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The Major Invertebrate Pests and Weeds of Agriculture and Plantation Forestry in the Southern and Western Pacific

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Canberra 1997

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Foreword

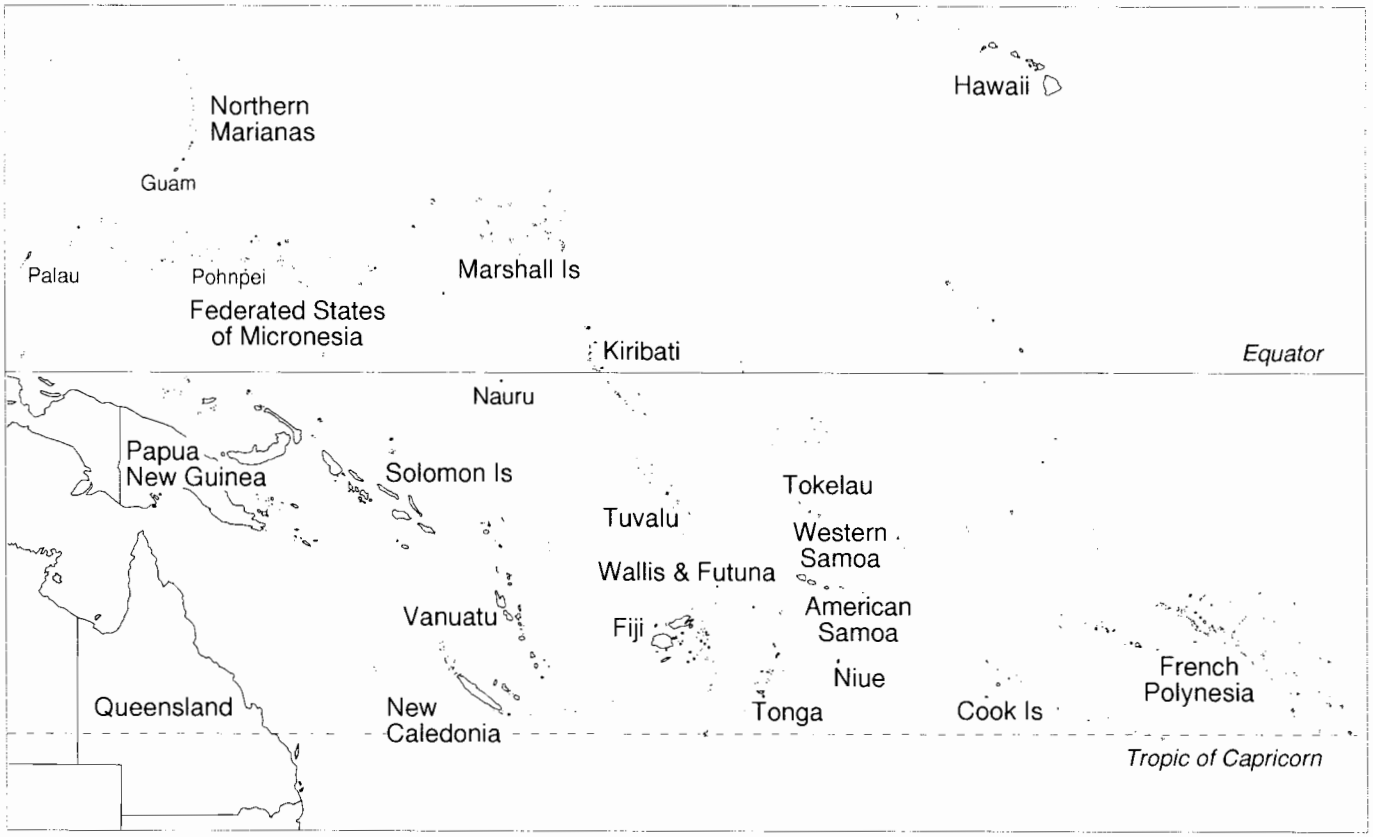
SINCE it was established in 1982, ACIAR has strongly supported sustainable and environmentally friendly crop production and protection. An approach that not only fits perfectly both requirements but leads to increases in the harvest of agricultural products is classical biological control. This form of control has particular relevance to the oceanic Pacific. The majority of the major pests and weeds have been introduced to the region and, for very good reasons, pesticide applications are the least attractive of the various methods of control. It is relevant also that a number of the pests and weeds have already been targets for often successful biological control projects in Hawaii, California, Australia or New Zealand.

The aim of the present monograph is to bring together what is known of the occurrence, distribution and relative importance of the major insect pests and weeds of agriculture and plantation forestry in the oceanic Pacific. Such information is essential if priority is to be given to the selection of the most appropriate regional targets for biological control. A first, somewhat limited survey in 1985 led to the publication by ACIAR of *Biological Control: Pacific Prospects* by D.F. Waterhouse and K.R. Norris, comprising a set of 55 dossiers on major Pacific pests and weeds. This and its two supplements (1989, 1993) providing an additional 11 dossiers, have contributed materially to the current greatly increased biological control activity in the Pacific. To take stock of the position a decade after the first Biological Control Workshop in the Pacific in Tonga, ACIAR commissioned Dr D.F. Waterhouse to undertake a comparative survey of the pests and weeds of agriculture and forest plantations, and their priority ratings. The results are summarised in a series of tables in this volume which is designed to complement ACIAR Monograph 21 (1993), *The Major Pests and Weeds of Agriculture in Southeast Asia: Distribution, Importance and Origin*, also by D.F. Waterhouse.

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Map of the Pacific area, showing the nations involved in the survey

1. Abstract

THE information assembled, and summarised in 22 tables, is intended to provide a database to facilitate the selection of appropriate target pests for classical biological control.

Agricultural experts provided the raw data on the distribution and importance of the pests of most concern to agriculture in the 18 participating nations in the southern and western Pacific. This enabled the identification of 157 major arthropod pests, two molluscs, one crustacean and 142 major weeds of agriculture.

Of the 160 invertebrate pests nominated, a subgroup of 46 species was rated as highly important. The majority of these are believed to be exotic to the region and thus potential targets for classical biological control. Indeed, at least 25 of these species have already been investigated elsewhere and a number of control successes reported. When countries listed their top 10 invertebrate pests in priority order, most species earlier rated as highly important continued to rate highly. The 10 highest-scoring agricultural insect pests were *Bactrocera* spp., *Cosmopolites sordidus*, *Spodoptera litura*, *Aphis gossypii*, *Cylas formicarius*, *Plutella xylostella*, *Crocidolomia pavonana*, *Liriomyza* spp., *Othreis fullonia* and *Helicoverpa armigera*.

Of the 142 major weeds of agriculture, 56 were rated as highly important; and the vast majority of these are believed to be exotic. Four of the 56 have been targets elsewhere in successful or partially successful biological control projects. Information from the aggregated ratings and top 10 weed ratings provided the following highest-scoring weeds: *Cyperus rotundus*, *Lantana camara*, *Mimosa pudica*, *Mimosa invisa*, *Mikania micrantha*, *Stachytarpetha urticifolia*, *Bidens pilosa*, *Bidens alba*, *Eleusine indica* and *Sida rhombifolia*.

Although plantation forestry is in its infancy in most Pacific nations, information available on invertebrate pests and weeds is summarised in the same format as that for agriculture. On the basis of the limited information available, the five most important insect pests [*Crossotarsus externedentatus* (Curculionidae), *Hypsipyla robusta* (Pyralidae), *Uraba lignifera* (Nolidae), *Unaspis citri* (Diaspididae), and *Xyleborus perforans* (Scolytidae)] are exotic to the oceanic Pacific. By far the most important weeds are *Mikania micrantha* (Asteraceae) and *Merremia peltata* (Convolvulaceae), also both exotic to the region.

It is abundantly clear from the information provided that there are many very suitable biological control targets (both arthropod pests and weeds), and that progressive attention to them over coming decades will provide a highly valuable impetus to both agricultural production and plantation forestry in the oceanic Pacific.

2. Introduction

THE aim of this publication is to provide some of the data required to select the most relevant targets for classical biological control in the Pacific. The majority of the invertebrate pests, and almost all the weeds of importance in agriculture and plantation forestry in the oceanic Pacific, have been introduced into the region. Often they have not been accompanied by some of the key natural enemies which help to regulate their abundance in the region where each evolved and where their numbers are generally low. The introduction and establishment of these natural enemies in the Pacific, when it is safe to do so (Waterhouse 1991), is known as classical biological control. When biological control is successful, pest abundance is reduced to a level such that it is unnecessary or uneconomical to adopt any further control measures. Generally, the only requirement then is to avoid the unnecessary use of non-selective pesticides. Classical biological control may resolve the pest problem or it may need to be integrated with other measures.

Since the cost of a biological control project does not depend upon whether the pest is a major or minor one, it is highly desirable to choose a target with care in order, if it is successful, to maximise the economic and/or social returns. Four sets of information are desirable for each potential target pest, with as much precision as possible, so as to provide a basis for establishing priorities for action (Waterhouse and Norris 1987). This information is often a prerequisite for support from not only the government of the country or countries concerned, but especially potential donor agencies.

1. ***Importance to your country of the crop(s) affected***

(a) area of the crop(s)
(b) export value(s)
(c) value as a local staple crop
(d) size of human population affected
(e) proportion of human population affected
(f) social importance of the crop(s)

2. ***Importance to your country of the pest***

(a) estimate of losses — actual, — potential
(b) threshold of economic damage
(c) costs of existing controls
(d) environmental costs
(e) social costs
(f) quarantine considerations, if any

3. ***Biological control***

(a) previous successes against the same target, if any
(b) additional facilities and staff required
(c) estimated cost of a program and proposed country contribution (in kind)
(d) estimated chances of success
(e) conflicts of interest, if any

4. ***Alternative methods of control (Are they effective and economic?)***

(a) chemical control
(b) cultural control
(c) resistant varieties
(d) other methods.

Even in such a country as Australia it is often difficult to obtain reliable figures for some of these categories. Where there has already been successful biological control of a pest (and this applies to a significant number of Pacific pests), the chances are promising to very promising that the success can be repeated, particularly when the climate and other conditions are similar. It is extremely valuable, therefore, to assemble, in a

set of dossiers, information on the prospects for successful biological control of the most important of the potential target pests. Dossiers have now been published for 39 insect pests or groups of closely related pests, one mite, one mollusc and 42 weeds by Waterhouse (1993b, 1994) and Waterhouse and Norris (1987, 1989), and additional dossiers are in press.

An overriding factor in the selection process is whether or not the target is suitable for classical biological control. Suitability is low when little or no damage can be tolerated or when the pest is native. An additional requirement is introduced if it is desirable, or perhaps necessary (as it is in many instances from an aid donor point of view), to select top priority regional targets. To facilitate this process and so that Pacific nations can be better informed of the situation in neighbouring countries (sometimes an issue of quarantine importance), a series of five postal surveys of oceanic Pacific countries (excluding Hawaii) has been carried out commencing in 1985 and repeated in 1989, 1991, 1993 and 1995. Only the 1985 results (Waterhouse 1985; Waterhouse and Norris 1987) have been published.

For all countries in the region where this has been possible, information on the distribution and importance of invertebrate pests and weeds has been generously supplied by plant protection workers (acknowledged in Chapter 3) nominated by their respective directors of agriculture and by forestry authorities. This information has been supplemented in some instances with data from other sources, including the literature. However, the validity of the records and their completeness depend largely upon information supplied by country experts, although this has been cross-checked when possible.

It is probable that there are errors of both omission and commission. Experts within a single country may not agree on the importance of a particular pest, and perceptions change with changes in agricultural practices and in the relative values of the crops affected. As the author I would be most grateful if errors and omissions can be drawn to my attention; also of additional ways in which the information might be assembled, so that it can best serve its main purpose of focusing on promising targets for classical biological control.

Correspondents were asked to supply information on pest seriousness (and distribution) on a very simple rating system (Waterhouse 1993a):

+++	very widespread and very important
++	widespread and important
+	important locally
P	present, but not an important pest
*	one of the top 10 invertebrate pests or top 10 weeds
•	reported in the literature, but importance not known

The entry '•' has been used when the presence of a species in a country is mentioned in the literature, but without sufficient information to assign a rating of '+s'. A blank indicates that there is no information to indicate that the pest is present. Experience has shown that any more sophisticated system than this requires more information than is generally available in most countries and, furthermore, would attempt to achieve a degree of accuracy greater than that required for the present purpose.

Although a simple rating system based on personal assessments of the degree of importance of a pest has a very large subjective component, it nevertheless also contains a quantitative element. In examining whether use can be made of this element, it is necessary to be aware of inherent limitations of the system:

(i) it has only a small number (four) of not-well-separated categories

(ii) although the occurrence of infestation can generally be established fairly accurately, importance is far more difficult to evaluate. It is influenced mainly by cost of existing control measures and by reductions in yield or value of the product

(iii) different experts in a country sometimes rate pests differently, because of varying perceptions of the damage caused.

Nevertheless, some advantages of the system are that it:

(i) requires country experts to attempt a relative value judgment of a large number of pests;
(ii) enables those experts to compare their perceptions with those of nearby countries, in the process exposing real or apparent anomalies whose resolution may be revealing;
(iii) highlights regional problems which may benefit from collaborative action (perhaps with multilateral donor support); and
(iv) directs attention to a pest of particular significance to an individual country, but not to adjacent countries, thereby focusing action on bilateral donor support.

Bearing in mind reservations that arise from the foregoing, it is instructive to examine whether some simple arithmetical clumping of the ratings will assist in a broad stratification of the pest problems in the oceanic Pacific.

In this exercise a political and information bias is introduced. As to the political bias, the ratings for nations small in size and population (e.g. Tuvalu, Tokelau) are given the same weight as those for large nations (e.g. Papua New Guinea, Fiji). As to information bias, the amount of detailed knowledge on pests held by any one of four countries (Guam, Papua New Guinea, Fiji, New Caledonia), possibly exceeds that of the aggregate of information available in the remaining countries.

Because a considerable number of species in some countries were, not surprisingly, assigned a triple-plus rating in the first survey, in later surveys countries were initially asked to place an asterisk against their top 10 invertebrate pests and their top 10 weeds; and, in the latest survey, to perform an even more challenging task, namely, to arrange their selected species in order of importance. The conclusions that can be drawn from this subjective exercise, and also from abstracting from this data information on the top five pests and weeds in each country, are discussed in association with the relevant tables (4, 5, 6, 14, 15, 16). The two approaches reflect somewhat different evaluations made by country experts. The sum of the pluses provides a broad measure of the importance of the pest to the region and is not concerned with whether or not there are other pests also of great importance. The top 10 (and top 5) evaluations attempt to place in priority order the most important pests. Normally these are chosen from pests rating three pluses, of which there are often a considerable number. Indeed, there are 70 different invertebrate pests placed in their top 10 and 44 in their top five by at least one Pacific country (Tables 4, 5) and these (and particularly the latter 44) deserve special consideration.

In many Pacific countries native forests (where they exist: see row 4, Table 20) are being depleted at a rate which is unsustainable. Forestry plantations are thus growing in importance to meet increasing needs for timber and fuel. All countries, and especially those with limited areas available for plantations, will need to maintain losses due to pests and weeds as low as possible if they are to have commercially viable plantations. Some of the tree species in use or undergoing trials are native, but the more important are likely to be exotic. Each of these is liable to attack by damaging insect pests, some of which are potential targets for classical biological control. A few introduced weeds have also emerged as important competitors, particularly in nurseries and young plantations. Very little information is available on the distribution and relative importance of these insect pests and weeds, except for Papua New Guinea, Fiji, Solomon Islands and Guam. What is available is assembled in Tables 9 and 18 as a first step in reviewing their regional importance. It is hoped that this will lead to the progressive filling-in of the many gaps in the data presented. I am most grateful to Dr M.D. Kamath of the Department of Forestry, Fiji for sharing his extensive knowledge of forest insect pests of the region. I would be most grateful for any additional

input that would improve the accuracy and comprehensiveness of the tables.

It is not unusual for some pests to be known under different scientific names in different countries of the region. In such instances a preferred name has been adopted after advice from expert taxonomists and consultation with sources such as Wood (1992) and Zhang (1994). For convenience, alternative names that have been dropped are cross-referenced in the two main tabulations of preferred names, one for arthropods (Table 21), the other for weeds (Table 22). Where a (= ...) appears in relation to a scientific name, the name *not* in brackets is the preferred one for the particular pest species referred to in the Pacific. It is not intended to imply that the two are synonyms, as often they are not.

Country abbreviations used at the top of some tables are:

Co I	Cook Islands
Fij	Fiji
Fr P	French Polynesia
FSM	Federated States of Micronesia
Gua	Guam
Kir	Kiribati
Mar I	Marshall Islands
NCa	New Caledonia
Niu	Niue
Pohn	Pohnpei
PNG	Papua New Guinea
A Sa	American Samoa
W Sa	Western Samoa
So I	Solomon Islands
Tok	Tokelau
Ton	Tonga
Tuv	Tuvalu

3. Contributors

Listed below are contributors to the 1995 survey. Over the previous decade there have also been many others who have generously supplied information from which the current tables have been constructed. I am most grateful to all involved

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4. Results

Table 1 Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
Abroma pumila (Distant)	Hemiptera	Cicadidae		citrus, litchi, mango
Achatina fulica Bowdich	Gasteropoda	Achatinidae	giant African snail	many vegetables and ornamentals
Acria sp.	Lepidoptera	Xylorictidae	oil palm webworm	oil palm
Acrocercops sp.	Lepidoptera	Gracillariidae		sweet potato, phaseolus
Adoretus sinicus Burmeister	Coleoptera	Scarabaeidae	Chinese rose beetle	larvae: roots of many plants adults: leaves of many plants
Adoretus versutus Harold	Coleoptera	Scarabaeidae	rose beetle, Indianrose beetle	as above, especially cocoa and sugarcane
Agonoxena argaula Meyrick	Lepidoptera	Agonoxenidae	coconut flat moth	leaves of coconut and other palms
Agonoxena pyrogramma Meyrick	Lepidoptera	Agonoxenidae	coconut flat moth	as above
Agrius convolvuli (Linnaeus)	Lepidoptera	Sphingidae	sweet potato hawkmoth	sweet potato, taro, beans
Agrotis ipsilon (Hufnagel)	Lepidoptera	Noctuidae	greasy cutworm, black cutworm	polyphagous
Aleurodicus dispersus Russell	Hemiptera	Aleyrodidae	spiraling whitefly	papaya, guava, polyphagous
Aleurotrachelus trachoides (Back)	Hemiptera	Aleyrodidae	chilli whitefly	chilli, taro, tomato, sweet potato
Amblypelta cocophaga China	Hemiptera	Coreidae	fruit spotting bug	coconut, cocoa, rubber, cassava, mango, papaya
Amblypelta lutescens (Distant)	Hemiptera	Coreidae	fruit spotting bug	coconut, cocoa, rubber, cassava, mango, papaya
Amblypelta papuensis	see *A. lutescens*			
Amrasca devastans (Distant)	Hemiptera	Cicadellidae	cotton leafhopper	cotton
Amrasca biguttula	see *A. devastans*			
Aonidiella aurantii (Maskell)	Hemiptera	Diaspididae	California red scale	citrus, breadfruit, coconut, banana, papaya
Aphis craccivora Koch	Hemiptera	Aphididae	cowpea aphid	legumes, citrus, mango, breadfruit
Aphis gossypii Glover	Hemiptera	Aphididae	melon aphid, cotton aphid	cucurbits, Solanaceae, polyphagous
Aspidiella hartii (Cockerell)	Hemiptera	Diaspididae	yam scale	yam, ginger, taro, sweet potato
Aspidiotus destructor Signoret	Hemiptera	Diaspididae	coconut scale, transparent scale	coconut, polyphagous
Aulacophora spp.	Coleoptera	Chrysomelidae	pumpkin beetles	cucurbits
Austracris spp.	Orthoptera	Acrididae	grasshoppers	polyphagous
Axiagastus cambelli Distant	Hemiptera	Pentatomidae	coconut flower bug	coconut
Bactrocera spp.	Diptera	Tephritidae	fruit fly	most fruit, some vegetables
Baeturia papuensis de Boer	Hemiptera	Cicadidae	grass cicada	sugarcane roots, coffee
Bemisia argentifolii Bellows & Perring	Hemiptera	Aleyrodidae	silverleaf whitefly	polyphagous
Bemisia tabaci (Gennadius)	Hemiptera	Aleyrodidae	cotton whitefly, tobacco whitefly	polyphagous
Brachyplatys pacificus Dallas	Hemiptera	Plataspididae	dwarf shield bug	legumes, polyphagous

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
Brevicoryne brassicae (Linnaeus)	Hemiptera	Aphididae	cabbage aphid	Cruciferae
Brontispa longissima (Gestro)	Coleoptera	Chrysomelidae	coconut leaf hispa	coconut
Brontispa mariana Spaeth	Coleoptera	Chrysomelidae	coconut leaf hispa	coconut
Brontispa palauensis (Esaki & Chuju)	Coleoptera	Chrysomelidae	coconut leaf hispa	coconut
Bruchophagus muli Bouček & Brough	Hymenoptera	Eurytomidae	lime gall wasp	citrus
Cassida circumdata (Herbst)	Coleoptera	Chrysomelidae	green tortoise beetle	sweet potato
Cassida compuncta (Boheman)	Coleoptera	Chrysomelidae	tortoise-shell beetle	sweet potato
Ceroplastes rubens Maskell	Hemiptera	Coccidae	pink wax scale	citrus, polyphagous
Chilo terrenellus Pagenstecher	Lepidoptera	Pyralidae	sugarcane internode borer	sugarcane
Chloropulvinaria (= Pulvinaria) psidii (Maskell)	Hemiptera	Coccidae	green shield scale	citrus, coffee, polyphagous
Chrysodeixis eriosoma (Doubleday)	Lepidoptera	Noctuidae	green semi-looper, corn semi-looper	corn, legumes, tomato, capsicum, cabbage
Chrysomphalus aonidum (Linnaeus)	Hemiptera	Diaspididae	purple scale, circular black scale	citrus, coconut, papaya
Coccus celatus De Lotto	Hemiptera	Coccidae	coffee green scale	coffee
Coccus viridis (Green)	Hemiptera	Coccidae	green scale	coffee, polyphagous
Coenobita spp.	(Crustacea)	Coenobitidae	hermit crab	vegetables
Cosmopolites sordidus (Germar)	Coleoptera	Curculionidae	banana weevil borer	banana, sugarcane
Crocidolomia binotalis	see *C. pavonana*			
Crocidolomia pavonana (Geyer)	Lepidoptera	Pyralidae	cabbage cluster caterpillar	cabbage
Cryptophlebia pallimfibriata Bradley	Lepidoptera	Tortricidae	fruit borer	*Inocarpus edulis* (ivi), avocado
Cylas formicarius (Fabricius)	Coleoptera	Apionidae	sweet potato weevil	sweet potato
Deanolis albizonalis (Hampson)	Lepidoptera	Pyralidae	red banded mango borer	mango
Dermolepida nigrum (Nonfried)	Coleoptera	Scarabaeidae		banana leaves
Dialeurodes citrifolii (Morgan)	Hemiptera	Aleyrodidae	cloudy winged whitefly	citrus
Diaphania indica (Saunders)	Lepidoptera	Pyralidae	cucumber moth	cucumber, cotton
Diocalandra taitense (Guérin-Méneville)	Coleoptera	Chrysomelidae	spathe weevil	coconut
Dysmicoccus brevipes (Cockerell)	Hemiptera	Pseudococcidae	pineapple mealybug	pineapple, polyphagous
Dysmicoccus neobrevipes Beardsley	Hemiptera	Pseudococcidae	grey pineapple mealybug	pineapple, banana
Earias fabia	see *E. vittella*			

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
Earias vittella (Fabricius)	Lepidoptera	Noctuidae	rough bollworm, shoot and fruit borer	aibika, okra
Epilachna spp.	Coleoptera	Coccinellidae	leaf-eating ladybirds	legumes, cucurbits, Solanaceae
Epitrix hirtipennis (Melsheimer)	Coleoptera	Chrysomelidae	tobacco flea beetle	tomato, eggplant, potato
Erionota thrax (Linnaeus)	Lepidoptera	Hesperiidae	banana skipper	banana
Eurycantha sp.	Orthoptera	Phasmatidae	oil palm stick insect	oil palm
Euscepes postfasciatus (Fairmaire)	Coleoptera	Curculionidae	Indian sweet potato weevil	sweet potato
Fabrictilis (= Leptoglossus) gonagra (Fabricius)	Hemiptera	Coreidae	squash bug, leaf-footed plant bug	cucurbits, citrus, polyphagous
Furcaspis oceanica Lindinger	Hemiptera	Diaspididae	red coconut scale	coconut, pandanus
Graeffea crouanii (Le Guillou)	Orthoptera	Phasmatidae	coconut stick insect	coconut, pandanus
Halticus tibialis Reuter	Hemiptera	Miridae	sweet potato flea mirid	sweet potato, beans, cucumber
Helicoverpa armigera (Hübner)	Lepidoptera	Noctuidae	cotton bollworm, corn earworm	polyphagous
Heliothis armigera	see *Helicoverpa armigera*			
Hellula spp.	Lepidoptera	Pyralidae	cabbage centre grubs	brassicas
Helopeltis clavifer (Walker)	Hemiptera	Miridae	cocoa mirid	cocoa
Heteropsylla cubana Crawford	Hemiptera	Psyllidae	leucaena psyllid	leucaena
Hippotion celerio (Linnaeus)	Lepidoptera	Sphingidae	taro hawkmoth	taro, sweet potato, tobacco
Homoeosoma sp.	Lepidoptera	Pyralidae		
Hymenia recurvalis (Fabricius)	Lepidoptera	Pyralidae	Hawaiian beet webworm	sweet potato, tomato, corn, silver beet
Hypothenemus hampei (Ferrari)	Coleoptera	Scolytidae	coffee berry borer	coffee
Icerya aegyptiaca (Douglas)	Hemiptera	Margarodidae	breadfruit mealybug	breadfruit
Icerya purchasi Maskell	Hemiptera	Margarodidae	cottony cushion scale	citrus, polyphagous
Icerya seychellarum (Westwood)	Hemiptera	Margarodidae	Seychelles scale	citrus, breadfruit
Laevicaulis alte	(Gasteropoda)		slug	vegetables, garden plants
Lamprosema diemenalis Guenée	Lepidoptera	Pyralidae	bean leafroller	beans, corn
Lamprosema octasema	see *Nacoleia octasema*			
Lepidiota reuleauxi (Brenske)	Coleoptera	Scarabaeidae	white grub	sugarcane roots
Leptocorisa oratorius (Fabricius)	Hemiptera	Alydidae		rice
Leptoglossus gonagra (Fabricius)	see *Fabrictilis gonagra*			
Leptoglossus australis	see *F. gonagra*			

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
Leucoptera spp.	Lepidoptera	Lyonetiidae	winged bean, blotch miner	beans
Lipaphis erysimi (Kaltenbach)	Hemiptera	Aphididae	mustard aphid	cabbage, tomato, radish
Liriomyza spp.	Diptera	Agromyzidae	leaf miners	vegetables
Lygus muiri Poppius	Hemiptera	Miridae		
Mahasena corbetti Tams	Lepidoptera	Psychidae	rough bugworm	oil palm
Marasmia exigua Butler	Lepidoptera	Pyralidae	rice leaf roller	rice
Maruca vitrata (Geyer)	Lepidoptera	Pyralidae	bean podborer	beans, pigeon pea, cowpea
Maruca testulalis	see *M. vitrata*			
Mictis profana (Fabricius)	Hemiptera	Coreidae	crusader bug	pigeon pea, citrus, eggplant
Myndus taffini Bonfils	Hemiptera	Cixiidae	foliar decay leafroller	coconut
Mythimna separata (Howarth)	Lepidoptera	Noctuidae	paddy armyworm	rice, sugarcane, sorghum, corn, tobacco
Myzus persicae (Sulzer)	Hemiptera	Aphididae	green peach aphid	polyphagous
Nacoleia octasema (Meyrick)	Lepidoptera	Pyralidae	banana scab moth	banana, pandanus
Neotermes rainbowi Hill	Isoptera	Kalotermitidae	coconut termite	coconut
Neotermes sp.	Isoptera	Kalotermitidae		tree crops, citrus
Nezara viridula (Linnaeus)	Hemiptera	Pentatomidae	green vegetable bug	vegetables
Nilaparvata lugens (Stål)	Hemiptera	Delphacidae	brown planthopper	rice
Nisotra spp.	Coleoptera	Chrysomelidae	shot hole beetles	aibika
Noorda albizonalis	see *Deanolis albizonalis*			
Ochetomyrmex auropunctata	see *Wasmannia auropunctata*			
Omiodes diemenalis (Guenée)	see *Lamprosema diemenalis*			
Ophiomyia phaseoli (Tryon)	Diptera	Agromyzidae	bean fly	beans
Orchamoplatus mammaeferus Quaintance and Baker	Hemiptera	Aleyrodidae	citrus whitefly	citrus
Oribius spp.	Coleoptera	Curculionidae	shot hole weevils	horticultural crops
Oryctes rhinoceros (Linnaeus)	Coleoptera	Scarabaeidae	rhinoceros beetle	coconut, palms
Ostrinia furnacalis (Guenée)	Lepidoptera	Pyralidae	corn borer	corn, sorghum, sugarcane, ginger
Othreis fullonia (Clerck)	Lepidoptera	Noctuidae	fruit piercing moth	most fruits, some vegetables
Palmicultor palmarum (Ehrhorn)	Hemiptera	Pseudococcidae	coconut mealybug	coconut, betel nut
Pansepta teleturga Meyrick	Lepidoptera	Oecophoridae	cocoa webworm	cocoa
Pantorhytes sp.	Coleoptera	Curculionidae	cocoa weevils	cocoa

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
Papilio polytes Linnaeus	Lepidoptera	Papilionidae	citrus swallowtail	citrus
Papuana sp.	Coleoptera	Scarabaeidae	taro beetle	taro, sweet potato, oil palm, banana
Parlatorius sp.	Hemiptera	Diaspididae	parlatorius scale	
Pentalonia nigronervosa Coquerel	Hemiptera	Aphididae	banana aphid	banana
Pericyma cruegeri (Butler)	Lepidoptera	Noctuidae	poinciana looper	poinciana
Phthorimaea operculella (Zeller)	Lepidoptera	Gelechiidae	potato tuber moth	potato
Phyllocnistis citrella Stainton	Lepidoptera	Gracillariidae	citrus leaf miner	citrus
Phyllocoptrupa oleivora (Ashmead)	Acarina	Eriophyidae	citrus rust mite	citrus
Pinnaspis strachani (Cooley)	Hemiptera	Diaspididae	lesser snow scale	citrus, yam, polyphagous
Planococcus pacificus Cox	Hemiptera	Pseudococcidae	Pacific mealybug	custard apple, cocoa
Plutella xylostella (Linnaeus)	Lepidoptera	Yponomeutidae	diamondback cabbage moth	crucifers
Podagrica (= *Nisotra*) *basselae*	Coleoptera	Chrysomelidae	flea beetle	aibika
Polyphagotarsonemus latus (Banks)	Acarina	Tarsonemidae	broad mite	vegetables, some fruits
Pomacea lineata Wagner	(Gasteropoda)	Ampullariidae	golden apple snail	polyphagous
Prays citri (Milliére)	Lepidoptera	Yponomeutidae	citrus flower moth	citrus
Promecothera opacicollis Gestro	Coleoptera	Chrysomelidae	coconut leaf miner	coconut
Pseudaulacaspis pentagona Targioni-Tozzetti	Hemiptera	Diaspididae	passionfruit scale	passionfruit
Pseudococcus sp.	Hemiptera	Pseudococcidae		
Pseudodioniella pacifica China & Carvalho	Hemiptera	Miridae	cocoa mirid	cocoa
Rhabdoscelus obscurus (Boisduval)	Coleoptera	Curculionidae	sugarcane weevil	sugarcane, coconut, banana
Rhopalosiphum maidis (Fitch)	Hemiptera	Aphididae	maize aphid	corn, banana, sugarcane, sorghum
Rhynchophorus bilineatus (Montrouzier)	Coleoptera	Curculionidae	black palm weevil	coconut
Rhyparidella sobrina (Bryant)	Coleoptera	Chrysomelidae	banana scarring beetle	banana
Riptortus spp.	Hemiptera	Coreidae	bean pod suckers	beans, legumes
Scapanes australis (Boisduval)	Coleoptera	Scarabaeidae	scapanes	coconut, palms
Scirpophaga excerptalis (Walker)	Lepidoptera	Pyralidae	tip shoot borer	mature sugarcane
Segestidea spp.	Orthoptera	Tettigoniidae	coconut tree hoppers	coconut
Selenothrips rubrocinctus (Giard)	Thysanoptera	Thripidae	red banded thrips	mandarin, mango, cocoa, cashew
Sesamia grisescens Warren	Lepidoptera	Noctuidae	pink stem borer	rice, sugarcane
Sessinia livida (Fabricius)	Coleoptera	Oedemeridae	toddy bug, blister beetle	

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
Sogatella furcifera (Horvàth)	Hemiptera	Delphacidae	grass planthopper	rice
Solenopsis geminata (Fabricius)	Hymenoptera	Formicidae	fire ant	(protect honeydew producers)
Spodoptera exempta (Walker)	Lepidoptera	Noctuidae	lawn armyworm	polyphagous
Spodoptera litura (Fabricius)	Lepidoptera	Noctuidae	cluster caterpillar	cabbage, polyphagous
Spodoptera mauritia (Boisduval)	Lepidoptera	Noctuidae	armyworm	rice, corn, sugarcane
Sternochetus mangiferae (Fabricius)	Coleoptera	Curculionidae	mango stone weevil	mango
Syllepte derogata (Fabricius)	Lepidoptera	Pyralidae	aibika leafroller	aibika, okra
Tarophagus colocasiae (Matsumura)	Hemiptera	Delphacidae	taro plant hopper	taro
Tarophagus persephone (Kirkaldy)	Hemiptera	Delphacidae	taro plant hopper	taro
Tarophagus proserpina Kirkaldy	Hemiptera	Delphacidae	taro plant hopper	taro
Tetranychus cinnabarinus Boisduval	Acarina	Tetranychidae	carmine or red spider mite	polyphagous
Tetranychus lambi Pritchard & Baker	Acarina	Tetranychidae	banana spider mite	banana, taro
Tetranychus marianae McGregor	Acarina	Tetranychidae	spider mite	cassava
Tetranychus spp.	Acarina	Tetranychidae		polyphagous
Tetranychus urticae Koch	Acarina	Tetranychidae	two-spotted mite	polyphagous
Thosea spp.	Lepidoptera	Limacodidae	cup moth	polyphagous on tree crops
Thrips palmi Karny	Thysanoptera	Thripidae	melon thrips	polyphagous
Thrips tabaci Lindeman	Thysanoptera	Thripidae	onion thrips	onion
Tirathaba rufivena (Walker)	Lepidoptera	Pyralidae	coconut spathe moth	coconut
Toxoptera aurantii (Boyer de Fonscolombe)	Hemiptera	Aphididae	black citrus aphid	citrus
Trialeurodes vaporariorum (Westwood)	Hemiptera	Aleyrodidae	greenhouse whitefly	cucurbits
Ueana lifuana (Montrouzier)	Hemiptera	Cicadidae		citrus, litchee, mango
Unaspis citri (Comstock)	Hemiptera	Diaspididae	white louse scale, citrus snow scale	citrus
Wasmannia auropunctata (Roger)	Hymenoptera	Formicidae	red fire ant	(protect honeydew producers)
Xyleborus spp.	Coleoptera	Scolytidae	stem borers	cocoa, tree crops

Table 2. The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
Abroma pumila	Cicadidae								++												2	
Achatina fulica	Achatinidae			+	+	P			+++		+++	+	* ++					P	* +++	2	14	31
Acria sp.	Xylorictidae										++										2	
Acrocercops sp.	Gracillariidae		++																		2	
Adoretus sinicus	Scarabaeidae			++		+															3	
Adoretus versutus	Scarabaeidae	* +++	+++	* ++								++	* +++			* +++		P	+	4	17	24
Agonoxena argaula	Agonoxenidae		+		++		* ++		+	* +++		++	+	P	* +	++	* +++	* +++	+	5	22	17
Agonoxena pyrogramma	Agonoxenidae					++				+	P			P			P				3	
Agrius convolvuli	Sphingidae	P	P	P		P	P		+		+		P	P	P	P	P	P			2	
Agrotis ipsilon	Noctuidae	P	+	+			P		P		++			P		P	P	+	P		5	84=
Aleurodicus dispersus	Aleyrodidae	* +++	+++	P	P	P	P	* +++	++		++	+	++	P	* +	+++				3	20	20
Aleurotrachelus trachoides	Aleyrodidae	+++																			3	
Amblypelta cocophaga	Coreidae										++			+++							5	84=
Amblypelta lutescens (= *A. papuensis*)	Coreidae										+++										3	
Amrasca devastans (= *A. biguttula*)	Cicadellidae					++					+++										5	84=
Aonidiella aurantii	Diaspididae	P	P				P	++	++	P	++		P	P		P		+			7	63=
Aphis craccivora	Aphididae	P	* +++	P	++	++	++				++		P	P		P	P	P		1	11	39
Aphis gossypii	Aphididae	++	* +++	++	++	+++	* ++	P	+	++	+	+	++	+	* +	* +++	* ++	* +++	+	6	32	4
Aspidiella hartii	Diaspididae		+++						+					+		+		+			7	63=
Aspidiotus destructor	Diaspididae		+	++	+	+		* +++	+		P	P	P	P		P	* +	++	+	2	13	35
Aulacophora spp.	Chrysomelidae		+++		++	* +++			+++	+	+++	+	+	+		+++		++	* ++	2	25	13

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
Austracis spp.	Acrididae		P						+	P	++			+		P			+		5	84=
Axiagastus cambelli	Pentatomidae										+			+				P			2	
Bactrocera spp.	Tephritidae	* +++	* +++	* +++	* +++	* +++	+		* ++	* +++	* +++	++	* +++	* +++		* +++		* +++	* +++	13	41	1
Baeturia papuensis	Cicadidae										++										2	
Bemisia argentifolii	Aleyrodidae	* +++	†	†		* +++			* +++											3	9	46
Bemisia tabaci	Aleyrodidae		++		* +++	+++	* ++				P								P	3	10	41
Brachyplatys pacificus	Plataspididae		++																		2	
Brevicoryne brassicae	Aphididae		++																		2	
Brontispa longissima	Chrysomelidae			* ++					+++		+++	* +++	++	+++	* +++			* +++	P	4	22	18
Brontispa mariana	Chrysomelidae				++												P				2	
Brontispa palauensis	Chrysomelidae					++															2	
Bruchophagus muli	Eurytomidae										++										2	
Cassida compuncta	Chrysomelidae		++																		2	
Ceroplastes rubens	Coccidae	P	P	+	* +++	P	+		++	P	++		P	P				+		1	10	42
Chilo terrenellus	Pyralidae										+++										3	
Chloropulvinaria (= Pulvinaria) psidii	Coccidae			+	+	+			P	+++	+			+				P			8	53=
Chrysodeixis eriosoma	Noctuidae	P	P	P	++		* ++		+	P	P	P	P		P		P	P	++	1	7	63=
Chrysomphalus aonidum	Diaspididae		P	P	+		P		+	P	P		P				P				2	
Coccus celatus	Coccidae	++									+++							P			5	84=
Coccus viridis	Coccidae	P	P	+	++	++	P		++	+	+++	P	P	P		P	* +++	P	+	1	15	30
Coenobita spp.	Coenobitidae				+		+	P							* +		P		+	1	4	

† Very recently reported

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
Cosmopolites sordidus	Curculionidae	+++	+++	+++	+	+++	P		* +++	* +++	++	* +++	* ++	++		+++		++	++	4	35	2
Crocidolomia pavonana (= *C. binotalis*)	Pyralidae	+++	* +++	++		+++			+	* +++	+++	++	* ++	++		* +++		++		4	29	7
Cryptophlebia pallimfimbriata	Tortricidae		P	++							P										2	
Cylas formicarius	Apionidae	+++	* +++	++	* +++	+++	* ++	P	* ++	++	* +++	P	P	+++		* +++	* ++		P	7	31	5
Deanolis (= *Noorda*) *albizonalis*	Pyralidae										+++										3	
Dermolepida nigrum	Scarabaeidae										++										2	
Dialeurodes citrifolii	Aleyrodidae				++																2	
Diaphania indica	Pyralidae		P	P	++	+	* +++													1	6	70=
Diocalandra taitensis	Chrysomelidae		P	P			++											P			2	
Dysmicoccus brevipes	Pseudococcidae	+++	P	P	++	+++	+		+	++	+	P	+	+	P	P	P	++	P		17	25
Dysmicoccus neobrevipes	Pseudococcidae	P				+	+					P	P								2	
Earias vittella (= *E. fabia*)	Noctuidae	P	+++			+			P	P	+++		P	* +++		P		++		1	12	38
Epilachna spp.	Coccinellidae	* +++	+++	++		P			+	++	* ++	* +++	* +++	++		P		++	+	4	25	12
Epitrix hirtipennis	Chrysomelidae		+++																		3	
Erionota thrax	Hesperiidae					++					++										4	
Eurycantha sp.	Phasmatidae										++										2	
Euscepes postfasciatus	Curculionidae	++	P	++					+++	* +++						* +++	P	* +++		3	16	26
Fabrictilis gonagra	Coreidae	+++		P					+		+++	++	P	P				P			9	48=
Furcaspis oceanica	Coccidae				* +++	++														1	5	77=

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
Graeffea crouanii	Phasmatidae	++	++	P					P	P		* +++	+		* ++	++	P	P		2	12	36=
Halticus tibialis	Miridae				* +++	+++	* +++				+++			+++			P	+		2	16	27
Helicoverpa (= Heliothis) armigera	Noctuidae	+	+++	+	* +++	* +++	+		* +++		++		+	++		* +++	P	++	++	4	27	10
Hellula spp.	Pyralidae		++	P	+	+++			+	+	++	P	++	++	P	P					14	32=
Helopeltis clavifer	Miridae										+++										3	
Heteropsylla cubana	Psyllidae	+	P	P	P	+	P		++	P	+++	P	P	P		P		P	P		7	63=
Hippotion celerio	Sphingidae	+	P	P	P	+	P		+	P	++	++	+	+		+	P	P			10	43=
Homoeosoma sp.	Pyralidae			++																	2	
Hymenia recurvalis	Pyralidae		++																		2	
Hypothenemus hampei	Scolytidae		++	* ++					+++											1	7	59=
Icerya aegyptiaca	Margarodidae				+	+	* +++	* +++												2	8	52
Icerya purchasi	Margarodidae		P	P		P	P		++	++	P			++		P	P				6	72=
Icerya seychellarum	Margarodidae	+	+	++		P	P		+	++	P	P	P	P		P	P	++			9	48=
Laevicaulis alte	Gasteropoda						+	P					+++								4	
Lamprosema diemenalis	Pyralidae	+	P	+					P	P	+			P		P					3	
Lepidiota reuleauxi	Scarabaeidae										++										2	
Leptocorisa oratorius	Alydidae		P		P	P					+++	P									3	
Leucoptera spp.	Lyonetiidae										++										2	
Lipaphis erysimi	Aphididae										++										2	
Liriomyza spp.	Agromyzidae	* +++	+++	* +++	P	+	+		* +++	+++	+	* ++	+++			++		++	++	4	29	7=
Lygus muiri	Miridae		++																		2	
Mahasena corbetti	Psychidae										++										2	
Marasmia exigua	Pyralidae		+++			P								P							3	

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
Maruca vitrata (= *M. testulalis*)	Pyralidae	* +++	* +++	P	* ++	++			++	P	+++	+	+++	+		++		+	+	3	24	14=
Metriona circumdata	Chrysomelidae				* +++	P						P								1	3	
Mictis profana	Coreidae		++																		2	
Myndus taffini	Cixiidae								P									* +++		1	3	
Mythimna separata	Noctuidae		+++						++		+		P	P		P		++			8	53=
Myzus persicae	Aphididae	P	P			P			P		++		P	P							2	
Nacoleia (=Lamprosema) octasema	Pyralidae		+++						+++	+	++	* +++	* +++	+		+++		* +++	++	3	24	14=
Neotermes rainbowi	Kalotermitidae	* +++															* +++			2	6	68=
Neotermes sp.	Kalotermitidae		* +++												P					1	3	
Nezara viridula	Pentatomidae	++	+	++	P	P	+		+	++	++	+	++	P		P		P			14	32=
Nilaparvata lugens	Delphacidae		* +++								++									1	5	77=
Nisotra spp.	Chrysomelidae										+++										3	
Ophiomyia phaseoli	Agromyzidae		++		P	+++					++		+	+		P		P			9	48=
Orchamoplatus mammaeferus	Aleyrodidae	* +++	+									P								1	4	
Oribius spp.	Curculionidae										* +++									1	3	
Oryctes rhinoceros	Scarabaeidae		* +++								P	++	* +++		* +++	++			++	3	15	28
Ostrinia furnacalis	Pyralidae					* +++					+++			P		P			+	1	7	59=

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
Othreis fullonia	Noctuidae		++	P	* +++	* +++			* ++	++	P	* +++	* +++	* +++		* +++		* ++	+	8	27	9
Palmicultor palmarum	Pseudococcidae			P			* ++		P	P						P	++		P	1	4	
Pansepta teleturga	Oecophoridae										++										2	
Pantorhytes sp.	Curculionidae										* +++			P						1	3	
Papilio polytes	Papilionidae				+	+								++							4	
Papuana spp.	Scarabaeidae		* +++				* +		+		* +++			* +++				* +++	++	5	17	24
Parlatorius sp.	Diaspididae	++		P	++														* +++	1	7	59=
Pentalonia nigronervosa	Aphididae	P	+	++	+	+++		P	+	++	P	* +++	+++	P	* +	* +++	* +++	++	+	4	26	11
Pericyma cruegeri	Noctuidae					* +++					+++									1	6	70=
Phthorimaea operculella	Gelechiidae		++	+					++		+							P			6	72=
Phyllocnistis citrella	Gracillariidae		++		++	+				* +++	+++	+++	++	P		P			* ++	2	18	21=
Phyllocoptruta oleivora	Eriophyidae	++	++	++		P			++	+			++					++	+		14	32=
Pinnaspis strachani	Diaspididae	P	P	+		P	P		P	P	P		P	++	P	P	P	* +++	+	1	7	59=
Planococcus pacificus	Pseudococcidae	+	+	P		+	++		P	P	P		P	P	* +		* ++	+++	+	2	12	36=
Plutella xylostella	Yponomeutidae	* ++	* +++	* ++	+	* +++			* +++	* +++	* +++	+	* +++	+		* +++		++	P	9	30	6
Podagrica basselae	Chrysomelidae													* +++						1	3	
Polyphagotarsonemus latus	Tarsonemidae	+++		+	++	+++	P		++	* +++	+		++	+		++		++	++	1	24	16

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
Pomacea lineata	Ampullariidae										++										2	
Prays citri	Yponomeutidae				++																2	
Promecotheca opacicollis	Chrysomelidae													* +++				P		1	3	
Pseudaulacaspis pentagona	Diaspididae		++			P			P		+		P	P		P	P	+	P		4	
Pseudococcus sp.	Pseudococcidae																	P	* +++	1	3	
Pseudodoniella pacifica	Miridae										* +++		+							1	4	
Rhabdoscelus obscurus	Curculionidae	+	P	+		+++			P	P	+++		+	+		P		P			10	43=
Rhopalosiphum maidis	Aphididae	+	+	P		P			P		+		P	P		P		P	+		4	
Rhynchophorus bilineatus	Curculionidae										+++		P	P							3	
Rhyparidella sobrina	Chrysomelidae										++										2	
Riptortus spp.	Coreidae										* +++			+						1	4	
Scapanes australis	Scarabaeidae										* +++			* +++						2	6	68=
Scirpophaga excerptalis	Pyralidae										++										2	
Segestidea spp.	Tettigoniidae										+++				P						3	
Selenothrips rubrocinctus	Thripidae			P	P	P	++				++		++					P			6	72=
Sesamia grisescens	Noctuidae										++								P		2	
Sessinia livida	Oedemeridae			P			++								* +++		P			1	5	77=
Sogatella furcifera	Delphacidae		++																		2	
Solenopsis geminata	Formicidae		P		P	+	+		P								* +++			1	5	77=
Spodoptera exempta	Noctuidae								++	+	++		+	P							6	72=
Spodoptera litura	Noctuidae	++	+	++	++	* +++	+++		++	* +++	+++	* +++	+++	* +++		++		P	++	4	34	3
Spodoptera mauritia	Noctuidae	P	++	P		+++	P		++		+	P	P			P	P	P			8	53=

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
Sternochetus mangiferae	Curculionidae		+++	++		+	P		P								P				6	72=
Syllepte derogata	Pyralidae		+				P				+++			+++							7	63=
*Tarophagus colocasiae***	Delphacidae	+++				+					++			* +++					P	1	9	47
*Tarophagus persephone***	Delphacidae										++			+++							5	84=
*Tarophagus proserpina***	Delphacidae		+++		+				P	++	++	* ++	++			+	* +++	++	* +++	3	21	19
Tetranychus cinnabarinus	Tetranychidae				++	+	P														3	
Tetranychus lambi	Tetranychidae	++	+	+			P		+			+	+					++	++		11	40
Tetranychus marianae	Tetranychidae		++			+	P		+		+	+	+	++				+			10	43=
Tetranychus spp.	Tetranychidae	++		+		+	+				+++			P							8	53=
Tetranychus urticae	Tetranychidae			+				* ++	++											1	5	77=
Thosea spp.	Limacodidae										++										2	
Thrips palmi	Thripidae			* +++		* +++			* +++			+++	++						+	3	15	29
Thrips tabaci	Thripidae	+	P		P	P			P		P		+	+		P		P			3	
Tirathaba rufivena	Pyralidae		++							P	++		P	+	P	P	P	P			5	84=
Toxoptera aurantii	Aphididae	++	+	+	P	++			P		+		+	P		P		P	+		9	48=
Trialeurodes vaporariorum	Aleyrodidae			* +++					++											1	5	77=
Ueana lifuana	Cicadidae								++												2	
Unaspis citri	Diaspididae	+++	+	P		P	P		+++	* ++	++	P	+	+		P		+++	* ++	2	18	21=
Wasmannia auropunctata	Formicidae	++							* ++					P			P		* +++	2	7	58
Xyleborus spp.	Scolytidae		P	* ++			++		P		P			P					+	1	5	77=

** It is probable that clarification is needed of the records for the three *Tarophagus* spp. (Asche and Wilson, 1989).

Table 3 Aggregated ratings of the major invertebrate pests of agriculture in the region.

Order	No. of +s	Pest and + scores	No. times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
		30 and over				
1.	41	*Bactrocera* spp.	13	+	+	+
2.	35	*Cosmopolites sordidus*	4	+	+	+ +
3.	34	*Spodoptera litura*	4	+	–	–
4.	32	*Aphis gossypii*	6	+	+	+ + +
5.	31	*Cylas formicarius*	7	+	–	–
6.	30	*Plutella xylostella*	9	+	+	+ + + +
		25–29				
7. =	29	*Crocidolomia pavonana*	4	+	–	+
7. =	29	*Liriomyza* spp.	4	+	+	+ +
9.	27	*Othreis fullonia*	8	+	+	+ + + +
10.	27	*Helicoverpa armigera*	4	+	+	+
11.	26	*Pentalonia nigronervosa*	4	+	–	+
12.	25	*Epilachna* spp.	4	+	+	+ +
13.	25	*Aulacophora* spp.	2	+	–	–
		20–24				
14. =	24	*Nacoleia octasema*	3	+	+	+ +
14. =	24	*Maruca vittrata*	3	+	–	+
16.	24	*Polyphagotarsonemus latus*	1	+	–	–
17.	22	*Agonoxena argaula*	5	+	+	+ + +
18.	22	*Brontispa longissima*	4	+	+	+ + + +
19.	21	*Tarophagus proserpina*	3	+	–	+ + + +
20.	20	*Aleurodicus dispersus*	3	+	+	+ + + +
		15–19				
21. =	18	*Phyllocnistis citrella*	2	+	+	+ + +
21. =	18	*Unaspis citri*	2	–	+	+ + +
23.	17	*Papuana* spp.	5	+	–	+
24.	17	*Adoretus versutus*	4	+	–	–
25.	17	*Dysmicoccus brevipes*	–	+	+	+ +
26.	16	*Euscepes postfasciatus*	3	–	–	–
27.	16	*Halticus tibialis*	2	–	–	–
28.	15	*Oryctes rhinocerus*	3	+	+	+ + + +
29.	15	*Thrips palmi*	3	(+)[a]	–	–
30.	15	*Coccus viridis*	1	–	?	+ +

[a]Walker 1993.

(cont'd over)

Table 3 (cont'd) Aggregated ratings of the major invertebrate pests of agriculture in the region.

Order	No. of +s	Pest and + scores	No. times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
		10–14				
31.	14	*Achatina fulica*	2	+	+	+ + + +
32.	14	*Phyllocoptrupa oleivora*	–	–	–	–
32. =	14	*Hellula spp.*	–	+	–	–
32. =	14	*Nezara viridula*	–	+	+	+ + + +
35.	13	*Aspidiotus destructor*	2	+	+	+ + + +
36. =	12	*Graeffea crouanii*	2	+	+	+ + +
36. =	12	*Planococcus pacificus*	2	–	–	+
38.	12	*Earias vittella*	1	–	–	–
39.	11	*Aphis craccivora*	1	+	+	+ +
40.	11	*Tetranycus lambi*	–	–	–	–
41.	10	*Bemisia tabaci*	3	(+)[b]	+	+
42.	10	*Ceroplastes rubens*	1	–	+	+ + +
43. =	10	*Hippotion celerio*	–	–	–	–
43. =	10	*Rhabdoscelus obscurus*	–	–	+	+ +
43. =	10	*Tetranycus marianae*	–	–	–	–
		Still invading				
46.	9	*Bemisia argentifolii*	3	(+)[b]	+	+

[b]De Barro 1995.

Table 4

It is desirable to examine the validity of conclusions from the simple rating system (**Table 3**), in which the number of pests to which +++ was assigned was not limited in any one country in any way. The method adopted was to obtain from country experts a list of their top 10 pests in order of importance (**Table 4**) and to assign values as follows:

Priority	1	was assigned a value of	10
	2	"	9
	3	"	8
	4	"	7
	5	"	6
	6	"	5
	7	"	4
	8	"	3
	9	"	2
	10	"	1

These values were then added for each species, to obtain the rating entered in the 'rating' column of **Table 4**. The great majority of the pests with a high rating by this method are the same as those with high scores in **Table 3**, although the order in which they appear differs somewhat. The main difference occurs when at least two countries give a particular pest that has a somewhat limited distribution a very high priority (e.g. *Papuana* sp., *Bemisia argentifolii*). This difference is valuable since it draws attention to the need to give special consideration to such species.

Table 4 The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in top 10).

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
Abroma pumila	Cicadidae												1						1	2	20	16
Achatina fulica	Achatinidae																					
Acria sp.	Xylorictidae																					
Acrocercops sp.	Gracillariidae																					
Adoretus sinicus	Scarabaeidae																					
Adoretus versutus	Scarabaeidae	3		8									9			3				4	16	24=
Agonoxena argaula	Agonoxenidae				3					2					9		3	7		5	31	5
Agonoxena pyrogramma	Agonoxenidae																					
Agrius convolvuli	Sphingidae																					
Agrotis ipsilon	Noctuidae																					
Aleurodicus dispersus	Aleyrodidae	4						3							2					3	16	26
Aleurotrachelus trachoides	Aleyrodidae																					
Amblypelta cocophaga	Coreidae																					
Amblypelta lutescens (= A. papuensis)	Coreidae																					
Amrasca devastans (= A. biguttula)	Cicadellidae																					
Aonidiella aurantii	Diaspididae							4												1	7	39=
Aphis craccivora	Aphididae		10																	1	1	64=
Aphis gossypii	Aphididae		9				9								8	2	9	8		6	21	11
Aspidiella hartii	Diaspididae																					
Aspidiotus destructor	Diaspididae							2									2			2	18	21=
Aulacophora spp.	Chrysomelidae					10													9	2	3	55=
Austracis spp.	Acrididae																					
Axiagastus cambelli	Pentatomidae																					
Bactrocera spp.	Tephritidae	6	2	1	1	1			4	1	2		2	2		1		2	4	13	120	1
Baeturia papuensis	Cicadidae																					
Bemisia argentifolii	Aleyrodidae	1				2			3											3	27	9

Table 4 (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
Bemisia tabaci	Aleyrodidae				10		4													2	8	34
Brachyplatys pacificus	Plataspididae																					
Brevicoryne brassicae	Aphididae																					
Brontispa longissima	Chrysomelidae			6								9			4			6		4	19	17
Brontispa mariana	Chrysomelidae																					
Brontispa palauensis	Chrysomelidae																					
Bruchophagus muli	Eurytomidae																					
Cassida compuncta	Chrysomelidae																					
Ceroplastes rubens	Coccidae				9															1	2	61=
Chilo terrenellus	Pyralidae																					
Chloropulvinaria (= Pulvinaria) psidii	Coccidae																					
Chrysodeixis eriosoma	Noctuidae						5													1	6	44=
Chrysomphalus aonidum	Diaspididae																					
Coccus celatus	Coccidae																					
Coccus viridis	Coccidae																8			1	3	57=
Coenobita spp.	Coenobitidae														10					1	1	63=
Cosmopolites sordidus	Curculionidae								7	6		7	8							4	16	24=
Crocidolomia pavonana (= C. binotalis)	Pyralidae		7							5			7			5				4	20	15
Cryptophlebia pallimfimbriata	Tortricidae																					
Cylas formicarius	Apionidae		10		6		10		9		5					9	10			7	18	19
Deanolis (= Noorda) albizonalis	Pyralidae																					
Dermolepida nigrum	Scarabaeidae																					
Dialeurodes citrifolii	Aleyrodidae																					
Diaphania indica	Pyralidae						6													1	5	49=
Diocalandra taitensis	Chrysomelidae																					

Table 4 (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
Dysmicoccus brevipes	Pseudococcidae																					
Dysmicoccus neobrevipes	Pseudococcidae																					
Earias vittella (= E. fabia)	Noctuidae													6						1	5	49=
Epilachna spp.	Coccinellidae	7									9	5	6							4	17	23
Epitrix hirtipennis	Chrysomelidae																					
Erionota thrax	Hesperiidae																					
Eurycantha sp.	Phasmatidae																					
Euscepes postfasciatus	Curculionidae									8						10		9		3	6	42
Frankliniella occidentalis	Thripidae																					
Furcaspis oceanica	Coccidae				7															1	4	53=
Graeffea crouanii	Phasmatidae											10			3					2	9	30=
Halticus tibialis	Miridae				8		7													2	7	38
Helicoverpa (= Heliothis) armigera	Noctuidae				5	4			8							6				4	21	12=
Hellula spp.	Pyralidae																					
Helopeltis clavifer	Miridae																					
Heteropsylla cubana	Psyllidae																					
Hippotion celerio	Sphingidae																					
Homoeosoma sp.	Pyralidae																					
Hymenia recurvalis	Pyralidae																					
Hypothenemus hampei	Scolytidae			10																1	1	64=
Icerya aegyptiaca	Margarodidae						2	1												2	19	18
Icerya purchasi	Margarodidae																					
Icerya seychellarum	Margarodidae			9																1	2	61=
Laevicaulis alte	Gasteropoda																					
Lamprosema diemenalis	Pyralidae																					
Lepidiota reuleauxi	Scarabaeidae																					
Leptocorisa oratorius	Alydidae																					

Table 4 (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
Leptoglossus gonagra (= L. australis)	Coreidae																					
Leucoptera spp.	Lyonetiidae																					
Lipaphis erysimi	Aphididae																					
Liriomyza spp.	Agromyzidae	8		4					1			4								4	27	7=
Lygus muiri	Miridae																					
Mahasena corbetti	Psychidae																					
Marasmia exigua	Pyralidae																					
Maruca vitrata (= M. testulalis)	Pyralidae	9			10															2	3	55=
Megymenum affine	Pentatomidae																					
Metriona circumdata	Chrysomelidae				4															1	7	39=
Mictis profana	Coreidae																					
Monolepta semiviolacea	Chrysomelidae																					
Myndus taffini	Cixiidae																	10		1	1	64=
Mythimna separata	Noctuidae																					
Myzus persicae	Aphididae																					
Nacoleia (= Lamprosema) octasema	Pyralidae											1	10					4		3	18	20
Neotermes rainbowi	Kalotermitidae	5															1			2	16	27
Neotermes sp.	Kalotermitidae		8																	1	3	57=
Nezara viridula	Pentatomidae																					
Nilaparvata lugens	Delphacidae		5																	1	6	44=
Nisotra spp.	Chrysomelidae																					
Ophiomyia phaseoli	Agromyzidae																					
Orchamoplatus mammaeferus	Aleyrodidae	2																		1	9	33
Oribius spp.	Curculionidae										4									1	7	39=
Oryctes rhinoceros	Scarabaeidae		4										4		1				5	4	30	6
Ostrinia furnacalis	Pyralidae					5														1	6	44=

Table 4 (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
Othreis fullonia	Noctuidae		3		9	9			5			6	3	10		1		3		9	44	4
Palmicultor palmarum	Pseudococcidae						8													1	3	57=
Pansepta teleturga	Oecophoridae																					
Pantorhytes sp.	Curculionidae										8									1	3	57=
Papiliopolytes	Papilionidae																					
Papuana spp.	Scarabaeidae		1				1				1			4				1		5	47	2
Parlatorius sp.	Diaspididae																		10	1	1	64=
Pentalonia nigronervosa	Aphididae											8			5	3	7			4	21	12=
Pericyma cruegeri	Noctuidae					3														1	8	35=
Phthorimaea operculella	Gelechiidae																					
Phyllocnistis citrella	Gracillariidae									3									8	2	11	28=
Phyllocoptruta oleivora	Eriophyidae																					
Pinnaspis strachani	Diaspididae																	5		1	6	41=
Planococcus pacificus	Pseudococcidae														7		4			2	11	28=
Plutella xylostella	Yponomeutidae	10	6	7		6			6	4	6		5			4				9	45	3
Podagrica basselae	Chrysomelidae																					
Polyphagotarsone mus latus	Tarsonemidae									9										1	1	64=
Pomacea lineata	Ampullariidae																					
Prays citri	Yponomeutidae																					
Promecotheca opacicollis	Chrysomelidae													3						1	8	35=
Pseudaulacaspis pentagona	Diaspididae																					
Pseudococcus sp.	Pseudococcidae																		6	1	5	49=
Pseudodoniella pacifica	Miridae										7									1	4	53=
Pulvinaria psidii	Coccidae																					
Rhabdoscelus obscurus	Curculionidae																					
Rhopalosiphum maidis	Aphididae																					

Table 4 (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
Rhynchophorus bilineatus	Curculionidae																					
Rhyparidella sobrina	Chrysomelidae																					
Riptortus spp.	Coreidae										10									1	1	64=
Scapanes australis	Scarabaeidae										3			1						2	18	21=
Scirpophaga excerptalis	Pyralidae																					
Segestidea spp.	Tettigoniidae																					
Selenothrips rubrocinctus	Thripidae																					
Sesamia grisescens	Noctuidae																					
Sessinia livida	Oedemeridae														6					1	5	49=
Sogatella furcifera	Delphacidae																					
Solenopsis geminata	Formicidae															6				1	5	49=
Spodoptera exempta	Noctuidae																					
Spodoptera litura	Noctuidae					7				5		2		8					7	5	26	10
Spodoptera mauritia	Noctuidae																					
Sternochetus mangiferae	Curculionidae																					
Syllepte derogata	Pyralidae																					
Tarophagus colocasiae	Delphacidae																					
Tarophagus persephone	Delphacidae																					
Tarophagus proserpina	Delphacidae											3		7			8		2	4	27	7=
Tetranychus cinnabarinus	Tetranychidae																					
Tetranychus lambi	Tetranychidae																					
Tetranychus marianae	Tetranychidae																					
Tetranychus spp.	Tetranychidae							5												1	6	43=
Tetranychus urticae	Tetranychidae																					
Thosea spp.	Limacodidae																					
Thrips palmi	Thripidae			2		8			2											3	21	14
Thrips tabaci	Thripidae																					
Tirathaba rufivena	Pyralidae																					

Table 4 (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
Toxoptera aurantii	Aphididae																					
Trialeurodes vaporariorum	Aleyrodidae			3																1	8	35=
Ueana lifuana	Cicadidae																					
Unaspis citri	Diaspididae									7				9						2	6	43
Wasmannia auropunctata	Formicidae								10										3	2	9	30=
Xyleborus spp.	Scolytidae			5																1	6	43=

Table 5. Ranking of the top 10 Pacific invertebrate pests, rating more than 10.

Order	Species	Cumulative rating	Number of entries in top 10
1	*Bactrocera* spp.	120	13
2	*Papuana* sp.	47	5
3	*Plutella xylostella*	45	9
4	*Othreis fullonia*	44	9
5	*Agonoxena argaula*	31	5
6	*Oryctes rhinoceros*	30	4
7 =	*Liriomyza* spp.	27	4
7 =	*Tarophagus proserpina*	27	4
9	*Bemisia argentifolii*	27	3
10	*Spodoptera litura*	26	5
11	*Aphis gossypii*	21	6
12 =	*Pentalonia nigronervosa*	21	4
12 =	*Helicoverpa armigera*	21	4
14	*Thrips palmi*	21	3
15	*Crocidolomia pavonana*	20	4
16	*Achatina fulica*	20	2
17	*Brontispa longissima*	19	4
18	*Icerya aegyptiaca*	19	2
19	*Cylas formicarius*	18	7
20	*Nacoleia octasema*	18	3
21 =	*Scapanes australis*	18	2
21 =	*Aspidiotus destructor*	18	2
23	*Epilachna* spp.	17	4
24 =	*Adoretus versutus*	16	4
24 =	*Cosmopolites sordidus*	16	4
26 =	*Aleurodicus dispersus*	16	3
27	*Neotermes rainbowi*	16	2
28 =	*Phyllocnistis citrella*	11	2
28 =	*Planococcus pacificus*	11	2

Table 6

Too much emphasis should not be placed on any one method of evaluating the significance of the subjective opinions of country experts. As a third approach to selecting the pests of greatest concern and as a means of testing the validity of the top 10 selection, the entries for the top five in **Table 4** were considered.

For this exercise,

Priority	1	was assigned a value of	5
	2	"	4
	3	"	3
	4	"	2
	5	"	1

and the values added for each species to obtain its score (**Table 6**).

It is interesting that as many as 44 of the 70 top-10 species appear in the top-5 ratings of at least one country; also that only one species (*Cosmopolites sordidus*) that made the short list of 29 top-10 species (**Table 5**) does not appear in the top-5 list in any country, although it rated very highly overall. It can be seen (from the last column in **Table 6**) that the vast majority of high-rating top-5 species also occupy a similarly high rating in the top-10 list. It is tempting to postulate the reasons for the differences in priority order obtained by the different approaches. However, to do so would probably be to rely on there being a precision in the lists that does not exist. Suffice it to conclude that some 30 major Pacific pests have been identified and that the most important species figure near the top of the rankings by all three methods. Any further narrowing of the choice of target pests must now depend upon taking into account other factors, notably not only those outlined in the Introduction but also on assessment of the prospects for successful biological control, which includes whether or not it has been successful elsewhere.

Table 6 Ranking of the top 5 invertebrate pests of agriculture.

Order	Species	Score	Entries in top 5	Order in top 10
1	*Bactrocera spp.*	55	13	1
2	*Papuana* sp.	22	5	2
3	*Oryctes rhinoceros*	15	4	6
4	*Bemisia argentifolii*	12	3	9
5	*Othreis fullonia*	10	4	4
6	*Agonoxena argaula*	10	3	5
7	*Achatina fulica*	10	2	16
8 =	*Aleurodicus dispersus*	9	3	26
8 =	*Liriomyza spp.*	9	3	7 =
10	*Icerya aegyptiaca*	9	2	18
11	*Tarophagus proserpina*	8	3	7 =
12 =	*Aspidiotus destructor*	8	2	21 =
12 =	*Scapanes australis*	8	2	21 =
12 =	*Thrips palmi*	8	2	14
15	*Nacoleia octasema*	7	2	20
16	*Neotermes rainbowi*	6	2	26 =
17	*Plutella xylostella*	5	3	3
18	*Spodoptera litura*	5	2	10
19	*Pentalonia nigronervosa*	4	2	12 =
20 =	*Aphis gossypii*	4	1	11
20 =	*Orchamoplatus mammaeferus*	4	1	
22	*Helicoverpa armigera*	3	2	12 =
23 =	*Adoretus versutus*	3	1	24 =
23 =	*Graeffea crouanii*	3	1	
23 =	*Phyllocnistis citrella*	3	1	28
23 =	*Pericyma cruegeri*	3	1	
23 =	*Promecotheca opacicollis*	3	1	
23 =	*Trialeurodes vaporariorum*	3	1	
23 =	*Wasmannia auropunctata*	3	1	
30	*Crocidolomia pavonana*	2	2	15
31 =	*Aonidiella aurantii*	2	1	
31 =	*Bemisia tabaci*	2	1	
31 =	*Brontispa longissima*	2	1	17
31 =	*Metriona circumdata*	2	1	
31 =	*Oribius* sp.	2	1	
31 =	*Planococcus pacificus*	2	1	28 =
37 =	*Chrysodeixis eriosoma*	1	1	
37 =	*Cylas formicarius*	1	1	19
37 =	*Epilachna spp.*	1	1	23
37 =	*Nilaparvata lugens*	1	1	
37 =	*Ostrinia furnacalis*	1	1	
37 =	*Pinnaspis strahani*	1	1	
37 =	*Podagrica basselae*	1	1	
37 =	*Xyleborus* sp.	1	1	

Table 7 Forest plantation trees (actual or potential) in the southern and western Pacific (numbers in brackets indicate importance).

Species	Family	Common name	Countries	
			Individual	Overall
Acacia aulacocarpa A. Cunn. ex Benth.	Mimosaceae	hickory wattle	PNG (1)	
Acacia auriculiformis A. Cunn. ex Benth.	Mimosaceae	ear-pod wattle	Guam (3)	+++
Acacia confusa Merrill	Mimosaceae		Guam (1)	
Acacia crassicarpa A. Cunn. ex Benth.	Mimosaceae	lancewood	PNG (1)	+
Acacia mangium Willd.	Mimosaceae	brown sandalwood	Cook I (1); Guam (3); PNG (3); Sol I (3)	+++
Adenanthera pavonina L.	Mimosaceae	red beantree	A Sam (2)	
Agathis macrophylla (Lindl.) Mast.	Araucariaceae	Vanikors kauri	N. Cal (3); PNG (1); Sol I (3); Van (1)	+++
Agathis moorei (Lindl.) Mast.	Araucariaceae		Fr P (1); N. Cal (2); PNG (1)	+
Agathis robusta (C. Moore ex F. Muell.)F.M. Bail.	Araucariaceae		PNG (1); Tonga (2)	
Agathis vitiensis (Seem.) Benth. & Hook. f. ex Drake	Araucariaceae	dakua makadre	Fiji (3)	+++
Albizia sp.	Mimosaceae	albizia	N. Cal (1); Sol I (2)	+
Anthocephalus chinensis (Lam.) A. Rich. ex Walp.	Rubiaceae	laran	Fiji (1)	+
Araucaria cunninghamii Aiton ex D. Don.	Araucariaceae	hoop pine	PNG (3); Sol I (3)	+++
Araucaria hunsteinii K. Schum.	Araucariaceae	klinkii pine	PNG (3); Sol I (3)	+++
Azadirachta indica A. Juss.	Meliaceae	neem	Guam (1); PNG (1)	
Barringtonia asiatica (L.) Kurz	Barringtoniaceae		Fr P (2); Sol I (?)	+
Calophyllum inophyllum L.	Clusiaceae	beach calophyllum, dilo	Guam (1); N. Cal (1); Sol I (1)	
Calophyllum papuanum Laut.	Clusiaceae	calophyllum	PNG (1)	
Calophyllum vitiense Turrill	Clusiaceae	calophyllum, damanu	Fiji (3); Sol I (1)	+++
Campnosperma brevipetiolata Volk.	Anacardiaceae	campnosperma	Sol I (2)	+
Casuarina equisetifolia J.R. & G. Forst.	Casuarinaceae	casuarina, velau	Cook I (1); Fr P (2); Guam (2); Sol I (1)	+
Cedrella odorata L.	Meliaceae		American Samoa (2)	
Cordia alliodora (Ruiz & Pavon) Cham. ex DC	Boraginaceae	salmwood, laurel, cypre	Fiji (1); PNG (2); Sol I (3); Van (1)	+++
Cordia subcordata Lam. & Poiret	Boraginaceae	sea trumpet	Fr P (2)	
Dacrydium nidulum de Laubenfels	Podocarpaceae	yaka	Fiji (3); PNG (1)	++

Table 7 (cont'd) Forest plantation trees (actual or potential) in the southern and western Pacific (numbers in brackets indicate importance).

Species	Family	Common name	Countries	
			Individual	Overall
Decussocarpus vitiensis (Seem.) de Laubenfels	Podocarpaceae	dakua salusalu	Fiji (3)	++
Endospermum macrophyllum (Muell. Arg.) Pax et K. Hoffm.	Euphorbiaceae	kauvula	Fiji (3)	++
Endospermum medullosum L. S. Sm.	Euphorbiaceae	basswood	Sol I (2); Van (3)	++
Eucalyptus deglupta Bl.	Myrtaceae	kamarere	Guam (1); Pohn (1); PNG (2); W. Sam (1); Sol I (3); Van (1)	++
Eucalyptus grandis W. Hill ex Maiden	Myrtaceae	flooded gum, rose gum	PNG (3); Sol I (3)	+++
Eucalyptus pellita F. Muell.	Myrtaceae	red mahogany	W. Sam. (2)	
Eucalyptus robusta Smith	Myrtaceae	swamp mahogany	PNG (3)	+
Eucalyptus terreticornis Smith	Myrtaceae	forest red gum	W. Sam. (2)	
Garcinia myrtifolia A. C. Sm.	Clusiaceae	laubu	Fiji (3)	++
Gmelina arborea L.	Verbenaceae	yemane	Sol I (3)	++
Gmelina vitiensis (Seem) A.C. Sm.	Verbenaceae	rosawa	Fiji (2)	+
Gonystylus punctatus A. C. Sm.	Gonystylaceae	mauota	Fiji (1)	+
Grevillea robusta Cunn. ex R. Br.	Proteaceae	silky oak	N. Cal (1); Tonga (1)	
Heritiera ornithocephala Kosterm.	Sterculiaceae	rogi, rosarosa	Fiji (2)	+
Intsia bijuga (Colebr.) O. Kuntze		ifilele	A. Sam. (2); Guam (1); N. Cal (2)	+
Khaya senegalensis (Desr.) A.H.L. Juss.	Meliaceae	African (Gambian) mahogany	Fr P (1)	+
Maesopsis eminii Engl.	Rhamnaceae		Fiji (1)	
Myristica castaneifolia A. Gray	Myristicaceae	kaudamu	Fiji (3)	++
Ochroma lagopus Sw.	Bombacaceae	balsa	PNG (3)	++
Octomeles (= Erina) sumatrana Mig.	Tetramelaceae		PNG (1)	+
Palaquium hornei (Hartog & Bak.) Dubard	Sapotaceae	sacau	Fiji (2)	+
Palaquium porphyreum A.C. Sm. & S. Darwin	Sapotaceae	bauvudi	Fiji (2)	+
Pinus caribaea Morelet, var *hondurensis* Barrett & Golfarr	Pinaceae	Caribbean pine	Cook I (3); Fiji (2); Fr P (3); N. Cal (3); PNG (1); Sol I (3); Tonga (2); Van (2); W.F. (3)	+++
Pinus chiapensis (L.)	Pinaceae		PNG (2)	+
Pinus elliottii Engelm.	Pinaceae	slash pine	PNG (3)	++

Table 7 (cont'd) Forest plantation trees (actual or potential) in the southern and western Pacific (numbers in brackets indicate importance).

Species	Family	Common name	Countries	
			Individual	Overall
Pinus merkusii Jungh. et De Vriese	Pinaceae	Mindoro pine	PNG (1)	+
Pinus patula Schldl. and Cham.	Pinaceae		Fr P (1), PNG (3); Sol I (3)	+++
Pometia pinnata J. R et G. Forst. f	Sapindaceae	taun	Fr P (2); A. Sam. (2)	++
Pterocarpus indicus Willd.	Papilionaceae	New Guinea rosewood, narra	Guam (3)	
Securinega flexuosa (Muell. Arg.)	Euphorbiaceae	poumuli	A. Sam. (2); W. Sam (3)	+++
Swietenia macrophylla King	Meliaceae	American mahogany	Fiji (3); Fr P (3); Guam (3); Niue (3); Pohn (1); Sol I (3); Tonga (2); W. Sam. (3); Van (1)	+++
Tectona grandis L. f.	Verbenaceae	teak	Fr P (1); Niue (1); PNG (3); Pohn (1); Sol I (3)	+++
Terminalia brassii Exell	Combretaceae	brown terminalia	Fr P (1); PNG (3); Sol I (3)	++
Terminalia calamansanai (Blco.) Rolfe	Combretaceae	yellow-brown terminalia	Sol I (3); W. Sam (2)	+++
Terminalia catappa L.	Combretaceae	Indian almond	Fr P (1); Sol I (1); Van (2)	+
Toona australis (F. Muell.) Harms	Meliaceae	Australian red cedar	Niue (3); W. Sam (1); Sol I (2); Tonga (2)	++

Table 8 The major arthropod pests of plantation forests in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal trees attacked
Acalolepta spp.	Coleoptera	Cerambycidae	longhorn beetles	many species
Acrocercops sp.	Lepidoptera	Gracillariidae		*Terminalia catappa*
Adoxoyphes aurantiana Bradley	Lepidoptera	Tortricidae		*Terminalia, Campnosperma, Calophyllum, Acacia, Albizia*
Adoxoyphes fasciculana (Walker)	Lepidoptera	Tortricidae		*Araucaria cunninghami*
Agathiphaga vitiensis Dumbleton	Lepidoptera	Agathiphagidae		*Agathis macrophylla, A. obtusa, A. vitiensis*
Agrilus opulentus Kerremans	Coleoptera	Buprestidae	varicose borer	*Eucalyptus deglupta*
Agrilus viridissimus Cobos	Coleoptera	Buprestidae		*Terminalia brassii*
Amblypelta cocophaga China	Hemiptera	Coreidae	coconut bug	*Eucalyptus deglupta, Campnosperma brevipetiolata,* coconut
Aonidiella eremocitri McKenzie	Hemiptera	Diaspididae		*Campnosperma brevipetiolata, Barringtonia*
Arispoda sp.	Coleoptera	Chrysomelidae		*Tectona grandis*
Ascalenia sp.	Lepidoptera	Cosmopterigidae		*Albizia, Pometia*
Aspidiotus destructor (Signoret)	Hemiptera	Diaspididae	coconut scale, transparent scale	coconut, *Barringtonia, Calophyllum*
Asterolecanium sp.	Hemiptera	Asterolecaniidae		*Cordia subcordata*
Asterolepis glycera (Meyrick)	Lepidoptera	Tortricidae		*Terminalia*
Asymplecta phobiophora Diakonoff	Lepidoptera	Lyonetiidae		*Campnosperma, Ochroma lagopus, Terminalia*
Badamia exclamationis (Fabricius)	Lepidoptera	Hesperiidae	brown awl	*Terminalia calamansanai T. catappa, T. brassii*
Ceroplastes rubens Maskell	Hemiptera	Coccidae	pink wax scale	*Pinus caribaea, Barringtonia*
Chrysomphalus aonidum (Linnaeus)	Hemiptera	Diaspididae	circular black scale	*Pinus caribaea*
Chrysomphalus dictyospermi Morgan	Hemiptera	Diaspididae	dictyospera scale	*Pinus, Calophyllum, Terminalia, Barringtonia*
Coccus hesperidum Linnaeus	Hemiptera	Coccidae	soft brown scale	*Eucalyptus, Cordia, Casuarina, Pinus, Terminalia, Pometia*
Coptotermes elisae (Desneaux)	Isoptera	Rhinotermitidae		*Araucaria cunninghamii, A. hunsteinii*
Crossotarsus externedentatus (Fairmaire)	Coleoptera	Platypodidae		*Swietenia, Cordia, Terminalia, Eucalyptus,* etc.
Cyphura bifasciata (Butler)	Lepidoptera	Uraniidae		Endospermum
Diotimana undulata (Pascoe)	Coleoptera	Cerambycidae	hoop-pine longicorn	*Araucaria cunninghamii*
Eriophyes casuarina Channabasavanna	(Acari)	Eriophyiidae		*Casuarina equisetifolia*
Eriophyes terminaliae Channabasavanna	(Acari)	Eriophyiidae		*Terminalia catappa*

Table 8 (cont'd) The major arthropod pests of plantation forests in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal trees attacked
Eucerocoris sp.	Hemiptera	Miridae		*Campnosperma*
Fabrictilis australis (Fabricius)	Hemiptera	Coreidae		*Araucaria, Eucalyptus, Tectona*
Fabrictilis gonagra (Fabricius)	Hemiptera	Coreidae	passionvine bug	*Tectona grandis*
Gryllotalpa africana Beauvois	Orthoptera	Gryllotalpidae		*Tectona grandis*
Homona coffearia (Nietner)	Lepidoptera	Tortricidae	tea tortrix, coffee tortrix	*Acacia, Araucaria, Terminalia*
Hyblaea puera (Cramer)	Lepidoptera	Hyblaeidae	teak moth	*Tectona grandis, Spathodea*
Hyblaea sanguinea Gaede	Lepidoptera	Hyblaeidae		*Tectona grandis, Vitex*
Hylurdrectonus araucariae Schedl	Coleoptera	Scolytidae		*Araucaria cunninghamii*
Hylurdrectonus piniarius Schedl	Coleoptera	Scolytidae	hoop-pine bark beetle	*Araucaria cunninghami*
Hypothenemus birmanus (Eichhoff)	Coleoptera	Scolytidae	kiawe scolytid	*Swietenia, Agathis, Casuarina*
Hypothenemus eruditus (Westwood)	Coleoptera	Scolytidae		*Swietenia, Tectona, Pterocarpus*
Hypsipyla robusta (Moore)	Lepidoptera	Pyralidae	cedar shoot caterpillar	*Swietenia, Toona, Cedrela*
Icerya purchasi Maskell	Hemiptera	Margarodidae	cottony cushion scale	*Casuarina equisetifolia, Pinus caribaea*
Icerya seychellarum (Westwood)	Hemiptera	Margarodidae	Seychelles mealybug	*Ficus, Albizia, Calophyllum, Tectona*
Ips sp.	Coleoptera	Scolytidae		
Leptynoptera sulfurea Crawford	Hemiptera	Psyllidae		*Calophyllum inophyllum*
Lymantria flavoneura Joicey	Lepidoptera	Lymantriidae		*Pinus patula*
Lymantria ninayi Bethune-Baker	Lepidoptera	Lymantriidae		*Pinus patula, P. radiata*
Microcerotermes biroi (Desneaux)	Isoptera	Termitidae		*Eucalyptus deglupta, Araucaria*
Mictis profana (Fabricius)	Hemiptera	Coreidae	crusader bug	*Acacia aulacocarpa*
Milionia isodoxa Prout	Lepidoptera	Geometridae		*Araucaria cunninghamii*
Mussidia pectinicornela Hampson	Lepidoptera	Pyralidae		*Eucalyptus grandis*
Nasutitermes novarum-hebridarum (Holmgren and Holmgren)	Isoptera	Termitidae		*Eucalyptus deglupta, Tectona, Acacia mangium*
Neotermes sp.	Isoptera	Kalotermitidae		*Calophyllum, Garcinia, Gonostylus, Heritiera, Myristica, Palaquium, Swietenia*
Oceanaspidiotus araucariae (Adachi and Fullaway)	Hemiptera	Diaspididae		*Araucaria cookii*
Ophiusa coronata (Fabricius)	Lepidoptera	Noctuidae		*Terminalia*

Table 8 (cont'd) The major arthropod pests of plantation forests in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal trees attacked
Oribius destructor Marshall	Coleoptera	Curculionidae		*Eucalyptus deglupta, Araucaria cunninghamii*
Oribius inimicus Marshall	Coleoptera	Curculionidae		*Eucalyptus deglupta, Araucaria, Pinus*
Orthotomicus erosus (Wollaston)	Coleoptera	Scolytidae		*Pinus*
Oxymagis horni (Heller)	Coleoptera	Cerambycidae		*Eucalyptus deglupta, Terminalia calamansanai, Albizia, Gmelina, etc.*
Pachypeltis sp.	Hemiptera	Miridae		*Terminalia*
Pantorhytes sp.	Coleoptera	Curculionidae		*Ochroma lagopus*
Paratella errudita Melichar	Hemiptera	Flatidae		*Eucalyptus deglupta*
Parectopa sp.	Lepidoptera	Gracillariidae		*Terminalia catappa*
Phytorus lineolatus Weise	Coleoptera	Chrysomelidae		*Calophyllum inophyllum*
Pinnaspis aspidistrae (Signoret)	Hemiptera	Diaspididae	fern scale	*Anacardium occidentale, Terminalia catappa*
Pinnaspis strachani (Cooley)	Hemiptera	Diaspididae		*Terminalia*, coconut
Planococcus lilacinus (Cockerell)	Hemiptera	Pseudococcidae	coffee mealybug	*Terminalia catappa*
Platypus gerstaeckeri Chapuis	Coleoptera	Platypodidae		*Swietenia macrophylla, Agathis, Calophyllum, Endospermum, Garcinia, Gonostylus, Heritiera, Myristica, Palaquium*, etc.
Platypus jansoni Chapuis	Coleoptera	Platypodidae		*Agathis, Araucaria*
Pternistria levipes Horvàth	Hemiptera	Coreidae		*Tectona grandis*
Pternistria macromera Guerin	Hemiptera	Coreidae		*Tectona grandis*
Ptochophyle innotata Warren	Lepidoptera	Geometridae		*Terminalia calamansanai*
Ptochophyle strigata Warren	Lepidoptera	Geometridae		*Terminalia brassi*
Rhyparida coriacea Jacoby	Coleoptera	Chrysomelidae		*Eucalyptus deglupta*
Saissetia coffeae (Walker)	Hemiptera	Coccidae	coffee scale	*Barringtonia*
Saissetia oleae (Olivier)	Hemiptera	Coccidae	black scale	*Erythrina*
Selenothrips rubrocinctus Giard	Thysanoptera	Thripidae	redbanded thrips	*Terminalia catappa*
Semiothisa abydata (Guenée)	Lepidoptera	Geometridae		*Albizia*
Syllepte derogata (Fabricius)	Lepidoptera	Pyralidae		*Campnosperma brevipetiolata, Ochroma lagopus*
Trigonops sp.	Coleoptera	Curculionidae		*Terminalia, Gmelina, Swietenia, Horsfieldia*
Trigonops inusitata Zimmerman	Coleoptera	Curculionidae		*Calophyllum inophyllum*
Trigonops vulgaris Zimmerman	Coleoptera	Curculionidae		*Terminalia catappa*

Table 8 (cont'd) The major arthropod pests of plantation forests in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal trees attacked
Unaspis citri (Comstock)	Hemiptera	Diaspididae	white louse scale, citrus snow scale	*Toona australis*
Uraba (=*Roeselia*) *lignifera* (Walker)	Lepidoptera	Nolidae		*Terminalia*
Urapteroides astheniata (Guenée)	Lepidoptera	Uraniidae		*Endospermum*
Vanapa oberthuri Pouillaude	Coleoptera	Curculionidae		*Araucaria cunninghamii*
Wasmannia auropunctata (Roger)	Hymenoptera	Formicidae	little red fire ant	(protects scale insects)
Westermannia gloriosa Hampson	Lepidoptera	Noctuidae		*Terminalia*
Xyleborus ferrugineus (Fabricius)	Coleoptera	Scolytidae		*Swietenia, Agathis, Endospermum, Garcinia, Heritiera, Myristica, Palaquium, Pinus*
Xyleborus perforans (Wollaston)	Coleoptera	Scolytidae	island pinhole borer	*Agathis, Calophyllum, Endospermum, Garcinia, Myristica, Palaquium, Pinus, Campnosperma, Terminalia, Cedrela, Eucalyptus, Pometia,* etc.
Xyleborus volvulus (= *X. torquatus*) (Fabricius)	Coleoptera	Scolytidae		*Swietenia, Pinus, Cedrela, Cordia*
Xyleutes ceramicus (Walker)	Lepidoptera	Cossidae	teak beehole borer	*Gmelina, Tectona*
Xylosandrus compactus (Eichhoff)	Coleoptera	Scolytidae	black twig borer	*Pometia, Melia, Swietenia, Pinus*
Xylosandrus morigerus (Blandford)	Coleoptera	Scolytidae	brown twig borer	*Swietenia*
Xylotrupes gideon (Linnaeus)	Coleoptera	Scarabaeidae	elephant beetle	*Eucalyptus, Toona, Fraxinus*
Zeuzera coffeae Nietner	Lepidoptera	Cossidae	red coffee borer	*Eucalyptus deglupta, Albizia Casuarina, Swietenia, Tectona, Terminalia*

Table 9

In spite of the limited number of entries in this table, it seems likely that the top-rating five species (*Crossotarsus externedentatus*, *Hypsipyla robusta*, *Uraba lignifera*, *Unaspis citri*, *Xyleborus perforans*) will remain among the group of most important pests when additional entries are made. It is fortunate that they are believed to have evolved elsewhere and that there are regions where they appear to be of minor importance, suggesting that they may be suitable targets for biological control. For example, the top-ranking species, the platypodid *Crossotarsus externedentatus*, occurs in East Africa and ranges in Southern Asia from Sri Lanka and India to the Philippines, Taiwan and Japan. However, it is not listed in a recent review of important pests of Asian plantation trees (Day et al. 1994), indicating its low status in this vast region. On the other hand, there have been comparatively few classical biological control successes against pest Coleoptera, so the prospects for successful biological control would need to be carefully evaluated before selecting it as a target. The fifth species (*Xyleborus perforans*) has a very wide tropical distribution including Central and South America, tropical Africa, India, Southeast Asia and the Pacific. Dead or dying trees, fresh logs and newly sawn timber are the usual targets, but it is known to attack living trees (Bigger 1988).

Table 9. The distribution and importance of the major arthropod pests of plantation forests in the southern and western Pacific (+++ very important and widespread; ++ important; + of lesser importance; P present, but unimportant; • recorded, but importance not known).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	Order
Acalolepta spp.	Cerambycidae													++						2	
Acrocercops sp.	Gracillariidae		•			+								+						2	
Adoxoyphes aurantiana	Tortricidae										•			++						1	
Adoxoyphes fasciculana	Tortricidae		P								•			+		•		+		2	
Agathiphaga vitiensis	Agathiphagidae		+											++				+		2	
Agrilus opulentus	Buprestidae										+++			+						4	
Agrilus viridissimus	Buprestidae										++									2	
Amblypelta coccophaga	Coreidae										•			+++						3	
Aonidiella eremocitri	Diaspididae		•		•						•			•				•			
Arispoda sp.	Chrysomelidae										+									1	
Ascalenia sp.	Cosmopterigidae													+						1	
Aspidiotus destructor	Diaspididae		++	•	•	•		•	•		•	•	•	P		•	•	•	•	2	
Asterolecanium sp.	Asterolecaniidae		•	•			•		•		•		•				•				
Asterolepis glycera	Tortricidae													++						1	
Asymplecta phorbiophora	Lyonetiidae										+			•						1	
Badamia exclamationis	Hesperiidae			•	•	+	•		•		•	•	•	++			•	++		5	
Ceroplastes rubens	Coccidae	•	P	•	•	P	P		+	P	++		•	P		P		•		3	
Chrysomphalus aonidum	Diaspididae		•	•	•		•		+	•	+		•				•			2	
Chrysomphalus dictyospermi	Diaspididae		+								•									1	
Coccus hesperidum	Coccidae	•	P	•		•	•		•	•	+	•	•	+		•	•	•		1	
Coptotermes elisae	Rhinotermitidae										+++									3	
Crossotarsus externedentatus	Platypodidae	•	+++	++	•		•			•	•		+++	+++		•		•		11	1
Cyphura bifasciata	Uraniidae													+				+		2	
Diotimana undata	Cerambycidae										+										
Eriophyes casuarina	Eriophyiidae					•															
Eriophyes terminaliae	Eriophyiidae					+														1	
Eucerocoris sp.	Miridae													+						1	
Euploea leucostictos	Nymphalidae					P															
Fabrictilis australis	Coreidae										++									2	

Table 9. (cont'd) The distribution and importance of the major arthropod pests of plantation forests in the southern and western Pacific (+++ very important and widespread; ++ important; + of lesser importance; P present, but unimportant; • recorded, but importance not known).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	Order
Fabrictilis gonagra	Coreidae	•		•					•			•	•	•				•			
Gryllotalpa africana	Gryllotalpidae										+									1	
Homona coffearia	Tortricidae										+			++						2	
Hyblaea puera	Hyblaeidae		P	•					•		++	•	•	++						4	
Hyblaea sanguinea	Hyblaeidae		•			P			•				•	•		•		•			
Hylurdrectonus araucariae	Scolytidae										+++									3	
Hylurdrectonus pinearis	Scolytidae										+++										
Hypothenemus birmanus	Scolytidae	•	++		•				•	•	•		+	++		•				5	
Hypothenemus eruditus	Scolytidae	•	+						•	•	•		+	+		•				3	
Hypsipyla robusta	Pyralidae				•						+++			+++		+++				9	2 =
Icerya purchasi	Margarodidae		+	•		+	•		•	•	•			•		•	•			2	
Icerya seychellarum	Margarodidae	•	+	++		•	•		•	•	•	•	+	+		•	•	•		5	
Ips sp.	Scolytidae											++								2	
Leptynoptera sulfurea	Psyllidae					+														1	
Lymantria flavoneura	Lymantriidae										+									1	
Lymantria ninayi	Lymantriidae										++									2	
Microcerotermes biroi	Termitidae										+		•	+						2	
Mictis profana	Coreidae								++		+									3	
Milionia isodoxa	Geometridae										++									2	
Mussidia pectinicornela	Pyralidae										+									1	
Nasutitermes novarum-hebridarum	Termitidae										+			++				•		3	
Neotermes sp.	Kalotermitidae		+++										++							5	
Oceanaspidiotus araucariae	Diaspididae			•	•				•										++	2	
Ophiusa coronata	Noctuidae			•	•	•			•				P	+				•		1	
Oribius destructor	Curculionidae										+++									1	
Oribius inimicus	Curculionidae										+++									1	
Orthotomicus erosus	Scolytidae		++																	2	
Oxymagis horni	Cerambycidae													+++						3	
Pachypeltis sp.	Miridae													+						1	

Table 9. (cont'd) The distribution and importance of the major arthropod pests of plantation forests in the southern and western Pacific (+++ very important and widespread; ++ important; + of lesser importance; P present, but unimportant; • recorded, but importance not known).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	Order
Pantorhytes sp.	Curculionidae										+									1	
Paratella errudita	Flatidae										P										
Parectopa sp.	Gracillariidae					P															
Phytorus lineolatus	Chrysomelidae					+++														3	
Pinnaspis aspidistrae	Diaspididae	•	P	•			•			•	•		•								
Pinnaspis strachani	Diaspididae	•	P	•		•	•		•	•	•		•	•	•	•	•	•	•		
Planococcus lilacinus	Pseudococcidae				•	P					•										
Platypus gerstaeckeri	Platypodidae		+++																	3	
Platypus jansoni	Platypodidae										+++									3	
Pternistria levipes	Coreidae										++									2	
Pternistria macromera	Coreidae										++									2	
Ptochophyle innotata	Geometridae													++						2	
Ptochophyle strigata	Geometridae													++						2	
Rhyparida coriacea	Chrysomelidae										++									1	
Saissetia coffeae	Coccidae										+++									4	
Saissetia oleae	Coccidae		+	•	•				•		•		•						•		
Selenothrips rubrocinctus	Thripidae			•	•	P					•		•					•			
Semiothisa abydata	Geometridae					+														1	
Syllepte derogata	Pyralidae										+			++						3	
Trigonops sp.	Curculionidae				•	+														1	
Trigonops inusitata	Curculionidae					+														1	
Trigonops vulgaris	Curculionidae					+														1	
Unaspis citri	Diaspididae	•	++	•		•	•		•	•	++	•	+	++		•		++	•	9	2 =
unidentified	(Scolytinae) Curculionidae											++								2	
Uraba (= Roeselia) lignifera	Nolidae										+++			+++				++		8	5
Urapteroides aestheniata	Uraniidae		•											+				+		2	
Vanapa oberthuri	Curculionidae										+++									3	
Wasmannia auropunctata	Formicidae	•							+++					•			•		•	3	

Table 9. (cont'd) The distribution and importance of the major arthropod pests of plantation forests in the southern and western Pacific (+++ very important and widespread; ++ important; + of lesser importance; P present, but unimportant; • recorded, but importance not known).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	Order
Westermannia gloriosa	Noctuidae													++						2	
Xyleborus ferrugineus	Scolytidae	•	++	•					++	•			+							5	
Xyleborus perforans	Scolytidae	•	+++	•	•	•	•	•	•	•	+++	•	+	++	•	•		•		9	2 =
Xyleborus volvulus	Scolytidae		+++						•											3	
Xyleutes ceramicus	Cossidae										•			•							
Xylosandrus compactus	Scolytidae		++								•		+	•						3	
Xylosandrus morigerus	Scolytidae		++										+	+						4	
Xylotrupes gideon	Scarabaeidae										++									2	
Zeuzera coffeae	Cossidae										+			+						2	

Table 10

In this table the origin, or presumed origin, of the major invertebrate pests scoring 10+ or more (**Table 3**) is given where possible. Where a species has long been widespread it is often difficult to presume its origin, although detailed study of the literature on it and related species may well add further precision, particularly if supplemented by information on its specific (or reasonably specific) natural enemies. Experience has shown that the largest number of these usually occur in the area of origin of a species. Also, if a phytophagous pest is specific, or reasonably specific, to a particular host plant, it is quite likely that it originated in the same region as that plant.

In general, those pests that originated outside the oceanic Pacific are far more likely to be suitable targets for classical biological control than those native to the region.

Table 10 Presumed origins of the major invertebrate pests in the southern and western Pacific, scoring 10+ or more (see Tables 3 and 9).

	Species	Family	Origin
1.	*Achatina fulica*	Achatinidae	East Africa
2.	*Adoretus versutus*	Scarabaeidae	India
3.	*Agonoxena argaula*	Agonoxenidae	Southwest Pacific
4.	*Aleurodicus dispersus*	Aleyrodidae	Central America
5.	*Aphis craccivora*	Aphididae	Southeastern Europe
6.	*Aphis gossypii*	Aphididae	Southeastern Europe
7.	*Aspidiotus destructor*	Diaspididae	
8.	*Aulacophora* spp.	Chrysomelidae	Malaysia–Australia
9.	*Bactrocera* spp.	Tephritidae	Some Pacific, others Southeast Asia or Australia
10.	*Bemisia argentifolii*	Aleyrodidae	? Caribbean
11.	*Bemisia tabaci*	Aleyrodidae	India
12.	*Brontispa longissima*	Chrysomelidae	Indonesia–PNG
13.	*Ceroplastes rubens*	Coccidae	China
14.	*Coccus viridis*	Coccidae	(Tropicopolitan)
15.	*Cosmopolites sordidus*	Curculionidae	Indo-Malaysian region
16.	*Crocidolomia pavonana*	Pyralidae	(Africa–Asia)
17.	*Crossotarsus externedentatus*	Platypodidae	Southern Asia
18.	*Cylas formicarius*	Apionidae	Indo–Malaysian region
19.	*Dysmicoccus brevipes*	Pseudococcidae	Central or South America
20.	*Earias vittella*	Noctuidae	Southeast Asia
21.	*Epilachna* spp.	Coccinellidae	Southeast Asia
22.	*Euscepes postfasciatus*	Curculionidae	South America
23.	*Graeffea crouanii*	Phasmatidae	Southwest Pacific
24.	*Halticus tibialis*	Miridae	Southeast Asia
25.	*Helicoverpa armigera*	Noctuidae	Old World tropics
26.	*Hellula* spp.	Pyralidae	
27.	*Hippotion celerio*	Sphingidae	Africa or Asia
28.	*Hypsipyla robusta*	Pyralidae	not Pacific

(cont'd over)

Table 10 (cont'd) Presumed origins of the major invertebrate pests in the southern and western Pacific, scoring 10+ or more (see Tables 3 and 9).

	Species	Family	Origin
29.	*Liriomyza* spp.	Agromyzidae	Southern USA – Northern South America
30.	*Maruca vittrata*	Pyralidae	possibly South America
31.	*Nacoleia octasema*	Pyralidae	Malaysia – ? Vanuatu
32.	*Nezara viridula*	Pentatomidae	Ethiopia
33.	*Oryctes rhinoceros*	Scarabaeidae	India – Indonesia
34.	*Othreis fullonia*	Noctuidae	Indonesia – Malaysia – PNG
35.	*Papuana* spp.	Scarabaeidae	Papua New Guinea – Solomon Is
36.	*Pentalonia nigronervosa*	Aphididae	Southeast Asia
37.	*Phyllocnistis citrella*	Gracillariidae	(tropical Asia)
38.	*Phyllocoptrupa oleivora*	Eriophyidae	Asia
39.	*Planococcus pacificus*	Pseudococcidae	? probably introduced to Pacific
40.	*Plutella xylostella*	Yponomeutidae	Southern Europe
41.	*Polyphagotarsonemus latus*	Tarsonemidae	? tropical Africa
42.	*Rhabdoscelus obscurus*	Curculionidae	? PNG
43.	*Spodoptera litura*	Noctuidae	(India – Australia)
44.	*Tarophagus proserpina*	Delphacidae	Pacific
45.	*Tetranychus lambi*	Tetranychidae	Australia – Pacific
46.	*Tetranychus marianae*	Tetranychidae	Central and South America
47.	*Thrips palmi*	Thripidae	Southeast Asia
48.	*Unaspis citri*	Diaspidae	Southeast Asia
49.	*Uraba lignifera*	Nolidae	Australia
50.	*Xyleborus perforans*	Scolytidae	not Pacific

Table 11 Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
Acacia farnesiana (L.) Willd.	Mimosaceae	mimosa bush	pasture, forests
Acacia nilotica (L.) Willd. ex Del.	Mimosaceae	prickly acacia	
Achyranthes aspera L.	Amaranthaceae	chafflower	disturbed forest
Agave americana L.	Agavaceae	century plant	
Ageratum conyzoides L.	Asteraceae	ageratum	gardens, field crops
Alternanthera sessilis (L.) R.Br. ex Roem & Schult	Amaranthaceae	sessile joyweed	taro, roadside ditches
Amaranthus interruptus R.Br.	Amaranthaceae	native amaranth	
Amaranthus spinosus L.	Amaranthaceae	spiny amaranth, spiny pigweed	vegetables
Amaranthus viridis (= *A. gracilis*) L.	Amaranthaceae	slender amaranth, green amaranth	vegetables, cabbage
Antigonon leptopus Hook. & Arnott	Polygonaceae	mountain rose, Mexican creeper	fruit trees, roadsides
Argemone mexicana L.	Papaveraceae		
Bidens alba (L.) DC.	Asteraceae	beggar's tick	vegetables, orchards, field crops
Bidens pilosa L.	Asteraceae	cobbler's pegs, beggar's tick	vegetables, orchards, field crops
Blechum pyramidatum (= B. brownei) (Lam.) Urb.	Blechnaceae		
Brachiaria mutica (Forssk.) Stapf	Poaceae	para grass, buffalo grass	vegetables, wetlands
Brachiaria reptans (L)	Poaceae	running grass	vegetables, roadsides
Brachiaria subquadriparia (Trin.) Hitchc.	Poaceae	green summer grass	vegetables, lawn, roadside
Broussonetia papyrifera (L.) Vent.	Urticaceae	paper mulberry	natural forest, roadsides
Canavalia rosea (Swartz) De Candolle	Fabaceae		sandy and rocky beaches
Cardiospermum halicacabum L.	Sapindaceae	balloon vine	hilly slopes
Cassytha filiformis L.	Lauraceae	dodder	coconut and pandanus seedlings, field crops, hedges
Cecropia peltata L.	Euphorbiaceae		
Cenchrus echinatus L.	Poaceae	sand burr	vegetables, coconut
Chamaesyce (=- *Euphorbia*) *hirta* (L) Millsp.	Euphorbiaceae	garden spurge, asthma plant	vegetables, bananas
Chloris barbata (L) Sw.	Poaceae	swollen fingergrass	pasture, roadsides
Chromolaena odorata (L.) King & Robinson	Asteraceae	chromolaena, siam weed	gardens, natural vegetation
Clerodendrum chinense (= *C. philippinensis*) (Osbeck) Mabberley	Verbenaceae	clerodendrum, Honolulu rose	field crops, roadsides, natural vegetation
Clidemia hirta (L.) D. Don.	Melastomataceae	Koster's curse	pasture, native vegetation

Table 11 (cont'd) Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
Coccinia grandis (L.) Voigt	Cucurbitaceae	ivy gourd, scarlet-fruited gourd	roadsides
Commelina benghalensis L.	Commelinaceae	dayflower, hairy wandering jew	vegetables, field crops
Commelina diffusa Burm. f.	Commelinaceae	spreading dayflower, commelina	vegetables, fruit trees
Cordia subcordata Lamarck	Boraginaceae	cordia	forest thickets, sandy shores
Crassocephalum crepidoides Benth (S. Moore)	Asteraceae		plantations, waste land
Crotolaria pallida Aiton	Fabaceae	smooth rattlepod, striped crotolaria	pasture, roadsides, waste land
Crotolaria retusa L.	Fabaceae		
Cuphea carthagenensis (Jacq.) Macbr.	Lythraceae	tarweed	
Cynodon dactylon(L.) Pers	Poaceae	couch, bermuda grass	vegetables, field crops
Cyperus rotundus L.	Cyperaceae	nutgrass, nutsedge, purple nutsedge	gardens, field crops, lawns, taro
Dactyloctenium aegyptium (L.) Willd.	Poaceae	crowfoot grass, beach wiregrass	disturbed places
Desmodium incanum DC.	Fabaceae	Spanish clover	lawns, roadsides
Digitaria ciliaris (Retz) Koeler	Poaceae	fingergrass, tropical crabgrass, common summergrass	pasture, field crops, roadsides
Digitaria eriantha (= *D. decumbens*) Steudel	Poaceae	woolly finger grass	
Digitaria insularis (L.) Mez ex Ekman	Poaceae	sour grass	pasture, waste places
Digitaria setigera Roth	Poaceae	itchy crabgrass	pasture, roadsides
Echinochloa colona (L.) Link	Poaceae	jungle rice, awnless barnyard grass	rice, wet soils, disturbed areas
Echinochloa crus-galli (L.) P. Beauv.	Poaceae	barnyard grass, watergrass	
Eichhornia crassipes (Mart.) Solms	Pontederiaceae	water hyacinth	lakes, rivers, waterways
Eleocharis geniculata (L.) R.&S.	Cyperaceae		rice, moist areas
Elephantopus mollis (= *E. scaber*) Kunth	Asteraceae	elephant's foot, tobacco weed	vegetables, field crops, tree crops
Eleusine indica (L.) Gaertner	Poaceae	crowsfoot grass, wiregrass, goosegrass	vegetables, field crops, lawns
Eleutheranthera ruderalis (Sw.) Sch.-Bip.	Asteraceae		
Emilia sonchifolia (L.) DC.	Asteraceae	emilia, red tassel flower	
Eragrostis tenella (L.) P. Beauv. ex Roem. & Schult.	Poaceae	feathery eragrostis, lovegrass	field crops, disturbed areas
Euphorbia heterophylla (= *E. geniculata*) L.	Euphorbiaceae	painted spurge	field crops, roadside
Fimbristylis cymosa (= *F. atollensis*) R. Br.	Cyperaceae		sweet potato, taro
Fimbristylis dichotoma (L.) Vahl	Cyperaceae		sugarcane, lawns, wetlands
Fimbristylis miliacea (L.) Vahl	Cyperaceae	grass-like fimbristylis, lesser fimbristylis	rice, moist places

Table 11 (cont'd) Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
Guettarda speciosa L.	Rubiaceae		coconut
Hydrilla verticillata (L. f.) Royle	Hydrocharitaceae	water thyme	
Hyptis pectinata (L.) Poit.	Lamiaceae	comb hyptus	pastures
Imperata conferta (= *I. cylindrica*) (Presl) Ohwi	Poaceae	blady grass	vegetables, field crops
Indigophera suffruticosa Mill.	Fabaceae	indigo	field crops, roadsides, waste land
Ipomoea macrantha Roem. & Schult.	Convolvulaceae		sweet potato, coconut seedlings
Ischaemum spp.	Poaceae		all crops
Jatropha gossypifolia L.	Euphorbiaceae	cotton-leaved physic nut	
Kyllinga brevifolia Rottb.	Cyperaceae		
Kyllinga nemoralis (Forst.) Dandy ex Hutchinson & Dalziel	Cyperaceae		pasture, lawns, plantations
Kyllinga polyphylla Willd. ex Kunth	Cyperaceae	navua sedge	pasture, agricultural land
Lantana camara L.	Verbenaceae	lantana	pasture, gardens, waste lands
Leucaena leucocephala (Lam.) de Wit	Mimosaceae	wild tamarind, leucaena	pasture, roadsides, waste lands
Ludwigia octovalvis (= *Jussiaea suffruticosa*) (Jacq.) Raven	Onagraceae	primrose willow	vegetables, taro, wetlands
Macroptilium lathyroides (L.) Urb.	Fabaceae	cowpea, phasey bean	vegetables, field crops
Melaleuca quinquenervia (Cav.) S.T. Blake	Myrtaceae	broad-leaved paperbark	
Merremia peltata (L.) Merr.	Convulvulaceae		gardens, plantations, pasture, forestry
Miconia calvescens DC	Melastomataceae		
Mikania micrantha Kunth	Asteraceae	mile-a-minute weed	gardens, plantations, fruit trees
Mimosa invisa Mart. ex Colla	Mimosaceae	creeping sensitive plant	gardens, growing lands, plantations
Mimosa pigra L.	Mimosaceae	giant sensitive plant	pasture, riverbanks
Mimosa pudica L.	Mimosaceae	sensitive plant	field crops, lawns
Miscanthus floridulus (Labill.) Warb. ex K. Schum.	Poaceae		
Momordica charantia L.	Cucurbitaceae	bitter gourd, balsam pear	field crops, low vegetation
Monochoria hastata (L.) Solms-Laub.	Pontederiaceae		
Nephrolepis hirsutula (Forster f.) Presl	Davalliaceae		coconuts
Ocimum gratissimum L.	Lamiaceae	wild basil	pasture, disturbed places
Oxalis corniculata L.	Oxalidaceae	yellow wood sorrel	vegetables, lawns
Panicum maximum Jacq.	Poaceae	guinea grass	gardens, roadsides

Table 11 (cont'd) Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
Parthenium hysterophorus L.	Poaceae	parthenium	
Paspalum conjugatum Bergius	Poaceae	sour paspalum	lawns, roadsides, disturbed places
Paspalum dilatatum Poiret	Poaceae	paspalum	
Paspalum paniculatum L	Poaceae	Russell river grass	taro, pasture, waste places
Paspalum vaginatum Sw.	Poaceae	saltwater couch	
Passiflora foetida L.	Passifloraceae	stinking passionfruit	pasture, low vegetation
Passiflora maliformis L.	Passifloraceae		
Pennisetum polystachion (L.) Schultes	Poaceae	feathery pennisetum, mission grass	field crops, pastures
Pennisetum purpureum Schum.	Poaceae	elephant grass	roadsides
Phyllanthus amarus Schumach & Thonn.	Euphorbiaceae		field crops, roadsides
Physalis angulata L.	Solanaceae	wild cape gooseberry	pasture, roadsides
Pistia stratiotes L.	Araceae	water lettuce	clogging waterways
Pluchea indica (L.) Less.	Asteraceae	Indian pluchea, Indian fleabane	low saline areas
Portulaca oleracea L.	Portulacaceae	pigweed, purslane	vegetables
Premna obtusifolia (= *P.serratifolia*) R. Br.	Verbenaceae		coconut, pandanus
Pseudelephantopus spicatus (Juss. ex Aubl.) C.F. Baker	Asteraceae	false elephant's foot	plantations, lawns
Psidium guajava L.	Myrtaceae	guava	pasture, forestry, waste land
Ricinus communis L.	Euphorbiaceae	castor oil plant, castor bean	vegetables, roadsides, waste places
Rottboellia cochinchinensis (Lour.) W. Clayton	Poaceae	itch grass	gardens, crops, roadsides, sugarcane
Ruellia prostrata Poiret	Acanthaceae		tree crops, roadsides
Salvinia molesta D. Mitch.	Salviniaceae	salvinia	
Scaveola sericea (= S. taccada) Vahl.	Goodeniaceae	scaveola	coconut, pandanus
Schinus terebinthifolius Raddi	Anacardiaceae	christmas berry	waste areas, roadsides
Senna (= *Cassia*) *occidentalis* (L) Link	Fabaceae	coffee senna	field crops, pastures, roadsides
Senna (= *Cassia*) *tora* (L.) Link	Fabaceae		
Sida acuta Burman f.	Malvaceae	spinyhead sida	pasture
Sida cordifolia L.	Malvaceae	flannel weed	
Sida fallax Walp.	Malvaceae		young coconut
Sida rhombifolia L.	Malvaceae	broom weed, common sida	pasture, plantations

Table 11 (cont'd) Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
Solanum americanum (= *S. nigrum*) Miller	Solanaceae	black nightshade, glossy nightshade	vegetables
Solanum mauritianum Scop	Solanaceae	wild tobacco tree	
Solanum torvum Sw.	Solanaceae	prickly solanum, devil's fig	plantations, pastures, roadsides
Sonchus oleraceus L.	Asteraceae	sow thistle	vegetables, field crops
Sorghum arundinaceum (= *S. verticilliflorum*) (Desv.) Stapf	Poaceae	wild sorghum	vegetables
Sorghum halepense (L) Pers.	Poaceae	Johnson grass	disturbed areas, roadsides
Sorghum sudanense (Piper) Stapf	Poaceae	Sudan grass	disturbed areas, roadsides
Spathodea campanulata P. Beauv.	Bignoniaceae	African tulip tree	pastures, roadsides
Sphaerostephanos invisus (Forst. f.) Holttum	Thelypteridaceae		
Sphaerostephanos unitus (L.) Holttum	Thelypteridaceae		
Stachytarpeta cayennensis (Rich) Schauer	Verbenaceae	snakeweed	
Stachytarpeta jamaicensis (L) Vahl	Verbenaceae	Jamaican snakeweed	pasture
Stachytarpeta urticifolia (Salisb.) Sims	Verbenaceae	blue rat's tail, dark-blue snakeweed	pasture, newly cleared areas, roadsides
Stichocardia tiliifolia (Descr.) H. Hallier	Convolvulaceae		
Syndrella nodiflora (L) Gaertn.	Asteraceae	syndrella, node weed	plantations, lawns
Tecoma stans (L) Juss ex Kunth	Bignoniaceae	yellow elder	
Themeda quadrivalis (L) Kuntze	Poaceae	grader grass	
Tournefortia (= *Messerschmidia*) *argentea* L.f.	Boraginaceae	tree heliotrope	coconut, pandanus
Tribulus cistoides L.	Zygophyllaceae		
Tridax procumbens L.	Asteraceae	tridax, coat buttons	vegetables, roadsides
Triumfetta rhomboidea Jacq.	Tiliaceae	Chinese burr, burr bush	pasture, plantations, roadsides
Urena lobata L.	Malvaceae	hibiscus burr, urena burr	pasture, roadsides
Vernonia cinerea (L) Less.	Asteraceae	vernonia, iron weed	sweet potato, banana
Vigna marina (Burman f.) Merr.	Fabaceae	dune bean	young coconut and pandanus
Vitex trifolia L.	Verbenaceae	beach vitex	sandy areas
Wedelia trilobata (L) Hitchc.	Asteraceae	wedelia	vegetables
Xanthium pungens Wallr.	Asteraceae	noogoora burr	vegetables, pasture

Table 12 The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
Acacia farnesiana	Mimosaceae		P	+		P	P		*+++	P				++				+		1	7	69=
Acacia nilotica	Mimosaceae								++										P		2	133=
Achyranthes aspera	Amaranthaceae	+	P	P		P			P		+	P	P	P				+			3	111=
Agave americana	Agavaceae			P			+		++												3	111=
Ageratum conyzoides	Asteraceae	+	+++	+		P			*+++	P	+	++	+	++		P		++		1	16	24
Alternanthera sessilis	Amaranthaceae		+	P		P					++	++	+	P		P		+	P		7	73=
Amaranthus interruptus	Amaranthaceae								++	P				P							2	133=
Amaranthus spinosus	Amaranthaceae		P			P			+		+		P	P				++			4	103=
Amaranthus viridis (= *A. gracilis*)	Amaranthaceae	++	++	++		P	P		++	P	P	P	P	P		P	+	+	+		11	44=
Antigonon leptopus	Polygonaceae			+		*+++						P	P							1	4	98=
Argemone mexicana (= *A. americana*)	Papaveraceae								++									P			2	133=
Bidens alba ; *Bidens pilosa*	Asteraceae	++	+	*+++	* ++	*+++	P		*+++		+	*+++	++	++		+++		+		5	26	8=
Blechum pyrimidatum (= *B. brownei*)	Acanthaceae					P						*+++	++			++				1	7	69=
Brachiaria mutica	Poaceae	*++	+	P		+			P	+	P	++	++	++		+		P	P	1	12	38=
Brachiaria reptans	Poaceae		+	++					++		P		P	+		+		P	P		7	73=
Brachiaria subquadripara	Poaceae	P	+			P			P			++	+	P	P	++		P	P		6	80=
Broussonetia papyrifera	Urticaceae			P								P		*+++		P		P	++	1	5	86=
Canavalia rosea	Fabaceae		P	P		P	P		P			P	P	P				P	*+++	1	3	106=
Cardiospermum halicacabum	Sapindaceae	*+++	P	P						P				++				P		1	5	86=

Table 12 (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
Cassytha filiformis	Lauraceae	P	P	++		*+++	*+++	P	+		P	P	P	P	P		*+++	+	P	3	13	33
Cecropia peltata	Euphorbiaceae			*+++																1	3	106=
Cenchrus echinatus	Poaceae	++	+	+++		++	*++	P	++	+	+	++	++	P	*+	+	++	+	*+++	3	26	10
Chamaesyce (= Euphorbia) hirta	Euphorbiaceae	*++	+	+++	*++	++	+		++	P	+	++	+		*+	P	+	+		3	20	16
Chloris barbata	Poaceae		P	++		P			++			+	+	P		P		P			6	80=
Chromolaena odorata	Asteraceae				*++	++					*++									2	6	78=
Clerodendrum chinense (= C. philippinum)	Verbenaceae	++	*+++	+	P					*+++	+	++	*+++							3	15	25
Clidemia hirta	Melastomataceae		+							+		*+++	+++	++		P		+	*+++	2	14	29=
Coccinia grandis	Cucurbitaceae		P			*+++										P		+		1	4	98=
Commelina benghalensis	Commelinaceae		P	P		P			P		P	P	P	++		*+++				1	5	86=
Commelina diffusa	Commelinaceae	*+++	+	++		P				P	P	*+++	++	P		P				2	11	42=
Cordia subcordata	Boraginaceae			P			P	P				P	P				P		++		2	133=
Crassocephalum crepidoides	Asteraceae	++	+	P					+	*++	P	++	++	P		++		P		1	12	38=
Crotolaria pallida	Fabaceae	+	+	++		P			P	+	P	P	+	++		+		+			10	51=
Crotolaria retusa	Fabaceae			+			P				P	P	P					++			3	111=
Cuphea carthagenensis	Lythraceae		+	+					+	P		++	++					+			8	63=
Cynodon dactylon	Poaceae	++	+	+++		+	P		++	P	+	++	++	+	P	P		P	P		15	26=

Table 12 (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
Cyperus rotundus	Cyperaceae	* +++	* +++	* +++	* ++	* +++	++		* +++	++	* +++	++	* +++	* +++	P	* +++	* +++	* +++	* +++	13	44	1
Dactyloctenium aegyptium	Poaceae	+	P	+		P	+	P				P	P	P		P		P			3	111=
Desmodium incanum	Fabaceae	+	P	+++		P						+	+			P		P	P		6	80=
Digitaria ciliaris	Poaceae	P	+	+		P			++			++	+	P		P		P			7	73=
Digitaria eriantha (= *D. decumbens*)	Poaceae		P	P					++	P									P		2	133=
Digitaria insularis	Poaceae		P			+					* +++			+				P		1	5	86=
Digitaria setigera	Poaceae	P	P	+++		P			+			* ++	+	P	P	+	++			1	10	47=
Echinochloa colona	Poaceae	P	+++	++		+			++		P	++	++	+		+		+			15	26=
Echinochloa crus-galli	Poaceae		+++	P					P	P	+		P	+			++		* ++	1	9	57
Eichhornia crassipes	Pontederiaceae	P	* +++	P	P	P		P	++		* +++		P	* +++				* +		4	12	36
Eleocharis geniculata	Cyperaceae	P	+	P			P	++		+		P		P							4	103=
Elephantopus mollis (= *E. scaber*)	Asteraceae	+	+	* +++		P			+	P	+			* +++		++		+		2	13	34
Eleusine indica	Poaceae	+	+	+++	* ++	* +++	P		* +++	P	+	++	* ++	++	* +	++	* ++	+	* ++	7	28	7
Eleutheranthera ruderalis	Asteraceae	+	P								+	+	+	P	P	++		+			7	73=
Emilia sonchifolia	Asteraceae	P	+	+					++	+	+	+	+	+		P		+			10	51=
Eragrostis tenella	Poaceae		P	+		P	P					+	+	P		P		P			3	111=
Euphorbia heterophylla (= *E. geniculata*)	Euphorbiaceae	+	+			* +++	+		P	+	+		P	+		+		P		1	10	47=

Table 12 (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
Fimbristylis cymosa (= *F. atollensis*)	Cyperaceae			P		+	P				+	++	P				* +++			1	7	69=
Fimbristylis dichotoma	Cyperaceae		P	++		P	P		++	P		P	P	P		P	P	+			5	92=
Fimbristylis miliacea	Cyperaceae		++	+		P							P				P				3	111=
Guettarda speciosa	Cyperaceae	+		P			* +++	P	P	P		P	P	P	* +					2	5	85
Hydrilla verticillata	Hydrocharitaceae		+++	P		P			P												3	111=
Hyptis pectinata	Lamiaceae		+++	++		P			++	+		P	* +++			P		+		1	12	38=
Imperata conferta (= *I. cylindrica*)	Poaceae		++		P				* +++		P	+	P	++				++		1	10	47=
Indigofera suffruticosa	Fabaceae	++	P	++		+						++	+	+		++		++			13	35
Ipomoea macrantha	Convolvulaceae			P			P	P				P	P		* +		* +++		P	2	4	97
Ischaemum spp.	Poaceae		* +++	P								P	P	P				P	P	1	3	106=
Jatropha gossypifolia	Euphorbiaceae			+					++												3	111=
Kyllinga brevifolia	Cyperaceae	P	+	++		P			+	P	++	++	++	P	P	P		+			11	44=
Kyllinga nemoralis	Cyperaceae		P	+++		P						P	P			P					3	111=
Kyllinga polyphylla	Cyperaceae		* +++	+++						P			* +++					++		2	11	42=
Lantana camara	Verbenaceae	P	* +++	* +++	* ++	+	+	P	* +++	* +++	++	++	++	+++		* ++	P	* +++	++	7	34	2
Leucaena leucocephala	Mimosaceae	++	P	* +++		+	P	P	P	+	+	++	++	P		* ++	P	++	++	2	18	20

Table 12 (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
Ludwigia octovalvis (= *Jussiaea suffruticosa*)	Onagraceae	+	+	++		P	* +++		+	P	P	++	++	P	P	P	* +++	+		2	16	22=
Macroptilium lathyroides	Fabaceae		+	+		+			++			+	+	P		P		P			7	73=
Melaleuca quinquenervia	Myrtaceae			P					+++												3	111=
Merremia peltata	Convolvulaceae	P	+	+++	* +++	P			P	P		+	++	+		P		* +++	P	2	14	29=
Miconia calvescens	Melastomataceae			* +++					P										++	1	5	86=
Mikania micrantha	Asteraceae	* +++	* +++	P		* +++			+	* +++	* +++	* +++	* +++	* ++		P	* ++	* +++		10	29	5
Mimosa invisa	Mimosaceae	* +++	* ++	* +++	* ++	P			+++	* ++	* +++	* +++	* +++	* +++				* ++		10	30	4
Mimosa pigra	Mimosaceae										* ++									1	2	129=
Mimosa pudica	Mimosaceae	++	++	+++	* ++	* +++			++	* +++	+	++	++	* +++		* +++		+	* +++	6	32	3
Miscanthus floridulus	Poaceae		++	+++		P					P	P	P					P			5	92=
Momordica charantia	Cucurbitaceae	++	P	++		++		P	P	P	++	+	+			P		+			11	44=
Monochoria hastata	Pontederiaceae		++																		2	132=
Nephrolepis hirsutula	Davalliaceae	P	P	P		P			P	P		++	+++	++	P	P		+			8	63=
Ocimum gratissimum	Lamiaceae	++	P	+++		P			* +++			P	P			P		+		1	9	57=
Oxalis corniculata	Oxalidaceae	++	P	+		P						+	+			P		P	P		5	92=
Panicum maximum	Poaceae	++	+	++		++			+	++	+	++	++	+		* +++		+	P	1	20	18
Parthenium hysterophorus	Asteraceae			P					+									* +		1	2	129=

Table 12 (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
Paspalum conjugatum	Poaceae	++	+	+++		P			++	P	+	*+++	*+++	++	P	++		++	*+	3	22	14
Paspalum dilatatum	Poaceae	++	P	++		P			+	P	+	P	P	P		P		P			6	80=
Paspalum paniculatum	Poaceae	P	+	+++		P			+++		+	++	++	P		P		++	+		15	26=
Paspalum vaginatum	Poaceae		+	+			+					P	P				+++	P			6	80=
Passiflora foetida	Passifloraceae	P	+	++	P	P			+	P	P	++	+	P		P		+	++		10	51=
Passiflora maliformis	Passifloraceae			+++								P							+		4	103=
Pennisetum polystachion	Poaceae		+++	P	*+++	++								+						1	9	57=
Pennisetum purpureum	Poaceae	+	P	++		P		P	+	*+++	+	++	+++	P	P			P	+	1	14	30=
Phyllanthus amarus	Euphorbiaceae	+	+	++		P	++		+			++	+	P	P	P		P			10	51=
Physalis angulata	Solanaceae		+	++		P			P		P	+	+	P		P		P			5	92=
Pistia stratiotes	Araceae			P					P		++			P				P			2	132=
Pluchea indica	Asteraceae			++		P						P	P				+				3	113=
Portulaca oleracea	Portulacaceae	*+++	+++	+++	P	P		++	++	P	P	++	+	++		+	*+++	+	P	2	23	13
Premna obtusifolia (= *P. serratifolia*)	Verbenaceae						*++													1	2	129=
Pseudelephantopus spicatus	Asteraceae	P	++	++		P			P			+	+	P		P		++			8	63=
Psidium guajava	Myrtaceae	+++	+++	+++	P	P	P	P	*+++	P	P	+	++	P		++	P	++	P	1	19	19
Ricinus communis	Euphorbiaceae	P	+	++		P	*+		++	P	P	P	+	P		P		+	++	1	10	47=
Rottboellia cochinchinensis	Poaceae		*+++								*+++			+						2	7	68
Ruellia prostrata	Acanthaceae												+++								3	111=

Table 12 (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
Salvinia molesta	Salviniaceae	++	P	P					+		P										3	111=
Scaveola sericea (= *S. taccada*)	Goodeniaceae	P	P	P		P	* +++		P	P		P	P		P		* +++		P	2	6	78=
Schinus terebinthifolius	Anacardiaceae		P	P		P		P	++			P	P								2	132=
Senna (= *Cassia*) *occidentalis*	Caesalpinaceae		+	++		P	+		++		+	+	+	P		P		+			10	51=
Senna (= *Cassia*) *tora*	Caesalpinaceae	P	++	++		P			++	P	+	+	++	+		* ++		* +++	P	2	16	22=
Sida acuta	Malvaceae	++	++	+++		+			* +++	+	* ++	+	++	* +++		P		* +++		4	23	12
Sida cordifolia	Malvaceae			P		P					++					P		++		1	4	98=
Sida fallax	Malvaceae			P			* +++										P			1	3	106=
Sida rhombifolia	Malvaceae	++	++	+++		P		P	++	++	* +++	* +++	++	++		* ++	P	++	P	3	25	11
Solanum americanum (= *S. nigrum*)	Solanaceae	++	+	+++		P			+	P	P	+	+	P		P		+			10	51=
Solanum mauritianum	Solanaceae	P	P	P					++					P		P					2	132=
Solanum torvum	Solanaceae		+++	++		P			++	P	++	P	* +++	* +++		* ++		* +++		4	20	15
Sonchus oleraceus	Asteraceae	+	P	+		+	+		++		P		+			P		+			8	63=
Sorghum arundinaceum (= *S. verticilliflorum*)	Poaceae	* +++	P	+					++		++			P				+		1	9	57=
Sorghum halepense	Poaceae		+++	+++		++		P	++	* +++	+			P		* ++		++	* ++	3	20	16=
Sorghum sudanense	Poaceae			P		P						* +++	+			P				1	4	98=

Table 12 (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
Spathodea campanulata	Bignoniaceae		* +++	P		P						P	P			P				1	3	106=
Sphaerostephanos invisus	Thelypteridaceae			++																	2	132=
Sphaerostephanos unitus	Thelypteridaceae												+	P		P		++			3	111=
Stachytarpheta cayennensis	Verbenaceae			P					++				+	P				P			3	111=
Stachytarpheta jamaicensis	Verbenaceae	+	P			* ++	+		+	* +++	P	+	P	+		P		++		2	12	37
Stachytarpheta urticifolia	Verbenaceae	+++	+	* +++		++			+++	* +++	++	* +++	++	* +++	P	* ++	P	++		5	29	6
Stictocardia tiliifolia	Convolvulaceae			P								+	+					+			3	111=
Syndrella nodiflora	Asteraceae	++	+	+++		P	+		++	P	P	++	++	++	P	P	P	++			17	21
Tecoma stans	Bignoniaceae	P	P	* +++					++			P		P		++				1	7	69=
Themeda quadrivalis	Poaceae		P						++									+			3	111=
Tournefortia (= Messerschmidia) argentea	Boraginaceae	P	P	P		P	* +++		P			P	P	P	P		P		+	1	4	98=
Tribulus cistoides	Zygophyllaceae			+			P				++										3	111=
Tridax procumbens	Asteraceae		P	++		P	+		+		P	+	+	P		P	++	+			9	61=
Triumfetta rhomboidea	Tiliaceae	P	P	+++		P			+	P	P	++	P	P		+		+			8	63=
Urena lobata	Malvaceae	+	++	+		P				+	P	+	+	P		+		++	++		12	41
Vernonia cinerea	Asteraceae	++	+	+++		++	++				P	P	+	P		P	++	+			14	32
Vigna marina	Fabaceae		P				* +++	P				P	P	P			P	P	++	1	5	86=
Vitex trifolia	Verbenaceae		++			++						P	P	P				+	P		5	92=
Wedelia trilobata	Asteraceae			+++								P						P			3	111=
Xanthium pungens	Asteraceae	* +++	+++	++							+									1	9	61=

Table 13

In this table the 56 most important (those scoring 10 or more +s) of the 141 major weeds of agriculture (**Table 12**) are arranged in five groups according to their combined score of +s. It contains those weeds that, if exotic to the Pacific, as most if not all are, should be considered first for appropriateness as targets for classical biological control on a regional basis. Of course, there could well be justification, for a more limited number of nations, for attention to be paid to other weeds which score +++ for at least one nation or ++ for at least two nations, particularly if biological control had already been successful elsewhere. This second group of weeds can be readily identified from entries in **Table 12**.The total +s can be taken only as a broad indication of the importance attached to the pest in the Pacific. However, differences of 5 or more can be assumed to be indicative of real differences.Grasses (with the exception of number 7, *Eleusine indica,* which is known to have a number of potentially useful enemies) are given a '–' rating for attractiveness as targets. This is because they have not been studied for specific natural enemies, and a major and costly investigation (more than 5 years) would be required.Where there is little or no information about possibly specific natural enemies of a pest it is given a '–' attractiveness rating on the basis that a major and costly investigation would be required. Unless there is a special reason to choose one of these targets, there are other far more promising (and less costly) targets to consider. In any case, the attractiveness ratings are very subjective and may be modified when additional information becomes available from dossiers or from studies elsewhere on the pest.

Table 13 Aggregated ratings of the major weeds of agriculture in the southern and western Pacific.

Order	Number of +s	Pest and + scores	Times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
		30 and over				
1	44	*Cyperus rotundus*	13	+	–	–
2	34	*Lantana camara*	7	+	+	+ + + +
3	32	*Mimosa pudica*	6	+	–	?
4	30	*Mimosa invisa*	10	+	+	+ + + +
		25–29				
5	29	*Mikania micrantha*	10	+	–	+ + +
6	29	*Stachytarpetha urticifolia*	5	+	–	?
7	28	*Eleusine indica*	7	+	–	+ +
8	26	*Bidens pilosa and*	5	+	–	–
9		*B. alba*			–	–
10	26	*Cenchrus echinatus*	3	–	–	–
11	25	*Sida rhombifolia*	3	+	–	+
		20–24				
12	23	*Sida acuta*	4	+	–	+
13	23	*Portulaca oleracea*	2	+	–	+++
14	22	*Paspalum conjugatum*	3	–	–	–
15	20	*Solanum torvum*	4	+	–	++
16 =	20	*Chamaesyce hirta*	3	+	–	–
16 =	20	*Sorghum halepense*	3	–	–	–
18	20	*Panicum maximum*	1	–	–	–
		15–19				
19	19	*Psidium guajava*	1	–	–	–
20	18	*Leucaena leucocephala*	2		–	–
21	17	*Syndrella nodiflora*	0	–	–	–
22 =	16	*Ludwigia octovalvis*	2	–	–	
22 =	16	*Senna tora*	2	+	–	?
24	16	*Ageratum conyzoides*	1	+	–	?
25	15	*Clerodendrum chinense*	3	+	–	+++
26 =	15	*Cynodon dactylon*	0	–	–	–
26 =	15	*Echinochloa colona*	0	–	–	–
26 =	15	*Paspalum paniculatum*	0	–	–	–

(cont'd over)

Table 13 (cont'd) Aggregated ratings of the major weeds of agriculture in the southern and western Pacific.

Order	Number of +s	Pest and + scores	Times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
		10–14				
29 =	14	*Merremia peltata*	2	+	–	?
29 =	14	*Clidemia hirta*	2	+	+	++++
31	14	*Pennisetum purpureum*	1	–	–	–
32	14	*Vernonia cinerea*	0	–		
33	13	*Cassytha filiformis*	3	–	–	+
34	13	*Elaphantopus mollis*	2	+	–	+
35	13	*Indigophera suffruticosa*	0	–		
36	12	*Eichhornia crassipes*	4	+	+	++++
37	12	*Stachytarpeta jamaicensis*	2	–		
38 =	12	*Brachiaria mutica*	1	–		
38 =	12	*Crassocephalum crepidoides*	1	–		
38 =	12	*Hyptis pectinata*	1	–		
41	12	*Urena lobata*	0	–		
42 =	11	*Commelina diffusa*	2	–		
42 =	11	*Kyllinga polyphylla*	2	+	–	?
44 =	11	*Amaranthus viridis*	0	–		?
44 =	11	*Kyllinga brevifolia*	0	–		?
44 =	11	*Momordica charantia*	0	–		?
47 =	10	*Digiteria setigera*	1	–		
47 =	10	*Euphorbia heterophylla*	1	+	–	+
47 =	10	*Imperata conferta*	1	–	–	–
47 =	10	*Ricinus communis*	1	–		?
51 =	10	*Crotolaria pallida*	0	–		?
51 =	10	*Emilia sonchifolia*	0	–		?
51 =	10	*Passiflora foetida*	0	+	–	+
51 =	10	*Phyllanthus amarus*	0	–		?
51 =	10	*Senna occidentalis*	0	–		?
51 =	10	*Solanum americanum*	0	–		?
(56)						

Table 14

Table 14 shows for weeds what **Table 4** did for invertebrates in relation to the top 10 entries. Since no information was available on the relative rating for the five weeds nominated by Tokelau (shown by an asterisk), each was allocated the median value of 5. The ranking order is only given for species that attain an aggregated value of 10 or more. These are arranged in descending order of importance in **Table 15**.

Table 14 The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific .

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
Acacia farnesiana	Mimosaceae								4											1	7	
Acacia nilotica	Mimosaceae																					
Achyranthes aspera	Amaranthaceae																					
Agave americana	Agavaceae																					
Ageratum conyzoides	Asteraceae								2											1	9	
Alternanthera sessilis	Amaranthaceae																					
Amaranthus interruptus	Amaranthaceae																					
Amaranthus spinosus	Amaranthaceae																					
Amaranthus viridis (= A. gracilis)	Amaranthaceae																					
Antigonon leptopus	Polygonaceae					2														1	9	
Argemone mexicana (= A. americana)	Papaveraceae																					
Bidens alba, Bidens pilosa	Asteraceae			7	9	3			8			1							9	6	29	6 =
Blechum pyrimidatum (= B. brownei)	Acanthaceae											8								1	3	
Brachiaria mutica	Poaceae	8																		1	3	
Brachiaria reptans	Poaceae																					
Brachiaria subquadripara	Poaceae																					
Broussonetia papyrifera	Urticaceae													4						1	7	
Canavalia rosea	Fabaceae																		10	1	1	
Cardiospermum halicacabum	Sapindaceae	2																		1	9	
Cassytha filiformis	Lauraceae					7	2										6			3	18	13
Cecropia peltata	Euphorbiaceae			5																1	6	
Cenchrus echinatus	Poaceae						3								*				3	3	21	12
Chamaesyce (= Euphorbia) hirta	Euphorbiaceae	10			10										*					3	7	45=
Chloris barbata	Poaceae																					

Table 14 (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
Chromolaena odorata	Asteraceae				3						7									2	12	21=
Clerodendrum chinense (= C. philippinum)	Verbenaceae		2							3			1							3	27	9
Clidemia hirta	Melastomataceae											4							5	2	13	20
Coccinia grandis	Cucurbitaceae					5														1	6	
Commelina benghalensis	Commelinaceae															2				1	9	
Commelina diffusa	Commelinaceae	9										6								2	7	
Cordia subcordata	Boraginaceae																					
Crassocephalum crepidoides	Asteraceae									10										1	1	
Crotolaria pallida	Fabaceae																					
Crotolaria retusa	Fabaceae																					
Cuphea carthagenensis	Lythraceae																					
Cynodon dactylon	Poaceae																					
Cyperus rotundus	Cyperaceae	7	6	8	7	1			1		5		4	1		1	1	9	1	13	98	1
Dactyloctenium aegyptium	Poaceae																					
Desmodium incanum	Fabaceae																					
Digitaria ciliaris	Poaceae																					
Digitaria eriantha (= D. decumbens)	Poaceae																					
Digitaria insularis	Poaceae									10										1	1	
Digitaria setigera	Poaceae																					
Echinochloa colona	Poaceae																					
Echinochloa crus-galli	Poaceae																		6	1	5	
Eichhornia crassipes	Pontederiaceae		7								1			2				8		4	26	10
Eleocharis geniculata	Cyperaceae																					
Elephantopus mollis (= E. scaber)	Asteraceae			9										3						2	10	26=
Eleusine indica	Poaceae				8	9			6				10		*		10		7	7	21	11
Eleutheranthera ruderalis	Asteraceae																					

Table 14 (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific .

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
Emilia sonchifolia	Asteraceae																					
Eragrostis tenella	Poaceae																					
Euphorbia heterophylla (= *E. geniculata*)	Euphorbiaceae					8														1	3	
Fimbristylis cymosa (= *F. atollensis*)	Cyperaceae																7			1	4	
Fimbristylis dichotoma	Cyperaceae																					
Fimbristylis miliacea	Cyperaceae																					
Guettarda speciosa	Cyperaceae						4								*					2	12	21=
Hydrilla verticillata	Hydrocharitaceae																					
Hyptis pectinata	Lamiaceae												3							1	8	
Imperata conferta (= *I. cylindrica*)	Poaceae								10											1	1	
Indigofera suffruticosa	Fabaceae																					
Ipomoea macrantha	Convolvulaceae														*		5			2	11	23 =
Ischaemum spp.	Poaceae		10																	1	1	
Jatropha gossypifolia	Euphorbiaceae																					
Kyllinga brevifolia	Cyperaceae																					
Kyllinga nemoralis	Cyperaceae																					
Kyllinga polyphylla	Cyperaceae		3										9							2	10	26 =
Lantana camara	Verbenaceae		8	6	6				7	1						6		3		7	40	4
Leucaena leucocephala	Mimosaceae			2									8			10				3	13	19
Ludwigia octovalvis (= *Jussiaea suffruticosa*)	Onagraceae						5										2			2	15	15 =
Macroptilium lathyroides	Fabaceae																					
Melaleuca quinquenervia	Myrtaceae																					
Merremia peltata	Convolvulaceae				1													10		2	11	23 =
Miconia calvescens	Melastomataceae			1																1	10	28 =
Mikania micrantha	Asteraceae	6	9			4				8	6	2	6	7			8	5		10	49	3
Mimosa invisa	Mimosaceae	1	1	3	4					7	4	3	7	5				2		10	73	2

Table 14 (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific .

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
Mimosa pigra	Mimosaceae										3									1	8	
Mimosa pudica	Mimosaceae				5	6				4				6		9			2	6	40	5
Miscanthus floridulus	Poaceae																					
Momordica charantia	Cucurbitaceae																					
Monochoria hastata	Pontederiaceae																					
Nephrolepis hirsutula	Davalliaceae																					
Ocimum gratissimum	Lamiaceae								5											1	6	
Oxalis corniculata	Oxalidaceae																					
Panicum maximum	Poaceae															3				1	5	
Parthenium hysterophorus	Asteraceae																	7		1	4	
Paspalum conjugatum	Poaceae												5						8	2	9	
Paspalum dilatatum	Poaceae																					
Paspalum paniculatum	Poaceae																					
Paspalum vaginatum	Poaceae											5								1	6	
Passiflora foetida	Passifloraceae																					
Passiflora maliformis	Passifloraceae																					
Pennisetum polystachion	Poaceae				2															1	9	
Pennisetum purpureum	Poaceae									2										1	9	
Phyllanthus amarus	Euphorbiaceae																					
Physalis angulata	Solanaceae																					
Pistia stratiotes	Araceae																					
Pluchea indica	Asteraceae																					
Portulaca oleracea	Portulacaceae	5															3			2	14	18
Premna obtusifolia (= P. serratifolia)	Verbenaceae						1													1	10	28 =
Pseudelephantopus spicatus	Asteraceae																					
Psidium guajava	Myrtaceae								3											1	8	
Ricinus communis	Euphorbiaceae						6													1	5	

Table 14 (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific .

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
Rottboellia cochinchinensis	Poaceae		5								2									2	15	15 =
Ruellia prostrata	Acanthaceae																					
Salvinia molesta	Salviniaceae																					
Scaveola sericea (= S. taccada)	Goodeniaceae						7										4			2	11	23 =
Schinus terebinthifolius	Anacardiaceae																					
Senna (= Cassia) occidentalis	Caesalpinaceae																					
Senna (= Cassia) tora	Caesalpinaceae															8		6		2	8	
Sida acuta	Malvaceae								9		9			8				4		4	14	17
Sida cordifolia	Malvaceae																					
Sida fallax	Malvaceae						8													1	3	
Sida rhombifolia	Malvaceae										8	9				7				3	9	
Solanum americanum (= S. nigrum)	Solanaceae																					
Solanum mauritianum	Solanaceae																					
Solanum torvum	Solanaceae												2	9		5		1		4	27	8
Sonchus oleraceus	Asteraceae																					
Sorghum arundinaceum (= S. verticilliflorum)	Poaceae	4																		1	7	
Sorghum halepense	Poaceae									9						4			4	3	16	14
Sorghum sudanense	Poaceae											10								1	1	
Spathodea companulata	Bignoniaceae		4																	1	7	
Sphaerostaphanos invisus	Thelypteridaceae																					
Sphaerostephanos unitus	Thelypteridaceae																					
Stachytarpheta cayennensis	Verbenaceae																					
Stachytarpheta jamaicensis	Verbenaceae					10				6										2	6	

Table 14 (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific .

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
Stachytarpheta urticifolia	Verbenaceae			10						5		7		10						4	12	20
Stictocardia tiliifolia	Convolvulaceae																					
Syndrella nodiflora	Asteraceae																					
Tecoma stans	Bignoniaceae			4																1	7	
Themeda quadrivalis	Poaceae																					
Tournefortia (= Messerschmidia) argentea	Boraginaceae						9													1	2	
Tribulus cistoides	Zygophyllaceae																					
Tridax procumbens	Asteraceae																					
Triumfetta rhomboidea	Tiliaceae																					
Urena lobata	Malvaceae																					
Vernonia cinerea	Asteraceae																9			1	2	
Vigna marina	Fabaceae						10													1	1	
Vitex trifolia	Verbenaceae																					
Wedelia trilobata	Asteraceae																					
Xanthium pungens	Asteraceae	3																		1	8	

Table 15

This table was constructed by assigning the following values to the top 10 entries in **Table 14** and then adding the scores for each weed.

Country order of importance	Score
1	10
2	9
3	8
4	7
5	6
6	5
7	4
8	3
9	2
10	1

Note that these scores are different from the ratings of +s in **Tables 12** and **13**.

Since this table is concerned with what are evaluated as being the top-10 weeds of each country, its rankings might be considered more sharply focused than those in **Table 13**. It is notable, however, that the seven highest-ranking weeds (first column) are the same as those in **Table 13** (last column), although the order is slightly different. Then follows a group of weeds (*Solanum torvum*, *Clerodendrum chinense*, *Eichhornia crassipes* and *Cassytha filiformis*) whose standing is much higher by this method. This arises because of the very high priority given to them by several countries. Perhaps this is an indication that the ceiling of +++ adopted for **Table 12** is too restrictive. Further consideration of the most appropriate way to rank the weeds is given in **Table 16**.

Table 15. Ranking of the 29 top 10 weeds of agriculture, scoring 10 or more.

Order in top 10	Species	Score	Entries in top 10	Order in aggregated +s (Table 13)
1	*Cyperus rotundus*	98	13	1
2	*Mimosa invisa*	73	10	5
3	*Mikania micrantha*	49	10	4
4	*Lantana camara*	40	7	2
5	*Mimosa pudica*	40	6	3
6 =	*Bidens pilosa*	29	6	6 =
6 =	*Bidens alba*	29	6	6 =
8	*Solanum torvum*	27	4	15
9	*Clerodendrum chinense*	27	3	25
10	*Eichhornia crassipes*	26	4	36
11	*Eleusine indica*	21	7	7
12	*Cenchrus echinatus*	21	3	10
13	*Cassytha filiformis*	18	3	33
14	*Sorghum halepense*	16	3	17
15 =	*Ludwigia octovalvis*	15	2	22 =
15 =	*Rottboellia cochinchinensis*	15	2	
17	*Sida acuta*	14	4	12
18	*Portulaca oleracea*	14	2	13
19	*Leucaena leucocephala*	13	3	20
20	*Stachytarpheta urticifolia*	12	4	37
21 =	*Chromolaena odorata*	12	2	
21 =	*Guettarda speciosa*	12	2	
23 =	*Ipomoea macrantha*	11	2	
23 =	*Merremia peltata*	11	2	30 =
23 =	*Scaveola sericea*	11	2	
26 =	*Elephantopus mollis*	10	2	34
26 =	*Kyllinga polyphylla*	10	2	42 =
28 =	*Miconia calvescens*	10	1	
28 =	*Premna serratifolia*	10	1	

Table 16

This table shows the results of considering the top five weeds designated by each country, so as to determine whether this was a means of focusing attention even more sharply on the most important species. For this purpose, the 53 weeds listed by one or more country in their top-5 (**Table 14**) had the following values assigned.

Country order of importance	Score
1	5
2	4
3	3
4	2
5	1

It can be seen in **Table 16** that the first 10 or so weeds are the same as those occupying this position in **Table 15**, although their relative positions are somewhat changed. Bearing in mind that (a) most countries do not have weed experts, (b) the evaluations of relative importance are subjective [being the opinions of the most relevant agricultural authorities in each country (who do not always agree)] and (c) each of the three methods of establishing priority order showed much the same species in the most important 20 or so, it was concluded that there was little merit in attempting to achieve greater precision. Other factors, including the attractiveness of a species as a target for biological control (**Table 13**), together with the criteria listed in the introduction, should thus be taken into account when finally selecting one or more species for action.

Table 16. Ranking of the 53 top 5 weeds of agriculture in the southern and western Pacific.

Order in top 5	Species	Score	Entries in top 5	Order in top 10 (Table 15)
1	*Cyperus rotundus*	33	8	1
2	*Mimosa invisa*	26	8	2
3	*Clerodendrum chinense*	12	3	9
4	*Solanum torvum*	10	3	8
5	*Eichhornia crassipes*	9	2	10
6 =	*Bidens pilosa*	8	2	6 =
6 =	*Bidens alba*	8	2	6 =
6 =	*Lantana camara*	8	2	4
9 =	*Cenchrus echinatus*	7	3	12
9 =	*Mikania micrantha*	7	3	3
9 =	*Mimosa pudica*	7	3	5
12 =	*Ludwigia octovalvis*	5	2	15 =
12 =	*Rottboellia cochinchinensis*	5	2	15 =
14 =	*Merremia peltata*	5	1	23 =
14 =	*Miconia calvescens*	5	1	28 =
14 =	*Premna serratifolia*	5	1	28 =
17 =	*Portulaca oleracea*	4	2	18
17 =	*Sorghum halepense*	4	2	14
19 =	*Ageratum conyzoides*	4	1	
19 =	*Antigonon leptopus*	4	1	
19 =	*Cardiospermum halicacabum*	4	1	
19 =	*Cassytha filiformis*	4	1	13
19 =	*Commelina benghalensis*	4	1	
19 =	*Leucaena leucocephala*	4	1	19
19 =	*Pennisetum polystachion*	4	1	
19 =	*Pennisetum purpureum*	4	1	
27 =	*Clidemia hirta*	3	2	
27 =	*Guettarda speciosa*	3	2	21 =
29 =	*Chromolaena odorata*	3	1	21 =
29 =	*Elephantopus mollis*	3	1	26 =
29 =	*Hyptis pectinata*	3	1	
29 =	*Kyllinga polyphylla*	3	1	26 =
29 =	*Mimosa pigra*	3	1	
29 =	*Panicum maximum*	3	1	
29 =	*Psidium guajava*	3	1	
29 =	*Xanthium pungens*	3	1	
37 =	*Ipomoea macrantha*	2	2	23 =
38 =	*Sida acuta*	2	1	17
38 =	*Acacia farnesiana*	2	1	
38 =	*Broussonetia papyrifera*	2	1	
38 =	*Clidemia hirta*	2	1	
38 =	*Scaveola sericea*	2	1	
38 =	*Sorghum verticilliflorum*	2	1	

Table 16. (cont'd) Ranking of the 53 top 5 weeds of agriculture in the southern and western Pacific.

Order in top 5	Species	Score	Entries in top 5	Order in top 10 (Table 15)
38 =	*Spathodea companulata*	2	1	
38 =	*Tecoma stans*	2	1	
46 =	*Cecropia peltata*	1	1	
46 =	*Chamaesyce hirta*	1	1	
46 =	*Coccinea grandis*	1	1	
46 =	*Eleusine indica*	1	1	11
46 =	*Ocimum gratissimum*	1	1	
46 =	*Paspalum conjugatum*	1	1	
46 =	*Paspalum vaginatum*	1	1	
46 =	*Stachytarpheta urticifolia*	1	1	20

Table 17. The major weeds of plantation forests in the southern and western Pacific.

Scientific name	Family	English common name
Antigonon leptopus Hook. and Arnott	Polygonaceae	mountain rose, Mexican creeper
Brousonettia papyrifera (L) Vent.	Urticaceae	paper mulberry
Cardiospermum grandiflorum Sw.	Sapindaceae	balloon vine
Cassytha filiformis L.	Lauraceae	dodder
Coccinea grandis (L) Voigt	Cucurbitaceae	ivy gourd, scarlet-fruited gourd
Cordia alliodora (Ruiz & Pavon) Cham.	Boraginaceae	
Cuscuta campestris Yuncker	Cuscutaceae	golden dodder
Entada phaseoloides (L) Merr.	Mimosaceae	matchbox bean, entada
Leucaena leucocephala (Lam.) de Wit	Mimosaceae	wild tamarind, leucaena
Merremia peltata (L) Merr	Convolvulaceae	merremia
Miconia calvescens DC	Melastomataceae	
Mikania micrantha Kunth	Asteraceae	mile-a-minute
Mimosa invisa Mart. ex Colla	Mimosaceae	creeping sensitive plant
Passiflora rubra L.	Passifloraceae	red passionfruit
Solanum repandum J.R. & G. Forster	Solanaceae	
Spathodea campanulata Beauvois	Bignoniaceae	African tulip tree

Table 18

Surprisingly few weeds have so far been reported to be of major importance to forest plantations in the Pacific and, of these, *Mikania micrantha* and *Merremia peltata* stand out clearly as of particular concern. Both, and especially *Mikania micrantha*, have emerged also as being of considerable importance to agriculture (**Table 13**). Dossiers are available on prospects for their biological control (Waterhouse 1993a or 1993b, Waterhouse and Norris 1987).

Three of the species listed in the table are considered to be pests in some Pacific countries, but valuable in others. Thus, in the Solomon Islands, the paper mulberry *Broussenetia papyrifera* is a rapidly invasive species forming dense thickets along roadsides and in recently cleared areas, whereas in Tonga its bark is highly prized and in limited supply for making tapa cloth. The fuel and forage tree *Leucaena leucocephala* is held in high regard in New Caledonia, but considered a nuisance in some other countries. *Cordia alliodora*, a fast-growing exotic tree, is regarded in the Solomon Islands and Fiji as having potential as a plantation species, but differently in American Samoa and some other countries.

Table 18. The distribution and importance of the major weeds of plantation forests in the southern and western Pacific (+++ very important; ++ important; + of lesser importance; P present, but unimportant; · recorded but importance unknown).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. +'s	Order
Antigonon leptopus	Polygonaceae					+++														3	
Brousonettia papyrifera	Urticaceae			·								·		+++		·		·	·	3	
Cardiospermum grandiflorum	Sapindaceae	+																		1	
Cassytha filiformis	Lauraceae								++											2	
Coccinea grandis	Cucurbitaceae		P			+++										P				3	
Cordia alliodora	Boraginaceae													·				++		2	
Cuscuta campestris	Cuscutaceae				P	+++			++											5	3 =
Entada phaseoloides	Mimosaceae	+																		1	
Leucaena leucocephala	Mimosaceae	·	·	·		·	·	·	·	·	·	++	++	·		P	·	·	·	4	
Merremia peltata	Convolvulaceae	·	·	+++	·	·			·	·		·	+++	+++		P		+++	·	12	2
Miconia calvescens	Melastomataceae			+++					·										·	3	
Mikania micrantha	Asteraceae	+	·	·		+++			·	+++	·	·	+++	+++		P	·	+++		16	1
Mimosa invisa	Mimosaceae	·	·	·	·	·			+++	·	·	·	++	·				·		5	3 =
Passiflora rubra	Passifloraceae	+																		1	
Solanum repandum	Solanaceae																	++		2	
Spathodea campanulata	Bignoniaceae		·	++		·						+	·			·				3	

Table 19 The presumed origins of the major southern and western Pacific weeds scoring 10+ or more. (In general the views of Whistler (1995) are adopted.)

Species	Family	Origin
Ageratum conyzoides	Asteraceae	tropical America
Amaranthus viridis	Amaranthaceae	old world tropics
Bidens alba	Asteraceae	tropical America
Bidens pilosa	Asteraceae	tropical America
Brachiaria mutica	Poaceae	Africa (tropical Africa?)
Cenchrus echinatus	Poaceae	tropical and subtropical America (Brazil?)
Chamaesyce hirta	Euphorbiaceae	tropical America
Clerodendrum chinense	Verbenaceae	southern China
Clidemia hirta	Melastomataceae	tropical America
Commelina diffusa	Commelinaceae	tropical Asia
Crassocephalum crepidoides	Asteraceae	tropical Africa
Crotolaria pallida	Fabaceae	tropical Africa
Cynodon dactylon	Poaceae	Africa
Cyperus rotundus	Cyperaceae	India
Digitaria setigera	Poaceae	southern Asia
Echinochloa colona	Poaceae	old world tropics
Eichhornia crassipes	Pontederiaceae	South America
Elephantopus mollis	Asteraceae	tropical America
Eleusine indica	Poaceae	India
Emilia sonchifolia	Asteraceae	Africa
Euphorbia heterophylla	Euphorbiaceae	tropical America
Hyptis pectinata	Lamiaceae	tropical America
Imperata conferta	Poaceae	tropical Asia
Indigofera suffruticosa	Fabaceae	tropical America
Kyllinga brevifolia	Cyperaceae	old world tropics (Africa?)
Kyllinga polyphylla	Cyperaceae	tropical Africa
Lantana camara	Verbenacee	tropical America (Brazil?)
Leucaena leucocephala	Fabaceae	South America
Ludwigia octovalvis	Onagraceae	tropical America
Merremia peltata	Convolvulaceae	Malaysia–Indonesia
Mikania micrantha	Asteraceae	tropical America

(cont'd over)

Table 19 (cont'd) The presumed origins of the major southern and western Pacific weeds scoring 10+ or more. (In general the views of Whistler (1995) are adopted.)

Species	Family	Origin
Mimosa invisa	Mimosaceae	tropical America
Mimosa pudica	Mimosaceae	tropical America
Momordica charantia	Cucurbitaceae	subtropical Asia or Africa
Panicum maximum	Poaceae	Africa
Paspalum conjugatum	Poaceae	tropical America
Paspalum paniculatum	Poaceae	tropical America
Passiflora foetida	Passifloraceae	tropical America
Pennisetum purpureum	Poaceae	old world tropics (Africa?)
Phyllanthus amarus	Euphorbiaceae	tropical America
Portulaca oleracea	Portulacaceae	central America
Psidium guajava	Myrtaceae	tropical America
Ricinus communis	Euphorbiaceae	Africa
Senna occidentalis	Fabaceae	tropical America
Senna tora	Fabaceae	Indo-Malaysia
Sida acuta	Malvaceae	central America
Sida rhombifolia	Malvaceae	tropical America
Solanum americanum	Solanaceae	central America
Solanum torvum	Solanaceae	Caribbean
Sorghum halepense	Poaceae	north Africa
Stachytarpeta jamaicensis	Verbenaceae	Caribbean
Stachytarpeta urticifolia	Verbenaceae	tropical America
Syndrella nodifolia	Asteraceae	tropical America
Urena lobata	Malvaceae	tropical Asia (SE Asia?)
Vernonia cinerea	Asteraceae	tropical America

Table 20 FAO agricultural production statistics for 1994 for countries in the southern and western Pacific. ([ ] indicates total land area. Figures in ( ) taken from the Pacific Islands Yearbook 1989.)

	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.
Population ('000)	(17)	771	215	(93)	147	78	(39)	178	(3)	4205	(36)	169	366	(2)	98	(8)	166	(13)
Permanent crops ('000 ha)	3	180	22		6	37		6	2	345	2	67	17	[1]	31	(3)	124	4
Arable land ('000 ha)	2	80	5		6			7	5	40	1	55	40		17		20	1
Forest and woodland ('000 ha)		1185	115		10	2		708	5	42000	14	134	2450		8		914	
Cereals total production ('000 t)		32						1		3							1	
Rice paddy ('000 t)		30								1								
Coarse grains ('000 t)		2						1		3							1	
Maize ('000 t)		2						1		2							1	
Sorghum ('000 t)										1								
Roots and tubers (total)('000 t)	7	64	13		2	8		22	4	1303	2	41	110		102		51	6
Potatoes ('000 t)			3					3										
Taro ('000 t)		15				1		2	3	220	2	37	27		27			2
Cassava ('000 t)	4	40	6					3		114		1	1		30			2
Sweet potatoes ('000 t)	2	3						3		484			62		14			
Yams ('000 t)		7						11		224		1	20		31			1
Pulses (total) ('000 t)		1								2			2					
Groundnuts (in shell) ('000 t)										1					1		2	

Table 20 (cont'd) FAO agricultural production statistics for 1994 for countries in the southern and western Pacific. ([ ] indicates total land area. Figures in ( ) taken from the Pacific Islands Yearbook 1989.)

	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.
Coconuts ('000 t)	4	201	86		43	65		10	2	790	5	130	220	3	25	2	259	2
Copra ('000 t)		13	10		2	8				100	1	11	31		2		30	
Palm kernels ('000 t)										66000			6000					
Palm oil ('000 t)										225000			32000					
Vegetables and melons (total) ('000 t)	1	13	6		5	5		3		383	1	1	6		8		8	1
Fruit, excluding melons ('000 t)	7	12	8		2	5		4	1	1833	1	43	14		13	1	20	9
Tree nuts ('000 t)										5								
Cabbage ('000 t)			1															
Tomatoes ('000 t)		4	1												1			
Pumpkins, squash, gourds ('000 t)		1																
Watermelon ('000 t)			1		2								1		2			
Cantaloupes and other melons ('000 t)													1					
Sugar cane ('000 t)		3750	3							300								
Sugar (centrifugal, raw) ('000 t)		450								43								
Rubber ('000 t)										3								
Oranges ('000 t)															3			
Tangarines, mandarins ('000 t)	3																	

Table 20 (cont'd) FAO agricultural production statistics for 1994 for countries in the southern and western Pacific. ([ ] indicates total land area. Figures in ( ) taken from the Pacific Islands Yearbook 1989.)

	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.
Lemons, limes ('000 t)															3			
Other citrus ('000 t)												1						
Avocados ('000 t)												2						
Mangos ('000 t)	2											5						
Pineapples ('000 t)		3	5							13		6						
Bananas ('000 t)		6	1			4		1		1329	1	10			1		13	4
Plantain ('000 t)								1							4			
Papayas ('000 t)	1											10						
Coffee (green) ('000 t)										66								
Cocoa beans ('000 t)										27			3				2	
Tea ('000 t)										9								
Fibre crops ('000 t)												1						
Rubber ('000 t)										3								

Tables 21 and 22

1. The names included here are from the lists submitted by country experts and are those where alternatives are, or have recently been in use in the region. Many other names, where there is no current confusion, appear in Table 1.
2. The preferred name (**x**) is indicated by '**see x**' or by '**x** use for **y**', the name (**y**) being non-preferred.
3. The names are arranged alphabetically. The author and family of each preferred name appear in **Table 1**.
4. Not all the non-preferred names are invalid: some, indeed, are valid, but not applicable to the taxa concerned in the Pacific.
5. The above comments apply also to the following list for weeds (**Table 22**), for which the author and family of each preferred name appear in **Table 11**.

Table 21. Checklist of preferred names of insect pests.

Amblypelta lutescens	**use for** *Amblypelta papuensis*
Amblypelta papuensis	**see** *Amblypelta lutescens*
Amrasca biguttula	**see** *Amrasca devastans*
Amrasca devastans	**use for** *Amrasca biguttula*
Cassida circumdata	**use for** *Metriona circumdata*
Chloropulvinaria psidii	**use for** *Pulvinaria psidii*
Crocidolomia binotalis	**see** *Crocidolomia pavonana*
Crocidolomia pavonana	**use for** *Crocidolomia binotalis*
Deanolis albizonalis	**use for** *Noorda albizonalis*
Earias fabia	**see** *Earias vittella*
Earias vittella	**use for** *Earias fabia*
Endoclita signifer	**use for** *Phassus signifer*
Fabrictilis gonagra	**use for** *Leptoglossus australis*
Ferrisia virgata	**use for** *Ferrisiana virgata*
Ferrisiana virgata	**see** *Ferrisia virgata*
Helicoverpa armigera	**use for** *Heliothis armigera*
Heliothis armigera	**see** *Helicoverpa armigera*
Lamprosema diemenalis	**use for** *Omiodes diemenalis*
Lamprosema octasema	**see** *Nacoleia octasema*
Leptoglossus australis	**see** *Fabrictilis gonagra*
Leptoglossus gonagra	**see** *Fabrictilis gonagra*
Macaria abydata	**see** *Semiothisa abydata*
Maruca testulalis	**see** *Maruca vitrata*
Maruca vitrata	**use for** *Maruca testulalis*
Metriona circumdata	**see** *Cassida circumdata*
Nacoleia octasema	**use for** *Lamprosema octasema*
Noorda albizonalis	**see** *Deanolis albizonalis*
Ochetomyrmex auropunctata	**see** *Wasmannia auropunctata*
Omiodes diemenalis	**see** *Lamprosema diemenalis*
Petrova cristata	**use for** *Rhyacionia cristata*
Phassus signifer	**use for** *Endoclita signifer*
Pleurotypa balteata	**see** *Syllepte derogata*
Pulvinaria psidii	**see** *Chlorpulvinaria psidii*
Rhyacionia cristata	**see** *Petrova cristata*
Roeselia lignifera	**see** *Uraba lignifera*
Semiothisa santhamaria	**see** *Semiothisa abydata*
Semiothisa abydata	**use for** *Macaria abydata*
Syllepte derogata	**use for** *Pleurotypa balteata*
Uraba lignifera	**use for** *Roeselia lignifera*
Wasmannia auropunctata	**use for** *Ochetomyrmex auropunctata*
Xyleborus torquatus	**see** *Xyleborus volvulus*
Xyleborus volvulus	**use for** *Xyleborus torquatus*

Table 22. Checklist of preferred names of weeds

Amaranthus gracilis	**see** *Amaranthus viridis*
Amaranthus viridis	**use for** *Amaranthus gracilis*
Argemone americana	**see** *Argemone mexicana*
Argemone mexicana	**use for** *Argemone americana*
Blechum browneii	**see** *Blechum pyramidatum*
Blechum pyramidatum	**use for** *Blechum browneii*
Cassia occidentalis	**see** *Senna occidentalis*
Cassia tora	**see** *Senna tora*
Chamaesyce hirta	**use for** *Euphorbia hirta*
Clerodendrum chinense	**use for** *Clerodendrum philippinum*
Clerodendrum philippinum	**see** *Clerodendrum chinense*
Digitaria decumbens	**see** *Digitaria eriantha*
Digitaria eriantha	**use for** *Digitaria decumbens*
Elephantopus mollis	**use for** *Elephantopus scaber*
Elephantopus scaber	**see** *Elephantopus mollis*
Euphorbia geniculata	**see** *Euphorbia heterophylla*
Euphorbia heterophylla	**use for** *Euphorbia geniculata*
Euphorbia hirta	**see** *Chamaesyce hirta*
Fimbristylis atollensis	**see** *Fimbristylis cymosa*
Fimbristylis cymosa	**use for** *Fimbristylis atollensis*
Imperata cylindrica	**see** *Imperata conferta*
Imperata conferta	**use for** *Imperata cylindrica*
Jussiaea suffruticosa	**see** *Ludwigia octovalvis*
Ludwigia octovalvis	**use for** *Jussiaea suffruticosa*
Messerschmidia argentea	**see** *Tournefortia argentea*
Premna obtusifolia	**use for** *Premna serratifolia*
Premna serratifolia	**see** *Premna obtusifolia*
Scaveola sericea	**use for** *Sericea taccada*
Scaveola taccada	**see** *Scaveola sericea*
Senna occidentalis	**use for** *Cassia occidentalis*
Senna tora	**use for** *Cassia tora*
Solanum americanum	**use for** *Solanum nigrum*
Solanum nigrum	**see** *Solanum americanum*
Sorghum arundinaceum	**use for** *Sorghum verticilliflorum*
Sorghum verticilliflorum	**see** *Sorghum arundinaceum*
Tournefortia argentea	**use for** *Messerschmidia argentea*

5. Useful Literature

Asche, M. and Wilson, M.R. 1989. The three taro planthoppers: species recognition in *Tarophagus* (Hemiptera: Delphacidae). Bulletin of Entomological Research, 79, 285

Bigger, M. 1988. The Insect Pests of Forest Plantation Trees in the Solomon Islands. Solomon Islands' Forest Record No. 4. ODNRI, Kent, U.K., 190p.

Day, R.K., Rudgard, S.A. and Nair, K.S.S. 1994. Asian Tree Pests: an Overview. FAO Technical Document GCP/RAS/134/ASB, FORSPA Publication 12, 71p.

De Barro, P.J. 1995. *Bemisia tabaci* biotype B: a review of its biology, distribution and control. CSIRO Division of Entomology, Technical Paper No. 33, 57p.

Douglas, N. and N., ed. 1989. Pacific Islands Yearbook, 16th ed. Sydney, Angus and Robertson, 717p.

FAO 1993. FAO Statistics Series 117. FAO Yearbook: Production, Volume 47.

Gray, B. 1968. Forest tree and timber insect pests in the territory of Papua New Guinea. Pacific Insects, 10, 301

— 1974. Forest insect problems in the South Pacific islands. Commonwealth Forestry Review, 53, 39

Gray, B. and Wylie, F.R. 1974. Forest tree and timber pests in Papua New Guinea II. Pacific Insects, 16, 67

Holm, L.G., Plucknett, D.L., Pancho, J.V. and Herberger, J.P. 1977. The Worldōs Worst Weeds. Distribution and Biology. Honolulu, Hawaii, University Press of Hawaii, 609p.

Julien, M.H. 1992. Biological Control of Weeds. A World Catalogue of Agents and Their Target Weeds, 3rd ed. Wallingford, U.K., CAB International Institute of Biological Control, 186p.

Lai, P.Y. and Funasaki, G.Y. 1986. List of Beneficial Introductions for Biological Control in Hawaii. Plant Pest Control Branch, Division of Plant Industry, Department of Agriculture, Hawaii, Monograph, 80p.

Li, L.Y., Wang, R. and Waterhouse, D.F. 1997. The Distribution and Importance of Arthropod Pests and Weeds of Agriculture and Forestry Plantations in Southern China. Chinese Academy of Agricultural Sciences and ACIAR, in press.

Lazarides, M. and Hince, B., ed. 1993. CSIRO Handbook of Economic Plants of Australia. Melbourne, CSIRO, 330p.

Naumann, I. 1993. CSIRO Handbook of Australian Insect Names. Melbourne, CSIRO, 192p.

Oliver, W.W. 1992. Plantation Forestry in the South Pacific: a Compilation and Assessment of Practices. USDA Forest Service, 121p.

Swaine, G. 1971. Agricultural Zoology in Fiji. London, Overseas Development Administration, Overseas Research Publication No 18, 407p.

Walker, A.K. 1994. A review of the pest status and natural enemies of *Thrips palmi*. Biocontrol News and Information, 15, 7N

Waterhouse, D.F. 1985. The occurrence of major invertebrate and weed pests in the Southwest Pacific. In: Ferrar, P. and Stechmann , D., ed., Proceedings of a Workshop on the Biological Control of Pests in the Southwest Pacific. ACIAR/ GTZ and the Government of Tonga, 17

— 1991. Guidelines for biological control projects in the Pacific. Noumea, New Caledonia, SPC Information Document 57, 30p.

— 1993a. The Major Pests and Weeds of Agriculture in Southeast Asia: Distribution, Importance and Origin. Canberra, ACIAR Monograph 21, 141p.

— 1993b. Biological Control: Pacific Prospects: Supplement 2,. Canberra, ACIAR, 138p.

— 1994. Biological Control of Weeds: Southeast Asian Prospects. Canberra, ACIAR, 302p.

— 1997. Biological Control of Insect Pests: Southeast Asian Prospects. Canberra, ACIAR, in press.

Waterhouse, D.F. and Ferrar, P. ed., 1997. Proceedings, Second Biological Control Workshop in the Pacific. South Pacific Commission, Noumea, New Caledonia.

Waterhouse, D.F. and Norris, K.R. 1987. Biological Control: Pacific Prospects. Melbourne, Inkata Press, 454p.

— 1989. Biological Control: Pacific Prospects: Supplement 2. Canberra, ACIAR, 123p.

Whistler, W.A. 1983. Weed Handbook of Western Polynesia. Eschborn, German Agency for Technical Cooperation (GTZ), Miscellaneous Publication 157, 143p.

— 1995. Wayside Plants of the Islands. Honolulu, Isle Botanica, 202p.

Williams, D.J. and Watson, G.W. 1988a. The Scale Insects of the Tropical South Pacific Region. Part 1. The armoured scales (Diaspididae). Wallingford, U.K., CAB International, 290p.

— 1988b. The Scale Insects of the Tropical South Pacific Region. Part 2. The Mealybugs (Pseudococcidae). Wallingford, U.K., CAB International, 260p.

— 1990. The Scale Insects of the Topical South Pacific Region. Part 3. The Soft Scales (Coccidae) and Other Families. Wallingford, U.K., CAB International, 267p.

Wood, A.M. 1992. Insects of Economic Importance: a Checklist of Preferred Names. Wallingford, U.K., CAB International, 149p.

Zhang, B-C. 1994. Index of Economically Important Lepidoptera. Wallingford, U.K., CAB International, 599p.