

Effects of capture injury and tag-type on the recovery rate of tagged tailor, *Pomatomus saltatrix* (Linnaeus)

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Summary

A series of tag-release-recapture experiments on tailor, *Pomatomus saltatrix*, was carried out at Fraser Island, Queensland, in 1978, 1979 and 1980. In all, 1731 tailor were tagged and released and 101 were subsequently recaptured and reported by fishermen. The severity of the injury caused by the capture method (angling) prior to tagging had no adverse effect on the recapture rate of tagged fish. Yellow spaghetti tags had a significantly higher rate of recovery than monel metal strap tags possibly because fishermen often failed to recognise strap tags after recapturing tagged fish.

INTRODUCTION

The fish *Pomatomus saltatrix* has a world-wide distribution and is fished extensively in North and South America, southern Africa, the Mediterranean region and Australia. In Australia fishermen use the common name tailor to describe the species. Tagging studies on *P. saltatrix* have been conducted in North America (Lund and Maltezos 1970; Wilk 1977) Africa (Champagnat 1978) and Australia (Thomson 1959); Bade 1977; Pepperell 1980), primarily to determine movements and migrations. In the present study, the effects of capture injury prior to tagging and tag-type on the recovery of tagged tailor were investigated in a series of tag-release-recapture experiments. Information obtained during the study on movements of tagged fish is published elsewhere (Pollock 1984). The study was conducted in southeast Queensland, the most productive fishing area for tailor in Australia (Pollock 1980).

MATERIALS AND METHODS

A total of 1731 tailor was captured near Indian Head, Fraser Island during September in 1978, 1979 and 1980 by the angling method (Chapman 1980). The bait consisted of a pilchard (*Sardinops neopilchardus*) attached to four hooks (size 4-0). Upon capture each tailor was removed from the hooks, tagged, measured (fork length to the nearest cm) and released. The lengths of tagged fish were from 25 to 56 cm (mean length=38.2 cm). The time from capture to release was less than 1 min. Any tailor which were hooked in the oesophagus, gill region or eyes were not used for tagging purposes. During 1979 and 1980 the number of hooks which had penetrated the mouth of each fish at capture was recorded as an index of the capture injury. Three types of tag were used namely, small monel metal strap tags (15 mm×4 mm×0.5 mm thick), large monel metal strap tags (20 mm×5 mm×0.5 mm thick) and lock-on spaghetti tags (Floy FT-4, 80 mm long, yellow). Strap tags were applied on the dorsal part of the operculum. Lock-on spaghetti tags were inserted below the first dorsal fin, midway between the lateral line and the mid-dorsal line. In 1978 fish were tagged with either large or small strap tags. In 1979 either large strap tags or yellow spaghetti tags were used. In 1980 the latter experiment was repeated but approximately one third of the fish tagged was double tagged with both large strap tags and spaghetti tags to determine the reason for different tag recovery rates. A total of 101 tagged tailor was recaptured by fishermen and returned to the author. Chi-square tests were used to determine differences in recapture rates of fish with different capture injuries prior to tagging and of fish with different tag-types.

RESULTS

Approximately 65% of tailor captured for tagging during 1979 and 1980 had single-hook injuries. Only a small percentage (8.5%) of the fish tagged had severe (3 or 4) hook injuries (Table 1). The severity of the capture injury prior to tagging had no significant effect on the recovery rate of tagged fish (Table 1). The difference in tag recovery rate between small and large strap tags was not significant (Table 2). Large strap tags had a significantly lower rate of recovery than spaghetti tags in both 1978 and 1979 (Table 2). The recovery rate of double tagged fish and that of fish with single spaghetti tags did not differ significantly (Table 2). There was no evidence of tag shedding because in all 16 cases of recovery of double tagged tailor, both tags were intact.

Table 1. Effect of capture injury prior to tagging on the recovery of tagged tailor

Capture injury prior to tagging (number of hooks in mouth)	Number of fish	
	Tagged and released	Recovered*
1	785	42 (5.4%)
2	322	24 (7.5%)
3 or 4	103	7 (6.8%)
Total	1 210	73

* Chi-square test showed no significant difference ($P>0.05$) in the frequency of recovery of tags from fish with different injuries.

Table 2. Effect of tag-type on the recovery rate of tagged tailor

Year of tagging		Number of fish with each tag-type				Results of Chi-square tests on differential tag recovery
		small strap	large strap	spaghetti tag	double tagged with large strap and spaghetti tag	
1978	release	228	293			not significant ($P>0.05$)
	recovered	10 (4.4%)	18 (6.1%)			
1979	released		373	311		significant ($P<0.01$)
	recovered		11 (3.0%)	23 (7.4%)		
1980	released		172	177		significant ($P<0.05$)
	recovered		6 (3.5%)	16 (9.0%)		
1980	released		172		177	significant ($P<0.05$)
	recovered		6 (3.5%)		17 (9.6%)	
1980	released			177	177	not significant ($P>0.05$)
	recovered			16 (9.0%)	17 (9.6%)	

DISCUSSION

Angling methods were used by Lund and Maltezos (1970), Bade (1977), Champagnat (1978) and Pepperell (1980) to capture tailor for tagging studies. On the east coast of Australia adult tailor commonly occur in the surf zone. Beach seines have not been used to catch tailor for tagging experiments in this region because the wave action of the surf zone would damage many fish before they could be removed from the net. Contrary to what might have been expected, the severity of the injury caused by the angling method of capture had no adverse effect on the rate of recapture of tagged tailor.

Following the significantly higher recovery rate of yellow spaghetti tags compared with strap tags in 1979 (Table 2), approximately one-third of the fish was double tagged in 1980. If strap tags were shed by tagged fish between release and recapture, then some double tagged fish would be recaptured with the strap tag missing and the spaghetti tag intact. Whereas if strap tags induced mortality on tagged tailor, double tagged fish would be recovered at a low rate, similar to that for fish with only strap tags. If however, strap tags were not identified by some fishermen on recapture, double tagged fish and fish with single spaghetti tags would have similar recovery rates. The results (Table 2) indicate that fishermen may often fail to recognise the monel metal strap tags on tagged tailor. This is possibly due to the colour and lustre of the tag which is similar to that of the operculum of the fish. Yellow spaghetti tags, which are more prominent, had a higher rate of recovery by fishermen (up to 9.6% in 1980). Tagging experiments with fish species other than *P. saltatrix* have also indicated that fishermen may fail to recognise certain types of tags on recapture (Jones, 1979). Tag visibility needs to be taken into account in tagging experiments where fishermen are required to identify tagged fish on recapture.

ACKNOWLEDGEMENTS

I thank Mr David Bateman for assistance in planning and carrying out the tagging work at Fraser Island and Dr Ross Quinn and an anonymous referee for commenting on the manuscript.

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(Received for publication 20 October 1983)

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