Nutritional and microbiological quality of bulk feed determined by different maize sowing dates

The field experiment was conducted at the Department of Agronomy of the Poznań University of Life Sciences, in the fields of the Gorzyń Educational and Experimental Station, Złotniki branch in 2016-2018. It was conducted for 3 years in the same system in 4 field replications. It was a single-factor experiment, with 6 sowing dates of an ultra-early maize variety: A1 – 12.IV, A2 – 26.IV, A3 – 10.V, A4 – 24.V, A5 – 7.VI, A6 – 21.VI. The same level of mineral fertilization was applied on all experimental sites at the level of 130 kg $N \cdot ha^{-1}$ (urea), 50 kg $P_2O_5 \cdot ha^{-1}$ (granular triple superphosphate) and 80 kg $K_2O \cdot ha^{-1}$ (potassium salt). Weeds were controlled after sowing (at each corn sowing date) with Lumax 557.5 SE in the amount of 4 $l \cdot ha^{-1}$. Maize was sown with a Monosem precision seeder. The assumed plant density in each year of the study was 7.95 pcs.m-2 (79,500 grains/ha), with an inter-row spacing of 70 cm and a sowing depth of 4-5 cm. The gross plot size was 24.5 m^2 (length 8.75 m, width 2.8 m). The net plot area for observations (collecting plant samples) was 12.25 m^2. The 2 middle rows of each experimental plot were designated for collecting corn plants. The 'Pyroxenia' corn seeds were used to establish the experiment. This variety is characterized by extreme early ripening (FAO 130), rapid initial development and elongation growth. In addition, this variety is characterized by very good disease resistance, a high proportion of cobs in the mass, a high starch content in the grain and very good fiber digestibility. The green corn was harvested each year at the waxy maturity of the grain, in each of the 6 terms of its sowing. The corn plants were crushed into chaff 1.0 to 1.5 cm long using a crusher. After crushing, the green maize was placed in a silo with a volume of about 10,600 cm3. A significant effect of sowing date on the chemical composition and nutritional value of green fodder from an ultra-early maize variety was demonstrated. Sowing this corn variety in the first half of April had a positive effect on the content of dry matter and feed unit of milk production in green fodder compared to sowing in June. An effect of sowing date on the chemical composition, nutritional value and quality of silage from an ultra-early maize variety was also demonstrated. Silage from maize sown in the period from the first half of April to the end of May was characterized by the best chemical composition, nutritional value and quality compared to feed material produced from plants sown at later dates in June. The high nutritional value and quality of silage from an ultra-early maize variety sown in the period from the first half of April to the end of May had a positive

effect on average milk production. Sowing of ultra-early maize varieties intended for the production of silage from whole plants should be carried out in the periods from the first half of April to the end of May. Delaying the maize sowing date caused an increase in the number of Clostridium bacteria in silages, which are responsible for increased losses of dry matter, including starch. The presence of butyric acid as the end product of butter fermentation was not determined in the studied silages. Silages prepared from corn from later sowing were characterized by a higher number of undesirable mold fungi, which are responsible for losses of dry matter, including starch. The coefficient of determination showed that the variability of starch content in silage was explained by more than 38% by the variability of molds in silage. All silages, regardless of the corn sowing date, obtained a very good rating on the Flieg-Zimmer scale.

Keywords: maize, silage yield, sowing date, ensiling