

# NODULATION OF LEGUMES INDIGENOUS TO QUEENSLAND

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## SUMMARY.

Information available on nodulation and cross-infection of Queensland indigenous legumes is assembled.

Nodulation is recorded on 29 previously unlisted indigenous species, including 2 unlisted genera.

The ability of isolates from 13 species to infect cowpea (*Vigna sinensis* (L.) Endl. ex Hassk.) is recorded.

The information on nodulation and cross-infection for indigenous legumes in the whole of Australia is assembled as an appendix.

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## I. NODULATION.

Allen and Allen (1954) reported that only about 1,200 of the estimated 10,000 species in the family *Leguminosae* have been examined for the presence or absence of root nodules due to infection by species of the bacterial genus *Rhizobium* Frank.

Bailey (1913) recorded 458 indigenous Queensland leguminous species in 84 genera. Species and recognised varieties (to some of which species rank is now attributed) numbered 553. Since this work 24 species have been added and the number of recognised genera raised to 90.

The presence of nodules on 83 of the indigenous species in 36 genera has been recorded in various papers by Australian and overseas workers. The species are listed together with available data on cross-infection in Table 1.

**Table 1.**  
RECORDED NODULATION OF QUEENSLAND INDIGENOUS LEGUMES.

Host.	Authority for Record of Nodulation.	Recorded Behaviour with Respect to Cross-inoculation Groups.*†	Authority for Cross-inoculation Data.
<b>PAPILIONOIDEAE.</b>			
Tribe Podalyrieae			
<i>Aotus lanigera</i> A. Cunn. ex Benth. . . . .	21,*		
<i>Daviesia corymbosa</i> Sm. . . . .	19		
<i>D. ulicifolia</i> Andr. ( <i>D. ulicina</i> Sm.) . . . . .	19,*		
<i>Dillwynia ericifolia</i> Sm. . . . .	18		
<i>D. floribunda</i> Sm. . . . .	18, 19,*		
<i>Jacksonia scoparia</i> R. Br. . . . .	21,*	C	21
<i>Mirbelia reticulata</i> Sm. . . . .	21,*	C	21
<i>Pultenaea daphnoides</i> Wendl. . . . .	18, 19		
<i>P. myrtoides</i> A. Cunn. ex Benth. . . . .	21	C	21
<i>P. villosa</i> Willd. . . . .	21,*	C	21,*
<i>Viminaria juncea</i> (Schrad.) Hoffm. . . . .	18		
( <i>V. denudata</i> Sm.)			
Tribe Genisteae			
<i>Bossiaea prostrata</i> R. Br. . . . .	19		
<i>Crotalaria cunninghamii</i> R. Br. . . . .	1	C	1
<i>C. incana</i> L. . . . .	1, 6, 11, 28, 30, 33, 34	C (C)	1, 11, 30, 33
<i>C. juncea</i> L. . . . .	6, 9, 11, 16, 25, 27, 30, 33	C (C, P, Lo, M, T)	9, 11, 16, 25, 27, 30, 33
<i>C. quinquefolia</i> L. . . . .	6		
<i>C. laburnifolia</i> L. . . . .	28		
<i>C. mucronata</i> Desv. ( <i>C. striata</i> DC.) . . . . .	9, 11, 28, 30, 34,	C (C)	9, 11, 30
<i>C. retusa</i> L. . . . .	11, 16, 30, 33	C (C)	11, 16, 30, 33
<i>C. verrucosa</i> L. . . . .	11, 28, 30, 31, 33,	C (C)	11, 30, 31, 33
<i>Goodia lotifolia</i> Salisb. ( <i>G. medicaginea</i> F. Muell.)	19		
<i>Platylobium formosum</i> Sm. . . . .	21,*	C	21
Tribe Trifolieae			
<i>Trigonella suavissima</i> Lindl. . . . .	29		
Tribe Euloteae			
<i>Lotus australis</i> Andr. . . . .	19		
Tribe Galegeae			
<i>Indigofera australis</i> Willd. . . . .	19,*		
<i>I. hirsuta</i> L. . . . .	1, 6, 9, 28,*	C	1, 9
<i>I. trita</i> L.f. . . . .	30	(C, P, B, T)	30
<i>I. viscosa</i> Lam. . . . .	30, 32, 33	C (C, Lu)	30, 32, 33
<i>Psoralea patens</i> Lindl. . . . .	19		
<i>Tephrosia purpurea</i> (L.) Pers. . . . .	2, 6, 25	C	2, 25
<i>Sesbania bispinosa</i> (Jacq.) Fawcett & Rendle ( <i>S. aculeata</i> (Willd.) Pers.)	20, 25,*	Strain specific— affinities to B, Lu, and C	20, 25

Table 1—continued.

Host.	Authority for Record of Nodulation.	Recorded Behaviour with Respect to Cross-inoculation Groups.*†	Authority for Cross-inoculation Data.
PAPILIONOIDEAE.—Continued.			
<i>S. grandiflora</i> (L.) Pers...	6, 20	Strain specific—affinities to B and C	20
<i>Swainsona galegifolia</i> (Andr.) R. Br. ( <i>S. coronillifolia</i> Salisb.)	30,*	(C, Lu, P)	30
Tribe Hedysareae			
<i>Aeschynomene americana</i> L. . . . .	11, 23	C	11
<i>A. indica</i> L. . . . .	4, 6,*		
<i>Alysicarpus rugosus</i> (Willd.) DC. . . . .	1, 28	C	1
<i>A. vaginalis</i> (L.) DC. ( <i>A. nummularifolius</i> (L.) DC.)	1, 2, 6, 28, 33, 34	C	1, 2, 33
<i>Desmodium gangeticum</i> (L.) DC. . . . .	6		
<i>D. polycarpon</i> (Poir.) DC. (—um) . . . . .	30	(C, T, B)	30
<i>Lespedeza sericea</i> (Thunb.) Miq. ( <i>L. cuneata</i> (D. Don) G. Don)	2, 3, 11, 13, 16, 27	C	2, 3, 11, 13, 16, 27
<i>Phyllodium pulchellum</i> Desv. ( <i>Desmodium pulchellum</i> (Desv.) Benth.)	6		
<i>Uraria lagopodioides</i> (L.) D. Don. ( <i>lagopoides</i> )	6		
Tribe Phaseoleae			
<i>Abrus precatorius</i> L. . . . .	1, 6	C	1
<i>Dolichos biflorus</i> L. . . . .	16, 24, 25, 28	C, Lu	16, 24, 25
<i>Erythrina indica</i> Lam. . . . .	1, 2, 9	C	1, 2, 9
<i>Hardenbergia violacea</i> (Schneev.) Stearn ( <i>H. monophylla</i> (Vent.) Benth., <i>Kennedyia monophylla</i> Vent.)	19, 30,*	C (C, Lo, Lu, P, M, T, B)	30,*
<i>Kennedyia prostrata</i> R. Br. . . . .	19		
<i>Mucuna gigantea</i> (Willd.) DC. . . . .	1	C	1
<i>Phaseolus mungo</i> L. . . . .	12, 16, 25	C, Lu.	16, 25
<i>Rhynchosia minima</i> (L.) DC. . . . .	28, 32, 33,*	C	32, 33
<i>Vigna marina</i> (Burm.) Merr. ( <i>V. retusa</i> Walp.)	1, 2, 30	C (C, Lu, P, B, T)	1, 2, 30
<i>V. vexillata</i> (L.) Benth. . . . .	28, 30	(C, P,B,T)	30
CAESALPINIOIDEAE			
Tribe Cassieae			
<i>Cassia mimosoides</i> L. . . . .	1, 2, 6	C	1, 2
MIMOSOIDEAE.			
Tribe Acacieae			
<i>Acacia acinacea</i> Lindl. . . . .	19		
<i>A. anceps</i> DC. . . . .	19		
<i>A. arabica</i> (Lam.) Willd. . . . .	1	C	1
<i>A. armata</i> R. Br. . . . .	16, 19	C	16

Table 1—continued.

Host.	Authority for Record of Nodulation.	Recorded Behaviour with Respect to Cross-inoculation Groups.*†	Authority for Cross-inoculation Data.
MIMOSOIDEAE.—Continued.			
<i>A. auriculiformis</i> A. Cunn. ex Benth. . .	1	C	1
<i>A. baileyana</i> F. Muell. . . . .	1, 33	C	1, 33
<i>A. cultriformis</i> A. Cunn. ex G. Don . .	33	C	33
<i>A. cunninghamii</i> Hook. . . . .	21,*	C	21,*
<i>A. dealbata</i> (Page) Link. . . . .	33	C	33
<i>A. decurrens</i> (Wendl.) Willd. . . . .	1, 30	C (C, P, Lo)	1, 30
<i>A. discolor</i> (Lam.) Willd. . . . .	18		
<i>A. elata</i> A. Cunn. ex Benth. . . . .	18		
<i>A. farnesiana</i> (L.) Willd. . . . .	1, 6,*	C	1
<i>A. floribunda</i> (Vent.) Willd. . . . .	16, 33	C	16, 33
<i>A. granitica</i> Maid. . . . .	21	C	21
<i>A. juniperina</i> (Vent.) Willd. . . . .	18,*		
<i>A. latifolia</i> Benth. . . . .	33	C	33
<i>A. ligulata</i> A. Cunn. ex Benth. . . . .	19		
<i>A. linifolia</i> (Vent.) Willd. . . . .	16, 18	C	16
<i>A. longifolia</i> (Andr.) Willd. . . . .	16	C	16
<i>A. melanoxylon</i> R. Br. . . . .	16, 33	C	16, 33
<i>A. myrtifolia</i> (Sm.) Willd. . . . .	19		
<i>A. obliqua</i> A. Cunn. ex Benth. . . . .	28		
<i>A. podalyriifolia</i> A. Cunn. ex G. Don	21,*	C	21
<i>A. pycnantha</i> Benth. . . . .	19		
<i>A. retinodes</i> Schlecht. . . . .	19		
<i>A. salicina</i> Lindl. . . . .	19		
<i>A. sophorae</i> (Labill.) R. Br. . . . .	19		
<i>A. spinescens</i> Benth. . . . .	19		
Tribe Ingeae			
<i>Albizia procera</i> (Roxb.) Benth. . . .	1	C	1

\* Indicates results obtained by the author.

† The symbols in column 3 refer to the following cross-inoculation groups :—

- B Garden bean
- C Cowpea (including soybean)
- Lo Lotus
- Lu Lupin
- M Medic
- P Garden pea
- T Trifolium

Where brackets are used in column 3 the cross-infection data within the brackets are derived from the work of J. K. Wilson (1939a), whose cross-inoculation data frequently do not concur with those of other authorities.

During current investigations on legume nodulation in Queensland many native legumes have been examined. The presence of nodules on 29 species on which nodules apparently had not been recorded previously has been noted as shown in Table 2.

**Table 2.**

NEW RECORDINGS FOR NODULATION.

## PAPILIONOIDEAE.

## Tribe Podalyrieae

- Aotus villosa* (Andr.) Sm.  
*Chorizema parviflorum* Benth.  
*Daviesia umbellulata* Sm.  
*Dillwynia peduncularis* Benth.  
*Gompholobium pinnatum* Sm.  
*G. virgatum* Sieb. ex DC.  
*Phyllota phyllicoides* (Sieb. ex DC.) Benth.  
*Pultenaea microphylla* Sieb. ex DC.  
*P. ?retusa* Sm.

## Tribe Genisteae

- Crotalaria linifolia* L.f.  
*Hovea acutifolia* A. Cunn. ex G. Don

## Tribe Galegeae

- Indigofera enneaphylla* L.  
*Psoralea tenax* Lindl.

## Tribe Hedysareae

- Desmodium nemorosum* F. Muell. ex Benth.  
*D. muelleri* Benth.  
*D. rhytidophyllum* F. Muell. ex Benth.  
*D. varians* (Labill.) G. Don  
*Dicerma biarticulatum* (L.) DC.  
*Zornia diphylla* (L.) Pers.

## Tribe Phaseoleae

- Clitoria australis* Benth.  
*Glycine clandestina* Wendl.  
*G. tabacina* (Labill.) Benth.  
*G. tomentosa* (Benth.) Benth.  
*Vigna lanceolata* Benth.

## MIMOSOIDEAE

## Tribe Adenanthereae

- Neptunia gracilis* Benth.

## Tribe Acacieae

- Acacia falcata* Willd.  
*A. fimbriata* A. Cunn. ex G. Don  
*A. pubescens* (Vent.) R. Br.  
*A. suaveolens* (Sm.) Willd.

The foregoing data, together with all available records on nodulation of legumes indigenous to the other Australian States, are summarized in an appendix.

The 90 genera of *Leguminosae* with members indigenous to Queensland are distributed as follows:—72 in *Papilionoideae*, 11 in *Caesalpinioideae*, and 7 in *Mimosoideae*. The distribution within these sub-families of Queensland genera with indigenous species for which nodulation has been recorded is now 41, 1, and 3 respectively. Of the remaining 31 Queensland genera of the *Papilionoideae*, 9 possess nodulating species not indigenous to Queensland, while for 22 there is no record of observation. If non-indigenous species are considered, no members of 10 of the 11 genera of *Caesalpinioideae* present in Queensland have been recorded to nodulate. This is due partly to lack of observations, although Allen and Allen (1947) recorded a relative lack of nodulation in this sub-family. Records of nodulation of non-indigenous legumes occur in 2 of the 4 genera of *Mimosoideae* lacking nodulation recordings in Queensland.

No previous reference to nodulation of members of the genera *Dicerma* DC., and *Zornia* Gmel. has been found.

A list of the introduced legumes of the cowpea miscellany nodulating naturally in various parts of Queensland is given in Table 3.

Table 3.

INTRODUCED LEGUMES OF THE COWPEA MISCELLANY NODULATING NATURALLY  
IN QUEENSLAND.

- Arachis hypogea* L.
- Cajanus cajan* (L.) Millsp.
- Calopogonium mucunoides* Desv.
- Centrosema pubescens* Benth.
- Clitoria ternatea* L.
- Crotalaria goreensis* Guill. & Perr.
- C. usaramoensis* Bak. f.
- Desmodium canum* (J. F. Gmel.) Schinz & Thell.
- D. heterophyllum* (Willd.) DC.
- D. ovalifolium* Wall. ex Merr.
- D. scorpiurus* (Sw.) Desv.
- D. tortuosum* (Sw.) DC.
- D. triflorum* (L.) DC.
- D. uncinatum* (Jacq.) DC.
- Dolichos lablab* L.
- Glycine javanica* L.
- G. max* (L.) Merr.
- Mimosa pudica* L.
- Phaseolus lathyroides* L.

*Pueraria phaseoloides* (Roxb.) Benth.  
*P. thunbergiana* (S. & Z.) Benth.  
*Stylosanthes gracilis* H.B.K.  
*S. sundaica* Taub.  
*Tephrosia candida* (Roxb.) DC.  
*Vigna sinensis* (L.) Endl. ex Hassk.

## II. CROSS-INFECTION.

The cross-infection data in Table 1 have been summarized and generalised on the basis of the cross-inoculation group distinctions used by Fred, Baldwin and McCoy (1932). Wilson (1939) has criticised the cross-inoculation group concept. Cross-inoculation data of Johnson and Allen (1952) and Raju (1936) indicate definite links between the cowpea "cross-inoculation" group and each of the bean group, the lupin group and the strain-specific *Sesbania* series.

A study of information on the cowpea and soybean cross-inoculation groups leaves little justification for the retention of a distinction between these two, any differences in infectivity being of no higher order than that of specificity recorded for other members of the cowpea miscellany. In Tables 1 and 4 (in appendix), plants listed in the cowpea miscellany have been so placed on the basis of infection studies with *Vigna sinensis* or with other members recognised in this group. The soybean and cowpea groups have been merged in these tables.

Preliminary work in this laboratory has indicated that isolates from several species of Queensland indigenous legumes have the ability to infect *V. sinensis*. These include isolates from :—

*Acacia cunninghamii* Hook.  
*A. fimbriata* A. Cunn. ex G. Don  
*A. juniperina* (Vent.) Willd.  
*Chorizema parviflorum* Benth.  
*Desmodium rhytidophyllum* F. Muell. ex Benth.  
*D. varians* (Labill.) G. Don  
*Dillwynia floribunda* Sm.  
*Glycine clandestina* Wendl.  
*Gompholobium virgatum* Sieb. ex DC.  
*Hardenbergia violacea* (Schneev.) Stearn  
*Hovea acutifolia* A. Cunn. ex G. Don  
*Pultenaea microphylla* Sieb. ex DC.  
*P. villosa* Willd.

*Pultenaea villosa* and *Acacia cunninghamii* have previously been recorded to infect cowpea (McKnight 1949), as has *Hardenbergia violacea* (Wilson 1939 a).

With the exception of *Sesbania bispinosa* (*S. aculeata*) and *S. grandiflora*, all Queensland species studied for cross-infection belong to the cowpea miscellany.

There is no published information on *Trigonella suavissima* or *Lotus australis*. The genus *Trigonella* is placed in the medic cross-inoculation group and the genus *Lotus* in the Lotus cross-inoculation group (Fred, Baldwin and McCoy 1932).

### III. DISTRIBUTION.

Over wide areas of Queensland from latitude 28°S to latitude 17°S, particularly in the coastal belt, cultivated tropical legumes (Table 3) planted without inoculation have been observed. Nodulation is frequently present and invariably occurs in well-established stands.

Intensive observations of both native and planted tropical legumes in the coastal areas between latitude 17°S and latitude 19°S have given no indication of a sparsity of nodulation in the tropics, as is sometimes suggested. The results of Bañados and Fernandez (1954) confirm the presence of the nodulation phenomenon in similar latitudes in the northern hemisphere.

The widespread occurrence of cowpea-type legumes in Queensland makes it almost inevitable that legume bacteria of the cowpea miscellany are widely distributed. This has in fact been found. Nevertheless, responses of the tropical legumes to inoculation have often been obtained. Experimental work in this laboratory indicates that the response of such legumes to inoculation is influenced by host specificity within the cowpea miscellany, localised field distribution of organisms effective on the particular host, and relative effectiveness of different organisms on a host.

### IV. ACKNOWLEDGEMENT.

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## APPENDIX.

## Nodulation of Australian Indigenous Legumes.

In the course of compiling the foregoing paper data were collected on the Australian indigenous legume flora with respect to nodulation and cross-infection. These are presented in Table 4 together with the data appearing in the previous tables.

Authorities consulted with respect to the indigenous nature of the plants were the relevant floras of each State (Bailey 1913, pp. 124-166 ; Black 1948, pp. 399-481 ; Ewart 1930, pp. 573-680 ; Ewart and Davies 1917, pp. 118-154 ; Gardner 1930, pp. 49-66 ; Maiden and Betche 1916, pp. 89-110 ; Rodway 1903, pp. 30-43) and "Flora Australiensis" (Bentham 1864, pp. 1-425). Bentham (1864) recorded 957 species of *Leguminosae* in 91 genera as indigenous. The number known at present would approach 1,100 species in 101 genera.

It is seen that the number of species observed to nodulate now stands at 135 in 48 genera. No record of the presence of nodules has been made with 40 genera indigenous to Australia. Records of nodulation of overseas species of the other 13 genera have been made.

Table 4.  
NODULATION BEHAVIOUR OF AUSTRALIAN INDIGENOUS LEGUMES.

Host.	Authority for Record of Nodulation.	Recorded Behaviour with Respect to Cross-inoculation Groups.†	Authority for Cross-inoculation Data.
<i>Abrus precatorius</i> L. . . . .	1, 6	C	1
<i>Acacia acinacea</i> Lindl. . . . .	19		
<i>A. anceps</i> DC. . . . .	19		
<i>A. arabica</i> (Lam.) Willd. . . . .	1	C	1
<i>A. armata</i> R. Br. . . . .	16, 19	C	16
<i>A. auriculiformis</i> A. Cunn. ex Benth... .	1	C	1
<i>A. baileyana</i> F. Muell. . . . .	1, 33	C	1, 33
<i>A. cultriformis</i> A. Cunn. ex G. Don . . .	33	C	33
<i>A. cunninghamii</i> Hook. . . . .	21,*	C	21,*
<i>A. dealbata</i> (Page) Link. . . . .	33	C	33

\* See footnote to Table 1.

† See footnote to Table 1.

Table 4—continued.

Host.	Authority for Record of Nodulation.	Recorded Behaviour with Respect to Cross-inoculation Groups.†	Authority for Cross-inoculation Data.
<i>A. decurrens</i> (Wendl.) Willd. . . . .	1, 30	C (C, P, Lo)	1, 30
<i>A. discolor</i> (Lam.) Willd. . . . .	18		
<i>A. elata</i> A. Cunn. ex Benth. . . . .	18		
<i>A. falcata</i> Willd. . . . .	*		
<i>A. farnesiana</i> (L.) Willd. . . . .	1, 6,*	C	1
<i>A. fimbriata</i> A. Cunn. ex G. Don . . . . .	*	C	*
<i>A. floribunda</i> (Vent.) Willd. . . . .	16, 33	C	16, 33
<i>A. granitica</i> Maid. . . . .	21	C	21
<i>A. juniperina</i> (Vent.) Willd. . . . .	18,*	C	*
<i>A. latifolia</i> Benth. . . . .	33	C	33
<i>A. ligulata</i> A. Cunn. ex Benth. . . . .	19		
<i>A. limifolia</i> (Vent.) Willd. . . . .	16, 18	C	16
<i>A. longifolia</i> (Andr.) Willd. . . . .	16	C	16
<i>A. melanoxyton</i> R. Br. . . . .	16, 33	C	16, 33
<i>A. myrtifolia</i> (Sm.) Willd. . . . .	19		
<i>A. obliqua</i> A. Cunn. ex Benth. . . . .	28		
<i>A. podalyriifolia</i> A. Cunn. ex G. Don . . . . .	21,*	C	21
<i>A. pubescens</i> (Vent.) R. Br. . . . .	*		
<i>A. pycnantha</i> Benth. . . . .	19		
<i>A. retinodes</i> Schlecht. . . . .	19		
<i>A. salicina</i> Lindl. . . . .	19		
<i>A. sophorae</i> (Labill.) R. Br. . . . .	19		
<i>A. spinescens</i> Benth. . . . .	19		
<i>A. suaveolens</i> (Sm.) Willd. . . . .	*		
<i>Aeschynomene americana</i> L. . . . .	11, 23	C	11
<i>A. indica</i> L. . . . .	4, 6,*		
<i>Albizia lophantha</i> (Willd.) Benth. . . . .	16	C	16
<i>A. procera</i> (Roxb.) Benth. . . . .	1	C	1
<i>Alysicarpus longifolius</i> (Rottl.) Wight & Arnott	1, 27, 28	C	1
<i>A. rugosus</i> (Willd.) DC. . . . .	1, 28	C	1
<i>A. vaginalis</i> (L.) DC. ( <i>A. nummularifolius</i> (L.) DC.)	1, 2, 6, 28, 33, 34	C	1, 2, 33
<i>Aotus lanigera</i> A. Cunn. ex Benth. . . . .	21,*		
<i>A. villosa</i> (Andr.) Sm. . . . .	*		
<i>Bossiaea prostrata</i> R. Br. . . . .	19		
<i>Cassia mimosoides</i> L. . . . .	1, 2, 6	C	1, 2
<i>Chorizema ilicifolium</i> Labill. . . . .	30	(C, P, Lo, M, B, T)	30
<i>C. parviflorum</i> Benth. . . . .	*	C	*
<i>Clianthus speciosus</i> (G. Don) Aschers. & Graebn. ( <i>C. dampieri</i> A. Cunn. ex Lindl.)	19, 30	(C, P, Lu, M)	30
<i>Clitoria australis</i> Benth. . . . .	*		

\* See footnote to Table 1.

† See footnote to Table 1.

Table 4—continued.

Host.	Authority for Record of Nodulation.	Recorded Behaviour with Respect to Cross-inoculation Groups.†	Authority for Cross-inoculation Data.
<i>Crotalaria cunninghamii</i> R. Br.	1	C	1
<i>C. incana</i> L.	1, 6, 11, 28, 30, 33, 34	C, (C)	1, 11, 30, 33
<i>C. juncea</i> L.	6, 9, 11, 16, 25, 27, 30, 33	C, (C, P, Lo, M, T.)	9, 11, 16, 25, 27, 30, 33
<i>C. quinquefolia</i> L.	6		
<i>C. laburnifolia</i> L.	28		
<i>C. linifolia</i> L.f.	*		
<i>C. mucronata</i> Desv. ( <i>C. striata</i> DC.)	9, 11, 28, 30, 34	C, (C)	9, 11, 30
<i>C. retusa</i> L.	11, 16, 30, 33	C, (C)	11, 16, 30, 33
<i>C. verrucosa</i> L.	11, 28, 30, 31, 33	C, (C)	11, 30, 31, 33
<i>Daviesia corymbosa</i> Sm.	19		
<i>D. ulicifolia</i> Andr. ( <i>D. ulicina</i> Sm.)	19,*		
<i>D. umbellulata</i> Sm.	*		
<i>Desmodium gangeticum</i> (L.) DC.	6		
<i>D. muelleri</i> Benth.	*		
<i>D. nemorosum</i> F. Muell. ex Benth.	*		
<i>D. polycarpon</i> (Poir.) DC. (—um)	30	(C, T, B)	30
<i>D. rhytidophyllum</i> F. Muell. ex Benth.	*	C	*
<i>D. varians</i> (Labill.) G. Don	*	C	*
<i>Dicerna biarticulatum</i> (L.) DC. ( <i>Desmodium biarticulatum</i> (L.) F. Muell.)	*		
<i>Dillwynia ericifolia</i> Sm.	18		
<i>D. floribunda</i> Sm.	18, 19,*	C	*
<i>D. hispida</i> Lindl.	19		
<i>D. peduncularis</i> Benth.	*		
<i>Dolichos biflorus</i> L.	16, 24, 25, 28	C, Lu	16, 24, 25
<i>Erythrina indica</i> Lam.	1, 2, 9	C	1, 2, 9
<i>Eutaxia microphylla</i> (R. Br.) J. M. Black	19		
<i>Glycine clandestina</i> Wendl.	*	C	*
<i>G. tabacina</i> (Labill.) Benth.	*		
<i>G. tomentosa</i> (Benth.) Benth.	*		
<i>Gompholobium minus</i> Sm.	19		
<i>G. pinnatum</i> Sm.	*		
<i>G. virgatum</i> Sieb. ex DC.	*	C	*
<i>Goodia lotifolia</i> Salisb. ( <i>G. medicaginea</i> F. Muell.)	19		
<i>Hardenbergia violacea</i> (Schneev.) Stearn ( <i>H. monophylla</i> (Vent.) Benth., <i>Kennedyia monophylla</i> Vent.)	19, 30,*	C, (C, Lo, Lu, P, M, T, B)	30,*
<i>Hovea acutifolia</i> A. Cunn. ex G. Don	*	C	*

\* See footnote to Table 1.

† See footnote to Table 1.

Table 4—continued.

Host.	Authority for Record of Nodulation.	Recorded Behaviour with Respect to Cross-inoculation Groups.†	Authority for Cross-inoculation Data.
<i>Indigofera australis</i> Willd. . . . .	19,*		
<i>I. enneaphylla</i> L. . . . .	*		
<i>I. hirsuta</i> L. . . . .	1, 6, 9, 28,*	C	1, 9
<i>I. trita</i> L.f. . . . .	30	(C, P, B, T)	30
<i>I. viscosa</i> Lam. . . . .	30, 32, 33	C, (C, Lu)	30,32,33
<i>Jacksonia scoparia</i> R. Br. . . . .	21,*	C	21
<i>Kennedyia prostrata</i> R. Br. . . . .	19		
<i>Lespedeza sericea</i> (Thunb.) Miq. ( <i>L. cuneata</i> (D. Don) G. Don)	2, 3, 11, 13, 16, 27	C	2, 3, 11, 13, 16, 27
<i>Lotus australis</i> Andr. . . . .	19		
<i>Mirbelia reticulata</i> Sm. . . . .	21,*	C	21
<i>Mucuna gigantea</i> (Willd.) DC. . . . .	1	C	1
<i>Neptunia gracilis</i> Benth. . . . .	*		
<i>Phaseolus mungo</i> L. . . . .	12, 16, 25	C, Lu	16, 25
<i>Phyllodium pulchellum</i> Desv. ( <i>Desmodium pulchellum</i> (Desv.) Benth.)	6		
<i>Phyllota phyllicoides</i> (Sieb. ex DC.) Benth.	*		
<i>P. pleurandroides</i> F. Muell. . . . .	19		
<i>Platylobium formosum</i> Sm. . . . .	21,*	C	21
<i>P. obtusangulum</i> Hook. . . . .	19, 30	(C, Lo)	30
<i>Psoralea patens</i> Lindl. . . . .	19		
<i>P. tenax</i> Lindl. . . . .	*		
<i>Pultenaea acerosa</i> R. Br. ex Benth. . . . .	19		
<i>P. canaliculata</i> F. Muell. . . . .	19		
<i>P. daphnoides</i> Wendl. . . . .	18, 19		
<i>P. densifolia</i> F. Muell. . . . .	19		
<i>P. elliptica</i> Sm. . . . .	18		
<i>P. involucrata</i> Benth. . . . .	19		
<i>P. largiflorens</i> F. Muell. var. <i>latifolia</i> H. B. Williamson	19		
<i>P. laxiflora</i> Benth. var. <i>pilosa</i> H. B. Williamson	19		
<i>P. microphylla</i> Sieb. ex DC. . . . .	*	C	*
<i>P. myrtoides</i> A. Cunn. ex. Benth . . . . .	21	C	21
<i>P. prostrata</i> Benth. . . . .	19		
<i>P. ? retusa</i> Sm. . . . .	*		
<i>P. scabra</i> R. Br. . . . .	19		
<i>P. stipularis</i> Sm. . . . .	18		
<i>P. tenuifolia</i> R. Br. . . . .	19		

\* See footnote to Table 1.

† See footnote to Table 1.

Table 4—continued.

Host.	Authority for Record of Nodulation.	Recorded Behaviour with Respect to Cross-inoculation Groups.†	Authority for Cross-inoculation Data.
<i>P. teretifolia</i> H. B. Williamson var. <i>brachyphylla</i> H. B. Williamson	19		
<i>P. villosa</i> Willd. . . . .	21,*	C	21,*
<i>Rhynchosia minima</i> (L.) DC. . . . .	28, 32, 33,*	C.	32, 33
<i>Sesbania bispinosa</i> (Jacq.) Fawcett Rendle ( <i>S. aculeata</i> (Willd.) Pers.)	20, 25,*	Strain specific—affinities to B, Lu, and C	20, 25
<i>S. grandiflora</i> (L.) Pers. . . . .	6, 20	Strain specific—affinities to B and C	20
<i>Swainsona galegifolia</i> (Andr.) R. Br. ( <i>S. coronillifolia</i> Salisb.)	30,*	(C, Lu, P)	30
<i>S. lasseriiifolia</i> DC. . . . .	19		
<i>Templetonia retusa</i> (Vent.) R. Br. . . . .	19		
<i>Tephrosia purpurea</i> (L.) Pers. . . . .	2, 6, 25	C	2, 25
<i>Trigonella suavissima</i> Lindl. . . . .	29		
<i>Uraria lagopodioides</i> (L.) D. Don ( <i>lagopoides</i> )	6		
<i>Vigna lanceolata</i> Benth. . . . .	*		
<i>V. marina</i> (Burm.) Merr. ( <i>V. retusa</i> Walp.)	1, 2, 30	C, (C, Lu, P, B, T)	1, 2, 30
<i>V. vexillata</i> (L.) Benth. . . . .	28, 30	(C, P, B, T)	30
<i>Viminaria juncea</i> (Schrad.) Hoffmgg. ( <i>V. denudata</i> Sm.)	18		
<i>Zornia diphylla</i> (L.) Pers. . . . .	*		

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