

## **INANGA SPAWNING**

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Inanga (*galaxias maculatus*) is the most well known species of Galaxias and is found around our coastal rivers, streams, lakes and swamps, in almost any fresh water that it can reach in its upstream migration from the sea.

Its familiarity is due to the fact that the Inanga juveniles are the most important and abundant species of the infamous annual [whitebait catch](#) where it is known to make up 90% of the entire catch.

Aside from bringing great culinary pleasure to many of us, Inanga are a source of food for many animals, birds and are known prey for large eels, flounder and no doubt many other fish who feed on them.

It is vital that we are able to understand and recognise Inanga spawning grounds and their important role in the life of whitebait.

The mature Inanga is most easily identified by its well forked caudal fin, thin membranous fins, low pectoral fins, small head and mouth and large eyes. It also has a bright, silvery belly. It commonly reaches between 100 – 110mm in length, in exceptional cases the Inanga may grow up to 170mm in New Zealand. The very large fish usually seem to be females.

The life cycle of Inanga has four critical stages – migration, stream residence, spawning, and marine growth

Inanga are an annual fish commonly known to migrate downstream once a year, spawn, then normally die. They are poor climbers and are unable to negotiate barriers to migration such as misplaced culverts and weirs, dams, floodgates, etc.

The first reported observations of its spawning go back to at least the 1890's when a well-known fish culturalist (A.M. Johnson) collected the ova and hatched them out.

The best-known early report was of spawning on the banks of the Rangitikei River in 1904.

## **Where, When and What to look for**

Inanga spawn amongst riparian vegetation in estuarine areas, usually near the upper limit of the saltwater wedge associated with high tides. It has been predicted that the same spawning sites are used year after year, therefore critical spawning areas can be protected and improved. Inanga begin their downstream migration a few days before the full and new moons.

The most important months are February – May, but, in the South Island, spawning also can occur in January.

In any one month, most fish will migrate on whichever moon has the highest tides. However, migrations also may occur on both moons in any one month. Spawning occurs on the peak spring tides and may commence from immediately after high tide up to an hour later.

Inanga spawn at sites where the soil is exposed at all but high spring tides, and remains damp.

They prefer long vegetation which will give their eggs good protection from becoming dehydrated.

Prime areas are where the vegetation is protected from grazing. Roads, fences, drains, bank slumping, and even stands of gorse can protect vegetation from stock. In grazed places you may have to look among the bases of clumps of rushes and sedges that stand above the surrounding pasture.

Start your search at the transition zone where salt tolerant plants cease growing and work your way upstream.

In 'natural' habitats, spawning areas are usually on gentle slopes.

In developed areas, spawning may be found on the sides of flood banks, the edges of drains, or even within pockets of long vegetation protected by steep banks.

Try to identify with a few of the following plants that are most commonly found near whitebait spawning grounds:

- Tall fescue (*Festuca arundinacea*)
- Cow parsley (*Apium nodiflorum*)
- Twitch (*Agropyron repens*)
- Koikoi fern (*Blechnum minus*)
- Tussock sedge, cutty grass (*Carex geminate*)
- Sedge, fine leafed (*Carex virgata*)
- Toetoe (*Cortaderia richardii*)
- Umbrella sedge (*Cyperus eragrostis*)
- Yorkshire fog (*Holcus lanatus*)
- Jointed rush (*Juncus articulatus*)
- Common dark green rush (*Juncus gregiflorus*)

- Lotus (Lotus major, Lotus pedunculatus)
- Mercer grass (Paspalum distichum)
- Creeping buttercup (Ranunculus repens)

The Inanga is unusual amongst the galaxiids in that the adults are found in shoals, which occur mostly in open, gently flowing or still waters.

When the fish reach maturity they aggregate in shoals and then migrate downstream to the river estuaries. In large bodies of water pre-spawning shoals may make circular `sorties' away from the bank, but always return. The shoals increase in size with each sortie, as new arrivals join in.

Some unknown trigger forces the Inanga to move towards the bankside vegetation in very shallow water to lay their eggs. The male inanga release large amounts of sperm which can make the water look like a milky substance has been released. This may be more evident depending on the size of the shoal.

After spawning the masses of sticky eggs adhere to the plants which they are deposited.

It is believed, that at some stage afterwards the eggs lose their stickiness and when the tide falls the eggs are washed down amongst the bases of vegetation and left out of the water.

The dampness of the vegetation keeps the eggs from dehydrating. Inanga eggs are best described as looking very similar to very small sago.

The eggs can be found with very careful and close inspection by parting the base of grasses and plants, particularly during peak spawning periods.

Following spawning, the eggs develop, and then, on the next spring tide the eggs are covered with water and hatch.

The development of the eggs depends on temperatures. In cooler temperatures it may take longer (up to four weeks) for development to complete. It has been found that hatching can be delayed for up to 48 days if the spring tide is not high enough to re-immers the eggs.

On hatching the young are carried out to sea to continue to grow, feed and in turn provide food for marine species.

Scientific studies have shown that the migratory whitebait are a little less than six months when they begin to move inshore. At this time, generally the first spring tides, they are attracted to fresh water flowing into coastal seas near the river mouths, and so begin the legendary whitebait migrations that are so well known and so keenly sought by many fishermen.

Over the summer, following migration into fresh water, the fish grow and mature.

They stay together in shoals and may be found in the pools, backwaters, streams and lagoons associated with rivers. Highest Inanga numbers are also associated with areas that have cover such as overhanging vegetation or macrophyte beds.

Providing upstream access is an important means of increasing habitat for adult Inanga as they have little climbing ability. Consequently, poorly designed culverts and weirs can arrest their upstream migration.

Inanga have largely sophisticated feeding habits, preferring a wide range of aquatic organisms and also being partial to terrestrial animals (beetles, wetas, spiders, etc) that may come their way.

### **What can be done to protect Inanga spawning grounds?**

#### **Dept of Conservation (DoC)**

Once you have clearly and positively identified a spawning site, it would be appropriate to contact your nearest DoC office who are responsible for managing NZ's whitebait fisheries (except the West Coast of the Sth Island).

DoC are active in identifying whitebait spawning habitat and working towards their protection.

#### **Raise awareness**

Inform your local regional council of your findings. Certain activities and consents administered by councils, such as, noxious weed spraying, lease grazing, mowing of riparian margins, placement of culverts, dams, etc can all severely impact on spawning grounds and inanga habitat.

#### **Co-operate and Collaborate with adjacent landowners**

Talk with the locals and inform them of your findings – they may not be at all aware!

Most farmers/landowners are usually pleased to hear about whitebait spawning on their river banks and could very well become enthusiastic about protecting these areas. However, be prepared for some negotiation as most farmers will become guarded about losing grazing areas.

#### **Keep Stock Out!**

In an ideal world it would be best to have stock removed from spawning areas on a permanent basis. Once again, be prepared to compromise. At least work towards having stock excluded during spawning season.

#### **Restore and enhance habitat**

Plant suitable species associated with Inanga spawning.

In areas frequented by humans build appropriate walkways to protect the grounds.

### **Education and Awareness**

Actively and positively promote and involve as many people in the community as possible by sharing your information with local schools, polytechnics, landcare groups, environmental centres and more. The passing of knowledge from one to another is the fastest and simplest method of encouraging humans to take notice and take action to care for the fragile freshwater ecosystem which the Inanga depend on for their on-going survival.

### ***Bibliography***

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