Summary of 1999 Lucy Cranwell Project

Title: Vegetation Zonation and History in Whangapoua Estuary Using Pollen Analysis

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1. Fieldwork

Fieldwork at Whangapoua was carried out in December 1999 and again from 21 - 25 February 2000. The first trip made me familiar with the study location. One vegetation transect across the swamp/estuary interface was made, and 30 samples of surface sediments taken for pollen identification. On the second trip five vegetation transects were taken in different area of the swamp, with 5 m x 2 m plots arranged at (usually) 20 m intervals. One hundred and thirty plant species were identified. Species frequency was recorded in 10 subplots within these plots, and a surface sample taken for pollen and analysis. In addition all the transect lines were probed for stratigraphic structure at 25 m or 50 m intervals. Three cores were taken using a D section cover for subsequent pollen analysis. The largest core sampled was 2 m (44 samples).

In addition to the above fieldwork I have carried out palynological analysis from cores collected in other areas of Great Barrier Island in conjunction with Dr. Mark Horrocks. The results presented below are based mainly on the analyses of the first fieldwork data. Data collected on the second fieldwork will be analysed in the same way, but will greatly expand the vegetation types covered.

2. Modern pollen spectra and vegetation in Whangapoua estuary

The vegetation communities are clearly recognized by Detrended Correspond Analysis (DCA) of the 29 plot sites in the first sample set. These vegetation communities are (1) Mangrove, (2) *Apodasmia similis* and *Juncus kraussii* sea rush, (3) *Sarcocornia quinqueflora* sea mat, (4) *Apodasmia similis* and *Baumea juncea* meadow, (5) *Baumea juncea* meadow (6) Dead *Leptospermum* and *Baumea juncea* swamp forest, (7) Live *Leptospermum* swamp forest, (8) Typha swamp, (9) *Plagianthus* coastal scrub, and (10) *Cordyline australis* swamp forest. The TWINSPAN results suggest that ten site groupings (Labeled A. B. C. etc.) can be described in Whangapoua wetland , showing in Fig. 1. The relationships between these sites and plant communities are summarized in Table 1. Fig. 2. also shows nine community types provisionally recognized and their relationships to each other in the first axis of DCA. This first axis is the gradient from salt rush (A) through to fresh- water *Cordyline* swamp scrub (I). Note that mangrove plots J group were excluded due to their clear distinction. The pollen spectra for each plant communities through DCA analysis showed some distinctive vegetation groupings such as *Plagianthus* and *Samolus repens* coastal scrub, *Cordyline australis* swamp forest, with ecological significance can be seen, especially towards the ends of axes (Fig. 3).

The result of the modern surface pollen samples are summarised in the Fig. 4.

The results of TWINSPAN and DCA analysis are shown as follows:

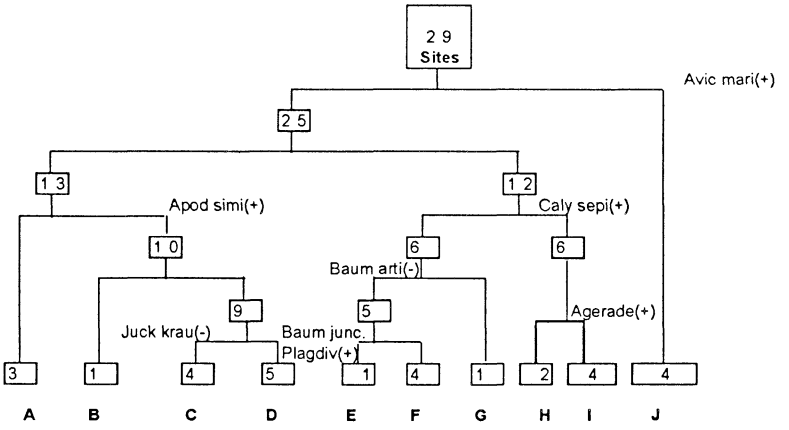

Fig. 1. Modified TWINSPAN dendrogram showing hierarchy of classified sites for Whangapoua Swamp. Values in boxes represent the number of sites at each division. Bolded letters indicate sites groupings.

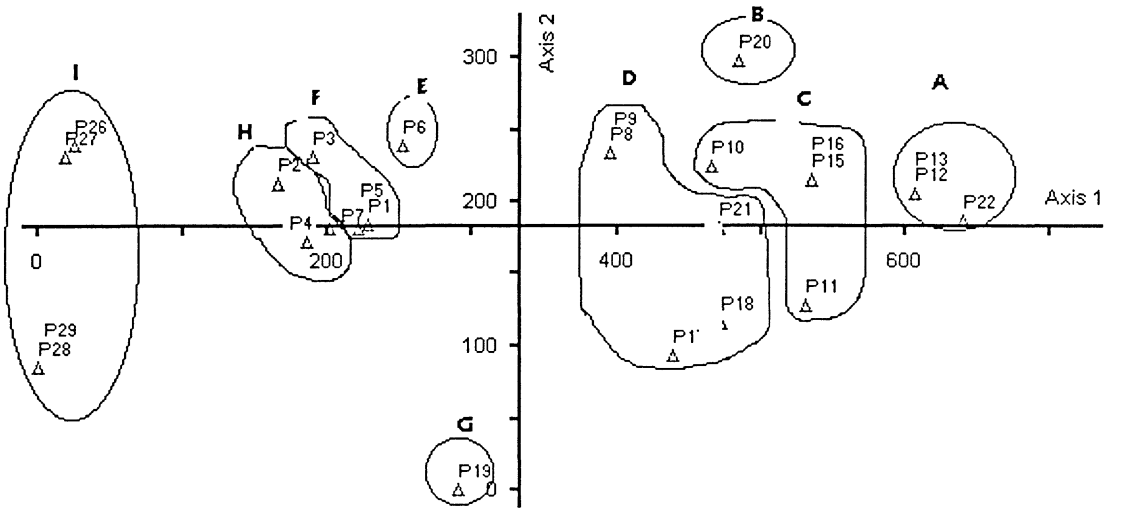

Fig. 2 First two axes of DCA results for 29 sites. Bolded letters represent site groupings assigned in the TWINSPAN classification.

Site groups	Plant communities
A	(2) *Apodasmia similis* and *Juncus kraussii* sea rush (3) *Sarcocornia quinqueflora* sea matt
B	(4) *Apodasmia similis* and *Baumea juncea* meadow
C	(5) *Baumea juncea* meadow (3) *Sarcocornia quinqueflora* sea mat
D	(9) *Plagianthus* coastal scrub
E	(5) *Baumea juncea* meadow
F	(6) Dead *Leptospermum* and *Baumea juncea* swamp forest
G	(8) *Typha* swamp
H	(7) Live *Leptospermum* swamp forest
I	(10) *Cordyline australis* swamp forest

Table 1. The relationships between plant communities and sites

3. Further work

I will be continuing my research on the vegetation succession of Whangapoua wetland for my further study. This work fits into large body of studies of vegetation succession of Great Barrier Island. We now have a Research Permit from the Department of Conservation for coring using a vibra-core at Whangapoua. In November 2000, three to five sediment cores will be taken from major plant communities on a transect line from the seaward to the landward edge of system. Because of the location this work is expensive. I shall continue working at Whangapoua for my doctoral research on "The temporal and spatial features of vegetation in the transition from estuary to fresh water swamp in Whangapoua Estuary". I am grateful for the Lucy Cranwell grant which supported my field work.

Harry Carse's Botanical Observations at Karioitahi

Steve Benham

Having resided at Clarks Beach on the southern shores of the Manukau six years ago now, I have become engrossed in the botany of Karioitahi. This west coast beach is within half an hour's drive of Clarks Beach and was botanised between 1899 and 1902 by Harry Carse, teacher, farmer and botanist; during this time he lived and taught at Mauku, just west of Pukekohe.

I first became aware of this self-taught botanist whilst requesting a search at the AK Herbarium in 1996 for *Gunnera dentata s.lat.* voucher specimens after locating extant populations at Karioitahi. The earliest AK voucher specimen of this taxon was collected by H. Carse in 1899 at "Kariotahi" (sic). Later, I became more familiar with Carse after