

## OBSERVATIONS ON THE GROWTH CHARACTERISTICS OF *GLYCINE JAVANICA* L.

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### SUMMARY

Seven introductions of *Glycine javanica* were grown as spaced plants during their establishment season at Kairi Research Station.

Variations in dry-matter production, degree of branching, time and mode of flowering, and stolon rooting are described. The cultivar Cooper showed excellent seedling vigour and also a profuse branching habit, which is favourably regarded for forage production under high grazing pressure.

### I. INTRODUCTION

Spaced plant growth studies have a number of deficiencies. They are, however, valuable in initial plant characterization work, where maximum expression of growth potential is being studied when seed supplies are limiting. The experiment reported here was designed to investigate aspects of seedling growth and development of natural variants of *Glycine javanica* L. (*G. wightii*).

### II. MATERIALS AND METHODS

Introductions of *Glycine javanica*, representing natural variant types, included in the experiment were Commonwealth Plant Introduction (C.P.I.) numbers 13300, 25918, 23411 and 28279, and the cultivars Tinaroo, Cooper and Clarence.

Seedlings were raised in jiffy pots and transplanted into the field under irrigation on February 8, 1965. A randomized block design was used with four absolute replications. Plots consisted of two rows each containing 10 plants. Inter- and intra-row spacing was 10 lk. The experimental area was kept free of weeds and individual plant identity was maintained except in the case of one treatment in the later part of the experiment.

Harvests were made at 8, 12 and 23 weeks from planting. Plants were cut at ground level at the crown and wherever stolons were rooted. Three plants constituted the sampling unit at the first two harvests, and one plant was harvested at 23 weeks. Plants were sampled according to a predetermined random order at each harvest.

The degree of branching was recorded on freshly harvested material. Dry-matter estimations of the entire sampling unit were made after drying at 160°F for 18 hr, except at the final harvest, when the material was passed through a forage harvester and a subsample taken for dry-matter estimation.

Visual ratings of flowering and stolon rooting characteristics were made.

### III. RESULTS

#### (a) Dry-matter Production

Data for dry-matter production are given in Table 1.

TABLE 1  
DRY-MATTER PRODUCTION FROM *Glycine javanica* IN ITS ESTABLISHMENT SEASON

Identity	Mean Dry Matter (g/plant)		
	8 Weeks	12 Weeks	23 Weeks
Cooper .. ..	6.26	45.38	987.7
C.P.I. 23411 .. ..	4.66	25.14	1,012.2
Clarence .. ..	6.16	33.16	626.0
Tinaroo .. ..	4.46	15.66	770.9
C.P.I. 13300 .. ..	4.37	26.57	451.4
C.P.I. 28279 .. ..	2.21	13.91	516.0
C.P.I. 25918 .. ..	2.93	13.91	236.7
L.S.D. .. .. { 5%	1.91	12.69	252.9
.. .. { 1%	2.62	17.39	346.5
C.V. ... ..	29%	30%	26%

Cooper and Clarence showed the highest vigour in the seedling phase, while C.P.I. 23411 increased its ranking in the later phase of the experiment. Differences in ranking at 8 and 12 weeks reflect differences in seedling vigour. Changes in ranking position from 12 weeks to 23 weeks are mainly a reflection of the length of the growing season. Tinaroo, C.P.I. 23411 and C.P.I. 28279 had longer growing seasons than the others.

**(b) Degree of Branching**

The number of meristems was recorded at 8 weeks. Primary meristems were those initiating from a leaf axil on the main stem. Meristems initiating from the leaf axil of a primary runner were termed secondary meristems.

Cooper showed a high degree of secondary branching and was superior in total number of meristems (Table 2). C.P.I. 28279 showed very low primary and secondary branching.

**TABLE 2**  
DEGREE OF BRANCHING IN *Glycine javanica*  
AT 8 WEEKS

Identity	Mean No. of Meristems Per Plant
Cooper .. .. .	13.50
C.P.I. 13300 .. .. .	8.75
C.P.I. 25918 .. .. .	8.25
Clarence .. .. .	8.00
Tinaroo .. .. .	7.25
C.P.I. 23411 .. .. .	6.25
C.P.I. 28279 .. .. .	4.75
L.S.D. .. .. .	4.65
C.V. .. .. .	39%

**(c) Flowering Characteristics**

Commencement, peak and mode of flowering appear in Table 3.

**TABLE 3**  
FLOWERING CHARACTERISTICS OF *Glycine javanica* IN 1965

Identity	Flowering		
	Commencement	Peak	Mode
C.P.I. 25918 .. .. .	March 29	—	Axillary
Cooper .. .. .	April 12	May 10	Axillary
C.P.I. 13300 .. .. .	April 12	May 10	Terminal
Clarence .. .. .	April 13	May 10	Terminal
C.P.I. 23411 .. .. .	April 27	June 4	Axillary
Tinaroo .. .. .	June 2	June 16	Axillary
C.P.I. 28279 .. .. .	June 7	—	Axillary

Axillary flowering refers to the mode of flowering where all racemes are borne in leaf axils, and terminal meristems remain vegetative. With a terminal mode of flowering, racemes are borne in axillary and terminal positions, since at full flowering the terminal meristem assumes a reproductive function.

**(d) Stolon Rooting**

Results of qualitative assessment of stolon rooting made at 23 weeks are shown in Table 4.

TABLE 4

STOLON ROOTING CHARACTERISTICS OF *Glycine javanica*

Identity	Incidence of Nodal Rooting	Root Development at Rooted Nodes
C.P.I. 25918 .. .. .	Low	—
Cooper .. .. .	High	Profuse
C.P.I. 13300 .. .. .	Medium	Moderate
Clarence .. .. .	Medium	Moderate
C.P.I. 23411 .. .. .	Medium	Moderate
Tinaroo .. .. .	High	Profuse
C.P.I. 28279 .. .. .	Low	Weak

Tinaroo and Cooper showed the most favourable stolon rooting characteristics, and C.P.I. 25918 and C.P.I. 28279 the poorest.

**IV. DISCUSSION**

Phenotypic variation in valuable plant characters was exposed in this preliminary screening experiment.

The cultivar Cooper attained highest ranking for dry-matter production at 8 weeks; this is consistent with results in other experiments, some under sward conditions, and demonstrates the high seedling vigour of this cultivar.

In a dairy pasture ecosystem, where *Glycine javanica* is primarily utilized, high forage yield is required under high grazing pressures. The characteristic of a high degree of branching is favourably regarded for tolerance to high grazing pressures and for rapid recovery after grazing. Under the conditions of this experiment, Cooper exhibited the most profuse branching habit. Further screening for this character, however, should be conducted under a defoliation regimen, as C.P.I. 28279, which ranked lowest here, has been observed with satisfactory branching in a sward under grazing.

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