

THE PLEISTOCENE DISTRIBUTION OF THE TASMANIAN NATIVE-HEN *GALLINULA MORTIERII MORTIERII*

The Tasmanian Native-hen *Gallinula mortierii* had a known prehistoric range on continental Australia from Chinchilla, Queensland to Seton Rock Shelter, Kangaroo Island, South Australia. It became extinct on the continent during a particularly severe period of aridity between twelve and twenty thousand years before present.

Fossil material from the late Cainozoic Chinchilla locality (26°48'S, 150°41'E) was first described by DeVis (1888, 1892) as new taxa of the Rallidae. Olson (1975), re-examining this material, considered that it was all referable to the extant species *Gallinula mortierii*. Finding the mainland specimens smaller than a small series of the Tasmanian form, Olson treated the mainland form as subspecifically distinct, using for it the name *G. m. reperta* (DeVis). In the present article, the taxonomic status of the extinct populations of the mainland are considered and the idea of aridity being the sole factor behind its being left as a relic population in Tasmania is discussed.

The bulk of the Late Pleistocene material of *Gallinula mortierii* has come from the caves of the Glenelg River region of Victoria. Of these, Amphitheatre Cave (G-2) supplied the largest amount of material, with additional elements from McEachern's Cave (G-5), Fern Cave (kB-1), and Curran's Creek Cave (G-4). Further material has come from Lancefield Swamp (see Gillespie *et al.* 1978), the Bushfield Bone Site (see Gill 1967), and Spring Creek (see Flannery 1980) in central and western Victoria, and Mair's Cave (F-3), Green Waterhole (L-81; see Pledge 1980) and Seton Rock Shelter (Kangaroo Is., K-30; Hope *et al.* 1977) in south-eastern South Australia (Fig. 1). Material from Victoria and South Australia will eventually be housed in the Museum of Victoria (MV) and the South Australian Museum (SAM) respectively (see Appendix for material from each of the above localities). Numbers following each of the cave sites refer to the system of cave coding as set out in Matthews (1968) and Lewis (1976).

Measurements were taken on all material following guidelines set out in Steadman (1980) and means and standard deviations (s.d.) were calculated. Changes have been made in several under-estimates on fossil material (see below) by Olson and the whole of his length measurements from the tibiotarsi of extant specimens have been altered. His original tibiotarsal length measurements were from the top of the cnemial crest to the most distal point of the trochlea. So that a significant number of fossil specimens might be included, the proximal most measurement has been altered to the platform just distal to the cnemial crest to counter

terminal abrasion of the crest. Calculations were made only after determining, from a sample population, the mean difference between the cnemial crest measurement vs. the platform.

Of the material measured by Olson (1975) several elements were incomplete and estimated values were used. Re-examining the material, I suspect that at least one of the estimates was understated and should be increased by some 8 mm: left tarsometatarsus Queensland Museum F1126, whose original length estimate was 70 mm, but as compared with equable elements seems to conform closer to an estimate of 78 mm.

The definition of what constitutes a subspecies vary. I have used Rowley's (1970:36) criterion, i.e. a subspecies are 'geographically defined aggregates of local populations 90% of which differ taxonomically from 90% of other such subdivisions of the species'. In figure 2, the unshaded rectangle represents 1.3 × standard deviations (s.d.) on either side of the mean, and illustrates the area within which 90% of the population may be expected to occur. If these rectangles do not overlap, subspecific separation, by Rowley's criterion, would be justified.

RESULTS AND DISCUSSION

The mainland and Tasmanian populations differ very little and from Table 1 and Figure 2 it can be seen that there is extensive overlap in all measurements for the four elements studied. Of the seven total lengths measured on DeVis' material, three fall well within the 1.3 s.d. as given in Rowley (1970) for normal subspecific variation, and an additional two specimens lie within the ranges of the Pleistocene material. There are two elements that fall below the ranges of any Late Pleistocene material. Consequently there is no justification for separating *G. m. reperta* from *G. m. mortierii* on these characters. The designation of the mainland material in the nominate subspecies, *G. m. mortierii* is therefore merely a formality.

Dates sites where fossil Native-hens have been found range from approximately 26 000 years before present (y.b.p.) for Lancefield (Gillespie *et al.* 1978) and 19 800 ± 390 y.b.p. for Spring Creek (Flannery 1980) to between 10 940 ± 160 and 16 110 ± 100 y.b.p. for Seton Rock Shelter (Hope *et al.* 1977). The 6 605 ± 190 y.b.p. given by Gill (1971) for the Bushfield Bone site is most likely an underestimate, for the material was not assayed for collagen and apatite separately (Polach 1975). No dates earlier than 12 000 y.b.p. can be confirmed for sites containing *G. m.*

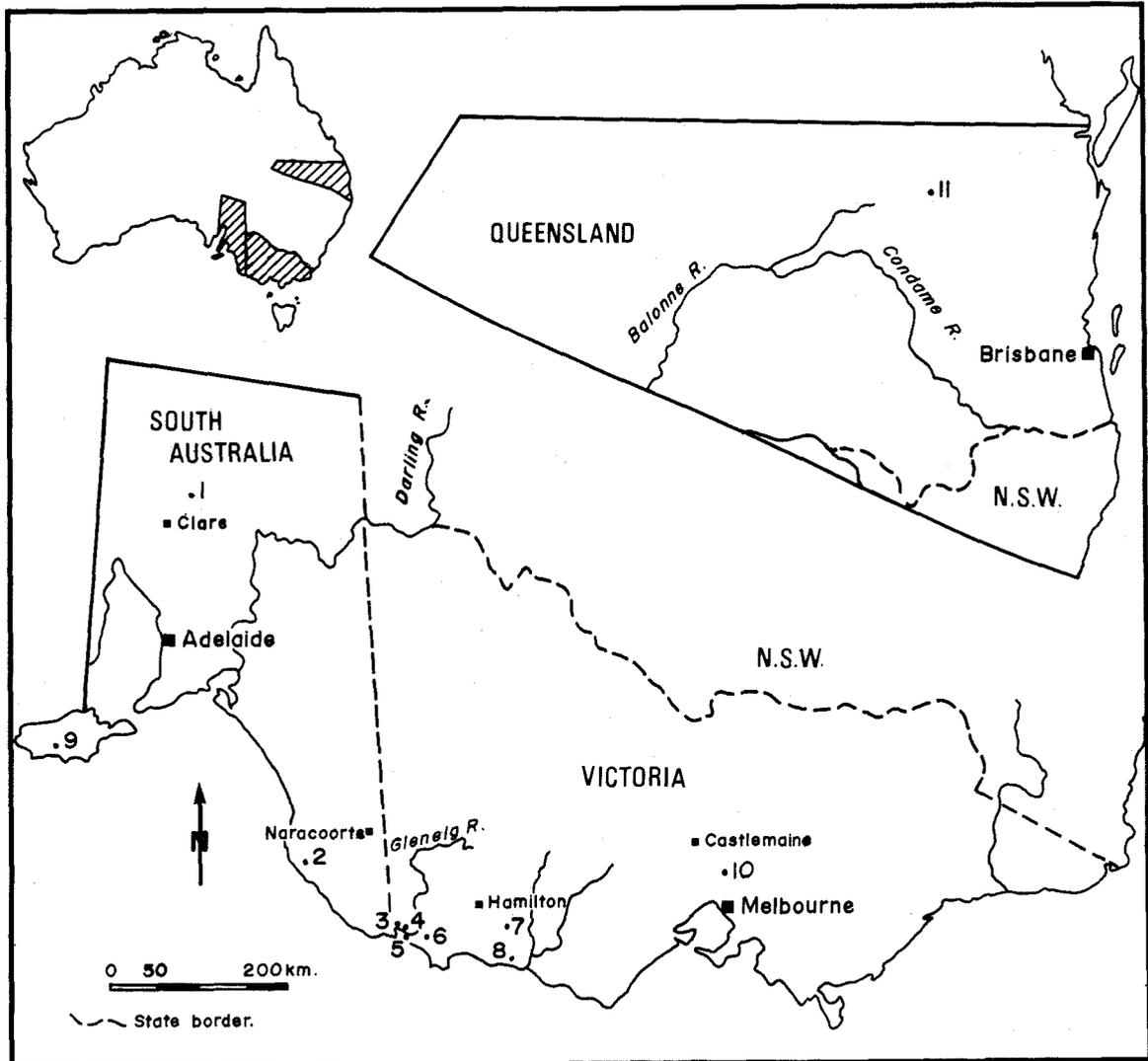


Figure 1. South-eastern Australia, showing localities from which *Gallinula mortierii* is known - (1) Mair's Cave; (2) Green Waterhole; (3) Amphitheatre Cave; (4) Curran's Creek Cave; (5) McEachern's Cave; (6) Fern Cave; (7) Spring Creek; (8) Bushfield Bone Site; (9) Seton Rock Shelter; (10) Lancefield; (11) Chinchilla.

mortierii. The last period of intense aridity in Australia occurred between twelve and twenty thousand y.b.p. (Bowler 1982).

I propose extinction of the Native-hen on the mainland occurred as a result of the deterioration of habitat during the last period of intense aridity. Local extinction of a species is probably most frequently caused by man (Olson & James 1982; Martin 1967; Wingate 1973) or by predators and pest species introduced by man (Greenway

1958; McDowall 1969; Wingate 1965). Man, in this case, seems unlikely as there are no remains of the Native-hen in any archaeological midden within the known prehistoric range. Predation, as well, was probably unimportant since the species abounds in Tasmania amidst a plethora of introduced and natural predators, including *Canis familiaris*, *Felis catus*, *Homo sapiens* (including road kills and sporadic shootings), *Sarcophilus harrisii* (R.H. Green. pers. comm.), *Circus assimilis*, *C. aeruginosus* (Mooney 1981), and *Accipiter fasciatus*

TABLE I

A compilation of measurements (in mm) of *Gallinula mortierii* fossils from Late Pleistocene continental sites in the southeast of Australia. All figures in parenthesis are those of *G. m. reperta* as measured in Olson (1975) (* = estimates).

		Femur	Tibia	Tarsus	Humerus
Proximal width	n	27	29	37	26
	range	16.0-18.5 (16.1+16.9)	13.5-16.0 (13.3+15.1)	12.5-14.5 (12.6)	13.0-15.0 (14.2)
	mean	17.1	14.1	13.2	13.8
	s.d.	0.7	2.1	0.4	0.5
Least width shaft	n	29	31	40	26
	range	6.0-7.0 (6.1+6.3)	5.0-6.5 (5.9+6.5)	4.5-6.0 (5.5+5.6)	4.0-5.0 (4.5+5.0*)
	mean	6.4	6.0	5.7	4.4
	s.d.	0.4	0.3	0.4	0.3
Distal width	n	27	31	38	22
	range	15.5-18.0 (15.1+15.2)	11.0-13.0 (12.0)	12.0-14.5 (12.1+12.2)	9.5-11.0 (9.9+10.4)
	mean	16.7	12.3	13.4	10.0
	s.d.	0.6	0.6	0.5	0.5
Length	n	25	30	38	22
	range	78*-87.0 (72.3+80.0)	115.0-137.0 (118.5+128*)	78.0-90.5 (70*+74.6)	61.0-68.0 (62.8)
	mean	83.4	129.6	85.5	63.9
	s.d.	2.5	4.2	3.8	2.1

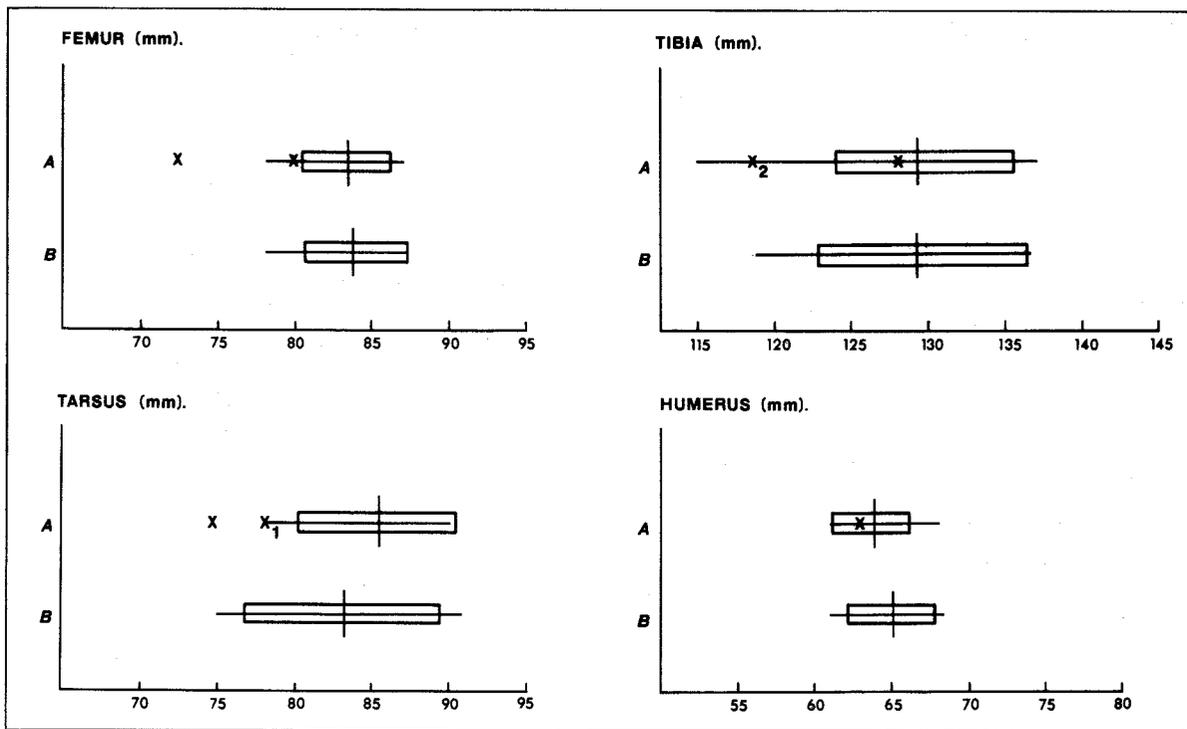


Figure 2. Length measurements of *Gallinula mortierii*: (A) continental Late Pleistocene sites; (B) Tasmanian extant individuals (adapted from Olson 1975). The bold X denotes the length measurements of the Chinchilla specimens. X₁ and X₂ are the corrected underestimates, differing from Olson (1975). The vertical line represents the mean; horizontal line, the range; and open rectangle, 90% of the population. Data for other measurements are given in Table I.

(Ridpath 1972). The dingo *Canis familiaris dingoensis* is not considered a natural predator in this paper because there is no firm date of dingos on continental Australia older than $3\ 450 \pm 95$ y.b.p. (Milham & Thomson 1976).

The Tasmanian Native-hen in Tasmania is a secondary grazer and is most frequently encountered in areas near permanent or temporary water, including arable land and cultivated pastures (Table 2, pp. 364 in Ridpath & Moreau 1966). It is dependent on short lush pasture for feeding and permanent water for breeding (Ridpath 1972). Prehistorically it probably fed on 'lawns' around the edges of water bodies where marsupial grazers constantly cropped the herbaceous layer, providing emergent herb growth throughout the year. The equivalent habitat is at present maintained by introduced rabbit *Oryctolagus cuniculus* and sheep *Ovis aries* (Ridpath 1972). The limiting factor would be the amount of permanent water. During arid periods the numbers and range of the Native-hen would have declined as available areas of water and adjacent short lush herb contracted and disappeared.

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APPENDIX

Compilation of all known fossil *Gallinula mortierii* specimens from continental Australia denoting the sites of origin and museums in which each is currently held.

Queensland Museum (Q.M.)

Chinchilla, Darling Downs (F7007-7009, F7029, F1126, F1128, F1138, F1144).

Museum of Victoria (M.V.)

Amphitheatre Cave (P167001-167053, 167056-167067,

167084-167101, 167104-167160, 167186-167204,
 178348-178361, 178467-178472, 178486-178496,
 178499-178503, 178542-178587, 178620-178656)
 McEachern's Cave (P178671-178676)
 Fern Cave (P178661)
 Curran's Creek Cave (178662)
 Lancefield Swamp (P178670)
 Bushfield Bone Site (P178663-178669)
 Spring Creek (P159947)

South Australian Museum (S.A.M.)

Mair's Cave (P19145)
 Green Waterhole (P22951, P24232-24239)
 Seton Rock Shelter (P24246-24248)