

## RESEARCH ON THE PROTEIN CONTENT OF SOME GRAIN SORGHUM HYBRIDS GROWN IN INAND, BIHOR COUNTY

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### RESEARCH ARTICLE

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#### Abstract

*This study analyses the protein content of some grain sorghum hybrids grown in 2019-2020 in Inand, Bihor County, on a soft clay illuvial soil. Sorghum has a similar chemical composition to corn, but with a slightly higher protein level. This cereal can be integrated into the nutrition recipes of most farms' animal breeding. The current genetics in the sorghum field has introduced for cultivation sorghum hybrids with low tannin content, so-called "low tannin" hybrids, the absence of tannins leading to a high digestible energy of the animals.*

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#### INTRODUCTION

Sorghum is the species that resists the high temperatures during the summer and achieves high productions even in conditions of water stress, it is a plant with a weak attack of diseases and pests, the most important disease being fusarium, but hybrids with high tolerance created to this disease have been.

The sorghum crop requires less input than the corn crop, sorghum having a well-developed root system with double absorbent pulps compared to those of corn makes very good use of nutrients from the soil, especially mineral nitrogen.

Sorghum is not pretentious compared to the preceding plant, however, cultivation in monoculture leads to the impoverishment of the soil in nutrients.

From an ecological point of view, one hectare of sorghum absorbs annually up to 50 - 55 t/ha/year of CO<sub>2</sub> from the atmosphere, while deciduous forests absorb 16 t/ha/year of CO<sub>2</sub>, and the rest of the cereals 3 - 10 t /ha/year. Sorghum is a productive species, undemanding to soil fertility, to drought, it involves minimal expenses for cultivation and processing and does not produce losses, the waste being usable.

Sorghum can be a good alternative to corn crop. This is due to the fact that sorghum is the species that resists the high temperatures

during the summer, the pollen being viable up to 40<sup>o</sup> C.

#### MATERIAL AND METHOD

We chose 5 sorghum hybrids for this study, 3 hybrids are produced by the company Euralis Semences France, they are: Armorik, Mousson and Alize and 2 are from the company KWS Germany: Arsenio and Lupus. Two hybrids out of the five have white grain colour: Mousson and Arsenio, Armorik and Lupus have orange grain colour, and Alizee has red grain colour.

For the grain sorghum crop, we prepared the soil similar to the grain corn crop.

After harvesting the preceding plant, we did deep ploughing, at a depth of 22-25 cm, with ploughs equipped with differs and in aggregate with a star harrow.

In the spring, we worked the soil with the disc harrow, followed by the harrow with adjustable tines at a depth of 8-10 cm

The day before sowing, we carried out a work with the combiner, which conferred the quality of the germinal bed, through the better degree of levelling, settlement and shredding of the soil. Fertilization of the experiments was carried out in the spring phase.

The first stage was applied under the plough, 200 kg of complex fertilizers 16.16.16., the second application of fertilizers was executed at sowing, 90 kg of complex fertilizers

20.20.0, and the third application was executed at the mechanical grid 100 kg of nitrogen.

The density at sowing was 300,000 germinating grains/ha at a distance of 70 cm between rows.

For weed control, a pre-emergent weeding was carried out with Dual Gold 980 EC 1.2 l/ha, the seeds being treated with Concept III, a "safener" type substance that protects the sorghum plant at emergence from the action of the anti-grass herbicide Dual Gold 980 EC.

At the 3-leaf stage of the sorghum plant, a post-emergence herbicide with Casper 0.4 kg/ha was carried out.

Harvesting was done with the grain combine at 14% humidity

The biochemical composition of the sorghum grains was determined with the help of the Pfeuffer NIR analyser, with which the protein, starch, fat, and ash contents were determined.

The research was carried out for 2 years, 2019 and 2020.

## RESULT AND DISCUSSIONS

After harvesting the sorghum, we took a sample of 2 kg of seed from each hybrid to determine the chemical composition.

Figure 1 shows the graph of the chemical composition of the sorghum hybrids, the hybrid with the highest protein content is Mousson with 12.01% followed by Lupus with a lower content than Mousson with 0.45%, respectively Alizee, Armorik and Arsenio with a protein content of 0.78%, 1.14% and 1.57% lower than Mousson. The first stage was applied under the plough, 200 kg of complex fertilizers 16.16.16., the second application of fertilizers was

Following the chemical analyses of the hybrids grown in 2019 presented in table 1, the protein content of the hybrids is as follows: Mousson 12.01% protein, Lupus with 11.56%, Alizee 11.23%, Armorik 10.87% and Arsenio 10.53%.

Table 1

The chemical composition of sorghum grains in 2019 , Inand, Bihor County

The name of the hybrid	Total protein (%)	Amidon (%)	Fats (%)	Ash (%)
ARMORIK	10.87	72.4	2.2	5.58
MOUSSON	12.01	67.8	2.9	6.72
ALIZEE	11.23	68.3	2.4	6.13
ARSENIO	10.53	70.5	3.1	5.50
LUPUS	11.56	71.3	2.6	6.24



Figure 1 Graph of the chemical composition of sorghum grains, 2019, Inand, Bihor County

Table 2 shows the chemical analyses of the hybrids cultivated in 2020, where the following protein values were recorded: Armorik 11.42%, Mousson 12.12%, Alizee 11.42%, Arsenio 10.46% and Lupus 11.62%.

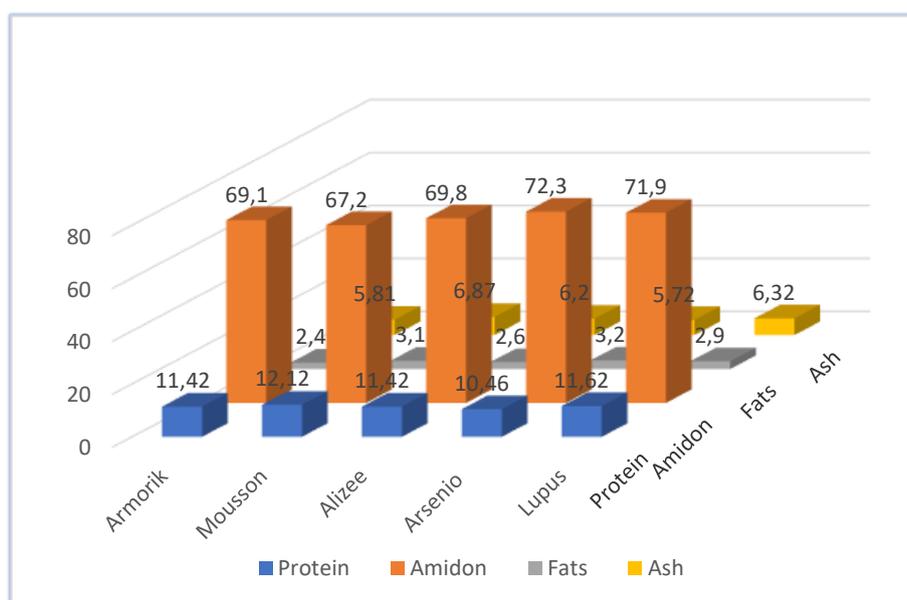
Figure 2 shows the graph of the chemical composition of sorghum grains. The hybrid that

registered the highest protein is Mousson 12.12% followed by Lupus with a lower protein content of 0.5% respectively Armorik, Alizee and Arsenio with a lower protein content of 0.7% and 1.6%.

Table 2

**The chemical composition of sorghum grains in 2020, Inand, Bihor County**

The name of the hybrid	Total protein (%)	Amidon (%)	Fats (%)	Ash (%)
ARMORIK	11.42	69.1	2.4	5.81
MOUSSON	12.12	67.2	3.1	6.87
ALIZEE	11.42	69.8	2.6	6.20
ARSENIO	10.46	72.3	3.2	5.72
LUPUS	11.62	71.9	2.9	6.32

Figure 2 **Graph of the chemical composition of sorghum grains, 2020, Inand, Bihor County**

In figure 3 we presented the protein graph of the hybrids recorded in the two years of the study. In 2019, the protein in the chemical composition of Armorik, Mousson, Alizee and Lupus hybrids is lower than that recorded in the 2020 study year, 10.87%,

12.01%, 11.23% and 11.56% compared to 11.42%, 12.12%, 11.42% and 11.62%.

The Arsenio sorghum hybrid is the only one that had higher protein in 2019 compared to 2020, 10.53% compared to 10.46%.

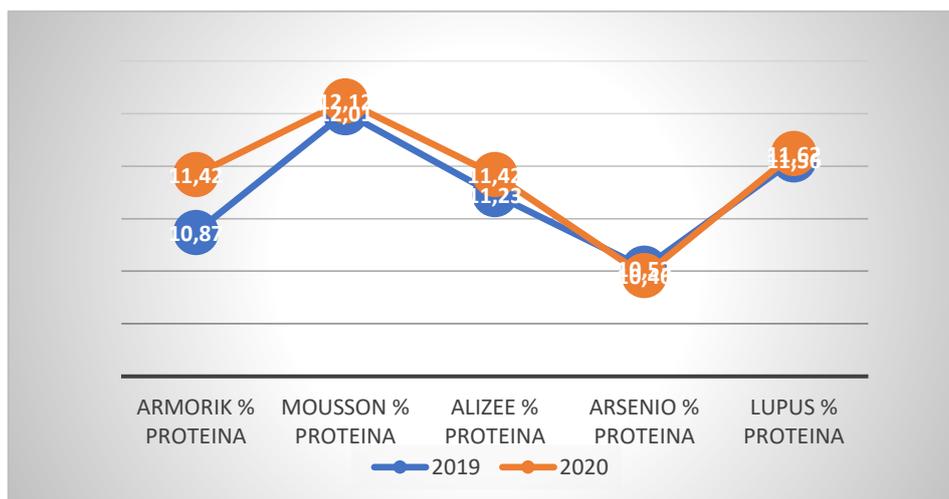


Figure 3 The protein graph of sorghum hybrids registered in 2019 and 2020, Inand, Bihor County

### CONCLUSIONS

The hybrid that recorded the highest protein during the 2 years of study was Mousson with a protein of 12.01% in 2019 and 12.12% in 2020.

The hybrid that registered the lowest protein is Arsenio 10.46% in 2019 and 10.53% in 2020

In the 2020 study year, the highest protein content of hybrids was recorded compared to 2019, namely Armorik 11.42% protein in 2020 compared to 10.87% in 2019, Mousson 12.12% protein recorded in 2020 compared to 12.01% recorded in 2019, Alizee 11.42% protein in 2020 compared to 11.23% in 2019, Lupus 11.62% protein in 2020 compared to 11.56% in 2019.

The only sorghum hybrid with a higher protein increase in 2019 compared to 2020 was Arsenio with 10.53% in 2019 compared to 10.48 in 2020.

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