

USEFUL FIELD MORPHOLOGICAL DIFFERENCES BETWEEN *STYLOSANTHES HUMILIS* H.B.K. (TOWNSVILLE STYLO) AND *STYLOSANTHES HAMATA* (CARIBBEAN STYLO) CV. VERANO

P. G. HARRISON* AND A. C. ARCHER*

ABSTRACT

Readily identifiable vegetative and seed characters are listed which can be used to quickly and accurately separate in the field the two species Stylosanthes humilis and S. hamata.

INTRODUCTION

Townsville stylo has rapidly found a place as a pioneering legume in pasture improvement work in the monsoonal tropical areas of northern Australia. It has been estimated (Begg 1972) that approximately 47 million hectares could be sown with this species and of this approximately three-quarters of a million hectares have been sown in the N.T. and Queensland (Anon 1972; Begg 1972). Various workers (Shaw 1961; Norman 1966) have demonstrated increases in animal productivity due to introduction of this annual self-regenerating legume.

Townsville stylo does have some serious drawbacks including poor competitive ability with weeds, particularly under improved soil fertility, and slow regeneration in the early wet season. The recently released Caribbean stylo cultivar Verano, which is a perennial, appears a promising additional legume for pasture work in northern Australia and may even give higher animal yields and carrying capacities (Anon 1973) than Townsville stylo.

These two species *Stylosanthes hamata* and *S. humilis* are very similar morphologically (Mohlenbrock 1957, 1963) and further work using different grouping techniques (Burt *et al.* 1971) has also shown them to be similar. In actual fact the original introduction of cv. Verano as C.P.I.38842 was described as *S. humilis* (Anon 1964). These similarities pose problems in the accurate identification of the two species.

Field identification

Botanists tend to rely on plants at the reproductive or flowering stage for identification but to agronomists and farmers it is essential that plants be recognised at all stages from seedlings through to maturity. One should be able to identify the seeds also to enable separation for pure seed production and for the general commercial purposes of the seed industry. Vegetative and seed identification tend to be more difficult than using reproductive characters and in some cases separation on these characters alone is virtually impossible. However, Townsville stylo and Caribbean stylo can be separated using these characters.

TABLE 1
Origin of seed used for study

<i>S. humilis</i>	<i>S. hamata</i>
Qld. commercial seed ex Yates	Katherine Experiment Farm, Katherine, N.T.
cv. Paterson	C.S.I.R.O. Katherine, N.T.
cv. Lawson	Upper Adelaide River Experiment Station
cv. Gordon	Douglas/Daly Experiment Station
Daly River, N.T.	
Coomalie Creek, N.T.	
Katherine, N.T.	

*Animal Industry and Agriculture Branch, Department of the Northern Territory, P.O. Box 5150, Darwin, N.T. 5794.

METHOD

Seed of *S. humilis* and *S. hamata* C.P.I.38842 (now cv. Verano) was collected from various sources as shown in Table 1. This seed was studied to observe major differences between the two types. Seed from these various sources was sown and plants collected and pressed at various stages of growth and studied for differences. Seed set was also observed in all plants. No effort has been made to follow traditional botanical lines as this was considered to be of little value for field identification.

RESULTS

Differences between the two plants are enumerated in Table 2 with pod and seed characters illustrated in Plate 1. Features listed for the whole plant, stem, stipule, inflorescence and seed pod are more readily observable under field conditions than seed characters though these are clearly seen in the laboratory. The characters listed show little change even under different environmental conditions and should enable a clear distinction to be drawn between the two plants.

TABLE 2
Morphological differences between S. humilis and S. hamata

Growth Stage	Plant Part	Townsville stylo	Caribbean stylo
Vegetative	Whole plant	ceases vegetative growth at flowering	continues vegetative growth during flowering
	stem	a) † bristly*	glabrous except for narrow pubescent strip on internodes* pubescent*
	stipule	b) bristly*	pubescent*
Reproductive	inflorescence	c) bristly* d) densely compacted structure	normally glabrous, occasionally pubescent* extended, loosely formed structure
	seed pod	e) covered in dense white tomentose hair	hooked pods glabrous, hookless pods pubescent
		f) length of beak usually 6-7 mm	length of beak usually 3-5 mm
		g) majority of pods with hooks	approx. 50% of pods without hook. Hookless pods thin and papery
		h) overall length of hooked pod usually 9-11 mm	overall length of hooked pod usually 7-8 mm
i) point of attachment very distinctly ridged		point of attachment flattened	
seed	j) flat at cotyledonary end	rounded at cotyledonary end	
	k) embryonic point sharp	embryonic point rounded	
	l) distinct "shoulder" on seed	seed gently curved between embryonic point and cotyledons	
	m) flat below hilum	distinct bulge below hilum	

† Letters refer to identification points marked on Plate 1.

* These differences particularly noticeable if held up against the light.

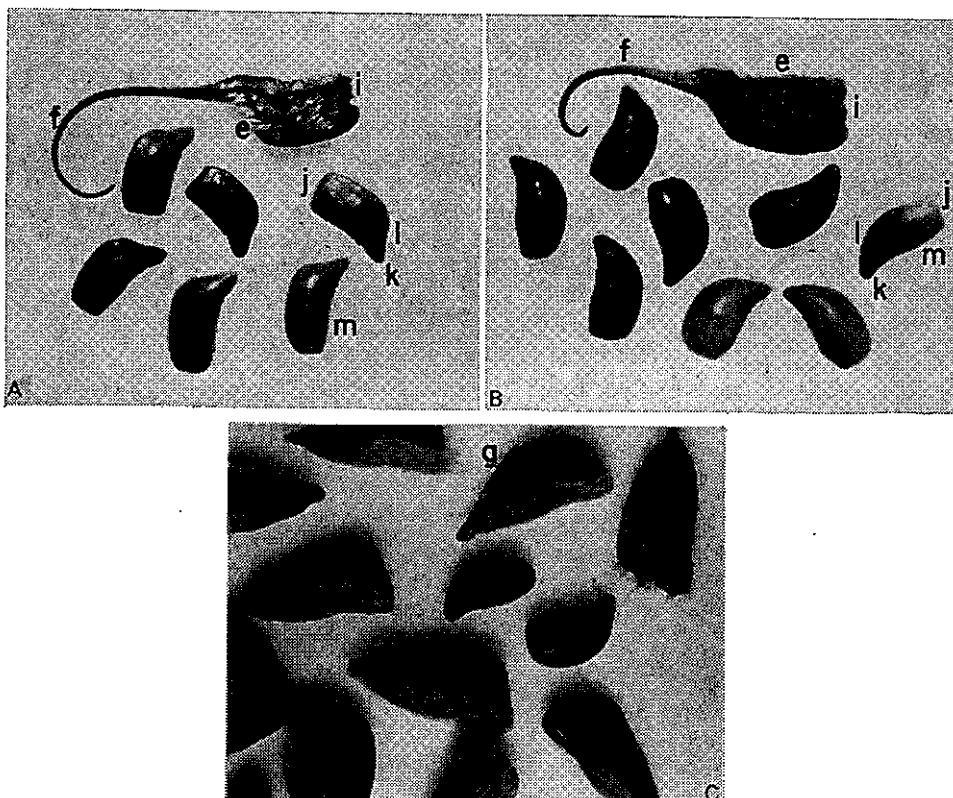


PLATE 1

Seed pods and seeds of (A) *S. humilis*, (B) *S. hamata*—hooked pods and seeds, and (C) *S. hamata*—hookless pods and seeds. Explanation of letters is given in Table 2. Magnification $\times 6$.

CONCLUSION

Townsville stylo and Caribbean stylo cv. Verano although very similar morphologically can be quickly and accurately identified in the field using readily visible characters that do not require the use of a microscope or hand lens. This should be of value to farmers, graziers, commerce and research personnel and ensure that no confusion exists over the field identification of these pasture species.

REFERENCES

- ANON (1964)—Plant Introduction Review Vol. 3 Number 1.
- ANON (1972)—Sown Pastures and Seed Production in Queensland August 1972. Queensland Department of Primary Industries.
- ANON (1973)—Introducing Caribbean stylo. Rural Research 82 C.S.I.R.O. 7-10.
- BEGG, J. E. (1972)—Probable distribution of Townsville stylo as a Naturalized Legume in Tropical Australia. *The Journal of the Australian Institute of Agricultural Science* 38: 158-162.
- BURT, R. L., EDYE, L. A., WILLIAMS, W. T., GROF, B., and NICHOLSON, C. H. L. (1971)—Numerical Analysis of Variation Patterns in the Genus *Stylosanthes* as an aid to Plant Introduction and Assessment. *Australian Journal of Agricultural Research* 22: 737-57.

- MOHLENBROCK, J. (1957)—A revision of the genus *Stylosanthes*. *Annals of Missouri Botanical Gardens* 44: 299-354.
- MOHLENBROCK, J. (1963)—Further considerations in *Stylosanthes* (Leguminosae). *Rhodora* 65: 245-258.
- NORMAN, M. J. T. (1966)—Katherine Research Station 1956-1964. A review of published work. *C.S.I.R.O. Division of Land Research* (1966) *Technical Paper* 28.
- SHAW, N. H., (1961)—Increased Beef Production from Townsville Lucerne (*Stylosanthes sunaica* Taub.) in the Spear Grass Pastures of Central Coastal Queensland. *Australian Journal of Experimental Agriculture and Animal Husbandry* 1: 73-80.

(Accepted for publication November 5, 1974)