Intermediary Scientific Report

synthesis

Phase September to December 2013

At the beginning of the project, the team members were documented regarding the project objectives. The research methodology was developed as well by involving all personnel involved in the project. At this stage the work plan was developed to determine the growth of sorghum plants under the influence of specific fall climatic conditions in the lower plains of the Timis. Also, the work plan was developed to study the production capacity of sweet sorghum biomass cultivated as catch crop after cereals (barley after). After harvesting barley (last decade of June) the soil was prepared and four sorghum hybrids were seeding, as successive crop after barley.

The biological material used for the research was composed of four varieties of sorghum with different origins, namely:

1. Sorghum bicolor x sudanense var. Jumbo - origin Australia
2. Sweet sorghum x sweet sorghum hybrid var. Sugargraze - origin Australia
3. Sorghum bicolor x sudanense x sweet sorghum var. Sugargraze II - origin USA
4. Sorghum bicolor convariet. saccharatum var. F135ST - origin România (INCDA Fundulea).

The experimental groups were established in July 10, 2013, after harvesting barley crops. In the experimental variants constructed in this project, sorghum plants were recorded amplitudes between 188 cm height in var. Jumbo and 254 cm in the case of var. F135ST. Regarding the increase in plant height belonging to the four genotypes studied, we found that in the phenological phase 1.4 BBCH the highest recorded plants were genotype Jumbo, in the phenological phase BBCH 3.7 plants belonging to genotype SugargrazeII, respectively phenophases 6.7 and 8.9 BBCH, genotype F135ST recorded the highest values of plant height compared to other genotypes. In terms of biomass dynamics was observed that all the experimental variants compared with other genotypes, F135ST achieved maximum values, while genotype Jumbo recorded the lowest values. Regarding the dry matter production of the four genotypes studied, it is found that in phenophase 1.4 BBCH highest value was recorded in plants belonging to genotype Sugargraze II, while the last three moments of genotype determination, genotype F135ST realized highest production of dry matter compared with other genotypes. Biomass production level was very high: between 70 and 86 t / ha, in all experimental variants. Sweet sorghum responds well to fertilizer application at seeding base by applying fertilizers to 3 cm below the seed. Sorghum is a species with high ecological plasticity, which provides high efficiency, even as a successive crop after cereals; biomass can be harvested when the seeds are developing. It is sufficient to fertilize only once, no need extra fertilization due to short development cycle in successive crop: 90-110 days. Sorghum crops

were stopped development in the first decade of October due to freezing temperatures overnight.


06.08.2013


22.08.2013


07.10.2013

Regarding research on sorghum biomass conservation, there was elaborated a scientific paper entitled ***Ensiling Sweet Sorghum and Maize Stalks as Feedstock for Renewable Energy Production,*** Authors: Trulea Adrian, Vintila Teodor, Pop Georgeta, Șumălan Radu, Sorin Gaspar, published în Research Journal of Agricultural Science Vol.45 No.3 - ISSN 2066 - 1843 - Editura Agroprint – 2013. The experiments were carried out on a laboratory scale and consisted of minisilages containing sorghum chopped to 1 cm, sorghum bagasse, combination of corn stalks and sorghum, treated and untreated with lactic acid bacteria inocula and ethanol as preservative additives. Twelve types of silos were obtained by a combination of types of biomass and additives. It was examined the effect of these additives and combinations of biomass on the quality and composition of the silages. Ensiled biomass samples were analyzed to assess the nutritional value and quality preservation ensiled biomass. The lowest pH (3.3) was recorded in silos of sorghum bagasse and sorghum bagasse with ethanol. The higher values of pH (6-6.3), where in the silages of corn stalks. In these silages the largest values of the number of contaminants were found. Soluble sugars were preserved in high concentration in the ensiled biomass treated with ethanol: over 91% of water-soluble sugars was found in sorghum silage with ethanol, and less than 57% in sorghum silage with lactic acid bacteria. Ethanol also inhibit protein degradation and multiplication of contaminants during storage (1.9 g^{-1} log10cfu in sorghum treated with ethanol as compared with 3.2 g^{-1} log10cfu sorghum in silage without additives). Inoculants with lactic acid bacteria improves conservation parameters of sorghum, but leads to a consumption of sugars during ensiling. The loss of dry matter, fat, crude fiber were not significant in the types of silages obtained.