Vicia Species, an Alternative Forage Crop in Semiarid Regions of Mexico

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Introduction Rain-fed cultivated forages play an important role in the sustainability of cattle , goats , and sheep production systems in arid and semiarid rangelands of northern México . Oats and corn are the forage crops most commonly sown . Forage legumes tend not to be considered in this region because critical information is lacking .

Materials and methods Three species of genus *Vicia* (*Vicia narbonensis* L , *Vicia dasycarpa* L . , and two ecotypes of *Vicia sativa* L .) and oat (*Avena sativa* L .) were evaluated under rain-fed conditions at study area near . Forage was harvested when these crops were in the flowering stage . Dry matter yield , crude protein content and rainfall were measured and water-use efficiency was calculated (Nilesen *et al* ,2005) . The experiment was carried out under a Randomized Complete Block design and the Tukey's test was used to separate means .

Results No significant difference was found among *Vicia* species and oat for dry matter yield , but *V . narbonensis* L . yielded only 47% of the *Vicia dasycarpa* and oat yield . During the growing season , only 114 .2 mm of precipitation were received , dry matter yield per mm of rain ranged from 14 .9 to 6 .9 kg DM ha^{-1} mm^{-1} , where oat and *V .* dasycarpa were the most efficient species . Crude protein content was higher in *Vicia* species than oat , except for *V . narbonensis* . *V . dasycarpa* forage had the highest crude protein content , almost twice than oat . Consequently , this species produced more protein per hectare and per mm of precipitation than *Vicia dasycarpa* and *Vicia sativa* had high leaf :stem ratios ; more that 60% of the forage were leaves . Similar results were reported by Flores (2007) . Also , *Vicia dasycarpa* , and *Vicia sativa* showed a good tolerance to drought , as reported by (Sattell *et al* . , 1998) .

Table 1 *Dry matter and crude protein yield of* Vicia *species and oat under rainfed conditions .*

Species	DM yield (ton ha^{-1})	Precip-DM Efficiency (DM kg/ mm)	Crude Protein (%)	Protein yield (Kg/ha)	Precip-Protein efficiency (PC kg/ mm)
Oat (*Avena sativa* L .)	1 .7	14 .9	13 .6	227 .3	1 .99
Vicia dasycarpa L .	1 .7	14 .7	23 .4	393 .6	3 .45
Vicia sativa (Mexican)	1 .4	12 .2	23 .3	324 .8	2 .84
Vicia sativa (ICARDA)	1 .3	11 .8	22 .0	294 .6	2 .57
Vicia narbonensis L .	0 .8	6 .9	11 .8	93 .8	0 .82
P> F	0 .3550	0 .3557	0 .033	0 .011	0 .011
HSD 0 .05	1 .5	13 .8	0 .033	213 .1	1 .9

Conclusions *Vicia dasycarpa* and *Vicia sativa* can be a viable alterative forage crop having similar dry matter yield and water-use efficiency to that of oats but having higher forage quality and precipation-protein conversion efficiency . These species also fix nitrogen in the soil and are drought-tolerant thus supporting a more sustainable and profitable forage production system .

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