

Annotation

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Productivity of a sugar beet after long-term use of the organic fertilizer system in field crop rotation

The results of the five-year studies of the effect of organic fertilizers on the formation of productivity of the sugar beet on heavy loamy podzolized chernozem after long-term use of the organic fertilizer system in comparison with the mineral and organic-mineral systems are given.

The saturation of a field crop rotation with organic fertilizers at the rate of 9, 13.5 and 18 t/ha with the direct manure application for the sugar beet in the dose of 30, 45 and 60 t/ha increased the yield of root crops on average by 6.5-13.5 t/ha or 18-37% over five years. In the mineral fertilizer system, in case of a single dose ($N_{45}P_{45}K_{45}$) the yield of sugar beets exceeded the check variant at 9 t/ha and a single dose of manure (9 t/ha) at 2.5 t/ha. In case of a double dose ($N_{90}P_{90}K_{90}$) of mineral fertilizers and manure (18 t/ha) the productivity of root crops was 49.9 and 49.7 t/ha, respectively. The higher sugar beet harvest is obtained when applying both manure and mineral fertilizers in a dose of 30 t/ha + $N_{60}P_{135}K_{30}$ – 51.7 t/ha.

The sugar content in root crops was dependent on systems and doses of fertilizer application for sugar beets. In case of the organic fertilizer system, a significant reduction in sugar content (0.4%) was only when applying 60 t/ha of manure directly for the sugar beet; in case of mineral and organic-mineral fertilizer systems, it reduced in the dose of 0.5% of $N_{135}P_{135}K_{135}$ and after applying 30 t/ha of manure + 0.4 % of $N_{60}P_{135}K_{30}$.

For the organic fertilizer system in the crop rotation with the manure saturation of 9, 13.5 and 18 t/ha after the direct application of 30, 45 and 60 t/ha, the sugar taking per unit area increased by 1.2-2.23 t/ha or 19-34%. For the mineral fertilizer system it was 8.71 t/ha after a double dose of fertilizers applied in the crop rotation ($N_{90}P_{90}K_{90}$) and $N_{135}P_{135}K_{135}$ for roots. After the manure saturation of 9 t/ha + $N_{45}P_{68}K_{36}$ and 30 t/ha + $N_{60}P_{135}K_{30}$ for roots it was 9.07 t/ha.

It is recommended for enterprises that are engaged in animal husbandry and use the organic fertilizer system to apply 60 t/ha of manure directly for the sugar beet. When growing only grain and industrial crops mineral fertilizers in the dose of $N_{135}P_{135}K_{135}$ should be applied. In enterprises that have a diversified specialization the fertilizer system of the sugar beet should provide for the introduction of 30 t/ha manure + $N_{60}P_{135}K_{30}$.

Key words: sugar beet, manure, mineral fertilizers, crop rotation, long-term fertilizer, yield, sugar content, sugar taking.