

Vegetation of Imbota and Yina Nature Reserves, Armidale, New South Wales

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Abstract: The vegetation of Imbota Nature Reserve (30° 35'S, 151° 45'E) (218 ha in area), 10 km south-east of Armidale, and Yina Nature Reserve (30° 29'S, 151° 45'E), (101 ha in area), 10 km east of Armidale, on the Northern Tablelands, NSW, is described. Based on classification analyses, air photo interpretation and ground-truthing, seven vegetation communities are described and mapped :

1. *Eucalyptus caliginosa* (Broad-leaved Stringybark) Grassy Forest and Woodland on deep soils at Imbota
2. *Eucalyptus viminalis* (Manna Gum) Grassy Forest and Woodland, Community
3. *Eucalyptus caliginosa* (Broad-leaved Stringybark) Grassy Forest and Woodland on shallow soils at Imbota
4. *Eucalyptus caliginosa* (Broad-leaved Stringybark) Grassy Forest and Woodland at Yina
5. *Eucalyptus blakelyi* (Blakely's Red Gum) – *Eucalyptus melliodora* (Yellow Box) Woodland
6. *Eucalyptus viminalis* (Manna Gum) – *Eucalyptus nova-anglica* (New England Peppermint) Grassy Forest and Woodland
7. Riparian Herbfields

252 vascular plant taxa (from 59 families) were recorded from the two reserves, 179 species in Imbota NR, the larger reserve and 209 in Yina NR. The lower species richness at Imbota is likely to have resulted human disturbance rather than from overall habitat heterogeneity.

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Introduction

Imbota Nature Reserve (30° 35'S, 151° 45'E) and Yina Nature Reserve (30° 29'S, 151° 45'E) lie 10 km to the south-east and 10 km to the east of Armidale respectively (Fig. 1). Both are in the Armidale/Dumaresq Shire and in the New South Wales Northern Tablelands Botanical District. Imbota includes 218 ha of remnant native vegetation and Yina, 101 ha.

The reserves were dedicated in 1999, prior to which Imbota NR was Eastwood State Forest and Yina NR was Hillgrove State Forest. Selective logging of hardwoods occurred in these forests from the 1920s onwards but this was sporadic. Timber was regularly removed for firewood and fence posts, and domestic stock grazed the areas up until the reserves were gazetted in 1999. The reserves are currently bordered on all sides by private holdings and much of the surrounding lands are cleared and used for grazing (Fig. 2).

Imbota Nature Reserve includes a minor ridge, and ranges in elevation from 980 m to 1050 m. Some ill-defined drainage lines occur but no definitive creeks flow through the reserve. Rock types include greywacke, slate, chert, jasper, metabasalt, phyllite and schist. The soils are of lithosols or low nutrient sandy soils.

Yina Nature Reserve includes a minor ridge with primarily north-east facing slopes of elevation ranging from 960 m to

1030 m. The eastern boundary is marked by Burying Ground Creek, a minor tributary of the Commissioners Waters, that eventually flows into the Gara River and the eastern fall of the Divide. The rock type of the reserve is mainly of metasediments and soils are generally lithosols or low nutrient sandy soils.

This paper gives part of the results of flora surveys carried out for the New England Tablelands Region of the NSW National Parks and Wildlife Service, to be used to develop appropriate management strategies (Hunter 2003ab).

Methods

Twenty-two quadrats, each 20 x 20 m, were surveyed for vascular plants scored using the Braun-Blanquet (1982) six point cover abundance scale within Imbota Nature Reserve, and a further 20 within Yina Nature Reserve. Quadrats were placed using a stratified random method. As only a small number of sites were available and the size of the reserve was small, physiography alone was used for site stratification. The 42 sites were surveyed over four days during March of 2003.

Voucher specimens were retained by the New England Tablelands Region of the NSW National Parks and Wildlife Service. Nomenclature follows that of Harden (1990–1993) except where recent changes have been made.

Analysis and data exploration were performed using options available in the PATN Analysis Package (Belbin 1995a, b). For final presentation of results all species and their cover abundance scores were used. Cluster analysis was performed using Kulczynski association measure, which is recommended for ecological applications (Belbin 1995a, b) along flexible Unweighted Pair Group arithmetic Averaging (UPGMA) and the default PATN settings.

Delineation of community boundaries in was based on the location of sites and their position within the multivariate analysis, air photograph interpretation, substrate and ground truthing. The vegetation map is based on a 1:25 000 scale. Structural names are based on the most consistent uppermost stratum.

Coleman curves (species accumulation) were calculated using EstimateS (Colwell 1997) for Imbota and Yina Nature Reserves and two other nearby reserves of small size Yarrowyck and Indawarra Nature Reserves (Hunter, unpublished data) for comparison of species turnover and species pool size.

Results

Within Imbota Nature Reserve 179 vascular plant taxa (from 55 families and 132 genera) were recorded from existing records and current sampling. Approximately 11% were of taxa introduced to NSW. The families with the highest number of taxa include: Poaceae (30), Asteraceae (28), Fabaceae (17), Cyperaceae (7), Rubiaceae (6) and Myrtaceae (5), Juncaceae (5) and Rosaceae (5).

Within Yina Nature Reserve 209 vascular plant taxa (from 56 families and 149 genera) were recorded. Approximately 20% were of taxa introduced to NSW. In total 252 vascular plant taxa (from 59 families) were found in the two reserves.

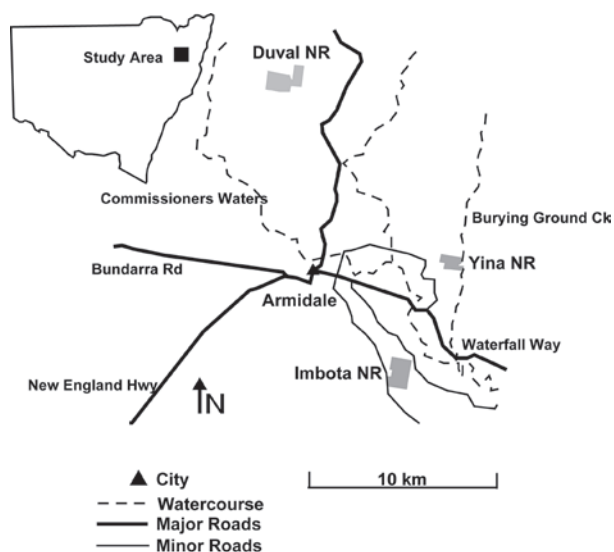


Fig. 1. Locality of Imbota and Yina Nature Reserves, east of Armidale, in the NSW Northern Tablelands

Vegetation communities

Seven vegetation communities are recognised at the dissimilarity of 0.6 (see dendrogram Figure 5). The mapped assemblages for Yina are shown in Figure 3 and Imbota in Figure 4. The structure of all communities was of forest or woodland formation although grasslands are found in areas that have been cleared and are yet to regenerate. In the following descriptions species from each layer are listed in order of decreasing importance (cover-abundance x frequency). Exotic species are not listed, their occurrence in each community is listed in Appendix 1.



Fig. 2. Yina Nature Reserve is a 101 ha remnant within an extensively cleared landscape on the Northern Tablelands of NSW.

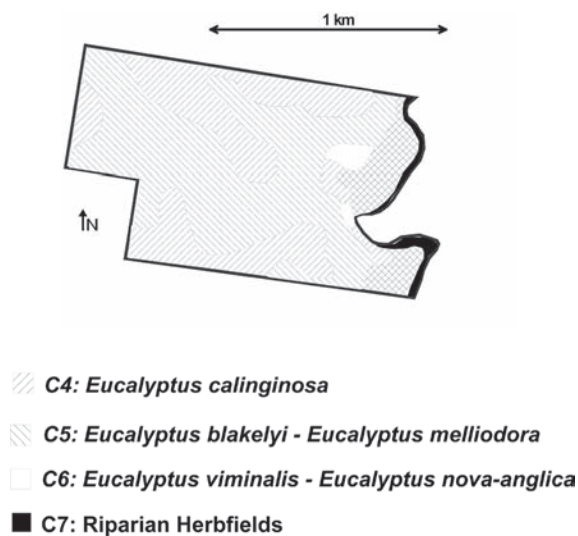


Fig. 3. Vegetation communities for Yina Nature Reserve

Imbota Nature Reserve

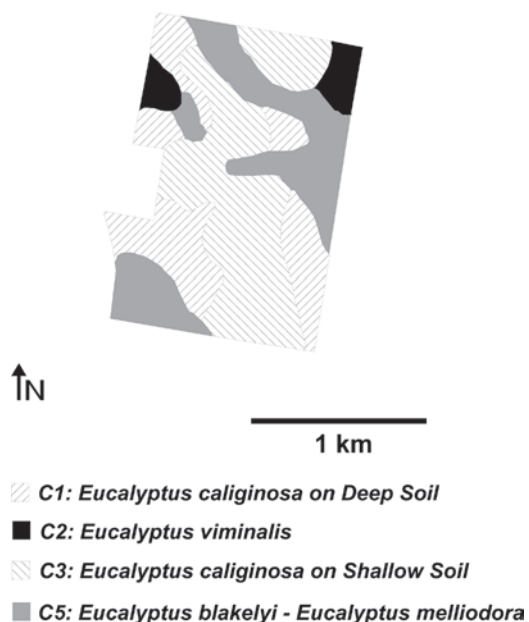


Fig. 4. Vegetation communities for Imbota Nature Reserve

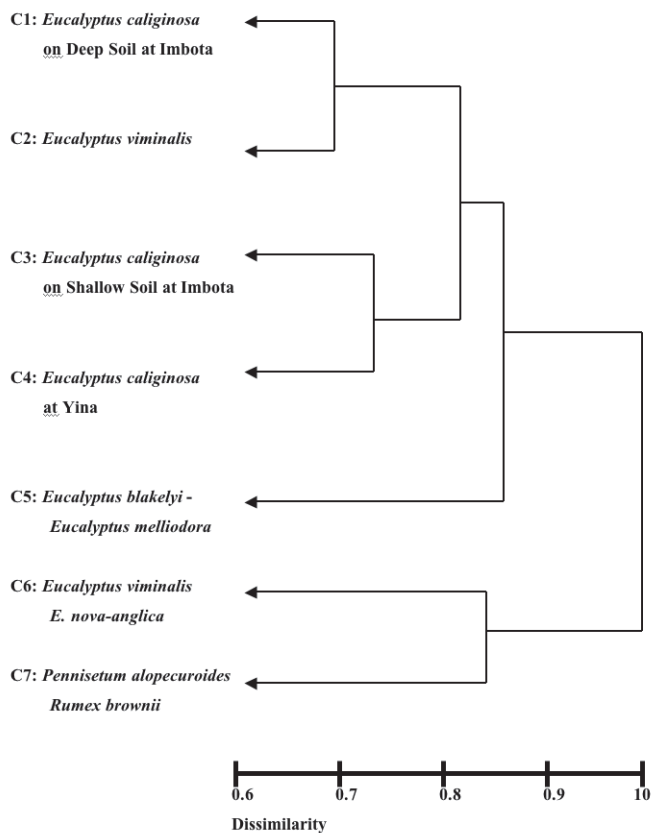


Fig. 5. Summary dendrogram of dataset of sites using Kulczynski association and flexible UPGMA fusion strategy. communities are defined at a dissociation of 0.6

Community 1: *Eucalyptus caliginosa* (Broad-leaved Stringybark) Grassy Forest and Woodland on deep soil at Imbota

Distribution: generally on hill slopes (Fig. 6).

Trees: *Eucalyptus caliginosa*, *Acacia filicifolia*, *Eucalyptus blakelyi*, *Eucalyptus melliodora*, *Eucalyptus viminalis*, *Eucalyptus bridgesiana*, *Allocasuarina littoralis*.

Shrubs: *Lissanthe strigosa*, *Olearia elliptica*, *Hibbertia obtusifolia*, *Einadia hastata*, *Brachyloma daphnoides*, *Olearia viscidula*, *Melichrus urceolatus*, *Jacksonia scoparia*, *Cassinia quinquefaria*.

Climbers & trailers: *Desmodium varians*, *Rubus parvifolius*.

Groundcover: *Dichondra repens*, *Microlaena stipoides*, *Poa sieberiana*, *Calotis cuneifolia*, *Oxalis chmoodes*, *Mentha diemenica*, *Echinopogon caespitosus*, *Hydrocotyle laxiflora*, *Cheilanthes sieberi*, *Rumex brownii*, *Eragrostis molybdea*, *Aristida ramosa*, *Themeda australis*, *Sporobolus elongatus*, *Lagenifera stipitata*, *Dichelachne micrantha*, *Opercularia diphylla*, *Lomandra multiflora*, *Austrostipa scabra*, *Austroanthonia laevis*, *Wahlenbergia planiflora*, *Wahlenbergia luteola*, *Scleranthus biflorus*, *Plantago varia*, *Lomandra filiformis*, *Goodenia hederacea*, *Desmodium brachypodium*, *Carex inversa*, *Vittadinia muelleri*, *Viola betonicifolia*, *Urtica incisa*, *Senecio diaschides*, *Phyllanthus virgatus*, *Joycea pallida*, *Geranium solanderi*, *Fimbristylis dichotoma*, *Euchiton gymnocephalus*, *Dichanthium sericeum*, *Cyperus gracilis*, *Cymbopogon refractus*, *Cymbonotus lawsonianus*, *Chloris truncata*, *Austroanthonia racemosa*, *Austroanthonia pilosa*, *Austroanthonia induta*, *Ajuga australis*, *Acaena novae-zelandiae*.

Number of taxa per plot: 33–(36)–41.

Notes: *Eucalyptus caliginosa* dominated assemblages are widespread throughout the central and eastern parts of the New England Tablelands and are one of the most highly conserved types. The major differences between community 1 and the following community 3 is the dominance of grasses and herbs in the ground layer with over 70% cover and comparatively scattered to non-existent shrub layer. These differences are likely due to the deeper and less rocky soils on which this assemblage is found.



Fig. 6. Community 1: *Eucalyptus caliginosa* Forests and Woodlands in Imbota Nature Reserve on Deep Soils



Fig. 7. Community 2: *Eucalyptus viminalis* Grassy Forest and Woodland

Community 2: *Eucalyptus viminalis* (Manna Gum) Grassy Forest and Woodland

Distribution: restricted to low-lying valley bottoms and creek banks (Fig. 7).

Trees: *Eucalyptus viminalis*, *Acacia filicifolia*, *Eucalyptus bridgesiana*, *Eucalyptus caliginosa*, *Eucalyptus melliodora*, *Angophora floribunda*, *Eucalyptus blakelyi*, *Acacia implexa*.

Shrubs: *Lissanthe strigosa*, *Cassinia quinquefaria*, *Pultenaea microphylla*, *Olearia elliptica*, *Hibbertia obtusifolia*, *Pimelea curviflora*, *Melichrus urceolatus*, *Brachyloma daphnoides*.

Climbers & trailers: *Desmodium varians*, *Glycine tabacina*, *Glycine clandestina*, *Amyema pendulum*.

Groundcover: *Poa sieberiana*, *Themeda australis*, *Echinopogon caespitosus*, *Microlaena stipoides*, *Aristida ramosa*, *Dichondra repens*, *Mentha diemenica*, *Calotis cuneifolia*, *Dichelachne micrantha*, *Cheilanthes sieberi*, *Viola betonicifolia*, *Oxalis chnoodes*, *Goodenia hederacea*, *Hypericum gramineum*, *Hydrocotyle laxiflora*, *Desmodium brachypodum*, *Wahlenbergia luteola*, *Geranium solanderi*, *Opercularia diphylla*, *Austroanthonia pilosa*, *Vernonia cinerea*, *Sporobolus elongatus*, *Austroanthonia laevis*, *Ajuga australis*, *Vittadinia cuneata*, *Stackhousia viminea*, *Sorghum leiocladum*, *Senecio diaschides*, *Scleranthus biflorus*, *Phyllanthus virgatus*, *Lagenifera stipitata*, *Hypoxis hygrometrica*, *Fimbristylis dichotoma*, *Dichanthium sericeum*, *Cymbonotus lawsonianus*, *Asperula conferta*, *Veronica calycina*, *Solenogyne bellioides*, *Pomax umbellata*, *Plantago varia*, *Lomandra multiflora*, *Juncus filicaulis*, *Carex inversa*, *Austrostipa scabra*, *Acacia novae-zelandiae*..

Number of taxa per plot: 29–(38)–48.

Notes: *Eucalyptus viminalis* dominated assemblages are poorly reserved and have been heavily impacted upon throughout the region and are of high conservation concern. Within the Imbota Nature Reserve this community is largely of regrowth with few old trees.

Community 3: *Eucalyptus caliginosa* (Broad-leaved Stringybark) Grassy Forest and Woodland on shallow soil at Imbota

Distribution: found on shallow soils on ridge tops and in sheltered southern facing slopes (Fig. 8).



Fig. 8. Community 3: *Eucalyptus caliginosa* Grassy Forest and Woodland on Shallow Soil

Trees: *Eucalyptus caliginosa*, *Acacia filicifolia*, *Eucalyptus blakelyi*, *Eucalyptus melliodora*, *Eucalyptus viminalis*, *Eucalyptus bridgesiana*, *Acacia implexa*.

Shrubs: *Einadia hastata*, *Cassinia quinquefaria*, *Olearia viscidula*, *Hibbertia obtusifolia*, *Lissanthe strigosa*, *Indigofera australis*, *Lotus cruentus*.

Climbers & trailers: *Desmodium varians*, *Glycine clandestina*.

Ground cover: *Dichondra repens*, *Dichelachne micrantha*, *Goodenia hederacea*, *Senecio diaschides*, *Calotis cuneifolia*, *Poa sieberiana*, *Lagenifera stipitata*, *Echinopogon caespitosus*, *Austroanthonia laevis*, *Themeda australis*, *Scleranthus biflorus*, *Opercularia diphylla*, *Joycea pallida*, *Veronica calycina*, *Oxalis chnoodes*, *Microlaena stipoides*, *Wahlenbergia luteola*, *Lomandra multiflora*, *Gonocarpus teucroides*, *Aristida ramosa*, *Rumex brownii*, *Wahlenbergia planiflora*, *Vittadinia cuneata*, *Desmodium brachypodum*, *Cyperus gracilis*, *Cheilanthes sieberi*, *Carex inversa*, *Ajuga australis*.

Number of taxa per plot: 26–(29)–33.

Notes: as with community 1, this assemblage is dominated by *Eucalyptus caliginosa* which is well reserved across its range. This community is generally separated from community 1 by the sparse ground layer which is often below 50% and a slightly greater representation of shrubs. These changes are likely due to the much shallower soils that often have outcropping surface rocks.

Community 4: *Eucalyptus caliginosa* (Broad-leaved Stringybark) Grassy Forest and Woodland

Distribution: generally on rocky ridges but also on shallower soil areas elsewhere (Fig. 9).

Trees: *Eucalyptus caliginosa*, *Acacia filicifolia*, *Eucalyptus blakelyi*, *Eucalyptus melliodora*, *Eucalyptus bridgesiana*.

Shrubs: *Pultenaea microphylla*, *Lissanthe strigosa*, *Hibbertia obtusifolia*, *Brachyloma daphnoides*, *Cassinia quinquefaria*, *Melichrus urceolatus*, *Indigofera australis*.

Climbers & trailers: *Desmodium varians*, *Glycine tabacina*, *Hardenbergia violacea*, *Glycine clandestina*, *Billardiera scandens*.

Groundcover: *Poa sieberiana*, *Aristida ramosa*, *Dichondra repens*, *Echinopogon caespitosus*, *Oxalis chnoodes*, *Opercularia diphylla*, *Goodenia bellidifolia*, *Wahlenbergia communis*, *Goodenia hederacea*,



Fig. 9. Community 4: *Eucalyptus caliginosa* Forest and Woodland

Dichelachne micrantha, *Themeda australis*, *Microlaena stipoides*, *Lagenifera stipitata*, *Joycea pallida*, *Senecio diaschides*, *Scleranthus biflorus*, *Einadia hastata*, *Ajuga australis*, *Viola betonicifolia*, *Lomandra longifolia*, *Lomandra filiformis*, *Hypericum gramineum*, *Geranium solanderi*, *Chrysocephalum apiculatum*, *Arthropodium milleflorum*, *Acaena novae-zelandiae*.

Number of taxa per plot: 20–(34)–42.

Community 5: *Eucalyptus blakelyi* (Blakely's Red Gum) – *Eucalyptus melliodora* (Yellow Box) Woodlands

Distribution: restricted the lowest lying areas of the reserve along the most incised creek banks (Fig. 10).

Trees: *Eucalyptus blakelyi*, *Eucalyptus melliodora*, *Eucalyptus caliginosa*, *Acacia filicifolia*, *Eucalyptus bridgesiana*, *Acacia implexa*, *Eucalyptus viminalis*.

Shrubs: *Lissanthe strigosa*, *Cassinia quinquefaria*, *Pultenaea microphylla*, *Melichrus urceolatus*, *Lespedeza juncea*.

Climbers & trailers: *Desmodium varians*, *Glycine tabacina*, *Glycine clandestina*.

Groundcover: *Aristida ramosa*, *Poa sieberiana*, *Microlaena stipoides*, *Mentha diemenica*, *Dichondra repens*, *Fimbristylis dichotoma*, *Brachycome heterodonta*, *Vittadinia muelleri*, *Sporobolus creber*, *Geranium solanderi*, *Cheilanthes sieberi*, *Oxalis chnoodes*, *Haloragis heterophylla*, *Dichelachne micrantha*, *Senecio diaschides*, *Chrysocephalum apiculatum*, *Bothriochloa decipiens*, *Viola betonicifolia*, *Phyllanthus virgatus*, *Lagenifera stipitata*, *Hypericum gramineum*, *Hydrocotyle laxiflora*, *Cymbonotus lawsonianus*, *Carex inversa*, *Sorghum leiocladum*, *Rumex brownii*, *Acaena novae-zelandiae*, *Hypoxis hygrometrica*, *Eragrostis molybdea*, *Echinopogon caespitosus*, *Austrodanthonia racemosa*, *Wahlenbergia communis*, *Themeda australis*, *Plantago varia*, *Plantago debilis*, *Cymbopogon refractus*, *Acaena ovina*, *Goodenia hederacea*, *Einadia hastata*, *Austrostipa scabra*, *Desmodium brachypodium*, *Ajuga australis*.

Number of taxa per plot: 34–(44)–59.

Notes: grassy *Eucalyptus blakelyi* and *Eucalyptus melliodora* associations of high conservation concern are poorly represented within the local and state reserve network. The areas in both Imbota and Yina Nature Reserves have been cleared, often heavily in the past, and as such few older trees remain and much of the community is of various stages of recovery.



Fig. 10. Community 5: *Eucalyptus blakelyi* – *Eucalyptus melliodora* Grassy Forest and Woodland

Community 6: *Eucalyptus viminalis* (Manna Gum) – *Eucalyptus nova-anglica* (New England Peppermint) Grassy Forest and Woodland

Distribution: restricted to low-lying creek banks and alluvial flats (Fig. 11).

Trees: *Eucalyptus viminalis*, *Eucalyptus nova-anglica*, *Eucalyptus blakelyi*.

Shrubs: *Pimelea curviflora*, *Bursaria spinosa*, *Phyllanthus virgatus*, *Lissanthe strigosa*, *Lespedeza juncea*.

Climbers & trailers: *Desmodium varians*, *Glycine tabacina*, *Convolvulus erubescens*.

Groundcover: *Poa sieberiana*, *Sporobolus creber*, *Asperula conferta*, *Sorghum leiocladum*, *Fimbristylis dichotoma*, *Epilobium billardierianum*, *Rumex brownii*, *Hypericum gramineum*, *Bothriochloa bladhi*, *Chrysocephalum apiculatum*, *Pennisetum alopecuroides*, *Geranium solanderi*, *Eragrostis molybdea*, *Bothriochloa decipiens*, *Aristida ramosa*, *Viola hederacea*, *Microlaena stipoides*, *Mentha diemenica*, *Hypoxis hygrometrica*, *Hydrocotyle laxiflora*, *Acaena ovina*,



Fig. 11. Community 6: *Eucalyptus viminalis* – *Eucalyptus nova-anglica* Grassy Forest and Woodland

Acaena novae-zelandiae, *Xerochrysum bracteatum*, *Wahlenbergia communis*, *Tricoryne elatior*, *Persicaria hydropiper*, *Oxalis chnoodes*, *Lagenifera stipitata*, *Isolepis gaudichaudiana*, *Haloragis heterophylla*, *Cyperus sphaeroideus*, *Austrodanthonia penicillata*, *Aristida vagans*.

Number of taxa per plot: 25–(29)–32.

Notes: this community of high concern with very little found within conservation reserves. Community 6 was not found within Imbota Nature Reserve and was restricted to a very small area associated with the floodplain of Burying Ground Creek in Yina Nature Reserve.



Fig. 12. Community 7: Riparian Herbfield

Community 7: *Pennisetum alopecuroides* (Swamp Foxtail) – *Rumex brownii* (Dock) Riparian Herbfields

Distribution: restricted riparian areas with occasional sparse trees (Fig. 12).

Trees: *Eucalyptus nova-anglica*, *Eucalyptus viminalis*, *Eucalyptus caliginosa*, *Eucalyptus blakeyi*.

Shrubs: *Lespedeza juncea*, *Callistemon sieberi*.

Climbers & trailers: *Glycine tabacina*, *Desmodium varians*.

Ground cover: *Pennisetum alopecuroides*, *Rumex brownii*, *Paspalum distichum*, *Eleocharis pallens*, *Sporobolus elongatus*, *Persicaria hydropiper*, *Geranium solanderi*, *Epilobium billardierianum*, *Typha orientalis*, *Stackhousia monogyna*, *Senecio bipinnatisectus*, *Scirpus polystachyus*, *Plectranthus graveolens*, *Lomandra longifolia*, *Leptocarpus tenax*, *Dichondra repens*, *Dichanthium sericeum*, *Cynoglossum australe*, *Cymbopogon refractus*, *Chamaesyce drummondii*, *Bothriochloa decipiens*, *Bothriochloa bladhii*, *Asperula conferta*, *Aristida ramosa*, *Acaena novae-zelandiae*, *Wahlenbergia communis*, *Rorippa laciniata*, *Pterostylis* sp., *Pratia pedunculata*, *Poa sieberiana*, *Microlaena stipoides*, *Juncus subsecundus*, *Juncus subglauca*, *Cheilanthes sieberi*, *Ammobium alatum*.

Number of taxa per plot: 45–(47)–49.

Notes: this community is found on the banks of permanent creeks and was restricted to the eastern boundary of Yina Nature Reserve.

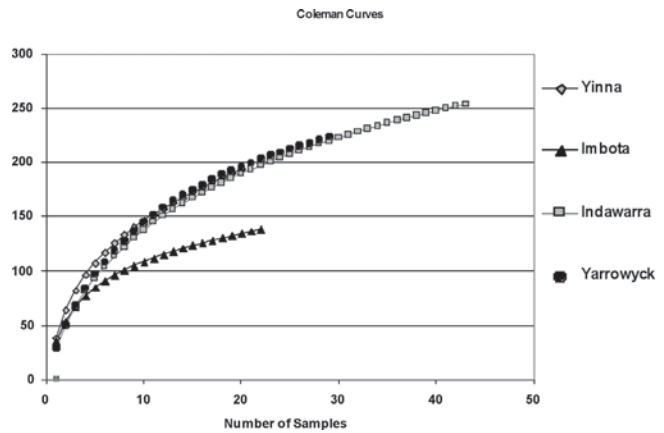


Fig 13. Coleman curves, showing smoothed species accumulation relationships based on 1000 permutations using EstimateS (Colwell 1997). Four small reserves all local to the Armidale area of the Northern Tablelands are compared. Note that Imbota is less diverse than the other three reserves in comparison.

Discussion

The vegetation communities of Imbota and Yina Nature Reserves are broadly similar to many found in the central parts of the NSW Northern Tablelands above 1000 m altitude. The distribution of the seven described assemblages is largely a reflection of topography and drainage.

Though the two reserves share the same rock type, altitude and similar vegetation, Imbota Nature Reserve, with 179 species recorded, is surprisingly poor in the number of species it contains. Yina Nature Reserve which is half the size and a more isolated remnant has more species (209), though the species richness per site is not significantly different (t-test 0.2243). Both reserves were surveyed by the same surveyor under the same intensity and within the same week of the same year.

A comparison of the turnover and overall species richness of the reserve compared to other small reserves in the area (Fig. 13) shows that Imbota has a much lower overall richness and although site richness is not significantly different, turnover certainly is. Thus compared to three other similarly-sized local reserves, Imbota has more uniform floristics between sites. These differences could be explained by the fact that it has less habitat heterogeneity than the three other reserves. For example Yina contains a well-defined watercourse (there is not one in Imbota), and Indawarra and Mt Yarrowyck Nature Reserves both incorporate greater elevation changes (400–500 m). Imbota has also had a greater human impact by the local Armidale community, as access is much easier and available from two public sealed roads on either side of the reserve, whereas access to Yina, Mt Yarrowyck and Indawarra requires access through private land on unsealed roads. Of these two factors, overall habitat heterogeneity and human disturbance, it is likely that the latter, human disturbance, has contributed the greater overall impact at Imbota, and resulted in the lower species richness and turnover.

Under previous management the reserve lands were regularly burnt, grazed and often used for local firewood collection. Only *Ozothamnus adnatus* in Imbota is listed as a significant species with RoTAP (Briggs & Leigh 1996) coding of 3RC– (Copeland & Hunter 1999). Though this species was not found during this investigation, it has been found opportunistically in the past. No listed rare or threatened species were found within Yina Nature Reserve. As this investigation was limited to only a few of survey days it is highly likely that on further investigations a number of additional species may be added, including rare or threatened taxa.

Despite the low number of listed threatened species, the reserves are highly significant as isolated remnants that contain significant vegetation types. In particular Communities 5 and 6 are considered endangered within the district (Benson & Ashby 2000) and are listed on the NSW *Threatened Species Conservation Act 1995* and the Federal *Environmental Protection and Biodiversity Act 1999*. Yina Nature Reserve for example, is almost entirely landlocked by heavily cleared private lands and what remnant vegetation remains in the local vicinity is almost entirely contained within the reserve. The very small size and remnant nature of these two reserves makes them vulnerable to further degeneration unless connectedness to other remnants is assured.

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Appendix 1: Flora of Imbota and Yina Nature Reserves, Armidale NSW

Taxa found within the survey sites are scored according to their occurrence in each of the communities defined. Some taxa were found in previous surveys or opportunistically and therefore are not assigned to a specific community.

Vegetation communities

- 1 = *Eucalyptus caliginosa* Grassy Forest and Woodland on deep soils at Imbota
- 2 = *Eucalyptus viminalis* Grassy Forest and Woodland
- 3 = *Eucalyptus caliginosa* Grassy Forest and Woodland on shallow soils at Imbota
- 4 = *Eucalyptus caliginosa* Grassy Forest and Woodland at Yina
- 5 = *Eucalyptus blakelyi*– *Eucalyptus melliodora* Woodland
- 6 = *Eucalyptus viminalis*– *Eucalyptus nova-anglica* Grassy Forest and Woodland
- 7 = Riparian Herbfields

Nomenclature follows that of Harden (1990–1993) except where recent changes have occurred. Introduced taxa are indicated by *.

FERNS AND ALLIES

Adiantaceae

<i>Adiantum aethiopicum</i>									5
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>									
	1	2	3	4	5				7
<i>Pellaea falcata</i>									5
<i>Pellaea nana</i>									5

Pteridium esculentum

Aspleniaceae

<i>Asplenium flabellifolium</i>									5
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MONOCOTYLEDONS

Anthericaceae

<i>Arthropodium milleflorum</i>									4	5		
<i>Tricoryne elatior</i>									2	4	5	6

Asphodelaceae

<i>Bulbine bulbosa</i>									2	2	2	6
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Cyperaceae

<i>Carex inversa</i>	1	2	3	4	5	
<i>Cyperus eragrostis</i>					5	7
<i>Cyperus gracilis</i>	1		3		5	
<i>Cyperus sanguinolentus</i>						
<i>Cyperus sphaeroideus</i>					6	
<i>Eleocharis pallens</i>						7
<i>Eleocharis sphacelata</i>						
<i>Fimbristylis dichotoma</i>	1	2		4	5	6
<i>Isolepis gaudichaudiana</i>					6	
<i>Lepidosperma laterale</i>			3			
<i>Schoenus ericetorum</i>						
<i>Scirpus polystachyus</i>						7

Hypoxidaceae

<i>Hypoxis hygrometrica</i>		2		4	5	6
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Juncaceae

* <i>Juncus bufonius</i>					6	
<i>Juncus filicaulis</i>	1	2				
<i>Juncus homalocaulis</i>					5	
<i>Juncus remotiflorus</i>					5	
<i>Juncus subglaucus</i>					5	7
<i>Juncus subsecundus</i>					5	7
<i>Luzula flaccida</i>					5	

Lomandraceae

<i>Lomandra filiformis</i>	1			4		
<i>Lomandra filiformis</i> subsp. <i>coriacea</i>				4	5	
<i>Lomandra longifolia</i>	1			4		7
<i>Lomandra multiflora</i> subsp. <i>multiflora</i>	1	2	3	4	5	

Orchidaceae

<i>Pterostylis decurva</i>						7
<i>Pterostylis parviflora</i>					5	

Phormiaceae

<i>Dianella caerulea</i>		2	3	4	5	
<i>Dianella revoluta</i>					5	
<i>Dianella revoluta</i> var. <i>revoluta</i>	1					
<i>Stypandra glauca</i>						

Poaceae

<i>Aira cupaniana</i>					5	6	7
<i>Aristida jerichoensis</i> subsp. <i>subspinulifera</i>	1						
<i>Aristida jerichoensis</i> var. <i>jerichoensis</i>			3				
<i>Aristida ramosa</i> var. <i>speciosa</i>	1	2	3	4	5	6	7
<i>Aristida vagans</i>	1		3			6	
<i>Austrodanthonia induta</i>	1						
<i>Austrodanthonia laevis</i>	1	2	3	4	5		
<i>Austrodanthonia penicillata</i>						6	
<i>Austrodanthonia pilosa</i> var. <i>pilosa</i>	1	2			5		
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>	1						
<i>Austrodanthonia racemosa</i> var. <i>racemosa</i>			3		5		

Austrostipa scabra subsp.

<i>falcata</i>		1	2			5		
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>						5	6	7
<i>Bothriochloa decipiens</i>						5	6	7
<i>Chloris truncata</i>	1					5		
<i>Cymbopogon refractus</i>	1	2		4	5		7	
<i>Cynodon dactylon</i>								
<i>Dactylis glomerata</i>								7
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>	1	2			5		7	
<i>Dichelachne micrantha</i>	1	2	3	4	5			
<i>Echinopogon caespitosus</i> var. <i>caespitosus</i>	1	2	3	4	5			
<i>Echinopogon mckiei</i>	1							
<i>Echinopogon nutans</i> var. <i>nutans</i>		2				5		
<i>Entolasia stricta</i>								
* <i>Eragrostis curvula</i>								7
<i>Eragrostis molybdea</i>	1	2	3		5	6		
* <i>Festuca rubra</i> subsp. <i>rubra</i>								7
<i>Joycea pallida</i>	1		3	4				
<i>Microlaena stipoides</i> var. <i>stipoides</i>	1	2	3	4	5	6	7	
* <i>Nasella trichotoma</i>								
<i>Panicum effusum</i>						5		
<i>Panicum miliaceum</i>		2				5		
<i>Panicum simile</i>						5		
* <i>Paspalum dilatatum</i>	1	2		4	5	6	7	
<i>Paspalum distichum</i>							7	
<i>Pennisetum alopecuroides</i>							6	7
* <i>Phalaris aquatica</i>								7
<i>Setaria gracilis</i>								7
* <i>Setaria pumila</i>						5		
<i>Sorghum leiocladum</i>	1	2	3		5	6		
<i>Sporobolus creber</i>						5	6	
<i>Sporobolus elongatus</i>	1	2			5		7	
<i>Themeda australis</i>	1	2	3	4	5			
* <i>Vulpia bromoides</i>								6

Restionaceae

<i>Leptocarpus tenax</i>								7
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Typhaceae

<i>Typha orientalis</i>								7
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DICOTYLEDONS**Apiaceae**

<i>Hydrocotyle laxiflora</i>	1	2	3	4	5	6		
<i>Hydrocotyle tripartita</i>								
<i>Oreomyrrhis eriopoda</i>						5		

Asteraceae

<i>Ammobium alatum</i>								7
<i>Brachyscome heterodonta</i> var. <i>A</i>						4		
<i>Brachyscome heterodonta</i> var. <i>heterodonta</i>		2				5		

