

Alive and kicking

Testing live mud crab for meat fullness

The Queensland Government, in conjunction with the National Mud Crab Industry Reference Group has developed guidelines for grading live mud crabs based on shell hardness and other signs of shell age. However, to provide greater certainty on whether the crab will be full of meat when cooked, a simple method of sampling the live mud crab's blood can be used.

This fact sheet gives instructions on how to test a live crab's blood for cooked meat yield.

The moulting cycle

- Crabs grow by an incremental moulting process. This occurs approximately 18 times at increasing intervals over the crabs 3-4 year life span.
- The moulting procedure and subsequent shell growth is assisted by the crab absorbing water, splitting the old shell, backing out of it and expanding the new soft shell by up taking more water.
- It can then take up to 4 weeks until the shell is hard, during which time the crab can be graded as either 'C' or 'B' grade depending on the amount of shell flex.
- The up take of water during the moulting process dilutes the protein in the crab's blood. The level of protein will then increase as the crab hardens and fattens up until it is ready to moult again.

Equipment required

- A clinical refractometer 1.3400 to 1.3600 RI.



- Syringe (3cc/mL) and needle (22^{Gx3/4}). Follow safety precautions when using syringes.



Taking a blood sample

- With the crab securely tied, turn it over and hold back the last walking leg. Insert the needle through a triangular opaque area close to the body and insert just under the membrane a few millimetres, pointing the needle towards the top of the flap as in the black line in Figure 1. This procedure is harmless and does not cause crab to bleed.



Figure 1. Taking a blood sample.

More information

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Taking a blood sample (continued)

- Slowly pull back on the syringe plunger until a small amount of blood enters the syringe tube. Remove the needle and place a drop or two of blood on the open glass pane of the refractometer and close the lid.
- Hold the refractometer to a light source and take a Refractive Index (RI) reading at the intersection of the white and blue background colour (Figure 2).

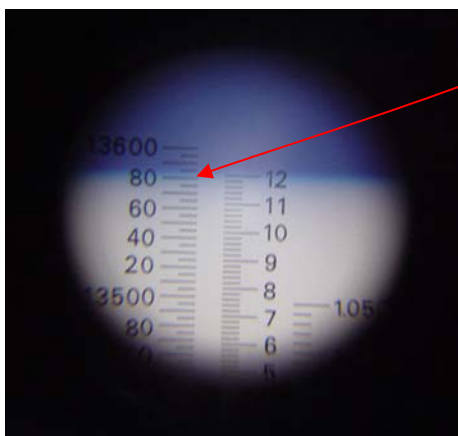


Figure 2. RI reading of 1.3582

Interpreting the result.

- The total amount of protein circulating in the blood of a crab is, in the first instance, correlated to feeding cycles in the animal. Blood protein has also been observed to decline significantly during periods of prolonged starvation.
- Mud crab blood protein concentrations measured using a refractometer (units measured as RI) have been validated against total protein determined by the commercial test kit Randox TP245.
- RI of 1.3400 is seawater.
- RI of 1.3400 to 1.3500 indicates 'C' or B' grade crab.
- RI of 1.3500 to 1.3550 indicates 'A' grade and usually nearly full of meat.
- RI of 1.3550 to 1.36+ will be an excellent 'A' grade crab, full of meat and ready to moult again or eat.

- Cooked meat yields range from 20% of total live body weight in a newly moulted crab (Figure 3) and up to 35% in a full 'A' grade crab (Figure 4).



Figure 3. Newly moulted crab claws not full of meat.



Figure 4. Cracked claws of an 'A' grade crab full of succulent meat.

- Some very old crabs with hard and scarred shells reach a stage where they no longer feed. The available protein in the blood, subsequent meat content and crab weight decreases over this starvation period.
- A recently moulted crab with any flex in its shell and a corresponding low RI will have little meat content if cooked. By returning these crabs to the water where they will continue to feed and fatten in just a few more weeks. Then we can all enjoy the pleasurable experience of mud crabs full of meat.

