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Finding Fletcher's Giant Worms – from Burrawang to Budderoo

Currently, approximately 700 earthworms are described from Australia, including about 80 exotic species. Whereas it is anticipated that the total faunal list will eventually be several times higher, the status of some of the earliest described worms is uncertain.

With the assistance and support of the Australian Geographic Society, modest expeditions were mounted in 2000 to resurvey some original sites (type-localities) in order to determine whether the worms were still surviving and, if so, to collect fresh material while recording ecological notes.

Almost 115 years earlier, in 1886, J.J. Fletcher published his first descriptions of earthworms (along with much detail of the general locality) obtained during several visits to Burrawang township in the County of Camden in the Southern Highlands of NSW. (Burrawang is 34° 36'S 150° 31'E, 670 m above sea-level).

At this time only four natives had been noted from Australia, a fifth was in fact an introduced species; these were: *Megascolides orthostichon* (Schmarda, 1861) supposedly from Tasmania; *Digaster lumbricoides* Perrier, 1872 and *Plutellus heteroporus* Perrier, 1873 both from Port Macquarie, NSW, and Victoria's *Megascolides australis* M'Coy, 1878 - the "Gippsland Giant Earthworm" that when extended measured about 183 cm long. In a series of papers (1886-1890) for the *Proceedings of the Linnean Society, N.S.W.*, Fletcher described a total of 69 additional species and varieties.

The rich soils of Burrawang initially provided Fletcher with five new species, listed here with their known Museum types, material that in some cases is aged, inadequate or wanting:

1. *Notoscolex camdenensis* Fletcher, 1886a the type-species of a new genus, this worm when living would extend itself to about 60 cm, [Lectotype and paralectotypes, Museum of Victoria NMV:G170];

2. *Notoscolex grandis* Fletcher, 1886a, a "giant" worm measuring up to 106 cm long also found "a few miles off at Robertson", [Syntypes, Australian Museum AM:W1493-1494 labelled "Cotypes"; AM:W1475, labelled "juveniles from Burrawang, June 1885"];

3. *Didymogaster sylvaticus* Fletcher, 1886a, the type-species of a new genus and commonly known as the "Blue Squirter Worm" that was also found at Springwood (?) and Jervis Bay, NSW, [Syntypes, AM:W1374, 1379];

4. *Cryptodrilus rusticus* Fletcher, 1886a, yet another type-species of a new genus, [Lectotype and paralectotypes, AM:W1389];

5. *Anisochaeta austrina* (Fletcher, 1886b), for which type material is missing.

Fletcher went on to describe the following species and varieties from adjacent Mt Kembla, Kiama, and the Illawarra region: *Notoscolex illawarrae* (Fletcher, 1889), [Syntypes, AM:W1488]; *Notoscolex pygmaeus* (Fletcher, 1889), [Syntypes, AM:W1327]; *Cryptodrilus fastigatus* Fletcher, 1889 from "Burrawang, and Illawarra", [Lectotype, AM:W4709; paralectotypes, AM:W1308]; *Cryptodrilus illawarrae* Fletcher, 1889 (now a junior homonym of *Notoscolex illawarrae*) from Illawarra that had varieties described from Springwood, [Syntypes, AM:W1311]; and *Notoscolex singularis* (Fletcher, 1889) also from Burrawang, [Syntypes, AM:W1377]. A further species, *Anisochaeta macleayi* (Fletcher, 1889), which was "common in the Hon. W. Macleay's garden at Elizabeth Bay", was later found by Fletcher (1890: 1006) at Burrawang along with a variety of *Anisochaeta fecunda* (Fletcher, 1887).

During the August Bank Holiday 2000, fresh material was collected by Dr Rob Blakemore, an ecologist and independent authority on earthworm taxonomy, with the assistance of two willing helpers (his young sons – see the illustration).

The home ground was prepared for this expedition in the preceding weeks by posting 'Wanted' notices in Scarlett's General Store and Burrawang Village Hotel, the local pub. Although the townsfolk seemed blasé about the historical importance of their earthworms, my advice was to sample from a hillside stand of Eucalypt/Sassafras woodland, facing the back of the pub above a small creek. Numerous specimens of about six native species were collected here, but none were of the expected "giant" species. Further advice

was that such large worms were thriving on the “Wallaya” property of Penny & Larry Osterhaus at Budderoo, near Robertson.

This pastoral farm, which had been cleared from rainforest in the 1800’s, did indeed yield several large specimens at depths of 50-60 cm where the deep-red, basaltic soil was riddled with burrows of ca. 1 cm diameter in both horizontal and vertical planes.

Entire worms were very difficult to obtain as exposed parts of their bodies responded to touch by contracting and autolysis, or breaking in two, with the head ends invariably evading capture. Fletcher (1886a: 551) said “It is somewhat difficult to extract these large worms from the ground without injury to them, hence some of my largest examples are in a fragmentary condition.”

Careful excavation by undermining rather than pulling out was the only way to obtain whole specimens that, once fully exposed, exuded clear coelomic fluid but were otherwise docile. The largest specimens collected were about 60 cm long, although specimens over 1 m had been found previously by the owners (Larry Osterhaus, pers. comm.).

Over a weekend, a total of 14 species of earthworms were unearthed at various habitats on this 45 ha property. In addition to the giant *Notoscolex grandis* and *Anisochaeta austrina*, two other unidentified native species were collected.

The ten remaining species were all exotics, that have been inadvertently introduced from various regions of the Globe in the years following European settlement of Australia.

These interlopers identified at Budderoo were:

- Amyntas corticis* (Kinberg, 1867)
- Aporrectodea caliginosa* (Savigny, 1826)
- Aporrectodea trapezoides* (Duges, 1828)
- Eisenia fetida* (Savigny, 1826)
- Eisenia rosea* (Savigny, 1826)
- Lumbricus rubellus* Hoffmeister, 1843
- Lumbricus castaneus* (Savigny, 1826)
- Microscolex dubius* (Fletcher, 1887)
- Ocnerodrilus occidentalis* Eisen, 1878
- Octolasion cyaneum* (Savigny, 1826)

Thus the AGS Burrawang expedition was successful in obtaining fresh material of most of Fletcher’s worms, and *Notoscolex grandis* was largely

thiving, at least at Budderoo in the vicinity of Robertson, despite the intrusions of agriculture and exotics.

The only original species absent from the resurvey was *Didymogaster sylvatica*. However, a few weeks later during a chance visit to coastal Kiama, deep blue worms secured from under logs revealed their identity, and lived up to their vernacular name, by accurately squirting coelomic fluid at arm's length directly in the collector's face!

After taxonomic processing and curation, all these samples will be lodged in the collections of the Australian Museum in Sydney allowing the preservation and continuation of much needed studies of Australia's abundance of earthworms.

- R.J. Blakemore, June, 2001

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Photo: Penny Osterhaus (*Notoscolex sp.* from Budderoo).