

Vegetables, fruits and culinary herbs sold in the Avondale and Otara Markets: a contribution to the ethnobotany of Auckland

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When travelling in foreign countries I usually make a bee-line for the local produce markets to see what is available. Tropical and oriental markets are always colourful, with the various fruits, vegetables, herbs, spices and nuts temptingly displayed. We actually have our own markets right here in Auckland – every Saturday morning at the Otara town centre and every Sunday morning at the Avondale Racecourse. Here you can get a range of fresh, locally-grown Chinese, Thai, Lao and Vietnamese vegetables and culinary herbs, all the familiar and usual fruits and vegetables, some Maori greens such as puha and watercress, and a great array of Pacific Islands fresh produce, much of it from Fiji, but also from Tonga, Samoa, Niue and the Cook Islands.

Some of my favourite Avondale and Otara market vegetables are okra or bindhi (*Abelmoschus esculentus*) mostly brought in from Fiji, though some is being locally grown in glasshouses; kong xin cai or “hollow stem” green (*Ipomoea aquatica*); and the huge Chinese radish or luo bo (*Raphanus sativus*). The Cucurbitaceae are well represented in an amazing variety of weird and wonderful gourds, cucumbers, melons and marrows. Winter melon or dong gua (*Benincasa hispida*), bitter melon or ku gua (*Momordica charantia*), and angled gourd or tauri (*Luffa acutangula*) are three cucurbits regularly on sale. Eggplants likewise come in bewildering variety, with a long, pale purple type from Fiji being most common. The New Zealand-grown variety is plumper in design and almost black in colour.

One of the more bizarre items on sale in April/May is duruka (*Saccharum edule*), a seasonal Fijian delicacy. The aborted inflorescence of this grass remains inside a tight sheath, and is delicious roasted or steamed. Also regularly found are sprigs of gau gei (*Lycium sinense*), the leaves of which add a special flavour to Chinese soups; rice paddy herb or ma hon (*Limnophila aromatica*), delicious in soups and Vietnamese salads; the popular curry leaf (*Murraya koenigii*); and, curiously, young leafy shoots of ipil-ipil (*Leucaena leucocephala*), although the vendor told me they were tha-om which is the name used in Thailand for *Acacia pennata*, the leaves of which are relished in cooking. At 96 Mountain Road, Mangere Bridge, Auckland, there

are three thriving ipil-ipil trees, 3m tall, which flower most of the year. The residents (Thai) said that they bought the seedlings at an Auckland Asian market, and that they eat the young leaves.

Beans are well represented, with green beans (*Phaseolus vulgaris*), hyacinth bean or papri (*Lablab purpureus*), cow pea (*Vigna unguiculata* subsp. *unguiculata*), yard-long bean (*Vigna unguiculata* subsp. *sesquipedalis*), cluster bean (*Cyamopsis tetragonoloba*), and pigeon pea (*Cajanus cajan*) all regularly available.

Instead of the usual cabbage, silverbeet, or spinach, eat some new greens for a change, such as puha, choko tendrils, Malabar spinach, Chinese spinach, chrysanthemum greens, kong xin cai, and pak choy. For flavouring, try fresh curry leaves, greater galangal (*Alpinia galanga*), gau gei, and ma hon. And for a change from potatoes and kumara there is a choice of taro, giant taro (kape), taro tarua, yam and cassava.

Though some of the produce is only seasonally available, a typical offering is likely to include many of the plants listed in the table below. They are listed in alphabetical order by family, and within family. For Chinese vegetables, the common names used by the vendors are generally the Cantonese version. Enjoy a visit to these markets. The atmosphere is colourful and friendly. Just ask – what's this ?, where does it come from? how do you eat it ? how much ? Good hunting--- and eating!



Otara Market. Garlic, tumeric, eggplant, angled luffa or tauri. 17 May 2003.

Latin name	Common name	Family	Origin	Uses
<i>Actinidia deliciosa</i>	kiwifruit, mi hou tao ("monkey peach"). 'Zespri Gold'- yellow, and 'Hayward' – green	Actinidiaceae	local	fresh fruit.
<i>Allium cepa</i>	onion, spring onions	Alliaceae	local	Vegetable
<i>Allium cepa</i> var. <i>aggregatum</i>	shallot, multiplier onion	Alliaceae	local	Vegetable
<i>Allium fistulosum</i>	oriental bunching onion, da cong	Alliaceae	local	Vegetable
<i>Allium porrum</i>	leek	Alliaceae	local	vegetable
<i>Allium sativum</i>	garlic	Alliaceae	imported from China	vegetable, flavouring
<i>Allium tuberosum</i>	Chinese chives, garlic chives, jiu cai	Alliaceae	local	vegetable, flavouring
<i>Amaranthus gangeticus</i> (syn. <i>A. tricolor</i>)	Chinese spinach, xian cai, tampala	Amaranthaceae	local	green vegetable
<i>Amaranthus viridus</i>	green amaranth, churuya, tubua	Amaranthaceae	Fiji	fresh leaves as vegetable
<i>Mangifera indica</i>	mango	Anacardiaceae	imported	fruit, leaves
<i>Anethum graveolens</i>	dill	Apiaceae	local	culinary herb
<i>Apium graveolens</i>	celery	Apiaceae	local	vegetable
<i>Centella asiatica</i>	gotu kola, bua bok	Apiaceae	local	leaves eaten as anti-inflammatory
<i>Coriandrum sativum</i>	coriander, yan sui	Apiaceae	local	culinary herb
<i>Daucus carota</i> subsp. <i>sativus</i>	carrot	Apiaceae	local	vegetable
<i>Eryngium foetidum</i>	eryngo, fitweed, long coriander	Apiaceae	local	culinary herb (Thai, Lao, Vietnamese)
<i>Hydrocotyle umbellatum</i>	water pennywort	Apiaceae	local	green vegetable (raw or cooked)
<i>Pastinaca sativa</i>	parsnip	Apiaceae	local	vegetable
<i>Petroselinum crispum</i> var. <i>crispum</i>	parsley	Apiaceae	local	culinary herb
<i>Petroselinum crispum</i> var. <i>neapolitanum</i>	Italian parsley	Apiaceae	local	culinary herb
<i>Alocasia macrorrhizos</i>	kape, giant taro, ta'amu	Araceae	Tonga	root vegetable
<i>Colocasia esculentum</i>	taro, ndalo ("pink" taro comes from Fiji; "white" taro from Fiji and other Pacific islands)	Araceae	Fiji, Samoa, Tonga, Niue	vegetable (root or green vegetable (leaves))
<i>Xanthosoma sagittifolium</i>	Hong Kong taro, cocoyam, tannia, taro tarua, talo palagi	Araceae	Fiji	edible tubers
<i>Cocos nucifera</i>	coconut	Arecaceae	Fiji	multipurpose
<i>Chrysanthemum coronarium</i>	chrysanthemum greens, tong hao, tong ho, tong cai	Asteraceae	local	green vegetable
<i>Lactuca sativa</i>	lettuce	Asteraceae	local	salad green
<i>Sonchus oleraceus</i>	sow thistle, puha	Asteraceae	local	green vegetable
<i>Basella rubra</i> var. <i>alba</i>	Malabar spinach, slippery vegetable	Basellaceae	local	green vegetable
<i>Brassica juncea</i> var. <i>rugosa</i>	Chinese mustard, kai tsoi, gai choi	Brassicaceae	local	green vegetable, soups
<i>Brassica oleracea</i> var. <i>alboglabra</i>	Chinese broccoli, Chinese kale, gai lan	Brassicaceae	local	green vegetable

<i>Brassica oleracea</i> var. <i>gemmifera</i>	brussels sprouts	Brassicaceae	local	green vegetable
<i>Brassica oleracea</i> var. <i>capitata</i>	cabbage	Brassicaceae	local	green vegetable
<i>Brassica oleracea</i> var. <i>gongylodes</i>	kohlrabi	Brassicaceae	local	swollen turnip-like stem
<i>Brassica oleracea</i> var. <i>italica</i>	broccoli	Brassicaceae	local	green vegetable
<i>Brassica rapa</i> subsp. <i>chinensis</i> var. <i>chinensis</i>	green vegetable, pak choy, qing cai, Shanghai qing, bai cai	Brassicaceae	local	green vegetable
<i>Brassica rapa</i> subsp. <i>chinensis</i> var. <i>parachinensis</i>	choy sum, cai tai, flowering white cabbage	Brassicaceae	local	vegetable (young leafy flower heads)
<i>Brassica rapa</i> subsp. <i>pekinensis</i>	Beijing cabbage, da bai cai, pe tsai	Brassicaceae	local	green vegetable
<i>Brassica rapa</i> var. <i>rapa</i>	turnip, swede	Brassicaceae	local	root vegetable
<i>Brassica rapa</i> var. <i>rosularis</i>	Chinese flat cabbage, rosette pak choy, tat soi, taal goo choy	Brassicaceae	local	green veg.
<i>Raphanus sativus</i>	Chinese radish, luo bo, long white radish, daikon, mooli	Brassicaceae	local	vegetable (raw or cooked)
<i>Raphanus sativus</i>	Chinese turnip, qing luo bo, green radish	Brassicaceae	local	vegetable (cooked)
<i>Rorippa microphylla</i>	watercress	Brassicaceae	local	edible leaves
<i>Ananas comosus</i>	pineapple	Bromeliaceae	various	fruit
<i>Carica papaya</i>	papaya	Caricaceae	Cook Is, Fiji, Tonga	ripe or green fruit, leaves
<i>Beta vulgaris</i> Cicla group	silver beet	Chenopodiaceae	local	green vegetable
<i>Beta vulgaris</i> Crassa group	beetroot	Chenopodiaceae	local	vegetable
<i>Spinacia oleracea</i>	spinach	Chenopodiaceae	local	green veg.
<i>Ipomoea aquatica</i>	water spinach, kong xin cai, ong choy	Convolvulaceae	local	green vegetable
<i>Ipomoea batatas</i>	kumara	Convolvulaceae	local	vegetable
<i>Benincasa hispida</i>	wax gourd, winter melon, Chinese fuzzy gourd, dong gua, mao gua	Cucurbitaceae	local	young fuzzy gourds eaten cooked like a marrow or in soups. Large melons as a vegetable.
<i>Citrullus lanatus</i>	water melon	Cucurbitaceae	local and Fiji	desert fruit
<i>Coccinia grandis</i>	ivy gourd, tindora, kovai fruit, scarlet gourd, hong gua	Cucurbitaceae	Fiji	young leaves, shoots and green fruits as vegetable
<i>Cucumis sativus</i>	cucumber, huang gua (numerous varieties)	Cucurbitaceae	local	vegetable
<i>Cucurbita pepo</i>	kamokamo, marrow, courgette	Cucurbitaceae	local	vegetable (fruit)
<i>Lagenaria siceraria</i>	bottle gourd, hue, hu lu gua	Cucurbitaceae	Fiji	immature fruits eaten as a vegetable, either base-ball bat-shaped, or bottle-shaped.

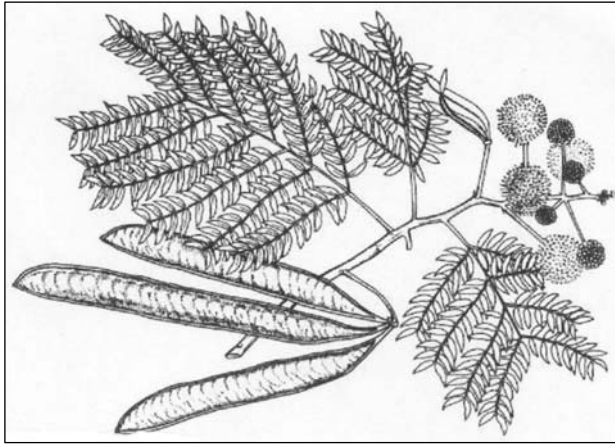
<i>Luffa acutangula</i>	angled loofah, silk melon, ridged gourd, Chinese okra, ling jia si gua, tauri	Cucurbitaceae	Fiji	vegetable (immature fruits)
<i>Luffa cylindrica</i> (syn. <i>L. aegyptica</i>)	smooth loofah, dish cloth gourd, si gua	Cucurbitaceae	Fiji	vegetable (immature fruits)
<i>Momordica charantia</i>	bitter melon, ku gua	Cucurbitaceae	local	vegetable, medicine (fruits), young leaves (green vegetable)
<i>Cucurbita moschata</i>	pumpkin, nan gua	Cucurbitaceae	local	vegetable
<i>Sechium edule</i>	choco	Cucurbitaceae	local	vegetable (fruit), young leaves and tendrils (green vegetable)
<i>Trichosanthes cucumerina</i>	snake gourd	Cucurbitaceae	local	vegetable
<i>Eleocharis dulcis</i>	water chestnut, bi qi, ma tai	Cyperaceae	imported	vegetable
<i>Dioscorea alata</i>	yam, uvi	Dioscoreaceae	Tonga, Fiji, Cook Islands	edible starchy tubers
<i>Diospyros kaki</i>	persimmon	Ebenaceae	local	fresh fruit
<i>Manihot esculenta</i>	cassava, tapioca, manioc	Euphorbiaceae	Fiji, Tonga	edible starchy tubers
<i>Arachis hypogaea</i>	peanut, groundnut	Fabaceae	Fiji	edible nuts
<i>Cajanus cajan</i>	pigeon pea, arhar, dhal	Fabaceae	Fiji	seeds eaten
<i>Cyamopsis tetragonoloba</i> (syn. <i>C. psoraloides</i>)	cluster bean, guar	Fabaceae	Fiji	immature pods and seeds used in curries.
<i>Lablab purpureus</i> (syn. <i>Dolichos lablab</i>)	hyacinth bean, papri, ndralawa, pigs ear, bian dou	Fabaceae	Fiji	leaves and young pods as vegetable
<i>Leucaena leucocephala</i>	ipil-ipil, kra thin thai	Fabaceae	local	young shoots
<i>Phaseolus vulgaris</i>	French bean, dwarf bean	Fabaceae	local, Fiji	vegetable
<i>Pisum sativum</i>	snow pea, xue dou, Holland pea, ho lan dou, mangetout	Fabaceae	local & imported	vegetable (green pods)
<i>Psophocarpus tetragonolobus</i>	winged bean, Goa bean	Fabaceae	Fiji	young pods as vegetable
<i>Tamarindus indica</i>	tamarind	Fabaceae	Thailand (frozen)	Pods
<i>Vigna aconitifolia</i>	moth, moth bean, black-eye bean	Fabaceae	Fiji	young pods as vegetable
<i>Vigna mungo</i>	black gram	Fabaceae	Fiji	seeds boiled and eaten, young pods as vegetable
<i>Vigna radiata</i>	green gram, mung bean	Fabaceae	Fiji	seeds boiled and eaten
<i>Vigna umbellata</i>	rice bean	Fabaceae	Fiji	seeds boiled and eaten, young leaves and pods as vegetable
<i>Vigna unguiculata</i> subsp. <i>unguiculata</i>	cow pea, black-eye pea	Fabaceae	Fiji	Pods and beans edible
<i>Castanea sativa</i>	chestnut	Fagaceae	local	nut

<i>Mentha spicata</i>	spearmint (the common culinary mint)	Lamiaceae	local	culinary herb
<i>Ocimum basilicum</i> var. <i>horapha</i>	Thai sweet basil	Lamiaceae	local	culinary herb
<i>Ocimum canum</i>	lemon basil	Lamiaceae	local	culinary herb (Thai, Vietnamese)
<i>Ocimum gratissimum</i>	shrubby basil, la'au sauga	Lamiaceae	Pacific Is.	leaves as vegetable
<i>Ocimum sanctum</i>	holy basil	Lamiaceae	local	culinary herb (Thai, Vietnamese)
<i>Perilla frutescens</i>	beefsteak plant, shiso	Lamiaceae	local	culinary herb
<i>Persea americana</i>	avocado	Lauraceae	local	savoury fruit
<i>Abelmoschus esculentus</i>	okra, bhindi, gumbo, lady's fingers	Malvaceae	Fiji	vegetable (immature fruit)
<i>Abelmoschus manihot</i> (syn. <i>Hibiscus manihot</i>)	Sunset hibiscus, hibiscus spinach, bush spinach, mbele (Fiji).	Malvaceae	Fiji	edible leaves and shoots.
<i>Hibiscus sabdariffa</i>	roselle, khatta, sour-sour, Indian sorrel	Malvaceae	Fiji	sour, edible leaves and calyces
<i>Azadirachta indica</i>	neem, margosa, sa-dao	Meliaceae	Thailand (frozen)	young flower heads
<i>Artocarpus altilis</i>	breadfruit	Moraceae	Pacific Islands	fruit (used as a vegetable)
<i>Moringa pterygosperma</i> (syn. <i>Moringa oleifera</i>)	Horse-radish tree, drumstick tree	Moringaceae	Fiji	Pods cooked in curries.
<i>Musa x paradisiaca</i> var. <i>paradisiaca</i>	plantain, large cooking banana	Musaceae	Samoa	vegetable
<i>Musa acuminata</i> (sterile triploid)	common or Cavendish banana	Musaceae	Ecuador	fruit (yellow) or vegetable (green)
<i>Musa</i> sp.	banana	Musaceae	Pacific	flowers (as vegetable)
<i>Acca sellowiana</i>	feijoa	Myrtaceae	local	fruit
<i>Limnophila aromatica</i>	rice paddy herb, ngo om, rau om	Orobanchaceae	local	culinary herb (Vietnamese soups)
<i>Piper betel</i>	betel, paan	Piperaceae	Fiji	leaves (chew)
<i>Piper methysticum</i>	kava, yagona	Piperaceae	Fiji	roots (stimulant)
<i>Bambusa oldhamii</i>	Oldham bamboo, green bamboo	Poaceae	local (autumn)	vegetable (bamboo shoots)
<i>Cymbopogon citratus</i>	lemon grass	Poaceae	local	culinary herb
<i>Phyllostachys edulis</i>	moso bamboo	Poaceae	local (spring)	vegetable (bamboo shoots)
<i>Saccharum edule</i>	nduruka, daruka, Fiji "asparagus"	Poaceae	Fiji	immature flower head (inside)
<i>Zea mays</i>	sweet corn	Poaceae	local	vegetable (corn cobs)
<i>Polygonum odoratum</i>	Vietnamese mint	Polygonaceae	local	flavouring
<i>Portulaca oleracea</i>	purslane	Portulacaceae	local	green vegetable
<i>Fragaria x ananassa</i>	strawberry	Rosaceae	local	fruit
<i>Malus pumila</i>	apple	Rosaceae	local	fruit
<i>Pyrus communis</i> var. <i>sativa</i>	pear	Rosaceae	local/imports	fruit

<i>Citrus hystrix</i>	Kaffir lime, rough lemon	Rutaceae	local	aromatic leaves used in Asian cooking, Fruits also available.
<i>Citrus x limon</i>	lemon	Rutaceae	local	fruit
<i>Citrus x aurantifolia</i>	lime	Rutaceae	Fiji	fruit (juice)
<i>Citrus x sinensis</i>	orange	Rutaceae	local	fruit
<i>Citrus reticulata</i>	mandarin	Rutaceae	local	fruit
<i>Murraya koenigii</i>	curry leaf bush, tej pati	Rutaceae	Fiji	leaves (spice)
<i>Capsicum annuum</i>	bell pepper, green capsicum	Solanaceae	local	fruit (vegetable)
<i>Capsicum frutescens</i>	chilli	Solanaceae	local, Fiji	fruit (condiment), leaves
<i>Cyphomandra betacea</i>	tamarillo, tree tomato	Solanaceae	local	fruit
<i>Lycium sinense</i>	Chinese boxthorn, gou qi, gau gei, kau kei	Solanaceae	local	fresh leaves used in soups
<i>Solanum melongena</i> var. <i>esculentum</i>	aubergine, egg plant, qie zi	Solanaceae	local, Fiji	fruit (vegetable)
<i>Solanum tuberosum</i>	potato	Solanaceae	local (Maori potatoes as well as standard commercial varieties)	vegetable (tuber)
<i>Lycopersicon esculentum</i>	tomato	Solanaceae	local	vegetable (fruit)
<i>Vitis vinifera</i>	grape	Vitaceae	local and imported	fruit
<i>Alpinia galanga</i> (syn. <i>Languas galanga</i>)	greater galangal, Siamese ginger	Zingiberaceae	Thailand	condiment, curries
<i>Curcuma domestica</i>	turmeric (red and white)	Zingiberaceae	Fiji	curries, yellow colorant
<i>Zingiber officinale</i>	ginger	Zingiberaceae	Fiji	roots (spice)
<i>Agaricus bisporus</i>	button mushroom	Fungi	local	the common commercial mushroom
<i>Flammulina velutipes</i>	enokitake, jin jun gu, jin shen gu golden needle mushroom	Fungi	local	cultivated fresh mushroom
<i>Pleurotus pulmonarius</i>	grey oyster mushroom, phoenix-tail mushroom, fèngweigu	Fungi	local	cultivated fresh mushroom
<i>Tremella fuciformis</i>	white jelly fungus, silver ear (yin er), white wood-ear (bai mu er)	Fungi	local	cultivated fresh mushroom
<i>Lentinus edodes</i>	shiitake, xianggu	Fungi	local	fresh

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Leucaena leucocephala (Fabaceae: Mimosoideae). A native of Central America but widely grown and naturalised in the tropics including the Pacific. Young shoots are sold as a vegetable in the Avondale Market.



Otara Market. 17 May 2003.



Avondale market. 18 May 2003.



Kaffir lime or rough lemon (*Citrus hystrix*), Avondale market. The leaves give a delicious lemony flavour in Thai soups and curries. 18 May 2003.



Green amaranth, churuya or tubua (*Amaranthus viridis*), a fresh green vegetable available at the Avondale market. 18 May 2003.



Beans from Fiji. Left: cow pea (*Vigna unguiculata* subsp. *unguiculata*). Centre: cluster bean or guar (*Cyamopsis tetragonoloba*). Top right: pigeon pea or dahl (*Cajanus cajan*). Bottom right: hyacinth bean or papri (*Lablab purpureus*). Avondale market. 18 May 2003.



Okra or bhindi (*Abelmoschus esculentus*: Malvaceae). The seed pods are a popular vegetable. Mostly imported from Fiji, but also locally grown in glasshouses. Avondale market. 18 May 2003.



Chinese boxthorn or gau gei (*Lycium sinense*:Solanaceae). The leafy sprigs are locally grown, the leaves being used in Cantonese cooking, especially in soups, Avondale Market. 18 May 2003.



Curry leaf (*Murraya koenigii*: Rutaceae). Avondale Market. The fresh leaves are imported weekly from Fiji and are used in curries and soups. 18 May 2003.



Two culinary herbs of the Apiaceae. Avondale market. Left: water pennywort (*Hydrocotyle umbellata*). Right: eryngo (*Eryngium foetidum*). 18 May 2003.



Rice paddy herb or ngo om (*Limnophila aromatica*: Orobanchaceae). Locally grown by Vietnamese. Avondale market. 18 May 2003.

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Current cruising coconuts: a new record of viable *Cocos nucifera* reaching New Zealand shores, and a brief review of New Zealand drift disseminule literature

Timothy J Martin

Introduction

Ocean dispersed plant parts, including fruits, seeds, and viviparous seedlings, are termed 'drift disseminules' (Smith 1992). Drift disseminules can be categorised as local, originating from a nearby source; refuse, arriving near the place of deposition by human dispersal; and 'peregrine', seeds that truly exhibit long distance oceanic dispersal (Nelson 2000). In terms of ecological significance, the maintenance of seed viability for the duration of the journey is critical, if the movement is to result in successful dispersal for the species involved. Seeds capable of oceanic dispersal while retaining viability are less dense than water, for example by the presence of a fibrous coat or air pockets, and have a tough seed coat that is impermeable to water when intact (Nelson 2000).

The two key vectors of dispersal once a seed has entered a body of water are currents and wind. If a seed floats on or below the water surface, its direction will be primarily determined by current. If a seed rides high in the water, direction will be mainly determined by the prevailing wind direction (Nelson 2000). Whether a seed arrives at its destination viable or not, depends upon the viability period in seawater for the species involved, and the length of time the seed has been in transit. Therefore, the speed of ocean currents and prevailing winds play an important role in oceanic seed dispersal.

Coconut (*Cocos nucifera*) seeds washed up at Takou Bay, Northland

Takou Bay is an exposed sandy beach that lies between the Purerua Peninsula and Matauri Bay in Eastern Northland. The beach faces north east and typically has a well developed strand-line composed of seaweed, driftwood, and human rubbish. The beach also receives a significant amount of locally sourced debris from the Takou River, which enters the sea at the northern end of the beach. During the course of a summer in the late 1990's six coconuts with husk still attached were found along the strand-line at Takou Bay. Any coconuts that were in good condition (not foul smelling or encrusted with barnacles) were collected. The seeds were sown onto the surface of a sandy mix on a heat-pad maintained at c. 30°C. One coconut germinated and has since grown in a greenhouse to c. 2 m tall (AK 257792 TJM 165, Fig. 1). As light frosts occur at Takou Bay during cold winters, the survival of this plant is dependent on greenhouse temperatures. The arrival of a viable coconut on a Northland beach raises the question of its' origin. Coconuts are not grown in New Zealand; therefore the coconut was either discarded locally, or arrived here from a distant source. Experiments on coconuts when floated in saltwater have shown that viability can be maintained under these conditions for c. 100 days (Nelson 2000). Viable coconuts arrive on the shores of

Rodrigues Island in the Indian Ocean, a distance of c.4800 kilometres from the nearest possible source. Dennis and Gunn (1971) claimed that a journey of this distance would take c. 3 – 4 months in several of the worlds' ocean current systems. Dennis and Gunn also noted that c.4800 kilometres appears to be the maximum voyage a coconut can travel while still remaining viable.

Possible origins of North Island drift disseminules

Drift disseminules arriving on New Zealand shores potentially originate from anywhere in the southern Pacific Ocean, including Tonga, Fiji, New Caledonia, Vanuatu, Australia, and possibly even New Guinea and the Solomon Islands (Smith 1990, 1992). The south Equatorial Current moves westward through the Pacific south of the equator, and upon reaching Australia is diverted southwards to become the East Australian Current. The West Wind Drift then sweeps drift disseminules in this current east and north east towards New Zealand (Smith 1990, Smith *et al.* 1990). The most probable source for tropical seeds arriving on the New Zealand coast is therefore the western South Pacific Ocean.