

**COMPETITION OF 35 CULTIVARS OF ALFALFA AT SERTÃOZINHO-SP<sup>1</sup>**

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**Abstract**

Thirty-five cultivars of alfalfa were evaluated at EE de Zootecnia in Sertãozinho, SP, Brazil. During four years, the plants were harvested to determine dry matter yield on total and individual cuts. A completely randomized block design with three replications was used, and data were analyzed by groups of origin and dormancy degree. There were significant differences ( $P < 0.05$ ) among the cultivars regarding their dormancy degree, however no differences ( $P > 0.05$ ) were observed regarding their origin. Cultivars with 8 and 9 dormancy degree showed better performance during the four year trial when compared to 7 degree, although some of the 9 degree cultivars resulted in low yield. The origin of cultivars did not influence yield, but the Argentinean group, although not significantly, showed a slightly higher yield when compared to other cultivars.

**Keywords:** Dry matter, *Medicago sativa*, cultivars, dormancy

**Introduction**

Due to the large number of alfalfa cultivars existing currently in the world several competition trials are being carried out in Brazil aiming at selection of the most promising in each region.

The results from the trials carried out in several places in Brazil, have shown the potential of this forage, when compared to several others, including Crioula, which has been traditionally used in southern states. These results showed that utilization of adapted cultivars might offer higher yield, reaching values as high as 22 t/ha/year according to Monteiro et al. (1996). Therefore, the present work aimed at evaluating total and per cut dry matter yield, leaf production and leaf: stem ratio in 35 alfalfa cultivars in Sertãozinho region, SP. The cultivars yields were then compared according to their origin and dormancy degree.

### **Material and Methods**

The experiment, which was part of National Evaluation Program of alfalfa cultivars (RENACAL) was carried out at Estação Experimental de Zootecnia in Sertãozinho, SP. The experimental station is located at 21°08' S and 47°59'W. Local soil (oxis soil type), after lime, presented the following chemical composition during sowing: pH (CaCl<sub>2</sub>) = 5.7; MO = 3.7%; P(resin) = 172 µg/cm<sup>3</sup>; K = 0.39; Ca = 5.4; Mg = 2.2; H+Al = 1.5 meq/100 cm<sup>3</sup>; V% = 84.

According to Koppen, the region climate can be classified as humid tropical AW type, with annual average temperature and precipitation of 22°C and 1.200 mm, respectively.

Completely randomized block design with three replications was used, where the 35 alfalfa cultivars were distributed in 5x1 m experimental blocks with 2.8 m<sup>2</sup> of experimental area. Sowing, carried out in 11/04/96, was done in 0.20 m spaced rows. The cuts, realized during the years 1996, 1997, 1998, 1999 and 2000, were done at a height of 5 to 8 cm, when the plants had 10% flowering average.

The following parameters were determined: dry matter yield, per cut and accumulated total, during the four years period. Statistical Analysis System (SAS, 1985) was used to analyze cultivar groups regarding their origin and dormancy degree for DM yield characteristics per cut and total.

Therefore, the following groups were formed according to their origin, North American (USA), Argentinean (ARG) and Brazilian (BRA). As for dormancy degree (vegetative dormancy of plants in the winter), the cultivars were distributed in 7 (with dormancy  $\leq 7$ ), 8 and 9 degrees, within their groups of origin.

## **Results and Discussion**

Table 1 shows the data for dry matter per cut and total yield of the 35 alfalfa cultivars classified according to their origin and dormancy.

Analysis of variance showed significant differences ( $P < 0.05$ ) for the cultivars with respect to DM yield, per cut and total, leaf production and L: S, as well as dormancy degree. However, no significant differences ( $P > 0.05$ ) were observed regarding origin. The origin was only significant in interaction with dormancy degree (Table 2).

According to the order of the cultivars the Alto, 5888, 5715, Florida 77, SW 9210 (USA cultivars), Rio, Araucana, Maricopa, Victoria SP Inta, Monarca SP Inta (Argentinean cultivars) and BR2 (Brazilian cultivar) displayed the highest DM per cut yield ( $P < 0.05$ ) when compared with the others cultivars, and both P 30 and P 205 of the Palaversich/Argentinean, displayed similar values but the worst values when compared with the others cultivars ( $P < 0.05$ ).

However, not all of the most productive cultivars showed the highest leaf production and L: S (Table 1).

Despite being the most cultivated in Brazil due to its great adaptation and yield (Dias et al., 1996; Viana et al., 1996; Botrel et al., 1996), the Crioula cultivar did not perform well during the evaluation period.

It can be seen that, generally, the 8 and 9 dormancy degree cultivars displayed better performance during the four year trial, when compared to 7 degree, although some of the 9 degree showed low yield (Table 1).

It should be observed that the cultivar origin did not affect yield (Table 2). However, although not significant, the Brazilian group had slightly higher yield when compared to others. This result is observed throughout the trial period, when the Brazilian cultivars were consistently among the best, regarding total dry matter yield (RUGGIERI et al. 1998, 1999).

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**Table 1** - Identification of Cultivars, origin and dormency degree; per cut and total dry matter production (DMP), leaf production (LP) and leaf:steam ratio (L:S) evaluated for four years

CULTIVARS (N°-Name)	GROUP/ORIGIN	DORM	DMP/CUT (Kg/ha/cut)	DMP/YEAR (kg/ha/year)	LP (kg/ha/cut)	L:S
02 -W1 516	1- Cargill/ USA	8	1578 C	13890 C	630 BC	0.70 B
03 -Alfa 200	1- Cargill/ USA	9	1669 BC	14693 C	677 B	0.73 B
07 -Alto	1- Great Plains/ USA	8	1702 A	14762 C	736 A	0.82 A
04 -Falcon	1- Nicola/ USA	8	1576 C	13966 C	642 BC	0.74 B
01 -Valley Plus	1- Oadea/ USA	8	1570 CD	13579 C	646 BC	0.77 A
26 -5888	1- Pioneer/ USA	8	1736 A	15280 C	693 B	0.72 B
27 -5715	1- Pioneer/ USA	8	1749 A	15526 BC	718 AB	0.76 AB
24 -5929	1- Pioneer/ USA	9	1607 C	14238 C	640 BC	0.70 B
25 -Florida 77	1- Pioneer/ USA	9	1713 A	14865 C	720 AB	0.75 AB
05 -SW 8210	1- S & W/ USA	8	1777 A	15539 B	742 A	0.76 AB
06 -SW 8112 A	1- S & W/ USA	8	1624 C	14165 C	736 A	0.70 B
34 -SW 9210 A	1- S&W/ USA	9	1711 A	14853 C	678 B	0.70 B
14 -Semit 711	1- Semit/ USA	7	1598 C	13875 C	706 AB	0.83 A
15 -Semit 921	1- Semit/ USA	9	1538 D	13679 C	591 C	0.67 B
09 -ICI 990	1- Zeneca/ USA	9	1627 C	14378 C	641 BC	0.70 B
08 -Rio	2- Llanos/ Arg	8	1691 A	14595 C	707 AB	0.78 A
21 -F 708	2- Forratec/ Arg	7	1637 BC	14090 C	678 B	0.75 AB
22 -F 686	2- Forratec/ Arg	7	1673 BC	14509 C	693 B	0.70 B
23 -El Grande	2- Franzani/ Arg	8	1571 C	13632 C	632 BC	0.72 B
16 -Araucana	2- Los Prados/ Arg	8	1703 A	14975 C	713 AB	0.76 AB
28 -MH 4	2- Mulcahy/ Arg	8	1626 C	13846 C	715 AB	0.83 A
29 -MH 15	2- Mulcahy/ Arg	8	1737 A	15126 C	747 A	0.82 A
17 -Maricopa	2- Nidera/ Arg	8	1762 A	15551 A	721 AB	0.75 AB
18 -Sutter	2- Nidera/Arg	8	1561 D	13741 C	625 BC	0.72 B
19 -P 30	2- Palaversich/ Arg	9	1502 E	12806 C	601 C	0.73 B
20 -P 205	2- Palaversich/Arg	8	1452 E	12379 C	626 BC	0.81 A
13 -Costera SP Inta	2- Sancor / Arg	7	1520 D	12943 C	638 BC	0.77 A
11 -Victoria SP Inta	2- Sancor / Arg	8	1734 A	15360 C	711 AB	0.74 B
12 -Esmeralda SP Inta	2- Sancor/ Arg	7	1614 C	14198 C	662 B	0.74 B
10 -Monarca SP Inta	2- Sancor/ Arg	8	1784 A	15689 A	761 A	0.80 A
30 -BR 1	3- Abi/ Bra	8	1686 B	14706 C	694 B	0.74 AB
31 -BR 2	3- Abi/ Bra	8	1777 A	15544 AB	748 A	0.79 A
32 -BR 3	3- Abi/ Bra	8	1686 B	14729 C	694 B	0.76 AB
33 -BR 4	3- Abi/ Bra	8	1582 C	13765 C	651 BC	0.73 B
35 -Crioula	3- Cra/ Bra	9	1615 C	13932 C	642 BC	0.70 B

Means followed by different letters in columns differ by the Tukey test (P<0.05)

**Table 2** - Grouping of the cultivars with relationship to the dormancy degree and origin; per cut and total dry matter production (DMP), leaf production (LP) and leaf: stem ratio (L:S)

Dormancy Degree	Origin	DMP kg/ha/cut	DMP kg/ha/year	LP kg/ha/cut	L:S
7	USA	1598 AB	13785 B	706 A	0.83 A
8	USA	1664 A	14588 A	693 AB	0.74 AB
9	USA	1644 AB	14451 AB	658B	0.71 B
Averages		1636	14275	686	0.76
7	ARG	1605 B	13913 AB	668 B	0.75 AB
8	ARG	1679 A	14644 A	696 A	0.77 A
9	ARG	1502 B	12806 B	601 C	0.73 AB
Averages		1595	13788	655	0.75
8	BRA	1683 A	14686 A	696 A	0.75 AB
9	BRA	1615 AB	13932 AB	642 B	0.70 B
Averages		1649	14309	669	0.73

Means followed by different letters in columns differ by the Tukey test (P<0.05).