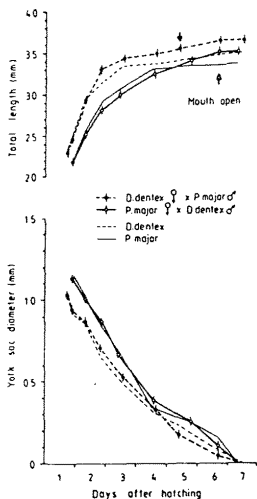


Fig. 1. Growth and yolk sac resorption of *Dentex dentex*, *Pagrus major* and their reciprocal hybrids at constant temperature (17 \pm 0.5 $^{\circ}$ C)

Distribution of total lengths with standard deviation and yolk-sac resorption for the yolk-sac larvae of common dentex, red sea bream and their reciprocal hybrids are shown in Figure 1. There was no significant difference between Hybrids and maternal species (T-test, $P < 0.05$; SOKAL and ROHLF, 1969).

There was no significant difference in survival from hatching to day 30 (G-test of independence; SOKAL and ROHLF, 1969) and growth (ANOVA, $P < 0.05$) between hybrid and maternal species (Table 1) in both hybridizations.

The results of this experiment confirm the possibilities of natural hybridization between common dentex and red sea bream, the species transplanted into the middle Adriatic where common dentex existed before. This calls for the control of natural sparid population for detection of eventual natural hybrids and their viability and great prudence in future introducing an allopatric species into an environment already populated with the same family.

REFERENCES

CHEVASUS B., 1979. - Hybridization in salmonids : results and perspectives *Aquaculture*, 17 : 113-128.
 HUBBS C.L., 1955. - Hybridization between fish in nature. *Syst. Zool.* 4 : 1-20.
 JUG-DUJAKOVIC J. and GLAMUZINA B., 1988. - Preliminary studies of reproduction and early life history of *Diplodus vulgaris* (E. Geofrey Saint-Hillaire 1817) in captivity. *Aquaculture*, 69 : 367-377.
 SOKAL R.R. and ROHLF F.J., 1969. - Biometry. *Freeman*, San Francisco, C.A. 776 pp.