PROGNOSIS FOR NATIVE PLANTS IN A CANTERBURY PLAINS SITE

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INTRODUCTION

Canterbury Botanical Society Journal 37 contains two somewhat different approaches to restoration of native vegetation in the eastern South Island, one involving a degree of active management (Walker, Lee and Rogers 2003), and the other, on Banks Peninsula, being non-interventionist (Wilson 2003). These articles prompted me to speculate what would happen to our property with little or no intervention.

THE SITE

We are situated on the northern edge of the Canterbury Plains at an altitude of 200 m. Rainfall is about 900mm per year. Normally we get several days a year when temperatures either reach 40°C or fall to -10°C. Our plantings seem to dam cold air at the bottom of the property. Snow lies up to a fortnight a year. On north facing slopes we can grow banana and taro which die down in winter to resprout in spring. Strong desiccating north-west winds are frequent. Some of these nor'-westers bring rain but most of our rain comes from southerlies. We receive fewer easterly winds and more sunshine than nearer the coast.

The site has two terraces separated by a steep escarpment with a 5 m vertical height of 5 m. The soil is Ashley silt loam. There are flat areas with silt about 0.5 m deep but much of the property is gravel. About 1.5 m under the lower terrace there is a layer of hard clay. In places gravel and boulders have been piled up by earth moving machinery.

When I first saw the property in 1968 it was covered in broom (*Cytisis scoparius*), gorse (*Ulex europaeus*) and blackberry (*Rubus fruticosus* agg.). Since then the gorse mite has decimated gorse, and cotoneaster has overtopped the broom in places. Beginning in the early 1970s we have planted many exotic and native plants. There have been energetic but not acrimonious family arguments about planting policy, ranging from 'mongrel

global' to 'local provenance'. Areas of different spheres of influence are apparent.

The pre-European vegetation may have included beech as we have found some burnt logs. The abundance of native earthworms is further evidence for former bush or scrub.

REGENERATION OF NATIVE PLANTS

I confine my attention to species likely to have been here in pre-human times. **List A** contains plants which have almost certainly arrived as seeds or spores from the Ashley River bed or bush remnants north of the river, and survived. The nearest bush remnants are about 0.5 km away, whereas our nearest neighbour, 0.25 km away, has few native plants. **List B** contains plants which have probably grown from seeds or spores of our native plantings and survived.

List A	**Comments**
Asplenium flabellifolium	Semi shade
Botrychium australe	Shade
Coprosma propinqua	
Coprosma linariifolia	
Cordyline australis	
Corybas sp.	Under cotoneaster
Helichrysum lanceolatum	On cliff; smothered by *Muehlenbeckia autralis*
Hydrocotyle heteromeria	Under canopy
Melicytis ramiflorus	Killed by frost when young unless under canopy
Microtis unifolia	Bare ground or thin grass
Muehlenbeckia axillaris	Bare ground or low vegetation
Muehlenbeckia australis	
Muehlenbeckia complexa	Light scrub or tussock
Myrsine australis	Killed by frost when young unless under canopy
Oxalis exilis	Open ground; dies down in drought or frost.
Parsonsia capsularis	

Parsonsia heterophylla	
Pittosporum tenuifolium	
Pseudognaphalium luteoalbum	Bare ground or low vegetation
Pseudopanax crassifolius	
Pteridium esculentum	Excluded from shade.
Solanum laciniatum	Under pine trees

List B

Anaphaliodes bellidioides	Turf
Blechnum penna-marina	Shade
Carex buchananii	Bare ground
Carex comans	Bare ground
Chionochloa rubra	Bare, shaded ground
Clematis paniculata	
Coprosma robusta	Excluded from dry places
Coprosma rugosa	In shaded litter
Elymus solandri	Bare ground, tussock grassland
Geranium sessiliflorum	Bare ground, turf
Hebe stricta	Bare ground, litter
Hydrocotyle novae-zelandiae	Bare ground, turf
Kunzea ericoides	Bare ground
Leptospermum scoparium	Bare ground
Leucopogon fraseri	Bare ground
Lophomyrtus obcordatum	Shade
Microlaena avenacea	Shade
Microlaena polynoda	Shade
Myriophyllum propinquum	Pond
Nothofagus solandri	Bare ground, litter
Olearia avicenniaefolia	Bare ground, rocks
Olearia paniculata	Established in shaded litter
Phymatasorus diversifolius	Shade
Pittosporum eugenioides	Shade
Poa cita	Bare ground, uncompetitive with ryegrass
Potamogeton cheesemanii	Pond
Pratia macrodon	Bare ground, tussock grassland
Pseudopanax arboreus	Shade
Sophora microphylla	Shade, bare ground
Uncinia unciniata	Shade or semi shade

CONCLUSIONS

Had we relied upon species that had arrived without human assistance, I think *Pittosporum tenuifolium* would have succeeded the broom, etc., with *Muehlenbeckia australis* also covering a large proportion of the property. Almost nothing grows under these two species whose surface roots or stems dry out the ground, though I think that *Coprosma propinqua* and cabbage trees would persist.

Seeds or spores produced by our earlier planting programme would see in addition *Nothofagus solandri, Hebe stricta*, *Pseudopanax arboreus*, *P. crassifolius*, *Pittosporum eugenioides*, *Kunzea ericoides, Leptospermum scoparium*, *Lophomyrtus obcordatum*, and *Sophora microphylla.* These woody plants succeed the broom shrubland and could accommodate herbs and ferns listed above.

This overlooks the possibility of non-native invaders. In fact *Clematis vitalba* and *Pittosporum ralphii* would probably preclude the survival of almost any local species except *Pittosporum tenuifolium* and *Muehlenbeckia australis.* We have planted other natives that produced seed but have not as yet noticed any resulting seedlings. We also have a turf garden with a number of mat plants spreading vegetatively. Last beech mast year produced hundreds of beech seedlings but nearly all were eaten by free range chooks (*Gallus gallus gallus*), which perform a useful role by eating weed seedlings such as those of broom as they appear, thereby destroying the broom seed bank. Next beech mast year will be significant as incarceration or genocide will prevent a repetition of the previous disaster.

If the native bush and shrubland that we predict should survive for a century, few if any broom seeds would remain viable. Then if fire swept through I think it probable that kanuka would become dominant, provided that the fire were not too hot and/or nearby plants survived to produce seed to be blown on to the burned area.

Extreme drought would kill *Pseudopanax,* manuka and beech, whereas *Podocarpus totara, P. hallii* and *Prumnopitys taxifolia* would survive provided their roots had reached the clay layer. If viable broom seed remained, broom , being fast growing, would fill the vacant places provided by drought deaths, but the slower-growing kanuka would eventually overtop

and suppress it. These predictions are based on my observations on our property and other sites with similar environmental conditions.

REFERENCES

Walker, S.; Lee, W., Rogers, G. 2003: Restoring indigenous biodiversity in the eastern South Island rainshadow zone. *Proceedings of the 50th Anniversary Symposium. Conserving Native Plants for the 22nd Century. Canterbury Botanical Society Journal 37 – 2003: 48-62.*

Wilson, H. 2003: Nature not nurture; minimum interference manatement and forest restoration on Hinewai Reserve, Banks Peninsula. . *Proceedings of the 50th Anniversary Symposium. Conserving Native Plants for the 22nd Century. Canterbury Botanical Society Journal 37 – 2003: 25 – 41.*

Celmisia gracilenta dainty daisy