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Naturalized Fabaceae (Leguminosae) species in Taiwan: the first approximation

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Abstract. The family Fabaceae (Leguminosae) is used as a starting point for creating a database of naturalized/invasive plant taxa in Taiwan, a Pacific island with very limited available information on plant invasions. A comprehensive list of naturalized Fabaceae, with background information on origin, habit, life form, and minimum residence time for most of the species is presented. This family is the second largest dicotyledon family in Taiwan, with non-native species accounting for one-sixth of the naturalized flora of this island: 54 naturalized species (approximately 23.8% of resident legume flora, including native and naturalized species) represent 34 genera (eleven exotic to Taiwan) and three subfamilies. Most of the naturalized taxa belong to the subfamily Papilionoideae, and the majority of them are herbaceous perennials with a minimum resident time ≥ 60 years. Among these naturalized species, two are listed among the world's worst weeds, and at least six of them are known as important environmental weeds in other parts of the world. Most of the naturalized legumes were introduced from the Neotropics, and a notable portion (at least 50%) of them was introduced deliberately for cultivation as forage or ornamentals. Naturalized legumes often exhibit different rates of spread within similar time frames. For example, *Crotalaria zanzibarica* is known from approximately 70 localities, while *C. bialata* is known from only three different localities even though both have the same minimum residence time of 69 years. Such differences suggest that different taxa have a different degree of invasiveness.

Keywords: Alien flora; Habit; Invasive; Life form; Minimum residence time; Pacific island.

Introduction

Plant invasions have been recognized as one of the most serious global processes impacting the structure, composition, and function of natural and semi-natural ecosystems (Mooney and Hobbs, 2000; Vitousek et al., 1997). Ecologists are now paying more attention to plant invasions, including their history and impacts. Several conclusions, concepts, and hypotheses have been put forward and evaluated, especially those related to biogeographical settings, historical events, and biological traits. For example, it has been shown that a species that invades one place tends to be invasive also in other areas (Meyer, 2000); some characteristics possessed by particular groups of species can be used to predict their invasiveness (Reichard and Hamilton, 1997; Rejmánek and Richardson, 1996); and plants of different geographical origin seem to differ in their success (Huston, 1994).

Despite the recent recognition of the importance of invasive species, there are still many areas of the world where basic information on naturalized plant taxa and plant invasions is only anecdotal or completely lacking. Taiwan, a tropical and subtropical Pacific island, is a good example: only occasional and non-ecological attention has been paid to naturalized species on this island (e.g., Peng et al., 1998; Peng and Yang, 1998; Chen et al., 1999; Kuoh and Chen, 2000; Chen and Wu, 2001; Yang, 2001).

Among resident plant families, Fabaceae (Leguminosae) was chosen as a model for evaluation of plant invasions in Taiwan. The legume family is one of the largest vascular plant families and is the most notorious contributor to the naturalized flora of the world (Binggeli, 1996; Pyšek, 1998). Approximately one-fourth of resident legumes in Taiwan are alien species. Furthermore, this family has been studied extensively by many taxonomists, and therefore, relatively comprehensive data are available and abundant specimen collections are accessible in local herbaria.

The goals of this study were: (1) to compile a comprehensive list of naturalized Fabaceae taxa in Taiwan; and (2) to summarize their basic biological characteristics and geographical sources.

Terminology

A "naturalized" species is defined as an introduced (non-native, exotic) species that can consistently reproduce and sustain populations over many generations without (or in spite of) direct intervention by humans. After successful local establishment, some naturalized species disperse and produce viable offspring in regions distant

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from the sites of introduction. Such species are called "invasive" (Richardson et al., 2000a; Pyšek et al., 2002). Many invasive plant species cause economic and/or ecological damage, and are commonly referred to as exotic "pests" or "weeds."

Materials and Methods

Fabaceae is one of the largest plant families in the world. There are approximately 18,000 species in 650 genera worldwide (Mabberley, 1998), and 227 species in 60 genera are included in the second edition of the Flora of Taiwan (Huang et al., 1993). Among 168 native species, 27 are endemic to Taiwan (Peng et al., 1993). Based on Volume Three of the Flora of Taiwan (Huang et al., 1979, 1993), a list of all species documented as naturalized, escaped or persistent after cultivation, or invasive in Taiwan with an origin in foreign regions, was compiled for further examination. Species described in Huang et al. (1993) as introduced or cultivated without evidence of escape were not considered. Other sources in the literature included relevant journal articles as well as Chuang and Huang (1965), Hsu (1975), Liu et al. (1998), and Chen and Hu (1976). Many other sources were also consulted for biological characters and native distributions of naturalized species. The main herbaria in Taiwan (TAI, HAST, and TAIF) were visited during the summer of 2000, and information on the labels of specimens of naturalized species was examined, including locality and year of collection.

Approximately 1,300 specimens of naturalized legumes were examined. To summarize general trends in the development of the naturalized leguminous flora, the cumulative number of recorded species was plotted against time (1890-2000; Figure 3). However, the year of first record was not available for all species. Therefore, only 48 out of 54 species could be used for this analysis. Collected data also provided a preliminary assessment of species invasiveness. The number of localities (distance ≥ 5 km apart) per species was plotted against minimum residence time (time between the first herbarium record in Taiwan and 2000). The relationship between these two variables was then quantified by a linear regression (Figure 4). Species distributed above the regression line were assumed to be more invasive, while species below the line seemed less invasive.

Results

Fifty-four species in 34 genera are documented as naturalized in Taiwan (Tables 1 and 2), representing 23.8% of the leguminous species in Taiwan. Among the three Fabaceae subfamilies, Papilionoideae are represented by 44 naturalized species, followed by Mimosoideae (six species) and Caesalpinioideae (four species) (Table 1). This is proportional to the sizes of these subfamilies worldwide (12150, 2950, 2175 species, respectively). Most naturalized species are herbaceous, followed by shrubs, herbaceous vines, trees, and lianas (Table 1).

Origin, habit, life form, height, seed number per pod, year of first specimen collection, purpose of introduction, and year of first introduction (if known) are presented in Table 2. Most naturalized legumes are from the Americas, followed by Asia, Europe, and Africa (Figure 1). Tropical areas of the Americas and Asia are especially important sources. Europe represents the single most important donor of temperate species naturalized in Taiwan (Figure 1).

Most of the naturalized legumes are herbaceous species (Table 1). Among all naturalized legumes, perennials are most common, followed by annuals, biennials, facultative annuals/perennials, and facultative annuals/biennials

Table 1. Numerical summary of the naturalized leguminous flora in Taiwan.

	Mimosoideae	Caesalpinioideae	Papilionoideae	Total
Genera	5	2	27	34
Species	6	4	44	54
Tree	2	0	1	3
Shrub	4	0	4	8
Herb	0	4	29	33
Liana	0	0	1	1
Vine	0	0	9	9

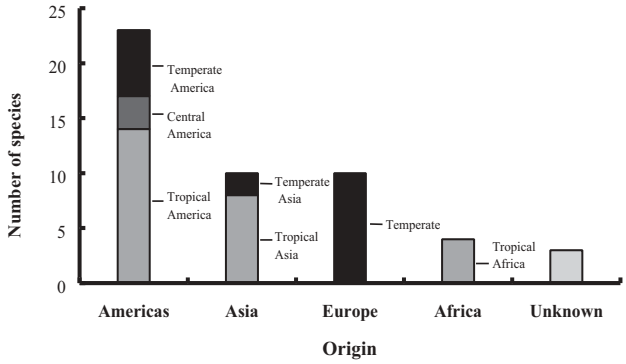

Figure 1. Origins of the naturalized legumes in Taiwan.

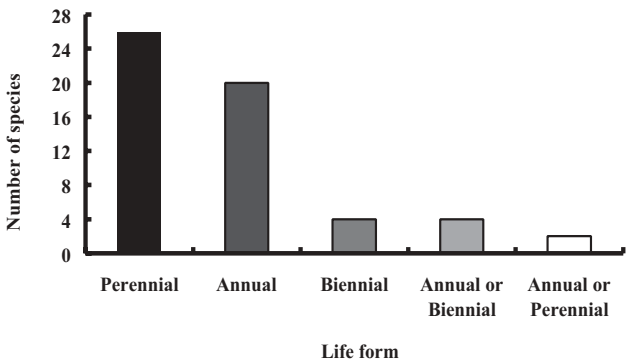

Figure 2. Frequency distribution of life forms of naturalized legumes in Taiwan.

(Figure 2). Excluding trees, plant height ranges from 0.1 m to 4 m, and seeds per pod vary from 1 to 70 (Table 2).

Usages of many naturalized legumes are not well documented. Known usages include cultivation for forage, ornament, or medicine (Table 2). At least six naturalized species were introduced as ornamentals, ≥ 20 as forage plants, and at least three for medicinal purposes (Table 2).

Based on the specimen records in the herbaria in Taiwan, the first specimen of any naturalized legume was collected in 1896: *Astragalus sinicus* L. (Table 2 and Figure 3). The development of the naturalized flora from 1896 to 2000 is illustrated in Figure 3. The number of naturalized species increased slowly from 1896 to 1915, and then substantially increased from 1910 to 1930. No new species were recorded 1930 - 1960. The number of recorded naturalized species increased again between 1970 and 2000 (Figure 3). The species with the longest minimum residence time (MRT) was *Astragalus sinicus*, followed by *Cajanus cajan*, *Clitoria ternatea*, *Medicago polymorpha*, and *Crotalaria pallida*. The species collected from the largest number of localities was *Crotalaria zanzibarica*, followed by *Crotalaria pallida*, *Clitoria ternatea*, *Desmodium scorpiurus*, and *Centrosema pubescens*.

Species differed in their number of localities when plotted against minimum residence time (MRT) (Figure 4). More than 50% of the naturalized species have been present in Taiwan for more than 70 years. About 2/3 of these species lay under the regression line in Figure 4, and about 1/3 lay above it. Several genera are represented by more than one naturalized species and show various patterns in the relationship between minimum residence time and number of localities (*Crotalaria, Desmodium, Trifolium* and *Vicia*; Figure 4). *Crotalaria*, which has six naturalized species, is the largest genus contributing to the naturalized legume flora. Four of the six naturalized *Crotalaria* have a similar minimum residence time, ca 70 years; however, the numbers of recorded localities range from four to 70. *Crotalaria zanzibarica* has the most localities (70 different localities in 69 years) and *C. pallida* has been collected from 67 localities in 90 years. However, their congeners *C. incana* and *C. micans* have established themselves in only 24 and 26 localities, respectively, during the same time. Finally, *C. bialata* has been collected from only three localities in 69 years (Figure 4). *Desmodium* has three naturalized congeners, and two of them have been collected for more than 70 years. *Desmodium scorpiurus* has been collected in 42 localities during 84 years but *D. tortuosum* has been collected in only eight localities in a 70-year period (Figure 4). *Trifolium* has three naturalized species, two of which have been collected for more than 69 years. *Trifolium repens* has been collected in 20 localities during 84 years but *T. pratense* in only four localities during 69 years. *Vicia* is represented by three naturalized taxa; all of which have been in Taiwan for more than 72 years. *Vicia sativa* subsp. *nigra* and *V. tetrasperma* are naturalized in approximately ten localities, but *V. hirsuta* has been collected in only three localities (Figure 4).

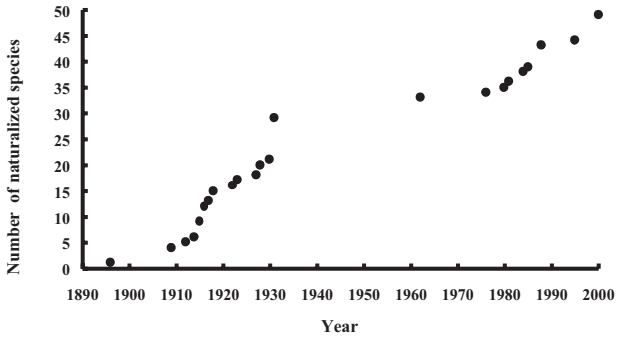

Figure 3. Number of naturalized leguminous species in Taiwan flora during the period 1890-2000.

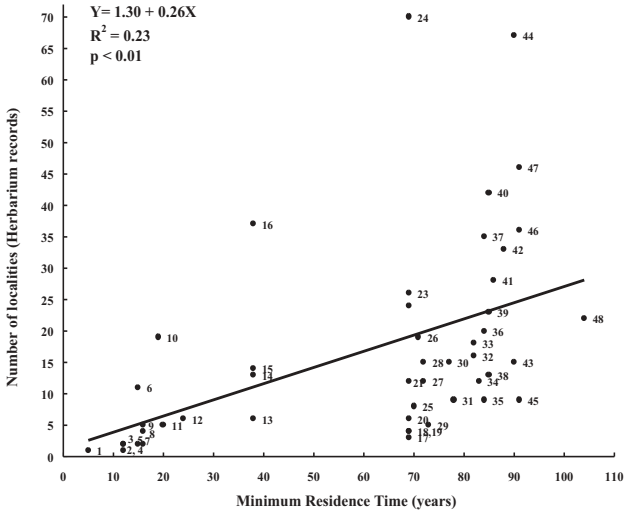

Figure 4. Number of localities per species vs. minimum residence time of naturalized legumes in Taiwan. 1, *Clitoria falcata* Lam; 2, *Desmanthus virgatus* L.; 3, *Acacia farnesiana* (L.) Willd; 4, *Senna occidentalis* (L.) Link; 5, *Crotalaria triquetra* Dalzell; 6, *Macroptilium atropupureus* (DC.) Urb.; 7, *Alysicarpus rugosus* (Willd.) DC.; 8, *Melilotus officinalis* (L.) Lam.; 9, *Pueraria lobata* (Willd.) Ohwi; 10, *Macroptilium lathyroides* (L.) Urb.; 11, *Trifolium dubium* Sibth.; 12, *Mimosa diplotricha* C. Wight; 13, *Neonotonia wightii* Lakey; 14, *Desmodium intortum* (DC.) Urb.; 15, *Aeschynomene Americana* L.; 16, *Centrosema pubescens* Benth.; 17, *Canavalia ensiformis* DC.; 18, *Crotalaria bialata* Schrank; 19, *Trifolium pratense* L.; 20, *Medicago sativa* L.; 21, *Calapogonium mucunoides* Desv.; 22, *Crotalaria incana* L.; 23, *Crotalaria micans* Link; 24, *Crotalaria zanzibarica* Benth.; 25, *Desmodium tortuosum* (Swartz) DC.; 26, *Medicago lupulina* L.; 27, *Tephrosia candida* (Roxb.) DC.; 28, *Vicia tetrasperma* Moench.; 29, *Vicia hirsuta* (L.) S. F. Gray; 30, *Vicia sativa* L. subsp. *nigra* (L.) Ehrh.; 31, *Albizzia lebbeck* (L.) Benth.; 32, *Mucuna pruriens* (L.) DC. var. *utilis* (Wall. ex Wight.) Burck.; 33, *Melilotus indicus* (L.) All.; 34, *Pachyrrhizus erosus* (L.) Urb.; 35, *Dalbergia sissoo* Roxb.; 36, *Trifolium repens* L.; 37, *Leucaena leucocephala* (Lam.) De Wit; 38, *Vigna umbellata* (Thunb.) Ohwi & Ohashi; 39, *Vigna radiata* (L.) Wiczek var. *sublobata* (Roxb.) Verdc.; 40, *Desmodium scorpiurus* (Sw.) Desv.; 41, *Sesbania canabina* (Retz.) Poir.; 42, *Mimosa pudica* L.; 43, *Arachis hypogea* L.; 44, *Crotalaria pallida* Ait.; 45, *Medicago polymorpha* L.; 46, *Cajanus cajan* (L.) Millsp.; 47, *Clitoria ternatea* L.; 48, *Astragalus sinicus* L.

Table 2. Characteristics of naturalized legumes in Taiwan.

Species	Origin	Habit	Life form[1]	Height (m)	Seed no.[2]	First spec.[3]	Purpose[4]	First intro.[5]
Subfamily: Caesalpinoideae								
Chamaecrista mimosoides (L.) Green	India and South China	Herb	Per	0.1-0.6	15-26		For?	
Chamaecrista nictitans (L.) Moench ssp. *patelloria* (Colladon) Irwin & Barneby var. *glabrata* (Vogel) Irwin & Barneby	Tropical America	Herb	Ann	1.5	8-16			
Senna hirsuta (L.) Irwin & Barneby	Sw US/Mexico	Herb	Ann	1	>20			
Senna occidentalis (L.) Link	South America	Herb	Per	1.5	25-40	1988		
Subfamily: Mimosoideae								
Acacia farnesiana (L.) Willd.	Tropical America	Shrub	Per	4		1988	Orn	1645
Albizzia lebbeck (L.) Benth.	Africa	Tree	Per	10	4-9	1922	Orn	1896
Desmanthus virgatus L.	Tropical America	Shrub	Per	2	10-25	1988		
Leucaena leucocephala (Lam.) De Wit	Tropical America	Tree	Per	6	8-18	1916	Orn	1645
Mimosa diplotricha C. Wight ex Sauvalle	Tropical America	Herb	Ann or Bien	1	3-5	1976	Orn	1965
Mimosa pudica L.	Tropical America	Herb	Ann or Bien	0.8	2-5	1912	Orn	1645
Subfamily: Papilionoideae								
Aeschynomene americana L.	America	Herb	Ann	1.5-2	2-10	1962		
Alysicarpus rugosus (Willd.) DC.	Tropical Africa	Herb	Ann	0.3-1		1984	For?	
Arachis hypogea L.	Brazil	Herb	Ann	0.3-0.7	1-3	1910	For	
Astragalus sinicus L.	Mainland China	Herb	Bien	0.1-0.25		1896	For	
Cajanus cajan (L.) Millsp.	India	Shrub	Per	3	3-7	1909	Med	
Calopogonium mucunoides Desv.	Tropical America	Vine	Ann	N/A	4-6	1931	For?	
Canavalia ensiformis DC.	Mexico and Brazil	Herb	Ann	1.6	10-20	1931	For?	
Centrosema pubescens Benth.	South America	Vine	Per	N/A	7-15	1962	For	
Clitoria falcata Lam.	Tropical America	Vine	Per	N/A	4-5	1995		
Clitoria ternatea L.	Tropical America	Vine	Per	N/A	6-10	1909	Orn	
Crotalaria bialata Schrank	Tropical Asia	Herb	Ann	0.2	10-20	1931	For	
Crotalaria incana L.	Tropical America	Herb	Ann	1	20-30	1931		
Crotalaria micans Link	South America	Herb	Per	2	10-15	1931		
Crotalaria pallida Ait.	Africa	Shrub	Ann or Per	0.5-2	20-40	1910		
Crotalaria triquetra Dalzell	Tropical Asia	Herb	Per	0.5		1985		
Crotalaria zanzibarica Benth.	Africa	Shrub	Ann or Per	1.5-2	40-70	1931		
Dalbergia sissoo Roxb.	India	Tree	Per	8	1-3	1916	For	
Desmodium intortum (DC.) Urb.	Tropical America	Herb	Per	0.7		1962	For?	
Desmodium scorpiurus (Sw.) Desv.	Tropical America	Herb	Per	0.2-0.6	4-8	1915	For?	
Desmodium tortuosum (Swartz) DC.	West Indies	Herb	Ann	0.5-2		1930	For?	
Lablab purpureus (L.) Sweet	Asia, China	Herb	Ann	0.1			For	
Macroptilium atropurpureus (DC.) Urb.	Tropical America	Herb	Per	0.7		1985	For?	
Macroptilium lathyroides (L.) Urb.	Tropical America	Herb	Ann	0.5	15-30	1981	For	
Medicago lupulina L.	Europe	Herb	Ann	0.3-0.6	1	1929	For	
Medicago polymorpha L.	Europe	Herb	Ann	0.1-0.4		1909	For	
Medicago sativa L.	Europe	Herb	Per	0.3-1	1-8	1931	For	
Melilotus indicus (L.) All.	Europe	Herb	Bien	0.2-0.5	1	1918		
Melilotus officinalis (L.) Lam.	Europe	Herb	Ann or Bien	0.9-1	1-2	1984	For	
Mucuna pruriens (L.) DC. var. *utilis* (Wall. ex Wight.) Burck.	Tropics	Vine	Per	N/A		1918	For	
Neonotonia wightii (Wight & Ann.) Lakey	Africa	Vine	Per	N/A	4	1962	For	
Pachyrrhizus erosus (L.) Urb.	Tropical America	Vine	Ann	5	8-10	1917	For	
Psoralea corylifolia L.	South Asia and China	Herb	Ann	1.5			Med	
Pueraria lobata (Willd) Ohwi ssp. *thomsonii* (Benth.) Ohashi & Tateishi	Eastern & Southern Asia	Liana	Per	N/A		1911	For	
Sesbania cannabina (Retz.) Poir.	India	Herb	Ann	1-1.5		1914	For	

Table 2. (Continued)

Species	Origin	Habit	Life form[1]	Height (m)	Seed no.[2]	First spec.[3]	Purpose[4]	First intro.[5]
Stylosanthes guianensis (Aubl.) Sw	Central and S. America	Herb	Per	0.3-0.6			For?	
Tephrosia candida (Roxb.) DC.	India	Shrub	Per	3	10-13	1928	For	
Trifolium dubium Sibth.	Europe	Herb	Ann	0.3	1	1980	For	
Trifolium pratense L.	Europe	Herb	Per	0.3-0.6	1	1931	For	
Trifolium repens L.	Europe	Herb	Per	0.1-0.3	3-4	1916	For	
Vicia hirsuta (L.) S. F. Gray	N. Hemisphere	Vine	Ann	0.8-1.2	2	1927		
Vicia sativa L. ssp. *nigra* (L.) Ehrh.	Europe	Herb	Ann	0.25-0.9	5-8	1923	For?	
Vicia tetrasperma (L.) Moench.	Europe	Herb	Ann or Bien	0.3-0.6	4	1928		
Vigna radiata (L.) Wiczek var. *radiata*	Thailand, Southeast Asia	Herb	Per	0.3		1915	Med	
Vigna umbellata (Thunb.) Ohwi & Ohashi	Subtropical Asia	Vine	Per	N/A	8-12	1915	For	

[1]Ann: annual; Per: perennial; Bien: biennial; Ann or Bien: annual or biennial; Ann or Per: annual or perennial.
[2]Seed no.: Seed number per pod.
[3]First spec.: year of first specimen in the herbaria in Taiwan.
[4]Purpose: purpose of introduction. Orn: ornamental; For: forage; Med: medicinal.
[5]First intro.: year of first introduction as known from literature.

Conclusion and Discussion

About 24% (54 out of 227 species) of the leguminous flora in Taiwan are naturalized species (Table 1 and 2). Compared with other Pacific islands (see Table 3), this proportion is rather low. Proximity of the largest continent that itself seems to be resistant to plant invasions is one possible explanation.

Most naturalized legumes in Taiwan are herbaceous (Table 1). Not surprisingly, most of the naturalized species (46 out of 54) are in the largest subfamily, Papilionoideae—a phenomenon reported from other islands (e.g. MacKee, 1994; Pickard, 1984). The second largest subfamily, Mimosoideae, is represented by only six naturalized species, all of them woody. Mimosoideae taxa are the most notorious group of invasive woody plants in the world (Binggeli, 1996).

Geographical origin of naturalized legumes is often difficult to discern. Many references to origin in the literature employ rather ambiguous terms, such as "old world," "cosmopolitan," or "pantropical." Many species introduced from Europe also occur in West Asia and/or North Africa. Many of them were very likely brought to Taiwan from Europe and are treated here as European. Most naturalized species are from the Americas (Figure 1), especially from the American tropics. Asia is the second most important source of naturalized species, followed closely by Europe. In general, this is in agreement with the belief that species might adapt well to a new environment with a climate similar to their "homeland" (Corlett, 1988). Taiwan has both tropical and subtropical climates, and most of the naturalized American, Asian, and African species are of tropical origin (Figure 2).

The number of naturalized legumes has been increasing since 1896 (Figure 3). Some African, Asian, and European species were probably brought onto the island by sailors, traders and immigrants during the nineteenth century or even earlier. However, it is still not clear how so

Table 3. Examples of naturalized leguminous floras in different regions.

Region	Area (km^2)	Naturalized species	Native species	Proportion (%)[1]	Reference
Continental areas					
Baja California Sur	ca 4,500	9	85	9.6	Lenz (1992)
California	411,020	90	307	22.7	Randall et al. (1998)
Malay Peninsula	ca 280,000	44	254	14.8	Turner (1995)
Vietnam	329,556	38	590	6.1	Chấn et al. (1999)
Island areas					
Galapagos	7,870	24	34	41.4	Lawesson et al. (1987), Tye (2001)
Hawaii	16,764	92	22	80.7	Wagner et al. (1999)
New Caledonia	18,576	53	98	35.1	Jaffré et al. (2001), Mackee (1994)
New Zealand	268,575	121	32	79.1	Webb et al. (1988), Parsons et al. (1995)
Taiwan	ca 36,000	54	168	23.8	This study
Tasmania	ca 67,800	67	90	42.7	Buchanan (1995), Rozefelds et al. (1999)

[1]Proportion (%): Number of naturalized species/Number of naturalized and native species × 100.

many successful American species were introduced. Since more than half of the naturalized legumes were introduced to Taiwan as ornamentals or for forage (Table 2), increased trading may bring in more potential invasive species after Taiwan becomes a member of the World Trade Organization.

One of the most robust generalizations of invasion biology is that the probability of invasion success increases with residence time (Rejmánek, 2000). However, a long minimum residence time does not always correlate with more localities. Several genera, including *Crotalaria, Desmodium, Trifolium,* and *Vicia*, have more than one naturalized species with similar minimum residence times and show conflicting patterns (Figure 4). Among the species present in Taiwan for at least 70 years, some occupy many habitats whereas others have never spread out (Figure 4). One explanation is that species with more localities have been spread by human activities (Williamson, 1996); a second explanation is that the taxa differ in their invasiveness. The first explanation seems less likely for most of these species because usage does not correlate with numbers of reported localities. Inevitably, long-term monitoring of naturalized species is needed because some invaders have prolonged lag phases lasting hundreds of years (Crooks and Soulé, 1999). The presence of compatible nitrogen-fixing, nodule-forming bacteria (rhizobia) can be critical for the success of many introduced leguminous species (Skerman et al., 1988; Richardson et al., 2000b; Parker, 2001).

Most of the naturalized leguminous species reported from Taiwan seem to be of minor economic importance. Only two are listed among the world's worst weeds: *Mimosa pudica* (Holm et al., 1991) and *Senna occidentalis* (Holm et al., 1997). Only four are listed among major weeds in Taiwan: *Astragalus sinicus*, *Medicago lupulina*, *Mimosa pudica*, and *Senna occidentalis* (Hsu, 1975). However, several other naturalized species are well known as exotic pests or environmental weeds (pests in natural or semi-natural areas) in other regions: *Acacia farnesiana, Albizia lebbeck, Cajanus cajan, Centrosema pubescens, Leucaena leucocephala*, and *Pueraria lobata* ssp. *thomsonii* (Gargominy et al., 1996; Meyer, 2000; Henderson, 2001; Tye, 2001). Because of their association with nitrogen-fixing bacteria, some of these species can be classified as "transformers" —species that change the nature of ecosystems over large areas (Richardson et al., 2000a). Moreover, even inconspicuous naturalized legumes can increase soil nitrogen concentrations to the point that invasions of other alien species are facilitated (Carino and Daehler, 2002). Therefore, a field assessment of the extent of infestation of the above-mentioned species should have the highest priority.

Establishment of a database of naturalized species is the first step in the development of invasion biology in Taiwan and also a stepping-stone to further detailed studies on the biology and impact of individual species.

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台灣豆科（Leguminosae）歸化植物之匯整與首次研究

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有鑒於台灣對於入侵植物之基本資料與生態研究的嚴重缺乏，本研究以豆科歸化植物為題材，對歸化及入侵植物的特質進行初步的探討。結果顯示，台灣擁有豆科歸化植物 54種，分屬於三個亞科，34屬（11屬為歸化屬）。此數量佔全台豆科植物之 23.8%，約為全島歸化植物之六分之一。大部份歸化的豆科植物為隸屬於蝶形花亞科（Papilionoideae）的多年生草本植物，在台灣的駐在時間（minimum residence time）多超過 60年。此 54種中，有兩種名列世界最惡劣雜草，至少有六種為國際所知對環境造成嚴重危害的外來植物。農業或是景觀用途為主要引進緣由，新熱帶地區則是豆科歸化植物的主要原生地。這些外來的植物多以不同的速度擴散，即使是具有相同駐在時間的同屬種類，亦有不同的表現。以南美豬屎豆（*Crotalaria zanzibarica*）為例，在其駐在的 69 年間，至少在 70 個不同的地點被發現，而同屬的翼莖野百合（*C. bialata*）在相同的駐在時間內，卻僅有三個不同的據點。據我們的推測及分析顯示，此一不同的擴散趨勢，可作為這些物種入侵能力（invasiveness）的指標。

關鍵詞：入侵植物；生活型；外來植物；台灣；豆科；習性；植物名錄；駐在時間；歸化。