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SUNFLOWER PRODUCTION FOR GRAIN IN DOUBLE CROPPING AND IRRIGATION

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After the harvest of early crops and wheat, a considerable acreage in Vojvodina Province remains unused until fall. It might be used for double cropping of sunflowers for grain. From mid-June when early crops (forage mixtures, sweet pea, string bean, etc.) and wheat are harvested until first frosts, there remains about 100-120 days with the temperature sum of 1,800-2,400°C which is sufficient for early sunflower hybrids (90-120 days) to bring grain. Such hybrids have already been made. However, such a production is hampered by a low rainfall and water shortage which may be counteracted by irrigation.

In 1984 and 1985, 10 experimental sunflower hybrids were dobule cropped on July 8, after wheat harvest. Their yields ranged between 1,850 and 3,700 kg/ha depending on hybrid and weather conditions. The average yield was 2,480 kg/ha. The average growing seasons in 1984 and 1985 were 122 and 126 days, respectively.

The temperature sums for the 1984 and 1985 growing seasons of the double cropped sunflowers were 2,065 and 2,067°C, respectively. The majority of the tested hybrids managed to reach maturity, as confirmed by the values of moisture content in grain which ranged from 20 to 30%. The content reached 40% in some hybrids. The two-year average oil content was 45.24%, ranging from 40.19 to 51.53% depending on hybrid and weather conditions.

In 1986 and 1987, 12 new early sunflower hybrids developed at the Institute of Field and Vegetable Crops in Novi Sad were tested for optimum planting date when double cropped. Four dates were tested: June 10, June 20, July 1, and July 10. In 1986, the growing seasons of the tested hybrids ranged from 130 days, with the first date, to 105 days, with the fourth date. In 1987, the respective values were 117 and 101 days.

In 1986, the average yield for all hybrids and planting dates was 2,413 kg/ha (13% grain moisture). The highest yield of 2,798 kg/ha was obtained with the first date, 2,355 kg/ha with the second date, 2,250 kg/ha with the third date, and 2,250 kg/ha with the fourth date but the moisture content in grain at the moment of harvest was above 50%, i.e., the grains were technically immature. Nevertheless, the oil content was on the level or higher than in grains from the third date. The tested hybrids differed significantly in grain yield. The highest average yield for the four planting dates was brought by NS-H-67, 2,995 kg/ha, the lowest by NS-H-75, 1,775 kg/ha. The highest yield was brought NS-H-56 in the first planting date, 3,340 kg/ha. Moisture content in grain varied in dependence of planting date and hybrid. The average moisture contents were 25% (18-35%) in the first date, 35% (22-40%) in the second date, 29% (18-24%) in the third date, and above 50% in the fourth date with the exception of NS-H-68 with 40%. The average oil content in 1986 was 47.25%, ranging in dependence of planting date and hybrid from 42.27% in NS-H-56 to 53.09% in NS-H-65.

In 1987, the grain yields were similar to those obtained in 1986 although the temperature sum was higher by 139°C or 5.4%. The average yield for all hybrids and planting dates was 2,504 kg/ha. The highest yield of 2,970 kg/ha was obtained with the first planting date, 2,668 kg/ha with the second date, 2,385 kg/ha with the third date, and 1,992 kg/ha with the fourth date. The brought by NS-H-60, the yields per date ranging from 3,869 to 2,430 kg/ha. NS-H-67 maintained a high yield level from the previous year. Its average yield was 2,910 kg/ha, the yields in the first three dates being above 3,000 kg/ha.

NS-H-71 brought the loest average yield of 1,618 kg/ha, the yields per date ranging from 2,189 to 1,198 kg/ha. The moisture contents in grain at the time of harvest were much lower than in 1986, 13.6% on average for the first planting date, 14.1% for the second date, 21.4% for the third date, and 26.2% for the fourth date. Differences among the hybrids were also considerably smaller. This increased uniformity was brout about by a high temperature in October, 12.2°C, i.e., the temperature sum of 371°C. The oil content in grain was also high, 44.32% on the average for all hybrids and planting dates. The highest content of 46.92% was obtained with the first planting date. The contents decreased with the later dates. The highest oil contents were recorded in NS-H-17 and NS-H-67.

The average four-year yield of grain was high, 2,470 kg/ha on the average for all hybrids and planting dates, i.e., on the level of average yields obtained in Vojvodina Province when growing sunflower as the first crop. When planted before June 10 and irrigated, the 12 hybrids brought the average yield of 2,900 kg/ha. The hybrids NS-H-67 and NS-H-52 yielded 3,287 and 3,165 kg/ha, respectively. The planting before June 20 also brought high yields, 2,521 kg/ha on the average for all hybrids. NS-H-67 and NS-H-56 yielded 3,113 kg/ha, respectively. The planting before July 1 brough fairly high yields, 2,313 kg/ha on the average. NS-H-67 yielded 3,047 kg/ha. The planting on July 10 was found risky because technological maturation was not reached each year. The success of double cropping of sunflowers depended on weather conditions in the growing season, especially on air temperature in October.

The oil content for all hybrids and planting dates was above 45%. Most hybrids had over 47% with the first planting date. These data show that a high oil content may be achieved when double cropping sunflowers after early crops or wheat. With respect to the production of sunflowers as the first crop, double cropping of sunflowers is cheaper, safer regarding the occurrence of diseases and simpler regarding the technology of production. However, irrigation is a compulsory practice.

The main problem in the double cropping of sunflower after wheat and the planting after July 1 is the harvest which is difficult on account of green heads and top leaves. It is thus necessary to consider the application of desiccants.