TECHNOLOGICAL CHARACTERIZATION OF CROPS FROM THE FARM "I.I. MARINCU RĂZVAN" IN THE VILLAGE OF ICLODA, COMMUNE OF SACOȘU TURCESC, TIMIȘ COUNTY, ROMANIA

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Abstract. *In order to set up a successful rapeseed culture, farmers should take into account, since the preparation of the germination bed, some essential technological elements that make the difference most often between a successful culture and one that has not survived. Of these specific elements, we need to mention crop rotation, land preparation, sowing, fertilising, and rolling. The study was carried out at the farm "I.I. Marincu Răzvan" on an area of 100 ha in the village of Icloda, commune of Sacoșu Turcesc, Timiș County, Romania. In 2021-2022, four cultures were set up: rapeseed, wheat, sunflower, and maize. Rapeseed was cultivated on an area of 17 ha using as working technology ploughing, discing, drilling, and sowing. The purpose was to obtain a good plant emergence and a good harvest. In order to obtain a good production, the seed used to set up rapeseed cultures should be certified, with a physical purity of at least 98% and a germination of more than 85%. All the seed used for this purpose should be treated with both fungicides and insecticides. It is necessary to take into account the deviations that appear in some years compared to the multiannual mean both in terms of temperature and rainfall, but especially compared to their distribution during vegetation periods. These deviations can be corrected by appropriate cultivation technology measures.*

Keywords: *technological characterization, rapeseed, wheat, sunflower, and maize*

INTRODUCTION

Rapeseed has been one of the most profitable agricultural crops in Romania. Even in the less favourable years, where the crop resisted, productions covered the cultivation technology expenses. Consequently, the market of rapeseed seeds is increasing and the number of farmers who will introduce this culture in their farms will be larger and larger. [VASS, H., si colab., 2021, NITA L., și colab., 2019, DAVID, SAIDA FEIER, și colab., 2020]

In practice, there were cases when rapeseed crops were compromised because of herbicide remanence. [STEF, RAMONA, și colab.,2022]. Depending on the land work, this remanence manifested itself in the autumn at the beginning of the vegetation period (when the rapeseed plants were in a phase of 2 to 6 leaves – when the land was prepared only with heavy discs) or spring (when the rapeseed plants were 20-30 cm tall and the land was prepared by ploughing). [NIȚĂ LUCIAN-DUMITRU, 2007]. It is recommended to pay special attention particularly to the lands on which some sulphonyl urea herbicides have been used. [MIHUȚ, CASIANA, și colab., 2014, MIHUȚ C. 2014]. Some of the herbicides included in this class may have a remanence of up to 14-16 months. To check the remanence of the herbicides used, farmers can ask for details from their suppliers. [LATO A.M., și colab., 2016].

Rapeseed is considered a good pre-emergent plant for wheat and barley crops, which yield high productions after rapeseed – over 500 kg/ha. Basically, rapeseed can successfully find its place in the crop rotation of Romanian farms.

Most of the time, the farmer's option regarding land preparation is closely related to the climate conditions in the area. [NIȚĂ L., și colab., 2018] . Where it is not possible to plough, one can prepare the germination bed through one or two passes with a heavy disc. Each farmer

decides, depending on facilities and on climate conditions, the most suitable and profitable solutions for his farm. [CASIANA MIHUȚ, si colab.,2022, DUMA COPCEA, ANISOARA, și colab., 2021]

From the observations in the field, it was found that, where ploughing was made, the vegetal debris were better incorporated in the soil, the phytotoxicity effect of the herbicides applied to the pre-emergent crop (where appropriate) was diminished, and the rapeseed culture was less invaded by the weeds.

After the basic work, the land is prepared either by one or two passes with the light disc, or by a disc and a combinator or a complex aggregate that leaves the land disced and levelled. Where there is last generation equipment, all the necessary works (discing, sowing, levelling, rolling, etc.) can be done through a single passage. Regardless of the type of work, it is important to prepare an aerated germination bed in the first 2-3 cm and a firm one below the sowing depth to ensure optimum conditions for seed germination. [OKROS A., și colab.,2018]

Sowing in rapeseed is one of the most important works and can be done either with classical sowing machines when the farmer uses a larger number of seeds per ha or with high-performance sowing machines that can ensure an even density and in which the quantity of seed per ha can be controlled. [OKROS A., și colab, 2014, DUMA COPCEA, ANISOARA, și colab., 2021]

MATERIAL AND METHODS

In 2021-2022, they set up four crops there: rapeseed, wheat, sunflower, and maize.

The machines used to carry out the works performed from setting up to harvest are:

-The Kuhn plough used to plough at a depth of 30-35 cm.

- The hard disc used to directly prepare the stub and to plough at different depths.

- The agricultural drill used to prepare the land especially in drought conditions when the soil is hard at a depth of 10-15 cm.

- The combinator used to prepare the land at a depth of work depending on the land – in general, 8-10 cm directly in the soil, once or twice if necessary.

- The Cansa sowing machine used for tillage plants i.e., maize and sunflower (65,000 plants/ha, about 21 cm between the plants) were sown.

- The John Deere combine used to harvest wheat, rapeseed and sunflower.

RESULTS AND DISCUSSIONS

The Marincu Răzvan Farm is located in Icloda, Timiș County. It has an area of 100 ha.
Existing Farm equipment:
-Two 105 and 115 hp tractors;
-Two discs, a heavy one and a lighter one, easier to prepare;
-Two ploughs, a combinator;
-A drill;
-Herbicide MET;
-Fertilizer MET.

Tractors of 105 hp with front loader and a Ford of 15 hp: both have semi-automatic gear boxes, i.e., integral traction power shift.

The disc is a heavy one, used only to break earth clods, that is, after the sunflower crop, after which a light disc with independent plates is passed.

Both Krone ploughs are reversible an have three cutters.

The herbicide machine is a Bertho with a 24 m working width and full hydraulic opening.

We apply 200 l/ha water with the possibility of changing the amount of water according to the substance applied.

MEA works at a distance of 24 m and it leaves no traces in soles.

For sowing, there is a high-precision sowing machine for tillage crops and one for straw cereals. Both have discs.

In 2021-2022, four crops were set up: rapeseed, wheat, sunflower, and maize.

Rapeseed was cultivated on 17 ha using, as a working technology, ploughing, discing, drilling, and sowing.

Sprouting was quite good with a density of about 35 plants/m^2.

We applied a pre-emergent herbicide in autumn on wide and narrow leaves and, in the spring, we applied herbicides again.

We applied pesticides and fungicides about 8-9 times because rapeseed is a demanding crop.

We sowed wheat on 3 ha, using the ASPAS hybrid.

Sunflower as the pre-emergent crop.

We disced twice in a row but with different discs to avoid the loss of water from the soil; before sowing, between the discing works, we applied 250 kg of complex 18/46/0.

After sowing, we applied pre-emergent herbicides and, in the spring, we applied 200 kg of nitro-calcium, after which we applied herbicides again and insecticide three times and another amount of 200 kg of nitrogen.

Spring crops, sunflower and maize, are most of the times cultivated in the fall, or very early in the spring, with the combinator – a passage or two if necessary.

After ploughing, we sow with 250 kg of complex at a plant density of around 65,000 plants/ha, we apply pre-emergent and post-emergent herbicides depending on the grass and, if the time allows, we plough with another 200 kg of fertilizer or we simply use the MEA but in larger quantity: 250-300 kg/ha.

Maize can be cultivated on different soils with fertility, texture and reaction, but extreme soils should be avoided. With high productive potential, maize needs large amounts of nutrients. For every 1,000 kg grains + secondary production, maize needs 1,828 kg nitrogen, 9-14 kg P_2O_5 and 24-36 kg K_2O. On all types of soil, maize uses well both organic and chemical fertilizers.

Ploughing is executed immediately after the clearing of the land by the pre-emergent plant 25-30 cm deep. The sowing time corresponds to the period when, in the soil, at a depth of 10 cm, temperatures stabilise above 8-10^{o}C. In the classical maize cultivation technology, they need 3-4 mechanical tillage between rows and 23 manual tillage per row. The most harmful pest is the broad-nosed weevil. In maize cultivated every 2-3 years, the density of the broad-nosed weevil can exceed 30 individuals per m^2. The plants are destroyed by this insect ever since the emergence phase. Given that this insect attacks several species of plants, maize should not be sown after sunflower, beans, soy, or sugar beet. The harvesting of the maize in the form of ears is done when the humidity of the grains is between 22-30%, and the black layer that separates the grain from the rachis is observed.

Rapeseed has been one of the most profitable agricultural crops in Romania. Within a crop rotation, it is recommended that the rapeseed does not to come after itself or other cultures with common diseases and pests, such as sunflower, mustard, soybean, beans, or other cruciferous plants at intervals smaller than four years. After the basic work, the land is prepared either by one or two passes with the light disc, or by a disc and a combinator or a complex aggregate that leaves the land disced and levelled. Where there is last generation equipment, all the necessary works (discing, sowing, levelling, rolling, etc.) can be done through a single passage. Regardless of the type of work, it is important to make an aerated germination bed in the first 2-3 cm and a firm ploughing below the depth of sowing to ensure optimum conditions for the germination of the seeds.

Sowing in rapeseed is one of the most important works, which can be done either with classical sowing when the farmer uses a larger number of seeds per ha or with high-performance sowing that can ensure an even density in which the quantity of seeds per ha can be controlled. Most suppliers of rapeseed seeds recommend an amount of 2-3 kg/ha (about 50-60 grains/m^2) and the companies that sell different varieties recommend an amount of 4-5 kg/ha (about 70-80 grains/m^2). These quantities vary depending on the mass of 1,000 grains, purity, and germination. In some cases, given the degree of intensivity of the hybrid or variety, the companies may recommend smaller quantities of seeds/ha. In order to ensure a correct number of seeds per ha, it is recommended to observe the instructions provided by the suppliers. From the point of view of the distance between the rows, several sowing intervals are used, namely at 18 cm, at 25 cm and at 37.5 cm depending, primarily, on the sowing machine used, on the variety sown, and on the degree of cultivability of the land.

The sowing depth of the rapeseed seeds is 2-3 cm and it is made on well-prepared land, without vegetable debris, and free of weeds. When sowing is done on aerated, uneven soil, it is recommended to adjust the sowing depth so that seeds be positioned in the soil at the same level. With sowing machine provided with two types of skates, the skates intended for small seeds will be used. In this way, we provide optimal conditions for an even germination and emergence of the plantlets. The seed used to set up rapeseed crops should be certified, with a physical purity of at least 98%, and germination of more than 85%. All the seed used for this purpose should be treated with both fungicides and insecticides.

As a result, ever since the preparation of the germination bed, an increased importance should be given to the fertilization of the crop. No high rapeseed production can be obtained without a firm support in terms of fertilization. Most seed producers have their own plans to fertilize the crops, but they are generally concentrated around the following values: 70-120 kg/ha N, 50-80 kg/ha P_2O_5, and 40-60 kg/ha K_2O.

Worldwide, among food oil plants, sunflower ranks second.

CONCLUSIONS

In conclusion, it can be shown that, from a climate point of view, the researched perimeter offers favourable conditions for the development of all common agricultural crops in this area.

It is necessary to take into account the deviations that appear in some years compared to the multiannual average both in terms of temperature and rainfall, and especially to their distribution during vegetation periods. These deviations can be corrected by appropriate agrotechnical measures.

With a moderate continental temperate climate during spring and early summer, air masses with abundant rainfall predominate;

Even if, during the vegetation period of agricultural crop, periods with reduced precipitation occur, one can intervene with the help of the river basin of the Timiș River.

If the flow of the River Timiș increases, the surplus can drain both in the collecting channels and in the desiccation channels.

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