

White-headed Stilt (*Himantopus leucocephalus*). A group of 4 and another of 30.

Australian Pratincole (*Stiltia isabella*). Total of about 35. One group of 10 and another of 15, remained single birds.

Gull-billed Tern (*Sterna nilotica macrotarsa*). A total of 56. A group of 30, remainder in groups of less than 10. One ♂ collected.

Caspian Tern (*Sterna caspia*). Total of 32. One group of 20, remainder in ones and twos.

Whiskered Tern (*Sterna hybrida*). A total of about 70. Two groups of 10 and one of 50, some with black on bills. Some perched on floating yellow weed, just off shore.

Diamond Dove (*Geopelia cuneata*). Six together in eucalypt zone.

Crested Pigeon (*Ocyphaps lophotes*). Three together in eucalypt zone.

Boobook Owl (*Ninox novaeseelandiae*). Calling from a eucalypt at night.

Spotted Nightjar (*Eurostopodus guttatus*). One hawking among eucalypts at dusk.

Red-rumped Kingfisher (*Halcyon pyrrhopygia*). One calling from eucalypts.

Bee-eater (*Merops ornatus*). One heard calling once.

Pipit (*Anthus novaeseelandiae*). A total of 10 on samphire flat.

Black-faced Cuckoo Shrike (*Coracina novaehollandiae*). One calling in eucalypts.

White-winged Triller (*Lalage sueurii*). One calling in eucalypts.

Magpie-Lark (*Grallina cyanoleuca*). One on samphire flat and another heard.

Grey-crowned Babbler (*Pomatostomus temporalis*). A party calling in eucalypts.

Red-browed Pardalote (*Pardalotus rubricatus*). One calling in eucalypts.

White-plumed Honeyeater (*Meliphaga penicillata*). Fairly common in eucalypts.

Orange Chat (*Epthianura aurifrons*). A total of 16 in parties of 3 or 4 on samphire flats; 2 ♂♂ and 1 ♀ collected.

Black-faced Wood-swallow (*Artamus cinereus*). Two in eucalypts and 3 in wattles.

Pied Butcher-bird (*Cracticus nigrogularis*). One on nest with 2 eggs starting to chip, 7 m up in wattle.

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PRELIMINARY OBSERVATIONS ON THE KOONAC IN CAPTIVITY

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INTRODUCTION

The Koonac (*Cherax preissii* Erichson, 1846) is one of four species of fresh-water crayfish that are known to occur in south-western Australia. Except for the work of Shipway (1951) few observations have been published on the natural history of the Koonac.

During the Naturalists' Club Easter Excursion (24-27 March, 1978) to Northcliffe (lat. 34°38'S, long. 116°07'E), whilst collecting frogs at

night, we discovered a pair of Koonacs in a burrow. The burrow, approximately 1 m deep and surmounted by a chimney of compacted mud was located in a sandy-peat swamp on the southern boundary of Chudalup State Forest. The vegetation was a low shrubland of *Melaleuca leptoclada*, *Kunzea recurva* and *Hakea varia* with a dense ground cover of sedges including *Scirpus nodosus* and *Evandra aristata*. The surface was dry at the time of our visit but the burrow terminated in a small chamber at the water table.

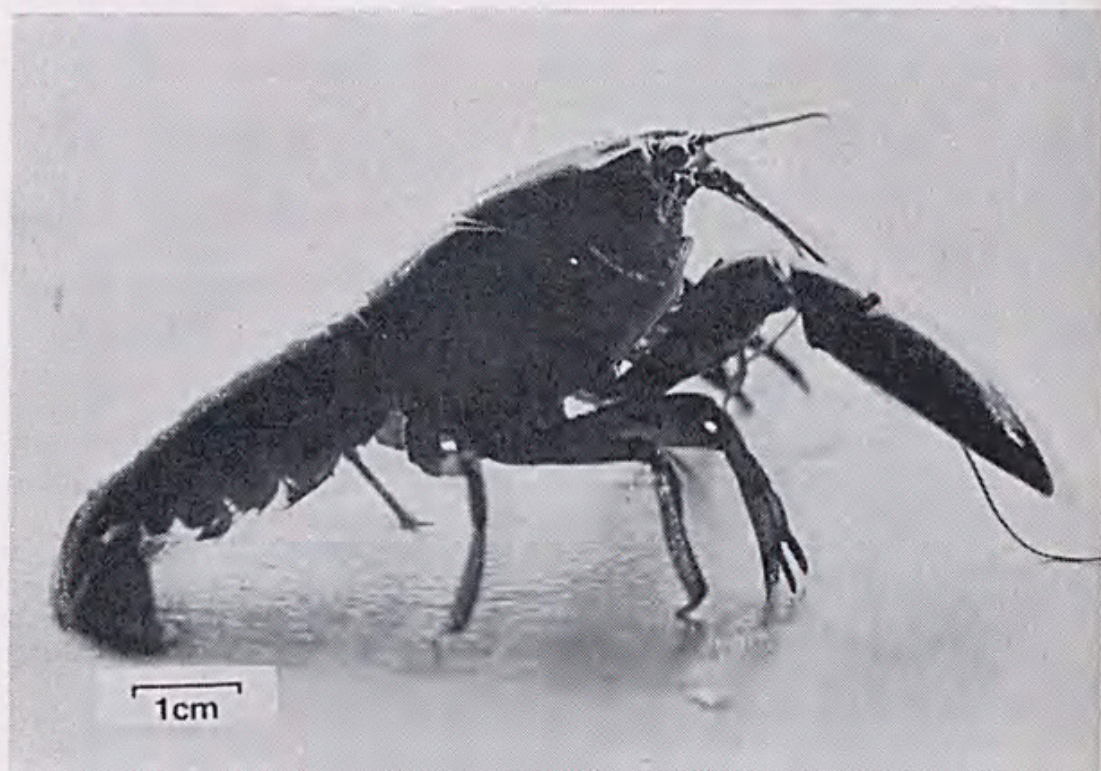


Fig. 1.—Male Koonac.

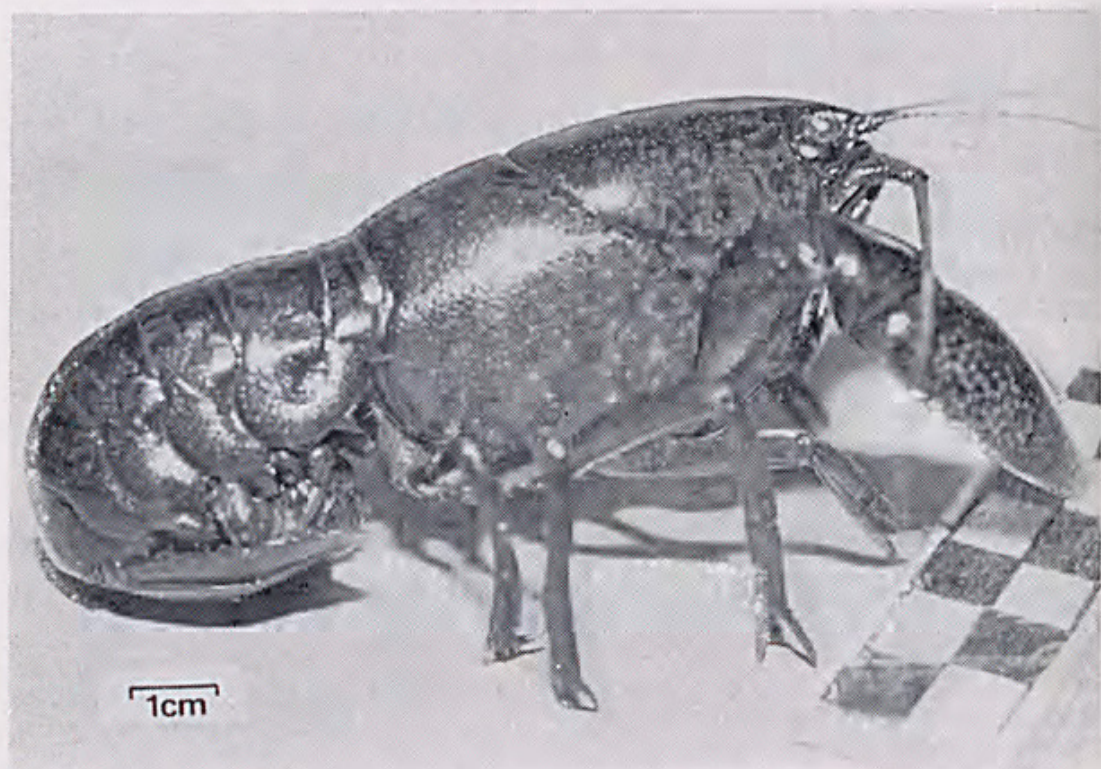


Fig. 2.—Female Koonac showing the tail held up under the young which are attached to the swimmerets.

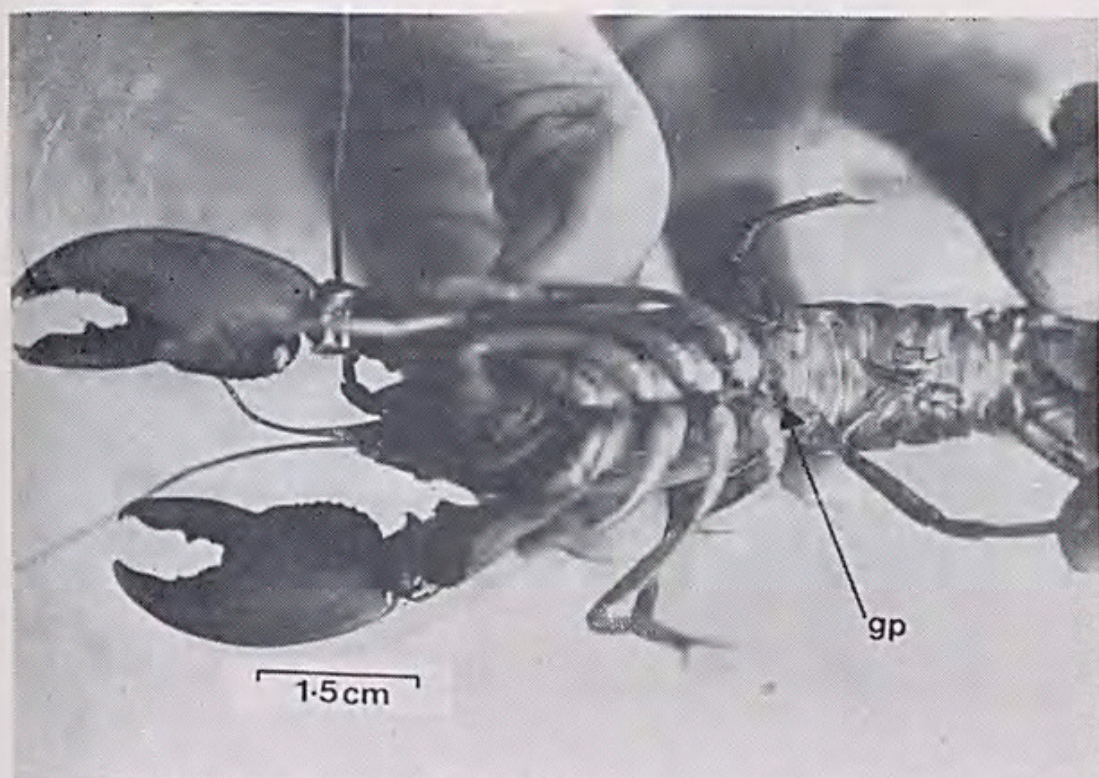


Fig. 3.—Male Koonac showing undersurface and genital papillae (gp).

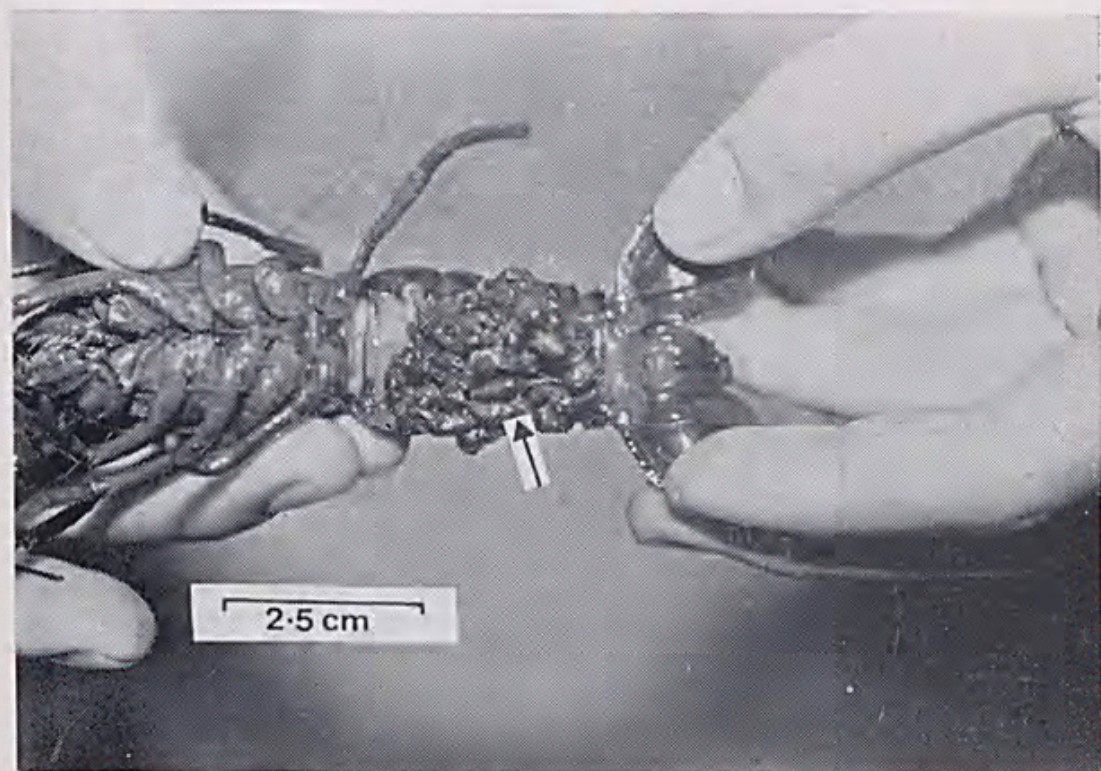


Fig. 4.—Female Koonac showing undersurface and young attached to swimmerets.

The Koonac were blackish-blue in colour; the male 8 cm in length (Figs. 1 and 3), the female 10 cm (Figs. 2 and 4). The female's left claw was missing and approximately 25 young were counted attached to her swimmerets; their average size being 6 mm and the average weight 0.05 g (Fig. 5). The young were suspended with the swollen carapace hanging down.



Fig. 5.—Photomicrograph of young Koonac after removal from swimmerets.

IN CAPTIVITY

The pair were brought back to Perth and initially housed in a terrarium until a suitable habitat could be constructed for them. On being placed in the terrarium during the afternoon they immediately moved towards a shallow pool of water. The female moved slowly, the tail at all times being held close under the young. On approaching the water she turned around and carefully lowered herself, tail first, into the pool. The male entered head first. They both remained in the water, the male adopting an aggressive stance—the claws raised—if anybody approached the terrarium. Occasionally they would both leave the water and move around the terrarium. During the early hours of the evening the male constructed a shallow burrow into which the female moved.

A second terrarium was constructed using sand and peat material obtained from a local swamp. This material was then wet and a water-table created by the accumulation of the excess water on the terrarium floor.

Upon being placed in the new terrarium the male almost immediately began to construct a burrow. The method of digging was for him to rake the mud underneath himself using the ambulatory limbs and to roll it around until it formed a compact mud ball. This was then carried out of the tunnel, being held in position close to the underside of the cephalothorax by the third maxilliped. The mud was then used to build a chimney and was packed into position using the flattened side of the claws. During the initial period of digging the female was not seen to assist but remained in the pool. As the burrow developed the female also moved in and was seen to remove mud from the head of the burrow and pass it back to the male who re-worked it into a mud ball and then carried it outside. As the chimney increased in height the male was forced to stand on his tail to increase his height, then propel the mud ball upwards using the ambulatory limbs before patting it into position with his claws. During this period the female was occasionally observed lying on her side within the burrow.

Once the tunnel was completed only the male was seen carrying out minor adjustments and removing the occasional mud ball. During the digging phase the Koonac were not seen to eat although a variety of food-

stuffs were placed in the terrarium. After four weeks a plug was constructed which effectively sealed both the male and the female in the burrow.

REFERENCES

SHIPWAY, B. 1951. The natural history of the Marron and other fresh water crayfishes of south-western Australia. Part 1. *W.A. Nat.*, 3 (1): 7-12. Part 2. *Ibid.*, 3 (2): 27-34.

FLOWERS ADAPTED TO MAMMAL POLLINATION

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ABSTRACT

Some *Banksias* and *Dryandras* which presumably are adapted for mammal-pollination are described. The inflorescences are dull-coloured (brownish, reddish, greenish and violet) and have different odours, which are strongest at night. The inflorescences are placed on or near the soil or into the shrub. The mouth of one of the presumed pollinators, the Honey-Possum (*Tarsipes spencerae*) is described.

The Honey-Possum (*Tarsipes spencerae*) is specially adapted to take its food: nectar and pollen from flowers. The teeth are inconspicuous and unable to chew anything, neither can they pick up insects (Fig. 1). The tongue is a brush and readily takes up nectar and pollen. The palate has pronounced ribbing and will probably be able to take the nectar and pollen from the brush when the tongue is moved against the palate. One pair of teeth in the front of the upper jaw apparently are adapted for cleaning the side of the tongue.

On the lower side of the tongue there is a keel, which glides between the two incisors in the front of the lower jaw. These teeth are placed, so the movements of the tongue are steered.

Also the Pygmy-Possum (*Cercartetus concinnus*) and the Dibbler (*Antechinus apicalis*) feed on nectar from flowers, but they eat insects too. They are not so specialised flower-feeders as the Honey-Possum.

The fur of mammals can easily transfer pollen from one flower to another, and there is no doubt that these mammals in fact do pollinate flowers.

As there are mammals adapted to flower-feeding and pollination, one should expect that there are flowers adapted for mammal-pollination. But no such flower has been described in the literature concerning pollination.

The mammals have been observed and photographed on *Banksia* flowers (M. K. Morcombe), but only on *Banksias* primarily adapted for

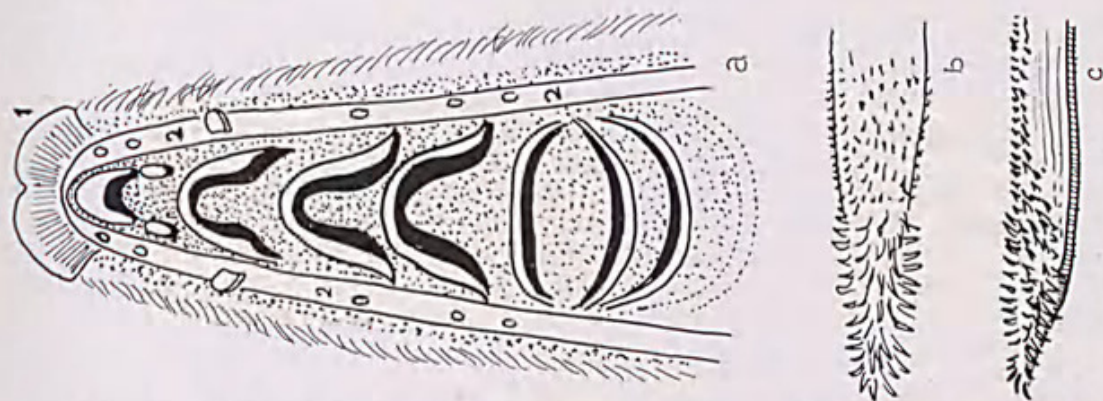


Fig. 1.—Honey-Possum (*Tarsipes spencerae*). a. Palate, upper jaw (2) with teeth and snout (1). The ridges on the palate are very prominent. (Schematic drawing). b. Upper side of tongue. c. Tongue seen from the side. Note the keel below (vertical lines).



Kenneally, Kevin F. and Pirkopf, Karl C. 1978. "Preliminary Onservations on the Koonac in Captivity." *The Western Australian Naturalist* 14(3), 67–71.

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