
Importance of the southern African members of tribe Phaseoleae (Leguminosae) in pasture development



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Tribe Phaseoleae indigenous to SA

Genera (22)

Alistilus, *Bolusafr*, ***Canavalia* (3)**, *Decorsea*, *Dipogon*,
***Dolichos* (12)**, *Dumasia*, *Eriosema*, *Erythrina*, *Flemingia*,
Galactia, ***Lablab* (1)**, ***Macrotyloma* (5)**, ***Mucuna* (3)**,
***Neonotonia* (1)**, *Neorautanenia*, *Ophrestia*, *Otoptera*,
***Rhynchosia* (57)**, *Sphenostylis*, ***Teramnus* (1)**, ***Vigna* (20)**



SA Indigenous legumes

Tribe (%)	Cultivated species	Grazed/browsed species	Total legume species
Crotalariaeae	8.7	15.6	38.0
Indigofereae	10.4	12.5	12.7
Phaseoleae	20.4	11.5	10.8



Species

Canavalia bonariensis

C. rosea

C. virosa

Dolichos angustifolius

D. angustissimus

D. decumbens

D. falciformis

D. hastaeformis

D. junodii

D. linearis

D. peglerae

D. pratensis

D. sericeus subsp. *sericeus*

D. trilobus subsp. *trilobus* var. *trilobus*

D. trilobus subsp. *transvaalicus*

Lablab purpureus subsp. *uncinatus*

Macrotyloma axillare var. *axillare*

M. axillare var. *glabrum*

M. coddii

M. maranguense

M. uniflorum var. *stenocarpum*

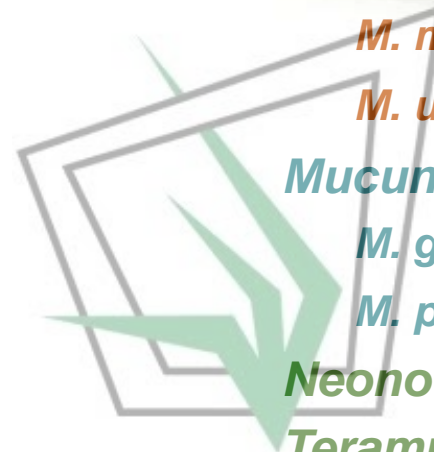
Mucuna coriacea subsp. *irritans*

M. gigantea subsp. *gigantea*

M. pruriens var. *pruriens*

Neonotonia wightii

Teramnus labialis subsp. *labilalis*



20 *Vigna* species

Vigna friesiorum var. *friesiorum*

V. frutescens subsp. *frutescens* var. *frutescens*

V. kokii

V. luteola var. *luteola*

V. marina

V. mudenia

V. oblongifolia var. *oblongifolia*

V. oblongifolia var. *parviflora*

V. schlechteri

V. unguiculata subsp. *dekindtiana* var. *dekindtiana*

V. unguiculata subsp. *dekindtiana* var. *huillensis*

V. unguiculata subsp. *protracta*

V. unguiculata subsp. *stenophylla*

V. unguiculata subsp. *tenuis* var. *ovata*

V. unguiculata subsp. *tenuis* var. *tenuis*

V. unguiculata subsp. *unguiculata* var. *unguiculata* (domesticated)

V. vexillata var. *angustifolia*

V. vexillata var. *davyi*

V. vexillata var. *ovata*

V. vexillata var. *vexillata*

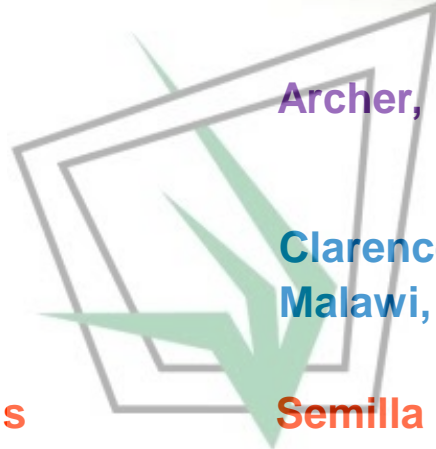


Cowpea



Improved species (Phaseoleae)

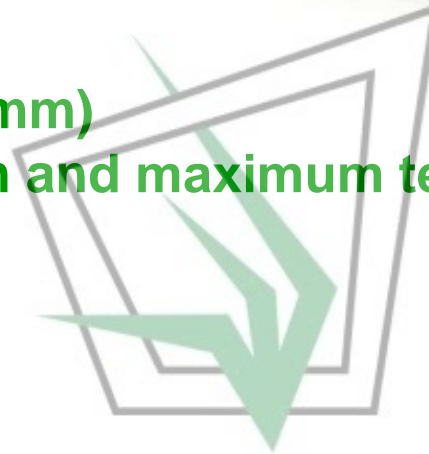
Species	Common name	Cultivars	Accessions
<i>Lablab purpureus</i> subsp. <i>purpureus</i>	Dolichos bean	Highworth, Rongai	India, Kenya
<i>Mucuna pruriens</i> var. <i>utilis</i>	Velvet bean	None	
<i>Macrotyloma axillare</i> var. <i>axillare</i>	Axillaris	Archer, Jade	Kenya
<i>Neonotonia wightii</i>	Glycine	Clarence, Cooper, Malawi, Tropical Verde	South Africa, Tanzania, Malawi, Zimbabwe
<i>Teramnus labialis</i> subsp. <i>labialis</i>	Teramnus	Semilla Clara and Semilla Oscura	Cuba
<i>Vigna unguiculata</i> <i>Vigna vexillata</i> (<i>Vigna subterranea</i>)	Cowpea Wild cowpea Bambara	Agri-Nawa, Encore Tubers	South Africa Indigenous to West Africa)



180 indigenous legume species in Phaseoleae

Discriminant analysis were used to examine whether significant differences exist among groups (legume species) in terms of the predictor variables

- Mean annual rainfall (mm)
 - Mean annual minimum and maximum temperature (°C)
 - Soil pH (H₂O)
 - Soil P (ppm)
-
- ✓ to determine range of tolerance
 - ✓ to use this as a selection tool for further screenings to select indigenous legume species with desirable attributes



Categories

Mean annual rainfall (mm)

Low < 400

Medium 400 – 800

High > 800

Mean annual minimum temperature (°C)

Low < 2

Medium 2 – 6

High > 6

Soil pH (H₂O)

Low < 6.4

Medium 6.4 – 7.4

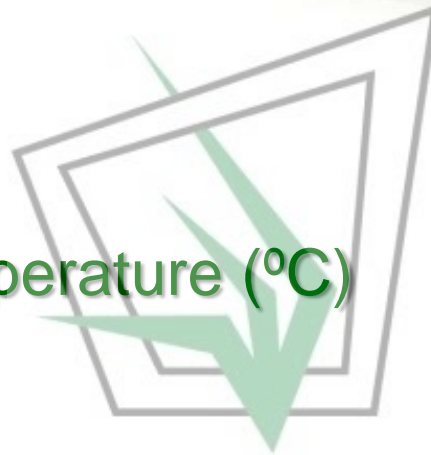
High > 7.4

Soil P (ppm)

Low < 10

Medium 5 – 35

High > 20



180 indigenous legume species in Phaseoleae

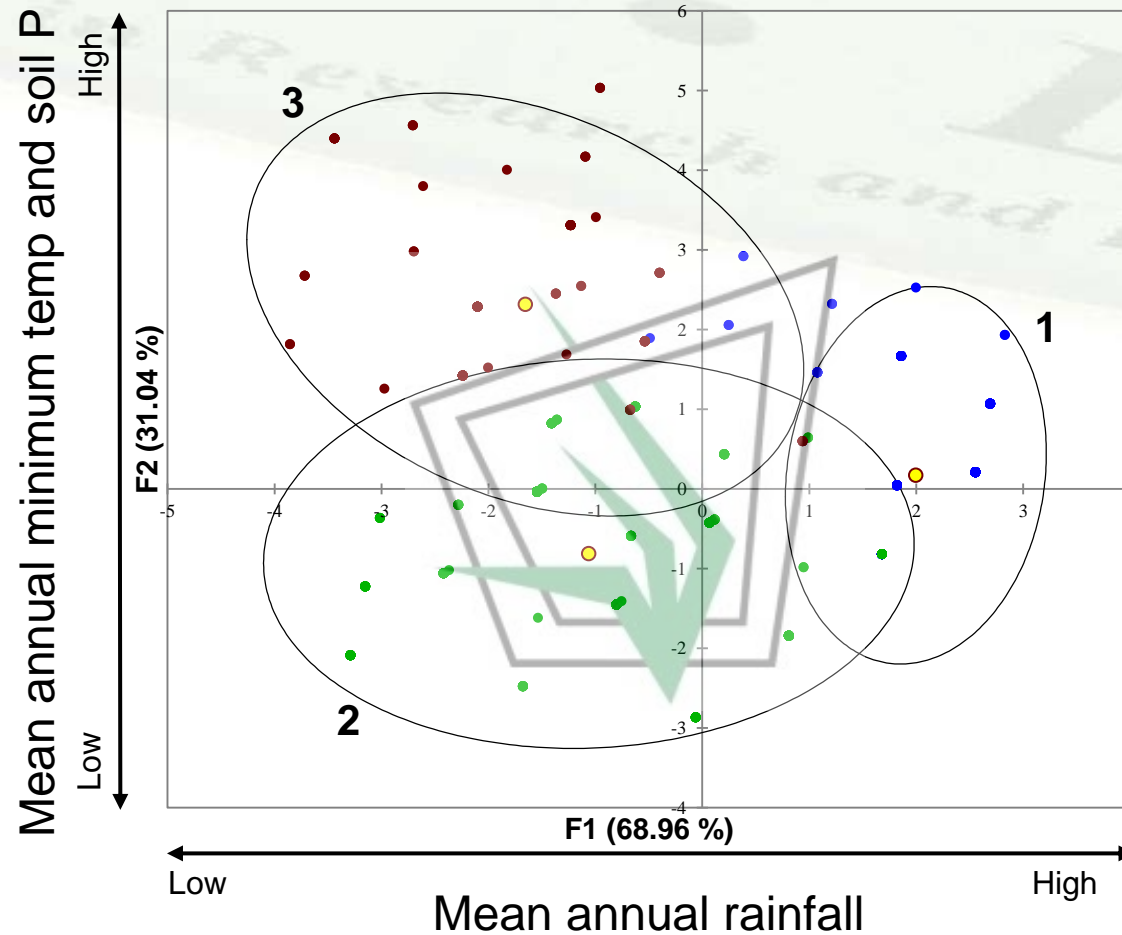
Eriosema spp. : 921 records

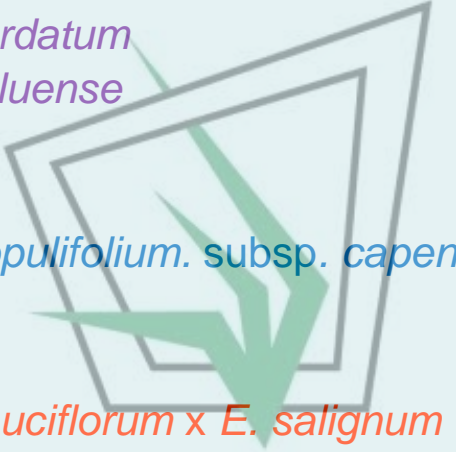
Rhynchosia spp. : 1702 records

Remaining species: 1758 records



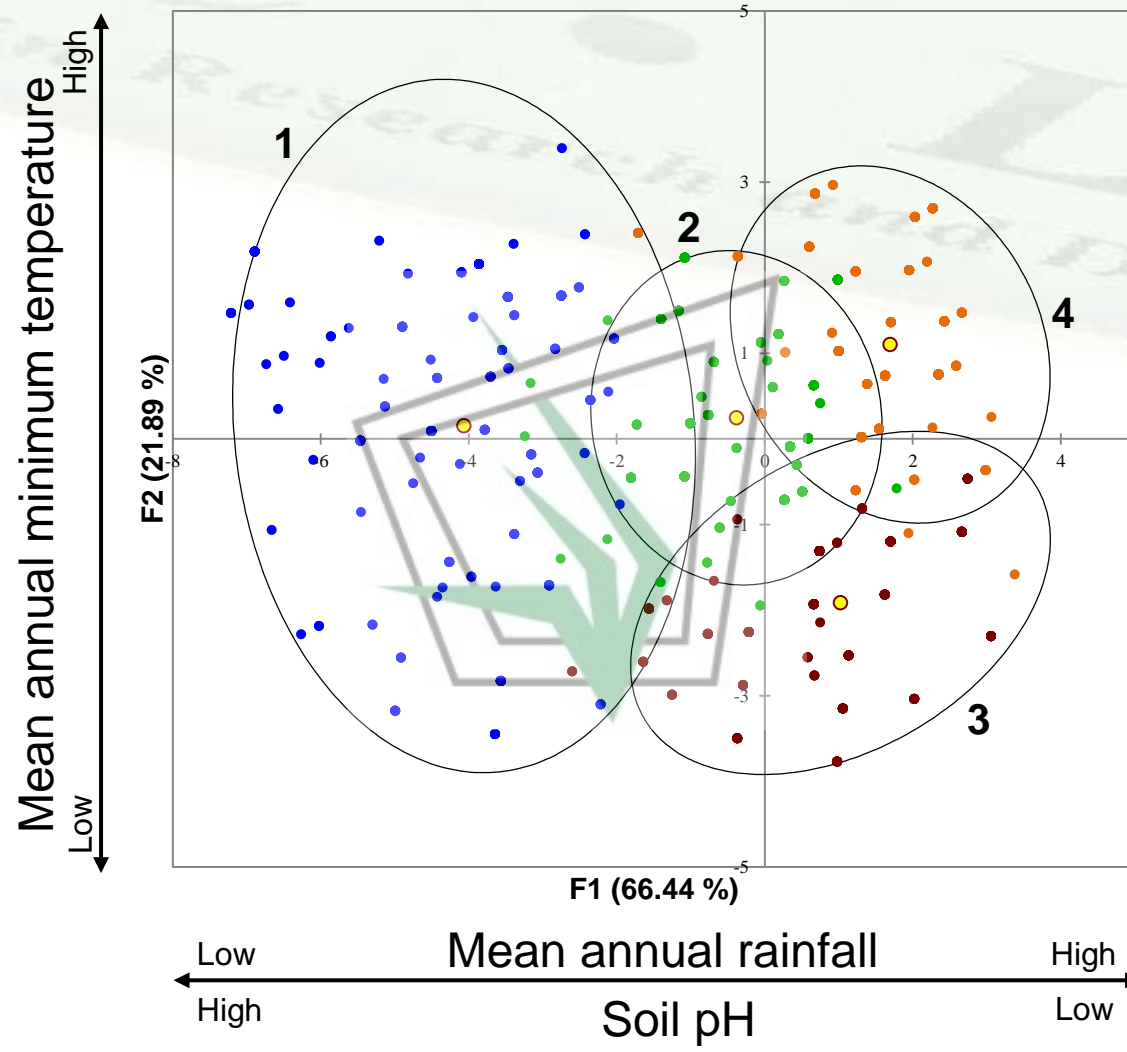
Eriosema spp. DA results



<p style="text-align: center;"><u>Group 1</u></p> <p>Higher MAR; Intermediate TMin and soil P</p>	<p style="text-align: center;"><u>Group 2</u></p> <p>Lower MAR, TMin and soil P</p>	<p style="text-align: center;"><u>Group 3</u></p> <p>Lower MAR; Higher TMin and soil P</p>
<p><i>Eriosema burkei</i> var. <i>burkei</i></p> <p><i>Eriosema cordatum</i></p> <p><i>Eriosema zuluense</i></p> <p><i>Eriosema dregei</i></p> <p><i>Eriosema durnfordensis</i></p> <p><i>Eriosema populifolium</i> subsp. <i>capensis</i></p> <p><i>Eriosema umtamvunense</i></p>	<p><i>Eriosema buchananii</i> var. <i>buchananii</i></p> <p><i>Eriosema naviculare</i></p> <p><i>Eriosema burkei</i> var. <i>burkei</i></p> <p><i>Eriosema cordatum</i></p> <p><i>Eriosema zuluense</i></p> <p><i>Eriosema populifolium</i>. subsp. <i>capensis</i></p> <p><i>Eriosema pauciflorum</i> x <i>E. salignum</i></p> 	<p><i>Eriosema buchananii</i> var. <i>buchananii</i></p> <p><i>Eriosema naviculare</i></p> <p><i>Eriosema burkei</i> var. <i>burkei</i></p> <p><i>Eriosema cordatum</i></p> <p><i>Eriosema zuluense</i></p> <p><i>Eriosema fasciculatum</i></p>



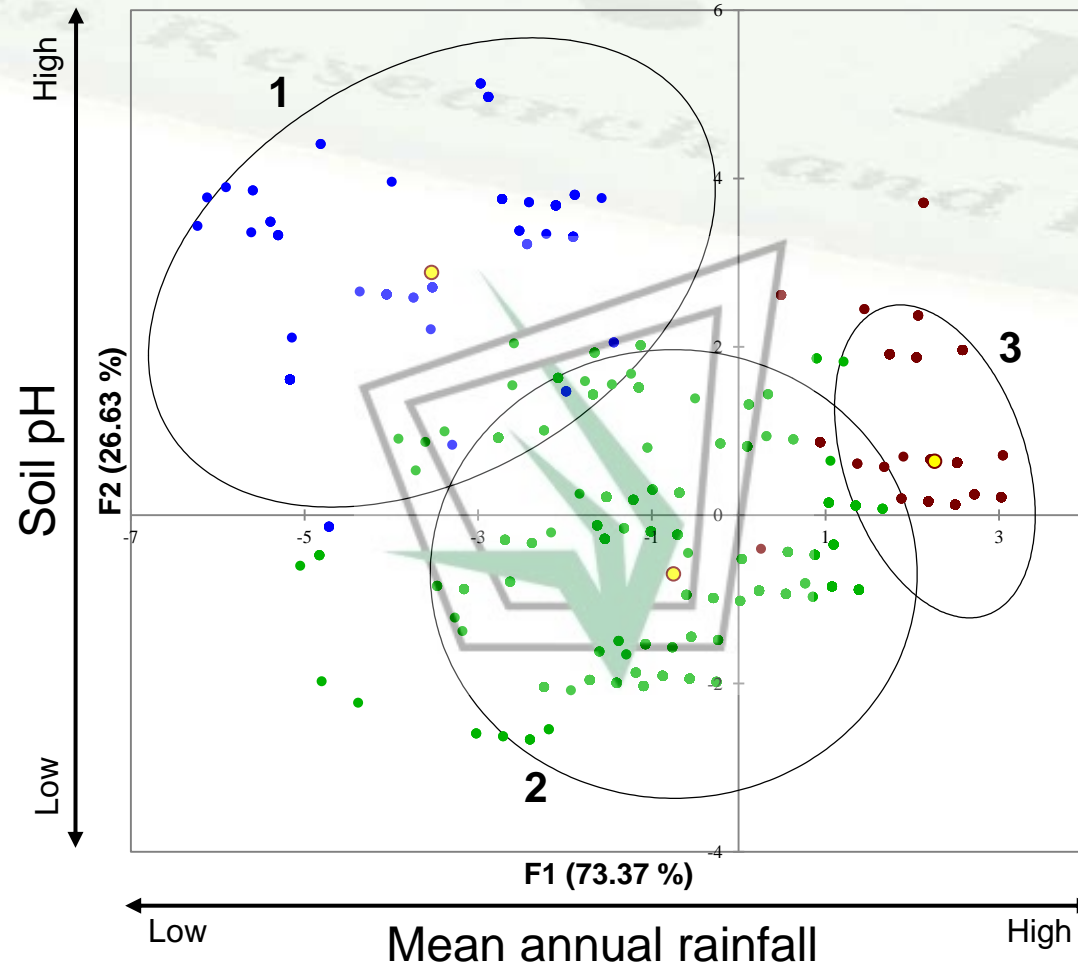
Rhynchosia spp. DA results



<p align="center"><u>Group 1</u></p> <p>Lower MAR; Higher soil pH</p>	<p align="center"><u>Group 2</u></p> <p>Intermediate MAR, soil pH and TMin</p>	<p align="center"><u>Group 3</u></p> <p>Higher MAR; Lower soil pH; Lower TMin</p>	<p align="center"><u>Group 4</u></p> <p>Higher MAR; Lower soil pH; Higher TMin</p>
<p><i>Rhynchosia arida</i></p> <p><i>Rhynchosia bullata</i></p> <p><i>Rhynchosia schlechteri</i></p> <p><i>Rhynchosia calvescens</i></p> <p><i>Rhynchosia komatiensis</i></p> <p><i>Rhynchosia pinnata</i></p> <p><i>Rhynchosia minima</i> var. <i>minima</i></p> <p><i>Rhynchosia totta</i> var. <i>totta</i></p>	<p><i>Rhynchosia angulosa</i></p> <p><i>Rhynchosia woodii</i></p> <p><i>Rhynchosia bullata</i></p> <p><i>Rhynchosia schlechteri</i></p> <p><i>Rhynchosia galpinii</i></p> <p><i>Rhynchosia thorncroftii</i></p> <p><i>Rhynchosia calvescens</i></p> <p><i>Rhynchosia komatiensis</i></p> <p><i>Rhynchosia pinnata</i></p> <p><i>Rhynchosia minima</i> var. <i>minima</i></p> <p><i>Rhynchosia totta</i> var. <i>totta</i></p>	<p><i>Rhynchosia angulosa</i></p> <p><i>Rhynchosia woodii</i></p> <p><i>Rhynchosia dieterlenae</i></p> <p><i>Rhynchosia villosa</i></p> <p><i>Rhynchosia minima</i> var. <i>minima</i></p> <p><i>Rhynchosia totta</i> var. <i>totta</i></p>	<p><i>Rhynchosia angulosa</i></p> <p><i>Rhynchosia woodii</i></p> <p><i>Rhynchosia rogersii</i></p> <p><i>Rhynchosia villosa</i></p> <p><i>Rhynchosia galpinii</i></p> <p><i>Rhynchosia thorncroftii</i></p> <p><i>Rhynchosia calvescens</i></p> <p><i>Rhynchosia komatiensis</i></p> <p><i>Rhynchosia pinnata</i></p> <p><i>Rhynchosia minima</i> var. <i>minima</i></p> <p><i>Rhynchosia totta</i> var. <i>totta</i></p>



Remaining species DA results



<p style="text-align: center;"><u>Group 1</u></p> <p style="text-align: center;">Lower MAR; Higher soil pH</p>	<p style="text-align: center;"><u>Group 2</u></p> <p style="text-align: center;">Intermediate MAR; Lower soil pH</p>	<p style="text-align: center;"><u>Group 3</u></p> <p style="text-align: center;">Higher MAR; Intermediate soil pH</p>
<p><i>Dolichos hastaeformis</i></p> <p><i>Dolichos junodii</i></p> <p><i>Dolichos peglerae</i></p> <p><i>Mucuna coriacea</i> subsp. <i>irritans</i></p> <p><i>Vigna unguiculata</i> subsp. <i>protracta</i></p> <p><i>Vigna unguiculata</i> subsp. <i>stenophylla</i></p>	<p><i>Canavalia bonariensis</i></p> <p><i>Canavalia rosea</i></p> <p><i>Dolichos hastaeformis</i></p> <p><i>Dolichos junodii</i></p> <p><i>Macrotyloma maranguense</i></p> <p><i>Mucuna coriacea</i> subsp. <i>irritans</i></p> <p><i>Mucuna gigantea</i> subsp. <i>gigantea</i></p> <p><i>Mucuna pruriens</i> var. <i>pruriens</i></p> <p><i>Mucuna pruriens</i> var. <i>utilis</i></p> <p><i>Vigna luteola</i> var. <i>luteola</i></p> <p><i>Vigna oblongifolia</i> var. <i>parviflora</i></p> <p><i>Vigna unguiculata</i> subsp. <i>protracta</i></p> <p><i>Vigna unguiculata</i> subsp. <i>stenophylla</i></p> <p><i>Vigna vexillata</i> var. <i>angustifolia</i></p>	<p><i>Canavalia bonariensis</i></p> <p><i>Canavalia rosea</i></p> <p><i>Dolichos peglerae</i></p> <p><i>Macrotyloma axillare</i> var. <i>glabrum</i></p> <p><i>Macrotyloma maranguense</i></p> <p><i>Mucuna coriacea</i> subsp. <i>irritans</i></p> <p><i>Mucuna gigantea</i> subsp. <i>gigantea</i></p> <p><i>Mucuna pruriens</i> var. <i>utilis</i></p> <p><i>Vigna kokii</i></p> <p><i>Vigna luteola</i> var. <i>luteola</i></p> <p><i>Vigna unguiculata</i> subsp. <i>protracta</i></p> <p><i>Vigna unguiculata</i> subsp. <i>stenophylla</i></p> <p><i>Vigna vexillata</i> var. <i>angustifolia</i></p>



Conclusion

✓ Phaseoleae contain many valuable pasture species

✓ Range of tolerance can be used as a screening tool by plant breeders to select indigenous legume species with desirable attributes



Thank you...



Mucuna pruriens var. *pruriens*



Eriosema burkei var. *burkei*



Canavalia rosea



Vigna luteola



Dolichos hastaeformis