

Study on the Consumption Speed of Forages and Consumption Indices of Forages in Romanian Black and White Cows

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Abstract

The aim of the paper was to determine the consumption speed of forages (g/min.) and consumption indices (quantity and consumption duration) of forages, administered in two portions, to Romanian Black and White cows. The administration order of forages (fibrous-succulents (O1) and succulents-fibrous (O2) order), the number of portion (P1 and P2) and number of feeding (F1 and F2) were the experimental variants. Data was computed by ANOVA/MANOVA. Results showed that the administration order of forages had an influence on the speed consumption, when was given before silage (O1), hay had a higher consumption speed (41.35 g/min) decreasing to 31.41 g/min when hay was fed after the silage (O2). For silage the consumption speed was 190.33 g/min in O1 and increased to 228.87 g/min when was given before hay (O2). Between portion 1 (P1) and portion 2 (P2), the significant difference ($p < 0.001$) was for silage consumption speed in favour portion P2. Regarding the number of feedings per portion, always the consumption speed of the feedstuffs, as well as the amount consumed, was higher in the first feeding F1 than in the second feeding F2.

Keywords: consumption speed of forages, Romanian Black and White Cows

1. Introduction

The interest on the feeding behaviour of cattle has recently been increased. The feeding behaviour should be encountered to obtain optimal performance from cattle [1].

The consumption speed of forages is influenced by the numerous factors and it is variable in large limits, according to their nature and preparation methods that are conditioning their palatability and digestibility [2].

At the same time, the consumption speed of forages is influenced by the breed [3], the ration structure and the ration cellulose and NDF content [4], as well as by the number of portions and feedings of the ration.

The aim of the paper was to determine the consumption speed and consumption indices of some cold-season specific forages, administered in two portions, according to their nature, the number of feedings in a portion and the administration order of forages within one portion.

2. Materials and methods

Investigations were carried out in The Experimental and Didactical Station of the Banat University of Agricultural Sciences and Veterinary Medicine Timișoara, during the autumn-winter season. The biological material in the study was 9 Romanian Black and White cows at first freshening, in their first one hundred days of lactation.

In our researches we studied some specific cold-season forages consumption speed, such as alfalfa hay, herbs silage and concentrates. Ration was

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made of 3 kg concentrates, 6 kg alfalfa hay, and 20 kg grass silage (leguminous and grasses), administered in two portion per day (P1 and P2). One forages portion was divided and administered in two equal feedings (F1 and F2).

Fodders given in two orders: fibrous-succulents (O1) and succulents-fibrous (O2). The nutritional behavior of cows was video recording for two consecutive days, 24 hours/day.

Methods used were: daily weighing of forages portion and feedings, tape recording of forage consumption length, data processing and statistical interpretation with ANOVA-MANOVA.

3. Results and discussion

There are controversies in the literature regarding the administering order of fibrous and silage within the same portion [5]. Some authors say [6] that feeding from the physiological point of view, is requires that fibrous fodder, having a high crude fibre content, should be fed first, and then should be fed forages rich in fermentescible carbohydrates (concentrates and succulents), in this way avoiding sudden increase of rumen pH and allowing a good assimilation of the bacterial nitrogen.

Table 1 presents averages and significance of differences for the feed consumption speed administered in order fibrous-succulents (O1) and succulents-fibrous (O2).

The fodder administration order clearly influenced the consumption speed of the feedstuffs, as well as the values of the other consumption indices, except for the concentrates. When was given before silage (O1), hay had a higher consumption speed (41.35 g/min) decreasing to 31.41 g/min when hay was fed after the silage (O2). For silage the consumption speed was 190.33 g/min in O1 and increased to 228.87 g/min when was given before hay (O2). For

both feedstuffs, the differences between administration orders were very significant ($p < 0.001$). Also, cows consumed 250.80 g more hay when this was given before silage and 812.43 g more silage when this was given before hay. Differences were very significant for both feedstuffs ($p < 0.001$).

Table 2 shows the averages and significance of differences for the feed consumption speed administered in portions 1 and 2 (P1 and P2).

Between the P1 and P2, significant differences ($p < 0.05$), was for the silage consumption speed which was 205.13 g/min in P1 and 214.06 g/min in P2 and for concentrates consumption duration, who was 220.66 sec. in P1 and 213.19 in P2. Distinct significant differences ($p < 0.01$) results for the amount of silage consumed (higher 188.12 g in P2 than in P1) and very significant difference ($p < 0.001$) was for consumer duration silage (290.67 sec.).

For the other consumption indices, the differences were statistically non-significant ($p > 0.05$).

The influence of feedings (F1 and F2) on the forage consumption speed it may be seen by analyzing the averages and significance of differences shown in Table 3.

Regarding the number of feedings per portion, always the consumption speed of the feedstuffs, as well as the amount consumed, was higher in the first feeding F1 than in the second feeding F2. For example, the consumption speed for concentrates was 257.51 g/min in F1 and 174.37 g/min in F2 ($p < 0.001$), for silage was 227.48 g/min in F1 and 191.71 g/min in F2 ($p < 0.01$), and for hay was 41.78 g/min in F1 and 30.90 g/min in F2 ($p < 0.001$). Furthermore, the amount of hay was 197.92 g higher in F1 than in F2, as well as the amount of silage consumed was 754.24 g higher in F1 than in F2.

Table 1. Averages and significance of differences for the feed consumption speed administered in order 1 and 2 (O1 and O2)

Specification		O1	O2	Differences and significance O1- O2
Concentrates	Consumption duration(s)	215.33	218.52	-3.19 ^{ns}
	Consumption speed (g/min.)	216.94	214.89	2.05 ^{ns}
Alfalfahay	Consumption(g)	1428.80	1178.00	250.80 ^{***}
	Consumption duration(s)	2113.50	2269.05	-155.55 ^{***}
	Consumption speed (g/min.)	41.35	31.41	9.94 ^{***}
Herbs silage	Consumption(g)	401.84	4825.27	-812.43 ^{***}
	Consumption duration(s)	1666.52	2051.25	-384.73 ^{***}
	Consumption speed (g/min.)	190.33	228.87	-38.54 ^{***}

$p < 0.05$ *, $p < 0.01$ **, $p < 0.001$ ***

Table 2. Averages and significance of differences for the feed consumption speed administered in portions 1 and 2 (P1 and P2)

Specification		P1	P2	Differences and significance P1- P2
Concentrates	Consumption duration(s)	220.66	213.19	7.47*
	Consumption speed (g/min.)	213.18	218.70	-5.52 ^{ns}
Alfalfahay	Consumption(g)	1305.68	1301.12	4.56 ^{ns}
	Consumption duration(s)	2204.33	2178.22	26.11 ^{ns}
	Consumption speed (g/min.)	35.97	36.79	-0.82 ^{ns}
Herbs silage	Consumption(g)	4325.00	4513.12	-188.12**
	Consumption duration(s)	2004.22	1713.55	290.67***
	Consumption speed (g/min.)	205.13	214.06	-8.93*

p<0.05*, p<0.01**, p<0.001***

Table 3. Averages and significance of differences for the feed consumption speed administered in feedings 1 and 2 (F1 and F2)

Specification		F1	F2	Differences and significance F1- F2
Concentrates	Consumption duration(s)	174.97	258.89	-83.92***
	Consumption speed (g/min.)	257.51	174.37	83.14***
Alfalfahay	Consumption(g)	1402.36	1204.44	197.92***
	Consumption duration(s)	2040.56	2342.00	-301.44***
	Consumption speed (g/min.)	41.78	30.90	10.88***
Herbs silage	Consumption(g)	4796.18	4041.94	754.24***
	Consumption duration(s)	1431.58	2286.19	-854.61***
	Consumption speed (g/min.)	227.48	191.71	35.77**

p<0.05*, p<0.01**, p<0.001***

4. Conclusions

- The fodder administration order clearly influenced the consumption speed of the feedstuffs, as well as the values of the other consumption indices, except for the concentrates. in the way that one feedstuff will always have a higher consumption speed if it is administered as the first feed than it is administered after other feed and differences were very significant (p<0.001).

- Between the P1 and P2, significant differences (p<0.05), was for the silage consumption speed and for concentrates consumption duration, distinct significant differences (p<0.01) results for the amount of silage consumed and very significant difference (p<0.001) was for consumer duration silage.

.- Regarding the number of feedings per portion, always the consumption speed of the feedstuffs, as

well as the amount consumed, was higher in the first feeding F1 than in the second feeding F2.

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