FORAGE CHICORY

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Abstract**:** *Chicory is a herbaceous, perennial, edible plant from the Genus Chicorium of the Family Asteraceae. In Romania, chicory is known mainly for its medicinal uses due to its high content of diuretic and laxative, hypoglycaemic, anti-thyroid and depurative substances. Its particular resistance to climate conditions, particularly prolonged droughts, and its high nutritive value have determined the introduction into cultivation of chicory in different fodder crop structures, particularly in moisture-deficit areas, where it is cultivated both in pure culture and in different temporary grassland mixtures. Chicory is a herbaceous, perennial, edible plant from the Genus Chicorium of the Family Asteraceae. It has been known ever since Ancient times: in Ancient Egypt, it was cultivated as a medicinal plant and was used to treat liver and bile, and kidney diseases. Nowadays, chicory root is a very popular coffee surrogate and its aerial parts are used in medicine and gastronomy (basal leaves, slightly bitter, are used in salads). Chicory is native from North Africa, Europe and Asia; it can be seen in different ecological areas, but it is spread mainly in grasslands and in haymaking fields, in uncultivated areas, from the plain area to the hill and mountain areas. In Romania, chicory is known mainly for its medicinal uses due to its high content of diuretic and laxative, hypoglycaemic, anti-thyroid and depurative substances. Though very frequent in the spontaneous flora, chicory is still very little known in Romania as a forage crop. Its particular resistance to climate conditions, particularly prolonged drought, and its high nutritive value (superior to other well-known fodder species such as alfalfa, cock's foot, and clover) determined its introduction in different fodder crop structures, particularly in moist-deficit areas, where it is cultivated both in monoculture and in different temporary grassland mixtures. The last decades, the cultivation of forage chicory has spread to all Mediterranean countries as well as to New Zealand and Australia, U.S.A. and Canada, France, Italy, India, and China (SANDERSON et al., 2001).*

Keywords: *chicory, drought, temporary grassland*

RESEARCH METHOD

In this paper, we present the results of several authors that have studied chicory (*Cichorium intybus* L.) as a fodder plant.

In order to measure the degree of adaptability of chicory in the Banat Plain area, we started, in 2012, a complex study of the quantitative and qualitative features of some agro ecotypes of chicory developed in southern Italy by the Animal Husbandry Institute of Sardinia, Olmedo.

SYNTHESIS OF RESULTS FROM LITERATURE

Improvement research in the species resulted in numerous fodder cultivars; these cultivars are characterised by a larger share of basal leaves and by a longer vegetation period (WANG and CUI, 2011; HUME et al., 1995; ZOBEL et al., 2006; SULAS, 2004; DAVID and SEARS, 2007). In Italy, they cultivate over 50 cultivars of forage chicory (GIOLO, 2003; TOSINI, 2004).

Table 1.

Forage chicory yield in N-W Sardinia, Italy (SITZIA et al., 2006) (t/ha DM)

Harvesting time	Year I	Year II
Fall	-	1.32
Winter	1.10	0.92
Spring	1.94	1.86
Total	3.04	4.10

In the conditions of Southern Italy (Sardinia), where there is a high moisture-deficit because of the droughts, monocultures or chicory associated cultures (with alfalfa, cock's foot) for direct grazing by sheep or goats yield good fodder yields (Table 1) (SITZIA et al. 2006).

Table 2.

Nutritive value of forage chicory depending on cultivar (SANDERSON et al., 2003)

Cultivar	Raw protein (%)	In vitro digestibility (%)	NDF (%)
Forage Feast	19.5	80.7	45.5
Puna	18.1	82.1	43.5
Lacerta	17.0	73.6	46.2
Lancelot	17.3	71.3	50.2
Tonic	17.9	72.4	47.6

The nutritive value of chicory is given by a high digestibility of the organic matter (71.3-82.1%), by a high content of raw protein (17.0-19.5%) and by a lower content of cellulose (NDF=43.5-50.2%) (Table 2). Chicory contains a low amount of tinins, which leads to an increase of the efficacy of protein use in the animals' rumen.

Table 3.

Mineral content of forage chicory compared to other fodder species (SANDERSON et al., 2003)

Elements (g/kg SU)	Chicory	Alfalfa	White clover	Cock's foot
P	4.7	3.3	3.3	3.4
K	36	25.1	24.4	29.1
Ca	18	15	14.5	2.7
Mg	4.8	2.1	4.7	1.1
Mn	170	47	123	157
Cu	32	11.4	9.4	19
B	33	-	-	-
Zn	45	37	17	40

Chicory fodder is rich in mineral elements, particularly P, K, Ca, Cu, B, and Zn, compared to alfalfa, white clover and cock's foot (Table 3) (SANDERSON et al., 2003; MOLONEY and MILNE, 1993). Fodder palatability is also very high, and the bioactive compounds of the plants reduce nematodes and other parasites that affect animals (ATHANASIADOU et al., 2007; HOSKIN et al., 2003; MARLEY et al., 2003).

Table 4.

Impact of feeding sheep and goats on forage chicory on milk production (SITZIA et al. 2006) in N-W Sardinia (Italy)

Specification	Year I	Year II
Duration of grazing (days)	7.4	8.6
Mean density of animals (animals/ha)	66	66
Fodder, hay consumption (g/day/animal)	381	465
Concentrate consumption (g/day/animal)	260	256
Milk production (g/day/animal)	1693	1637

Grazing chicory fodder results in an increase of the fodder crop due to the increase of the animal production, particularly in sheep (Table 4).

CONCLUSIONS

Chicory (*Cichorium intybus* L.) proved very resistant to climate conditions, particularly to longer drought periods and its high nutritive value, superior to other well known fodder species, determined the introduction into cultivation of chicory in different fodder crop structures.

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