



# Nutritive value for ruminants of winter oats-legume intercrops in organic cultivation



A. Díaz<sup>AD</sup>, M.D. Carro<sup>B</sup>, C. Palacios<sup>C</sup>, I. Mateos<sup>AD</sup>, C. Saro<sup>A</sup>, M.L. Tejido<sup>D</sup> and M.J. Ranilla<sup>AD</sup>

<sup>A</sup>Dept. Producción Animal, Universidad de León, 24071 León, Spain

<sup>B</sup>Dept. Producción Animal, Universidad Politécnica de Madrid, 28040 Madrid, Spain

<sup>C</sup>Dept. Construcción y Agronomía, Universidad de Salamanca, 37007 Salamanca, Spain

<sup>D</sup>IGM (CSIC-ULE), Finca Marzanas s/n. 24346 Grulleros, León, Spain

## 1. INTRODUCTION

In European countries organic livestock must be fed with organic feeds to meet the Regulations on organic farming. However, organic cultivation has been shown to reduce forage yield and crude protein content. The aim of this study was to assess the potential of winter oats-legume intercropping to increase forage yield and quality.

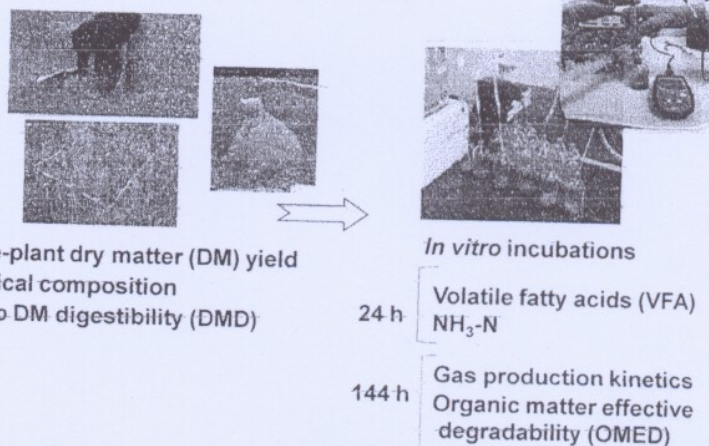
## 2. MATERIALS AND METHODS

4 Cultivars (4 plots /cultivar)

➤ Winter oats (monoculture)

Intercropped with: ➤ Bard vetch (BAV)  
➤ Bitter vetch (BIV)  
➤ Both legumes (MIX)

2 Harvest times (June and July)



## 3. RESULTS

Harvest time	Item	Oats	BAV	BIV	MIX	SEM	P value
June	DM yield (t/ha)	1.80 <sup>A</sup>	2.52 <sup>B</sup>	2.61 <sup>B</sup>	2.53 <sup>B</sup>	0.153	0.009
	Crude protein (g/kg DM)	36.9 <sup>A</sup>	69.1 <sup>B</sup>	37.8 <sup>A</sup>	63.4 <sup>B</sup>	3.31	<0.001
	DMD (%)	71.8 <sup>C</sup>	72.1 <sup>C</sup>	64.0 <sup>A</sup>	68.1 <sup>B</sup>	1.04	<0.001
	Gas production rate (%/h)	0.019 <sup>B</sup>	0.025 <sup>D</sup>	0.016 <sup>A</sup>	0.022 <sup>C</sup>	0.0011	<0.001
	OMED (%)	23.4 <sup>B</sup>	27.9 <sup>C</sup>	19.5 <sup>A</sup>	24.5 <sup>B</sup>	0.95	<0.001
	Total VFA (μmol)	1510 <sup>B</sup>	1678 <sup>C</sup>	1355 <sup>A</sup>	1372 <sup>A</sup>	79.5	<0.001
	NH <sub>3</sub> -N (mg/L)	182	178	170	172	8.5	0.171
July	DM yield (t/ha)	1.60 <sup>A</sup>	2.27 <sup>B</sup>	2.39 <sup>B</sup>	2.53 <sup>B</sup>	0.150	0.009
	Crude protein (g/kg DM)	36.2 <sup>A</sup>	65.7 <sup>B</sup>	38.6 <sup>A</sup>	51.8 <sup>B</sup>	3.57	<0.001
	DMD (%)	68.6	69.5	66.9	67.2	1.37	0.207
	Gas production rate (%/h)	0.017 <sup>A</sup>	0.021 <sup>B</sup>	0.018 <sup>A</sup>	0.018 <sup>A</sup>	0.0011	<0.001
	OMED (%)	19.9 <sup>A</sup>	22.8 <sup>B</sup>	19.9 <sup>A</sup>	20.0 <sup>A</sup>	0.95	<0.001
	Total VFA (μmol)	1275 <sup>A</sup>	1441 <sup>B</sup>	1241 <sup>AB</sup>	1348 <sup>AB</sup>	55.2	<0.001
	NH <sub>3</sub> -N (mg/L)	202 <sup>A</sup>	222 <sup>B</sup>	198 <sup>A</sup>	208 <sup>A</sup>	6.01	<0.001

- ✓ Intercropping of oats with BAV, BIV and MIX resulted in significantly greater forage DM yield at both harvest times, with no differences between intercrops (P>0.05)
- ✓ Intercropping of oats with BAV increased crude protein content, gas production rate, total VFA production and OMED at both harvest times
- ✓ Intercropping of oats with BIV decreased gas production rate, total VFA production and OMED in June

## 4. CONCLUSION

Under the seeding ratios and cultivation conditions of our study, intercropping of oats with bard vetch was the best choice of the intercrops tested to increase forage yield and nutritional quality at both harvest times.