

Bream: the survivor

NSW Fisheries scientists, MATT BROADHURST, PAUL BUTCHER and CRAIG BRAND follow up from last month's informative article with the results of a gut-hooked bream experiment.

IN 2004 we started a research project, jointly funded by the NSW Department of Primary Industries and the Recreational Fishing Trusts, entitled "Using recreational anglers to estimate and maximise the survival of released line-caught fish". This project involved experiments that aimed to (i) estimate the survival rates of key marine species after being released by anglers in NSW, and then (ii) where required, develop and test changes to gear and handling practices to minimise mortalities.

So far we have estimated short-term, post-release survival rates for snapper (67 per cent), trevally (63-98 per cent), mulloway (69-92 per cent), sand whiting (93 per cent) and yellowfin bream (72-100 per cent), and some key contributing factors. For example, the chances of trevally dying increased with their time spent in onboard holding tanks. In contrast, anatomical hook location (mouth vs. swallowed) was demonstrated to strongly influence the survival of sand whiting, mulloway and yellowfin bream; especially if swallowed hooks were physically removed. Simply cutting the line at the mouth and releasing gut-hooked mulloway and yellowfin bream more than quadrupled their chances of survival.

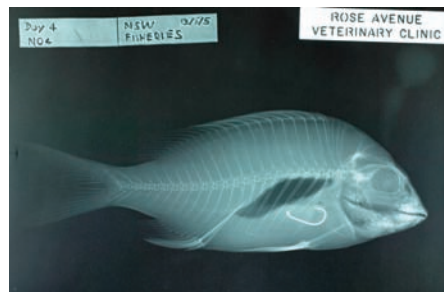
While the above survival rates are promising, they are limited to monitoring periods over less than 10 days; there is some concern there may be longer-term negative effects and/or survival of released fish, particularly those that have swallowed hooks. Our aims were to examine these issues during recent experiments done at the National Marine Science Centre in Coffs Harbour.

The experiments were done using six 3000L holding tanks and up to 58 110L tanks located in an enclosed room. All tanks were aerated and supplied with flow-through seawater. At the start of both experiments, about 400 yellowfin bream (17-28cm length) were distributed in the 3000-L tanks and then hooked by using a J-hook baited with prawns. Only fish that swallowed hooks were used in experiments.

Immediately after being caught, the line was cut (5cm from the mouth) and each

fish released into an individual 110-L tank. Once all gut-hooked fish were released, the same number of fish were scooped from the 3000-L tanks and placed into separate individual 110-L tanks to be used as "controls". All fish were checked daily and fed every second day.

In the first experiment, 20 gut-hooked and 20 control bream were monitored in the 110-L tanks for 105 days. All of the



X-ray of a healthy yellowfin bream that survived being gut-hooked showing the hook in the stomach with the barb orientated downwards.

control fish survived. By comparison, three gut-hooked fish died (all within the first eight days), providing a total survival rate of 85 per cent. Of the 17 surviving gut-hooked fish, 13 passed their hooks after between six and 56 days (an average of 20 days) of being released into the tanks. Typically, the hooks were apparently ejected from the mouth, oxidised to about 90 per cent of their original weight, and often broken into two pieces at the shaft barbs. Hook fragments and line were also observed being passed from the anus of some fish.

At the end of the experiment, all fish were euthanised and examined for general health, including stress, overall physical condition and the extent they were able to consume and digest food. There were no observed differences for these variables between gut-hooked fish (including four still containing hooks) and control fish. X-rays of the four surviving fish containing hooks showed these located at various orientations in the stomach, with no signs of corrosion.

In the second experiment, we examined the general health of fish at regular intervals

before they passed their hooks. A total of 70 gut-hooked and 70 control bream were released into the 110-L tanks, and monitored for mortalities. Some of the live gut-hooked individuals and their controls were euthanised and examined at different times between three and 42 days post release, and before the gut-hooked fish passed their hooks. Other gut-hooked and control fish were then placed into the tanks.

In total, three control and 24 gut-hooked bream died before being sampled (most within 13 days of being released) during the second experiment, providing an adjusted survival rate of almost 70 per cent. Similar to the first experiment, there were few differences in stress and physical condition between control fish and those still containing hooks in their stomachs.

According to the experiments above, cutting the line appears to be a good strategy for minimising the mortality of gut-hooked bream, with between 70 and 85 per cent surviving the process and the greater majority (eg: 76 per cent) eventually passing their hooks with few apparent negative effects. However, further work is required to validate these observations by examining the fate of gut-hooked yellowfin bream released in the wild, and the rates of oxidation of other designs and types of hooks used by anglers. In particular it would be important to investigate if stainless steel hooks are similarly passed by fish.

While this study and earlier work have demonstrated that considerably more released gut-hooked bream survive than die, if hooking is limited to the mouth and jaw, survival rates often approach 100 per cent. Therefore, our future research will also involve determining the extent to which different hook types (including circle and other J hooks) influence the rate species like bream swallow hooks. It's hoped these experiments will identify particular hook designs that maintain catching efficiencies, but reduce rates of gut-hooking, and therefore mortalities. This information, combined with previous results will provide clear and realistic options for maximising post-release survival rates of angler-caught yellowfin bream.



