SEA BAIT DIGGING

For sea anglers worm bait is often considered essential, and the main species required are:- Lugworm, (Arenicola Marina, Harbour Ragworm, (Nereis Diversicolor), King Ragworm (Nereis Virens) and white ragworms or catworms (Nephtys spp)

Lugworm is arguably the most popular, and it is plentiful, being widely distributed all around the UK coast. They inhabit burrows in sand, mud or muddy sand about 20cm below the surface, mostly in the middle and lower shorelines. It is tolerant to reduced salinities down to 12‰ (normal seawater = 30‰) They feed mainly on microorganisms and organic detritus in the sediment. Breeding is mainly in Autumn over a well defined period of about 2 to 3 weeks. The larvae remain in the parent's burrows for this period then move to below the low water tideline where they stay attached to the sea bottom for about 3 months. After 3 months they move to the upper shore level settling in the sediment to eventually form burrows and producing the lugworm's characteristic casts. All lugworms in burrows produce casts except during the 2 to 3 week breeding period. At 6 to 8 months after spawning they are 1 inch long (2.54cm) and after 1 year 6cm long, becoming sexually mature after 2 years. Lugworms do not die after spawning, but there are heavy mortalities. Full grown they are from 20 to 25cm long, and may survive for up to 6 years. They make limited movements about every 6 weeks probably for better food supply, and also they can move down shore to avoid Winter cold. Immature worms move down shore to repopulate adult beds as they mature. In some colonies very large lugworms are found at or below the low water spring tide level, and are not accessible to diggers, thus providing a reserve population.

King rag inhabit the lower shore level in burrows in mud, shingle, sometimes in sand, and even in cracks in the bedrock as deep as 60cm below the surface. They are thick worms, full grown generally 25cm long, but may reach 90cm, and there are no surface indications to its presence. It is not tolerant to reduced salinity. It is omnivorous, and its diet includes other polychaetes such as nephtys sp (white rag). Breeding takes place in May/April, when both sexes turn bright green. The male becomes epitokous at High Water (i.e in a free swimming breeding stage) whilst the females remain in their burrows, and discharge their eggs at high tide. The larvae settle on the bottom, but it is believed they have a brief planktonic stage. Length of life is believed to be about 3 years, and like other nereids they breed once and die. About a third of the resident mature population breed in any one year. There is good evidence to suggest that the major part of the population is sub tidal and therefore beyond the reach of diggers.

The harbour ragworm is similar to the King ragworm, and in lifestyle, but much smaller, up to 20cm maximum length, living in mud, sand, and sandy mud with shingle. It is widely spread around the UK coasts and is probably the commonest intertidal worm/ polychaete. Generally found in the upper shore line in burrows, and the only indication of their presence are small holes in the surface. It is omnivorous, and tolerant to salinities as low as 1‰. Judging by the Restronguet creek it is extremely tolerant to heavy metal pollution. Like other nereids they breed once and die. Despite their small size they are very popular bait, generally dug and used the same day. Estimated lifespan is about 3 years. It is important to note that no epitokous stage has been observed, and the larvae have no planktonic stage, but settle down on the bottom near their parent burrows. If therefore a colony is destroyed, unless there is nearby colony in good condition, it will not be quickly repopulated. This I believe was a major factor in the reason for banning digging in the Hayle. It is possible that other nereids may be collected in the lower shore accidentally or as a bycatch. Similarly the rock worm (Eunicidae Marphysa Sanguinea) as this is a popular bait in the Channel Islands. I have no information on these worms.

Finally there are white ragworms or catworms, (Nephtys spp), and these are only collected as bycatch, mainly when digging for lugworms. The different species are difficult to identify, and the 2 commonest are N. Hombergii and N Caeca. They are widely distributed in sand, mud, gravel, and are free burrowing in the intertidal and sub tidal zones. They are carnivorous, feeding on molluscs, crustacea, and other polychaete. The sexes are separate, maturing after 2 to 3 years, and breeding in April. The worms remain in their burrows on spawning when the eggs and sperm are released on the surface, so that fertilisation occurs by mixing on the incoming tide. The larvae are pelagic/planktonic, and individual worms breed several times.

BAIT DIGGING (Continuation 1)

To my best knowledge the main bait beds in Cornwall are:-

Camel Estuary Mainly Lugworms, Nephtys sp commonly found as a bycatch, and Harbour Ragworms. The area is heavily dug, but appears to be in no danger as there are many areas which cannot be dug.

HAYLE ESTUARY Mainly harbour ragworm, there may be some lugworm. Bait digging currently prohibited by RSPB and enforced by Hayle Harbour Co' byelaws.

MOUNTS BAY Lugworms. Heavily depleted after continuous digging and recent algae blooms, (or pollution?)

HELFORD Lugworms, Harbour Ragworms, Nephtys sp. currently heavily exploited.

FAL ESTUARY COMPLEX King ragworms in Falmouth Harbour and along shores of Penryn creek. (N.B. One good bed destroyed when the Port Pendennis built) Harbour ragworm plentiful. Some lugworm, but beds in Penryn Creek destroyed mainly by pollution and spoil from dredging)

FOWEY RIVER Lugworms, King Ragworms, and Harbour ragworms. These beds heavily decimated and no longer productive due to heavy digging and algae blooms. I have no firm information of present condition, but from several reliable sources there are unaffected beds which will eventually repopulate the River.

TAMAR ESTUARY COMPLEX. No data , but there should be colonies of all main species.

Many of the South Coast beaches have colonies of lugworm, and I have often dug nephtys sp on Perranporth Beach when digging for sandeels.

In general when digging for worms one specie is targetted, but others will be collected as a bycatch. Probably the most sought after worm is the lug, and in Cornwall a gardening fork, preferably a potato fork with broad tines is used. In the Camel best results are obtained by marking out an area of about 2 by 5 metres in the sand where there are plenty of worm casts and digging it over. The area is dug as deep as possible at one fork depth (spit) . Deeper digging is mostly counterproductive due to waterlogged lower levels quickly filling with sand and water. It helps too if the forkload is spread out over undisturbed sand when picking out the worms. Unfortunately this does not lead to easy back filling. In the Camel the incoming tide soon levels the diggings, and after several tides there is little evidence of the diggings, and no "silt holes" Shellfish are often dug up in the Camel, but I do not think they are edible cockles, (probably sand gapers?) and they seem to come to no harm . Other sandy beds and the Helford are dug the same way, but it is noted in the Helford that trenching is done. In the Helford the substrate is different, and more varied, even in a small area, notably Gillan Creek, where it varies from a gravel sand mixture to a stiff treacherous mud. In the Helford because of the physical nature of the substrate the diggings are not quickly levelled by tidal, and wave action etc'. Indeed they are painfully obvious after several weeks.

Harbour ragworm are usually dug in the upper shoreline near and above the neap high water mark. They are excellent bait for flounders, bass, and mullet etc', and they are plentiful, but small. Digging is done by fork, with no fixed pattern, but irregular, depending on size and abundance of the worms. A good bed will yield around 6 reasonable sized worms per forkload, and it is usually a waste of effort to dig deeper than one spit deep. They are in general found higher up the estuary as they are most tolerant to the reduced salinity there.

I think it is very doubtful if king ragworm are present in Helford, and digging for these worms in Falmouth Harbour is descibed for information purposes. The method is different from above methods, and unless the beds are rather intimately known, much hard fruitless digging follows. As a guide they are found from the low water neap tide mark downwards, and away from fresh water. Black watery mud extruded from a hole when stepping close to it may be an indication. Then you dig down in mud and stone, shift a rock or two, and if worms are present their burrows are easily seen and the worms eventually captured. Sometimes the worms are very deep, and the proverbial monsters go tantalisingly deep into cracks in the bedrock.

As the tide recedes on very low spring tides, mudflats are uncovered, and it is possible to find them in the mud. Digging here though is almost impossible, but sometimes worth the effort, particularly where there are plenty of oyster shells or the mud is firm enough to dig. The diggings are very irregular and deep although some diggers do work trenches. No lugworms are found, a few harbour ragworm, no nephtys sp, but occasionaly a thick markedly segmented red worm about 5 inches long. The worms are hard to find whereas 8 years ago they were plentiful. I have no firm information about the Fowey beds, but I believe there may be some near the boat moorings at Golant where digging is prohibited.

Worms are most effective when used fresh, especially lugworm and harbour ragworm. King ragworm can be usefully kept for a month or more in shallow trays of cold, well aerated, sea water. This is a good point for anglers because they can only be dug in any numbers at low water spring tides, so that enough can be dug on one tide for 2 weeks, and kept ready for use. Harbour ragworm are rarely kept, and used within 2 days, and can be dug at any tide. It is difficult to keep lug for a week, and even then they lose their effectiveness. An alternative, if the worms are good big ones, is to squeeze the gut out of them, mount them on a hook and nylon trace, and deep freeze them. This will of course lead to domestic strife if there is only one deep freeze.

It is difficult to quantify how many worms an angler needs. Some stack as many worms as possible on a hook and use as many rods as they can. Others are more skillful, using fewer worms and only one rod. Some are lucky to be able to fish every day, whilst others can only fish once a week or less. Incidentally for fish to qualify in a Cornish Federation of Sea Anglers competition, the rules state that a maximum of 2 rods with 3 hooks between them per angler may be used. Sandeels are of course one of the best all round baits, but the collection of these is not under review. Similarly I have not included crabs in this report. It should be noted though, that shore crabs are under pressure not only for bait, but there is a market for them in Spain.

The classification of bait diggers in the Budle Bay report can be applied to Cornwall to a lesser degree, especially in the Helford. So far as I know there are no full time diggers from Cornwall or others operating in Cornwall. There are of course the semi-professional diggers working part time who would be better described as opportunists from the " black economy ". From various reports their diggings are the most offensive, and damaging, as they make no attempt to backfill their extensive diggings. Reports from sea anglers buying lugworms often complain of the smallness of the worms sold. Harbour ragworm, King ragworm, and nephtys sp are not dug in Cornwall commercially. Of these worms only king ragworms are sold, and the supplies come from Southampton or Ireland.

Digging for king ragworms is arguably the most destructive due to the depth of the diggings, and because of the work involved the holes are often not backfilled. At Penryn because of the physical quality of the substrate the diggings take weeks to be levelled, and the holes fill with soft mud. Common eels (anguilla anguilla), butter fish (Pholis Gunellus) and anemones and even shore crabs that were common in these beds are now largely absent. There must have been much damage to other organisms due to smothering or dessication. Re colonising is very slow especially in the mud filled hollows, and these are very treacherous to all foreshore users. In March this year the beds were so depleted as to be not worth the effort. Digging there on 29th Oct this year at low water, 40 mature worms averaging 25cm length were found and about 20 immature ones, in about 15 sq metres of ground. No other worms were present and very few shore crabs. Significantly the ground chosen had levelled and returned to more nearly its original state. This does indicate a fair level of recovery, and bears out the report that a substantial portion of the stock is sub tidal.

In the Helford digging is only for lugworm and harbour ragworm, but digging for king ragworm has been reported above for information.

SEA BAIT DIGGING. (Continuation 3)

Digging for harbour ragworm in the Helford does not seem to be the problem. In the Gweek area there was no shortage of them or in other upper shorelines. The amount of digging for them is hardly damaging to the mud or other organisms, or deprives birds of food. Diggings should of course be backfilled.

It is the digging for lugworm that is the main problem, and the beds are in Polwheveral, Porthnavas, and Gillan Creeks, also at the Bar and Treath. I do not have much information about the Bar and especially Treath.

Relevant reports have been studied, notably the "Pilot Study on the Ecological Impact of Bait Digging", supplied by the NRA, also a paper by D.S. McLusky et al on the recovery of lugworm after bait digging in the Firth of Forth. Similarly reports by R.W. Blake for the North East Coast, and Martin (CRYER) et al for South Wales.

It is difficult to summarise these, but there is sufficient evidence that the lugworm population recovers within a few months to near original levels after digging. Evidence suggests that recovery from a seriously dug out condition back to original level takes a year to allow for larval settlement, and juvenile repopulation. Further research is needed to supply firm information on the effects of long term exploitation. Again there is evidence to suggest that lugworm beds can sustain the present level of exploitation, and possibly more, providing conservation methods are used. Notably backfilling, leaving immature worms, and avoiding "nursery" beds. ALSO "ROTATION" OF AREAS IN THE BEDS.

Very little information was available on the effect of digging on other organisms. The hollows in the diggings are quickly filled with fine sediment to about two thirds of original level, and this is rich in organic matter, and ideal for lugworms. The hollows are quickly repopulated, while the mounds become depopulated. (McLusky, on Forth Estuary) Except that the diggings (ARE DEEPER) this is similar to the Helford, and he goes on to say that unfilled hollows are evident for a few months. The report states there were (NO) deleterious effects on other animals (benthic), notably Macon Balthius (Baltic Tellins) and Hydrolia Ulvae (Laver spire shell) which are adaptable and opportunistic. Other observers noted aggregations of isopods, and amphipods in the hollows:- possible bird food? All the reports state that the diggings are harmful to edible cockles if they are not backfilled. John Morgan the secretary of the Bass Sportfishing Soc' informed me that commercial bait digging has been banned in the Loughor Estuary in South Wales by the Sea Fishery Committee because of the damage done to the cockle fishery. Sea anglers are allowed 100 worms for their personal use, and he says that the cocklers inform the the Sea Fishery Committee of any infringements. All reports state concern over other organisms being dessicated in the mounds or being smothered if diggings are not backfilled, and even though this does not affect the overall repopulation of lugworms, the beds recover quicker if the diggings are backfilled.

* Roy Webber and myself inspected the beds at Gillan and Polwheveral on 14th Oct' 92. Although not plentiful, there were good numbers of mature lug worms, but immature worms were present with the adult ones, and this possibly indicates some over exploitation. In Polwheveral several small (125mm long) live razor fish were found. Some old diggings that had not been backfilled were still very evident especially by the presence of large numbers of bleached clam shells. Digging again on the 29th Oct, Roy found good numbers of lug and more small razor fish. The latter quickly burrowed into the substrate, especially a larger specimen. This was in Polwheveral, and the species of Razor fish was not identified. This particular bed was very productive about 10 years ago, but was literaly wiped out overnight. The entire worm population was seen dead on the surface of the creek. Nearby crop spraying was blamed. The beds did recover, and were heavily dug some years back, and have now stabilised to their present condition.

Concerning the effects of raising anoxic mud to the surface, very little information was given in the reports, except to say that it could have a detrimental effect. Howell (1985) demonstrated a large increase in the amount of bio available lead and cadmium at Budle Bay after bait digging. More research on this aspect is needed, but judging by the number of worms happily existing in the black often sulphurous mud, it seems doubtful if this is a cause for concern, except of course if heavy metals etc get in the food chain. It might be of interest to note that following the Wheal Jane pollution, we were informed by the NRA that this had very little effect on the ecology in the Fal. Even the oysters had no dangerous (to humans) levels of cadmium in their tissues.

* League Co ordinator for the Cornish Federation Sea Anglers.

SEA BAIT DIGGING (Continuation 4)

Shellfish have a remarkable ability to tolerate heavy metal contamination, and some can concentrate high levels of it without ill effects to themselves. There is a paper in the Journal of the Marine Biological Association of the UK on the edible periwinkle by M.J. Bebianno, and W.J. Langston, that might throw light on the subject. In the annual report of the MBA 1991 Professor Alan Southward, and Dr Eve Southward reported on the research into the symbiosis between invertebrates and the sulphur oxidising bacteria, notably tubeworms and bivalve molluscs. This again could be relevant to the Helford.

Even allowing for a sea angler's natural bias, bait digging can be sustained even at the present high levels without harmful effects. All reports and our own experience point out that it is imperative to backfill the diggings. This is the major factor in all cases for the quickest recovery to all beds, and minimises damage to other organisms. In the Helford it may be advisable to restrict digging in the cockle beds and this should not be much of a loss to bait diggers. The beds are not large enough to support a viable commercial digging. I do believe there are strong grounds to recommend licensing by the Duchy (?) to allow a team of say 2 men to dig commercially in Duchy foreshore, subject to review, and good code of practice.

Finally the sight of unfilled diggings is an eyesore and an affront to public good opinion, and even the most ancient of laws will be of no avail to sea anglers or bait diggers against public opinion.

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