APPENDIX 1. Morphological character matrix for the Macropodidae. '?', state not known. See Appendix 2 for character numbers and states. From Prideaux & Warburton (2010) with the addition of *Tjukuru wellsi* gen. et sp. nov.

| | Characters | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Taxon | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| *Hypsiprymnodon moschatus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Bettongia penicillata* | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Potorous tridactylus* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| *Ngamaroo archeri* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 0 | ? | ? | 0 | 0 | 1 | ? | ? | ? | ? | ? | ? | 0 | 0 | 0 | 0 | ? | ? | ? | ? | 0 | 0 | 0 | 0 | 1 |
| *Lagostrophus fasciatus* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 |
| *Tjukuru wellsi* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 0 | ? | ? | ? | 0 | 2 | ? | ? | ? | ? | ? | ? | 1 | 2 | 1 | 1 | ? | ? | 0 | ? | 1 | 0 | 0 | 1 | 2 |
| *Troposodon minor* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 0 | ? | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 |
| *Nowidgee matrix* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | ? | ? | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| *Ganguroo bilamina* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 0 | 0 | 2 | ? | ? | ? | ? | ? | ? | 0 | 2 | 1 | 0 | ? | ? | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| *Wanburoo hilarus* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | ? | 1 | 0 | 2 | 1 | 0 | 0 | 1 |
| *Hadronomas puckridgi* | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 1 | 0 | 1 | 2 | 3 | 2 | 0 | 0 | 1 |
| *Sthenurus andersoni* | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 4 | 0 | 1 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 3 | 2 | 0 | 2 | 0 | 3 | 2 | 3 | 2 | 0 | 1 | 2 |
| *Simosthenurus occidentalis* | 2 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 4 | 0 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 2 | 3 | 2 | 0 | 2 | 0 | 3 | 2 | 3 | 2 | 0 | 1 | 2 |
| *Procoptodon goliah* | 2 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 4 | 0 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 2 | 3 | 2 | 0 | 2 | 0 | 3 | 2 | 3 | 2 | 0 | 1 | 2 |
| *Dorcopsoides fossilis* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | ? | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | ? | 1 | 1 | 2 | 2 | 0 | 0 | 1 | 2 |
| *Dorcopsis veterum* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 1 |
| *Dorcopsulus vanheurni* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 1 |
| *Setonix brachyurus* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 2 |
| *Thylogale billardierii* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 2 |
| *Petrogale brachyotis* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 1 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 2 | 0 | 2 | 0 | 0 | 1 | 2 |
| *Bohra illuminata* | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | ? | 1 | 2 | 0 | 2 | 1 | 0 | 1 | 2 |
| *Dendrolagus bennettianus* | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 3 | 1 | 2 | 0 | 1 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 2 |
| *Dendrolagus matschiei* | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 2 | 0 | 1 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 2 |
| *Protemnodon anak* | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 3 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 2 |
| *Congruus congruus* | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 3 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 2 | ? |
| *Wallabia bicolor* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 3 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 2 |
| *Prionotemnus palankarinnicus* | ? | ? | ? | ? | 0 | ? | ? | ? | ? | ? | ? | ? | ? | 2 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 3 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | ? | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 2 |
| *Kurrabi mahoneyi* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 3 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | ? | ? | 1 | 0 | 2 | 0 | 0 | 2 | 2 |
| *Lagorchestes conspicillatus* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| *Lagorchestes hirsutus* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| *Baringa nelsonensis* | ? | 0 | ? | ? | 1 | ? | ? | ? | ? | ? | ? | ? | 2 | 2 | ? | ? | 2 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 1 | 3 | 0 | 1 | 1 | 0 | 2 | 2 | 2 | ? | 1 | 1 | 0 | 2 | 0 | 1 | 2 | 2 |
| *Onychogalea unguifera* | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 2 | 2 |
| *Macropus eugenii* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 3 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 2 | 2 |
| *Macropus fuliginosus* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 3 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 2 | 2 |
| *Macropus pavana* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 3 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 3 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | ? | ? | ? | ? | ? | ? | 1 | 2 | 2 |
| *Macropus robustus* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 3 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 2 | 2 |

*(Continued on next page)*

APPENDIX 1. Morphological character matrix for the Macropodidae. '?', state not known. See Appendix 2 for character numbers and states. *(Continued)*

| | Characters | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Taxon | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 |
| *Hypsiprymnodon moschatus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Bettongia penicillata* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| *Potorous tridactylus* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| *Ngamaroo archeri* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | ? | 1 | 0 | 0 | 0 | 1 | ? | ? | ? | 0 | 1 | 0 | ? | ? | 0 | 0 | 0 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | 0 | 0 | 0 | ? | ? |
| *Lagostrophus fasciatus* | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| *Tjukuru wellsi* | 1 | 1 | 1 | 0 | 1 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Troposodon minor* | 1 | 1 | 2 | 0 | 1 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Nowidgee matrix* | 0 | 0 | 0 | 0 | 0 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Ganguroo bilamina* | 0 | 1 | 1 | 0 | 1 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | 0 | ? | ? | 0 | ? | ? | 1 | 1 | 0 | 1 | 0 | 0 | 2 | ? |
| *Wanburoo hilarus* | 1 | 1 | 1 | 0 | 1 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Hadronomas puckridgi* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | ? | ? | 0 | 1 | 3 | ? | 2 | 1 | 0 | ? | ? | 1 | 2 | ? |
| *Sthenurus andersoni* | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 2 | 1 | 2 | 2 | 0 | 1 | 3 | ? | ? | ? | 1 | 1 | 2 | 1 | 2 | 2 |
| *Simosthenurus occidentalis* | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 3 | 0 | 3 | 1 | 1 | 1 | 2 | 1 | 2 | 2 |
| *Procoptodon goliah* | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 3 | 0 | 3 | 1 | 1 | ? | 2 | 1 | 2 | 2 |
| *Dorcopsoides fossilis* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | ? | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | ? | ? | ? | ? | 0 | 0 | 1 | 0 |
| *Dorcopsis veterum* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| *Dorcopsulus vanheurni* | 1 | 1 | 1 | 0 | 1 | 0 | ? | ? | ? | ? | ? | 2 | 1 | ? | ? | ? | 0 | 1 | 1 | ? | ? | ? | ? | ? | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| *Setonix brachyurus* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| *Thylogale billardierii* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| *Petrogale brachyotis* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| *Bohra illuminata* | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 3 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | ? | ? | 1 | 1 | 2 | ? | ? | 1 | 0 | ? | 1 | 0 | ? | ? |
| *Dendrolagus bennettianus* | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 3 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 2 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 1 | 1 |
| *Dendrolagus matschiei* | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 3 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 2 | 2 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 1 | 1 |
| *Protemnodon anak* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 2 | 1 | 2 | 1 | 0 | 1 | 2 | 0 | 1 | 1 |
| *Congruus congruus* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Wallabia bicolor* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 1 | 2 | 0 | 0 | 1 | 2 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 2 | 0 | 1 | 2 |
| *Prionotemnus palankarinnicus* | 1 | 1 | 1 | 0 | 1 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Kurrabi mahoneyi* | 1 | 1 | 1 | 0 | 1 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Lagorchestes conspicillatus* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | - | 1 | 0 | 0 | 1 | 2 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 2 |
| *Lagorchestes hirsutus* | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 1 | 2 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 2 |
| *Baringa nelsonensis* | 1 | 1 | 1 | 0 | 1 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Onychogalea unguifera* | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 1 | 2 | 0 | 0 | 1 | 2 | 0 | 1 | 3 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 2 |
| *Macropus eugenii* | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 2 |
| *Macropus fuliginosus* | 1 | 1 | 2 | 0 | 2 | 0 | 0 | 2 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 2 |
| *Macropus pavana* | 1 | 1 | 2 | 0 | 2 | 0 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *Macropus robustus* | 1 | 1 | 2 | 0 | 2 | 0 | 0 | 2 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 3 | 0 | 1 | 0 | 1 | 2 | 1 | 2 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 2 |

*Morphological Characters used in Phylogenetic Analysis*

1. Rostrum depth relative to posterior (neurocranial) portion of cranium: shallow (0), intermediate (1), deep (2). The rostrum is the portion of the cranium anterior to the orbits. In most macropodids it is shallow relative to the remainder of the cranium, but it is deep in some apparently browsing forms, particularly sthenurines.

2. Marked cranial foreshortening (brachycephaly): absent (0), present (1). Extreme shortening of the rostrum is a diagnostic feature of the tribe Simosthenurini (Prideaux, 2004). Because cranium and dentary length are strongly correlated, taxa represented only by dentary specimens are assessable for this character.

3. Level of basicranial plane relative to palatal plane: same plane or slightly higher (0), markedly higher (1). In many sthenurines, particularly the simosthenurins, the level of the basicranium is distinctly higher than that of the palate (Prideaux, 2004).

4. Splanchnocranium anteroventral deflection: marked (0), intermediate (1), minimal (2). The splanchnocranium is the portion of the cranium anterior to the neurocranium (originally derived from the branchial arches), and is primarily associated with ingestion. The longitudinal axis of the splanchnocranium in most adult macropodids is deflected ventrally relative to that of the neurocranium (Prideaux, 2004: fig. 14).

5. Superficial masseter origin on jugal: shallow (0), deep, with distinct orbital rim (1). The distinct muscle scar on the lateral surface of the jugal corresponds to the more vertically oriented layer of the superficial masseter muscle. The dorsal edge of the jugal in species of *Onychogalea* and *Baringa* is distinctly projected laterally. It represents a flared posterior continuation of the ventral rim of the orbit (see Flannery & Hann, 1984).

6. Large ectoglenoid process: absent (0), present (1). The posterior end of the jugal of most macropodids is shallow and narrow, but in sthenurines it is deep and expanded to form a marked ectoglenoid process (Murray, 1991; Prideaux, 2004). This borders the glenoid fossa anteriorly and is the attachment point for the lateral mandibular ligament.

7. Postglenoid process: absent (0), small (1), large (2). The ventrally descending process of the squamosal immediately posterior to the glenoid fossa varies in size across the Macropodidae, although it is large in the majority of species (Fig. 8).

8. Neurocranium element contact: frontal-squamosal (0), parietal-alisphenoid (1). The configuration of the four bones composing the lateral surface of the neurocranium in macropodoids has long been considered phylogenetically important (e.g., Flannery, 1989). In *Hypsiprymnodon moschatus* and the potoroines the frontal and squamosal

contact each other, separating the parietal and alisphenoid, while the reverse is true in other macropodids (Fig. 8).

9. Ectotympanic proportions: small (0), thick, wide, rugose, ventrally keeled (1). Sthenurines are characterized by their possession of an enlarged, robust ectotympanic (Prideaux, 2004). In other macropodids the bone is narrow and smoothly surfaced (Fig. 8).

10. Maximum occiput breadth relative to height: deeper than broad (0), broader than deep (1).

11. Foramen magnum size relative to occiput size: small (0), large (1). Dendrolagins and representatives of three other macropodine genera each possess a foramen magnum distinctly larger than is typical of the occiput of all other macropodids.

12. V-shaped squamosal inflation between occiput and posterior end of zygomatic arch: absent (0), present (1). Viewed laterally, the cranium of dendrolagins bears a distinct V-shaped squamosal inflation that fills the gap (observed in other macropodids) between the perimeter of the occiput and the posterior end of the zygomatic process.

13. Relative anteroposterior length of upper incisors: I2 and/or I3 not reduced relative to I1 (0), I2 distinctly shorter than I1 and I3 (1), I2 and I3 distinctly shorter than I1 (2). The I2 and I3 vary in anteroposterior length (as opposed to crown height) relative to I1 in macropodids. I2, but not I3, in sthenurines is reduced to a very small, sub-cylindrical tooth (Murray, 1991; Prideaux, 2004). In *Onychogalea* and *Baringa* both I2 and I3 are reduced in length relative to I1.

14. I1 shape: sub-cylindrical (0), slightly broadened (1), markedly broadened (2). I1 is anteriorly curved and sub-cylindrical in relatively more plesiomorphic macropodids and most sthenurines In *Sthenurus* and many macropodines I1 is markedly broadened, while an intermediate condition typifies dorcopsins and tree-kangaroos.

15. I3 anterobuccal crest: absent or very small, restricted to anterior end (0), distinct (1). The minimally worn I3 of non-macropodine macropodoids is fundamentally a simple blade, but an anterobuccal eminence may be present (Ride, 1959; Prideaux, 2004: figs 16, 17). This feature is expanded into a distinct crest of varying length in macropodines, and is typically demarcated posteriorly from the main crest (the ancestral blade) by a groove.

16. I3 lingual surface: no anterolingual crest or lingual shelf (0), anterolingual crest present, no lingual shelf (1), anterolingual crest and small lingual shelf present (2). The lingual surface of the main crest of I3 of most macropodoids is relatively featureless. In sthenurines a typically low anterolingual crest or eminence usually extends from the anterior end of the crown for a half or two-thirds the length of the main crest.

Dendrolagins have independently evolved an anterolingual crest, but also possess a small adjacent shelf.

17. Number of cuspules/ridgelets on P3 anterior to large posterior cusp: five or more (0), four (1), three (2), less than three (3).

18. Deep cleft on main crest of P3 and p3 immediately posterior to anteriormost cuspule: absent (0), present (1).

19. P3 lingual cingulum: absent or very low, fine (0), low, narrow to moderately broad, tapered anteriorly (1), broad, not raised into crest along ling edge, with or without cuspules (2), broad, raised into low crest along lingual edge (3), raised into high crest along lingual edge (4). In many macropodids a shelf extends along the lingual side of the P3 crown. It is highly variable in morphology between taxa.

20. P3 lateral constriction immediately anterior to posterolingual cusp: absent (0), present (1). The P3 of dorcopsins is laterally constricted or "pinched in" in occlusal view immediately anterior to the posterior end of the tooth, which is dominated by the large posterior cusp of the main crest and the posterolingual cusp, to which it is often linked by a small crest.

21. Upper cheek tooth row shape in transverse plane: straight (0), bowed laterally (1). When observing the cranium in palatal view the cheek tooth rows of macropodids may be either straight and parallel or bowed (laterally convex).

22. Molar progression: absent (0), present (1). Species of the *Macropus* subgenera *Macropus* and *Osphranter* express a condition usually referred to as molar progression, whereby the cheek teeth shift anteriorly and are successively shed with ontogenetic age. One species of rock-wallaby (*Petrogale concinna*) also shows molar progression, but is distinguished by its continual production and progression of supernumerary molars. Molar progression is here distinguished from what is usually termed 'mesial drift', wherein cheek teeth drift forward with age but are not shed.

23. Molar morphology: bunodont (0), bunolophodont (1), bilophodont (2). *Hypsiprymnodon* and potoroines lack any substantial crests or lophs between adjacent buccal and lingual molar cusps, but they are incipient in *Nowidgee* and *Ngamaroo*. All other macropodids possess fully formed lophs.

24. Preprotocrista development: strongly developed, confluent with precingulum (0), small but distinct (1), absent (2). The preprotocrista (sometimes 'forelink') is a crest that extends from the vicinity of the protocone (lingual side of the protoloph) to the precingulum, and varies in relative size across the Macropodidae.

25. Postprotocrista orientation: restricted to lingual side of tooth (0), extends into interloph valley near to tooth midline (1). The postprotocrista (sometimes ‘midlink’) is a crest that extends posteriorly from the protocone apex, remaining on the lingual side of the crown or extending into the interloph valley.

26. Postprotocrista development: short, thick (0), fine, low (1), intermediate (2), high, thick, strongly developed (3).

27. Postprotocrista division: absent (0), incipiently or completely divided into two components (1). The postprotocrista of macropodids is typically expressed as a single crest, but in simosthenurins it is divided into one component that maintains contact with the protocone apex and another than is shifted buccally and more anteroposteriorly oriented (Prideaux, 2004).

28. Postparacrista development: present (0), absent or very fine and low (1). In most macropodids a distinct postparacrista extends posteriorly from the paracone apex, terminating at the interloph valley. In four derived macropodin genera the crest is highly reduced or absent.

29. Postmetacrista / postmetaconulecrista development: both distinct (0), postmetaconulecrista enlarged, postmetacrista absent or very weak (1). The two crests oriented posteriorly from the buccal and lingual sides of the metaloph are the postmetacrista and postmetaconulecrista, respectively. *Kurrabi, Baringa* and *Macropus* differ from the other macropodids by having a strong postmetaconulecrista and poorly expressed postmetacrista.

30. Morphology of symphyseal plate of dentary: shallow, smooth or very slight rugose (0), deep, rugose (1), deep, very rugose and anteriorly expanded (2). The symphyseal plate is the articulating surface of the dentary that, together with its counterpart, forms the mandibular symphysis. In most macropodids it is relatively shallow and smooth. In lagostrophines and sthenurines it is roughened with sub-parallel ridges and irregular rugosities representing attachment area for cruciate ligaments, but to differing degrees.

31. Buccinator sulcus on dentary: absent (0), broad, deep concavity (1), narrow, shallow (2), narrow, deep (3). The sulcus on the lateral surface of the dentary (beneath the anterior cheek teeth) that corresponds to the buccinator (cheek) muscle varies in its expression across the Macropodidae. Lagostrophines have a distinctive broad, deep concavity (Fig. 5c, d), while it is narrower and deeper in sthenurines compared with other macropodids (Prideaux, 2004).

32. Anterior extent of masseteric canal: to below anterior cheek teeth (0), to below posterior cheek teeth (1), posterior to m4 (near vertical) (2). A large masseteric foramen within the masseteric fossa of the dentary is a distinctive macropodoid feature. The

foramen leads into the masseteric canal, which is the insertion for the deep masseter muscle. The extent to which it penetrates the ramus varies across the Macropodidae.

33. Insertion area for middle masseter muscle: small to moderately proportioned (0), broad and concave (1), large, terminates ventrally at distinct ridge (2). The anteriormost layer of the middle masseter muscle inserts ventral to the masseteric crest on the lateral surface of the dentary. Lagostrophines (Fig. 5c, d) and *Baringa* and *Onychogalea* (Flannery & Hann, 1984) deviate from the condition typical of other macropodids in terms of the morphology of this area.

34. Mandibular condyle shape: barrel shaped, not tapered medially (0), oval or circular (1), barrel shaped, tapered medially (2).

35. Position of i1 occlusal surface during incisor occlusion: i1 rests on crowns of I2 and I3 and posterior facet on I1 (0), i1 rests on palate, bordered by I2 and I3 (1).

36. i1 morphology: procumbent, thin and elongate (0), procumbent blade with thick enamel flanges (1), slightly robust with thin enamel flanges (2), markedly upturned and robust (3). Morphology of the i1 crown varies markedly across the Macropodoidea. The i1 longitudinal axis of most taxa is aligned or slightly declined compared with that of the ramus (procumbent). In some sthenurines the i1 is upturned such that its occlusal surface is above the level of the diastema (Prideaux, 2004). Variation is also seen in the development of enamel flanges, extensions of the buccal enamel layer that form an elongate rim dorsal and/or ventral to the dentine core.

37. Enamel distribution on i1: principally buccal side (0), buccal enamel layer extended to completely encircle crown (1), separate lingual enamel layer present (2). In most macropodids enamel is largely restricted to the buccal side of the i1 crown, but may extend onto ventrolingual aspect (Prideaux, 2004: fig. 13). In lagostrophines this thick enamel layer envelops the crown entirely, while in sthenurines and *Dorcopsoides* a neomorphic lingual enamel layer is present, which contacts the buccal layer ventrolingually but is not continuous with it.

38. Morphology of p3: blade with many fine serrations along length of crown (0), crown markedly curved in lingually at posterior end, forming rounded L-shape (1), straight or slightly curved blade with fewer coarser serrations (2), base of crown markedly broadened relative to length (3).

39. Buccal side of p3: lacks eminence, cingulid or crest (0), bears posterobuccal eminence (1), bears well-developed buccal cingulid or crest (2). The buccal side of p3 is relatively featureless in most macropodids except for serrations or ridgelets descending from cuspules of the main crest. Sthenurines and tree-kangaroos are characterized by their possession of a distinct eminence or inflation on the posterobuccal aspect of the

main crest, a well-developed buccal cingulid, or buccal crest subequal in height to the main crest.

40. Cheek tooth row shape in dorsoventral plane: flat or very slightly convex (0), markedly convex dorsally (1). Viewed laterally, the cheek tooth row of species of *Onychogalea, Baringa* and *Macropus* are markedly curved dorsally, forming a so-called inverse curve of Spee (Sanson, 1989).

41. Molar crown height: low (<0.45) (0), intermediate (0.45–0.75) (1), high (>0.75) (2). Molar crown height varies markedly across the Macropodidae, but so do crown length and width. To quantify crown height relative to length and width for bilophodont teeth Prideaux (2004) introduced the crown height index, which is (m2 posterior height)$^2$ / m2 length x m2 posterior width. States for species not represented by a minimally worn m2 were scored through comparison with molars from which they are known with teeth in equivalent positions in other species.

42. Premetacristid development: well developed, confluent with paracristid (0), moderately developed (1), weakly developed or absent (2). The premetacristid extends anteriorly from the metaconid apex, in contrast to the parametacristid which extends anterobuccally from the metaconid (Prideaux, 2004). When well developed it often terminates at the position of the paraconid, lingual terminus of the paracristid.

43. Slight postmetacristid: present (0), absent (1). The postmetacristid extends posteriorly from the metaconid apex down the posterior face of the protolophid, and is usually small and fine where present.

44. Postprotocristid development: distinct (0), slight or absent (1). The postprotocristid extends posteriorly from the protoconid apex down the posterior face of the protolophid, and connects to the cristid obliqua in more plesiomorphic macropodids.

45. Cristid obliqua form: restricted to buccal side of tooth (0), straight or slightly curved, terminates near tooth midline low on posterior face of protolophid (1), distinctly kinked, terminates near tooth midline low on posterior face of protolophid (2). The cristid obliqua (sometimes midlink) extends anteriorly or anterolingually from the hypoconid.

46. Paracristid and cristid obliqua division: absent (0), present (1). In most macropodids the paracristid and cristid obliqua of the lower molars are each composed of a single unbroken crest directly connected to the protoconid or hypoconid apex, respectively. In simosthenurins these cristids are divided into a smaller buccal and larger lingual component (Prideaux, 2004).

47. Development of postentocristid and posthypocristid: postentocristid distinct, meets large posthypocristid (0), both crests fine or absent (1), posthypocristid present,

adjacent to distinct central groove (2). Most plesiomorphic macropodids bear a U-shaped confluence of the posthypocristid at the posterior end of the lower molar. In most bilophodont taxa the posterior face of the hypolophid is relatively flat and featureless, except for the occasional presence of a low postcingulid. The giant sthenurine *Procoptodon goliah* is characterized by a reemergent postentocristid and posthypocristid. Species of the *Macropus* subgenera *Macropus* and *Osphranter* also possess a reemergent posthypocristid adjacent to a vertical or slightly oblique groove in the middle of the hypolophid posterior face.

48. Lophid enamel crenulations: absent (0), present (1). We follow Prideaux (2004) in defining enamel crenulations as wrinkles on a molar surface that cannot readily be homologized with a cristid. They are typical of most sthenurines.

49. Tuber calcanei posteromedial expansion: absent (0), present (1). The tuber calcanei of tree-kangaroos is characterized by a posteromedially oriented longitudinal axis and ventromedial expansion posteriorly (Prideaux & Warburton, 2008, 2009; Fig. 9).

50. Relative length of calcaneus articular region: long (>0.43) (0), intermediate (0.43–0.35) (1), short (<0.35) (2). This varies markedly across the Macropodidae (Fig. 9) and is measured as the distance from posterior edge of lateral talar facet to the anterior extremity of calcaneus divided by maximum calcaneal length (measured on dorsal surface parallel to long axis).

51. Step of calcaneus-cuboid articulation: incipient (0), markedly stepped or slightly beveled (1), slightly smoothed, oblique (2), smoothed (3). Viewed dorsally the nature of the step between the dorsolateral and dorsomedial facets for the cuboid is smoothed in tree-kangaroos, but either markedly stepped (near 90°) or only slightly beveled (oblique) in most macropodids (Fig. 9).

52. Ventromedian facet of cuboid articulation on calcaneus: absent (0), continuous with dorsolateral facet (1), separate, distinct, well-developed (2), reduced, confluent with dorsomedial facet (3). Viewed anteriorly the macropodid cuboid articulation on the calcaneus is divisible into three facets, the more ventral being the ventromedian facet.

53. Relative breath of calcaneus-talus articulation: intermediate (0.40–0.45) (0), narrow (<0.40) (1), broad (>0.45) (2). This varies markedly across the Macropodidae (Fig. 9) and is measured as the maximum calcaneal breath of the articular facets in the horizontal plane divided by maximum calcaneal length.

54. Distinctness of medial and lateral talar facets on calcaneus: confluent, smoothly continuous anteriorly (0), continuous anteriorly but facet contours distinct (1), distinct, separate facets (2). In all macropodines except *Dorcopsoides* the medial and lateral talar facets are distinct and separate from one another, regardless of their shape (Fig. 9).

55. Shape of lateral talar facet on calcaneus: untapered or marginally tapered medially (0), slightly or moderately tapered medially (1), markedly tapered medially (2). The lateral facet varies in shape from semi-cylindrical (anterior and posterior borders near-parallel) to near-conical in *Dendrolagus* (Fig. 9). The facet borders of relatively more basal macropodines are intermediate, converging at 5–10°.

56. Medial projection of sustentaculum tali of calcaneus beyond edge of medial talar facet: absent or very slight (0), marked (1). Viewed dorsally the sustentaculum tali of most macropodids does not project beyond the medial talar facet, but in dorcopsins and *Dendrolagus bennettianus* the sustentaculum extends well beyond the edge of the facet.

57. Shape of sustentaculum tali of calcaneus: straight (anteroventrally oriented) or very slightly curved (0), rounded (1), square (2). Viewed medially the sustentaculum tali is generally flat or very slightly curved for the passage of the large flexor tendon. In some macropodines the surface is distinctly curved, while in *Lagostrophus* and derived sthenurines the surface is flexed such that the posterior portion forms a near-right angle with the plantar portion.

58. Posterior extent of sustentaculum tali: roughly in line with fibular facet (0), intermediate (1), significantly posteriorly placed from fibular facet (2). Viewed dorsally the length of the sustentaculum tali is highly variable across the Macropodidae, and ranges from short, where the posterior border is in line with the fibular facet, to long in most sthenurines and macropodins, where it extends well posterior to the position of the fibular facet (Fig. 9).

59. Orientation of talar trochlear crests: oblique (anterolaterally oriented) (0), anteroposteriorly oriented (1). Relative to the long axis of the calcaneus the trochlear crests on the talus of sthenurines are oriented anteroposteriorly as opposed to anterolaterally (obliquely), which is typical of all other macropodids (Fig. 7).

60. Height of medial trochlear crest on talus relative to lateral crest: subequal in height (trochlea groove shallow) (0), medial crest slightly higher (1), medial crest distinctly higher, with trochlear groove deep (2). In relatively plesiomorphic macropodids the crests are subequal in height, while in most macropodids the medial crest is slightly higher. In derived sthenurines it is markedly higher, and borders a deep groove (Fig. 7).

61. Medial malleolar process/fossa on talus: fossa intermediate, no distinct process (0), fossa intermediate, process small, slightly medially extended (1), fossa broad/shallow, process large and medially extended (2), fossa narrow/deep, process small, slightly medially extended (3). The medial malleolar fossa on the neck of the talus is variable across the Macropodidae, but is broad and shallow in tree-kangaroos, and narrow and deep in most macropodins (Fig. 7).

62. Metatarsal IV length relative to calcaneus length: intermediate (1.5–2.4) (0), long (>2.4) (1), short (<1.5) (2). Species of *Dendrolagus* and *Setonix* have relatively short metatarsals compared with most macropodids, while species of *Lagorchestes* have the longest.

63. Metatarsal IV relative breadth: narrow (<0.12) (0), intermediate (0.12–0.16) (1), broad (>0.16) (2). Measured as the medial-lateral width of the midpoint of the metatarsal shaft divided by the maximum metatarsal length.

64. Metatarsal IV distal epiphysis breadth: narrow relative to ligament attachments (0), distinctly broad relative to shaft width, minimum development of ligament attachments (1). Sthenurine and *Protemnodon* metatarsals are distinctive in the relatively wide articular surface of the metatarsal IV head. In all other macropodids it is narrow with distinctly enlarged medial and lateral tubercles for insertion of the collateral and sesamoidean ligaments.

65. Metatarsal V relative breadth: intermediate (0.07–0.13) (0), narrow (<0.07) (1), wide (>0.13) (2), highly to extremely reduced (3). This is measured as medial-lateral width of the midpoint of the metatarsal shaft divided by maximum metatarsal length. Relative breadth of metatarsal V varies across the Macropodidae. Tree-kangaroos are characterized by a wide metatarsal V, while it is narrow in *Lagorchestes, Onychogalea* and *Macropus*. The metatarsal V of derived sthenurines is extremely reduced and splint-like (Wells & Tedford, 1995).

66. Metatarsal V plantar ridge: small, posteriorly restricted (0), absent (1), elongate, well developed (2). A ridge on the plantar surface is present in most macropodid taxa, but absent in potoroines and derived sthenurines.

67. Relative length of fibular articular facet on tibia: short (<0.62) (0), long (>0.62) (1). This is measured as length of the fibular facet (tibia-fibular interosseous articulation) to the distal epiphyseal line divided by posterior tibial diaphysis length. It is short in most macropodids, but long in *Lagostrophus*, *Lagorchestes, Onychogalea* and *Macropus*.

68. Relative length of anterior tibial crest: intermediate (0.20–0.26) (0), long (>0.26) (10, short (<0.20) (2). This is measured as length of the anterior crest from the proximal epiphyseal line divided by posterior tibial diaphysis length. It is particularly long in the species of *Dendrolagus*, and at the opposite extreme, short in *Lagorchestes*, *Onychogalea* and *Macropus*.

69. Shape of anterior tibial crest: stepped in distally (0), not stepped distally, curves smoothly into diaphysis (1). In sthenurines the tibial crest curves smoothly into the diaphysis forming a sinuous outline when viewed medially, rather than a distinct step as observed in other taxa.

70. Length of tibia relative to that of femur: intermediate (1.10–1.45) (0), short (<1.10) (1), long (>1.45) (2). This is measured as posterior tibial diaphysis length divided by posterior femoral diaphysis length. Tree-kangaroos have a relatively short tibia, while most macropodins and sthenurines have a relatively long tibia.

71. Development of greater trochanter crest of femur: distally flared or intermediate (0) distally narrowed (1), distally flared and markedly broadened (2). Viewed anteriorly the greater trochanter of macropodins is distally narrowed, while it is distally flared and markedly broadened in sthenurines, and more intermediate in other macropodids.

72. Angle of ilium to ischium: slight angle (0), aligned in same plane (1), large angle (2). Assessed in lateral view relative to the acetabulum, the long axis of the ilium and ischium are aligned at close to 180° or slightly less. In simosthenurins these pelvic elements make an angle of approximately 135°.

73. Position of rectus femoris origin on ilium: distinctly separate from acetabular rim (0), intermediate (1), adjacent to acetabular rim (2). The rectus femoris muscle scar is distinctly separate from the edge of the acetabulum in most macropodids, but is immediately adjacent to it in *Dendrolagus*. In sthenurines, *Dorcopsis*, *Dorcopsulus* and *Bohra* its placement is intermediate.

74. Iliopubic process at junction of ilium and pubis: very small, pointed (0), long, well-developed, square in outline (1), short, broad (2), very large (3). In most macropodids this process is well-developed and square in outline, but in tree-kangaroos, *Protemnodon* and *Setonix* it is short and broad, and in sthenurines it is greatly enlarged.

75. Relative length of ischium to ilium: long (>0.7) (0), short (<0.7) (1). This is measured as maximum length of the ischium from the acetabular notch to the ischial tuberosity (parallel to pelvic symphysis) divided by length of the ilium from the midpoint of the acetabulum to the tip of the iliac crest).

76. Area of supraspinous fossa relative to infraspinous fossa of scapula: roughly equal (0), supraspinous fossa roughly half area (1), supraspinous fossa roughly one-third area (2), supraspinous fossa much smaller than infraspinous (3). The supraspinous fossa varies markedly in area relative to the infraspinous fossa across the Macropodidae (Fig. 6).

77. Scapula acromion shape: anterodorsally curved (0), straight (1). Plesiomorphic macropodids retain a distinctly curved acromion process, while in *Ganguroo* plus the sthenurines and macropodines it is relatively straight.

78. Displacement of acromion relative to glenoid fossa on scapula: caudal to the cranial margin of the glenoid fossa (0), cranially displaced (1). Viewed laterally the acromion process is cranially displaced relative to the articular surface of the glenoid in sthenurines and *Macropus robustus* compared with other macropodids.

79. Relative size of medial tuberosity to lateral tuberosity on humerus: slightly smaller (0), distinctly smaller (1), subequal (2). In *Ganguroo*, sthenurines and most macropodines the medial tuberosity the at the proximal end of the humerus is distinctly smaller than the lateral tuberosity, but in *Dendrolagus* they are subequal in size.

80. Development of deltoid tuberosity versus pectoral crests on humerus: deltoid insertion poorly developed (0), intermediate, small deltoid tuberosity connected by oblique ridge (1), large deltoid tuberosity separated from pectoral crest by sulcus (2). The relative development of the deltoid tuberosity and pectoral crest varies markedly across the Macropodidae.

81. Relative width of trochlear notch posterior margin on ulna: wide (0), narrow (1). The posterior margin of the trochlear notch is distinctly narrow relative to the width of the humerus articular surface in sthenurines compared with other macropodids.

82. Olecranon length/shape relative to length of ulna: long, deep (0), intermediate (1), reduced (2). Sthenurines have a reduced olecranon process. The olecranon process at the proximal end of the ulna is reduced in *Ganguroo* and sthenurines relative to other taxa, in which it is long and deep or moderately proportioned.

83. Radius cross-section depth (mid-length) to width of the diaphysis, measured at the mid-length of the diaphysis from between the epiphyseal plates: intermediate (1.3–1.5) (0), shallow (<1.3) (1), deep (1.5–2.0) (2), very deep (>2.0) (3). Potoroines have a very deep, blade-like radial diaphysis, while in sthenurines and most macropodines it is moderately deep. In *Lagostrophus, Setonix, Thylogale*, *Dendrolagus* and *Protemnodon* the radius is more circular rather than oval in cross-section.