

THE POTENTIAL OF WINTER/SPRING SOWINGS OF SUNFLOWER AS OILSEED CROP IN SOUTHERN BRAZIL.

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ABSTRACT

In Brazil, sunflowers can be grown during any of the four seasons. In the State of Parana (Southern Brazil), due to climatic conditions, the sowing period extends from August to November, with best performances being achieved with the September and October sowings. The average achenes yields during this period was 1,800 Kg/ha, reaching limits of 2,294 Kg/ha and 1,265 Kg/ha in some locations. Besides climatic conditions these variations were also affected by soil type and soil management. The average oil content among the genotypes tested in these two months was 43.2%, although a reduction in the oil content was evident as sowing time was delayed. The average oil yield (761.4 Kg/ha) was considered high when compared with soybean, the main oil crop in the region which, with an average grain yield of 2,000 Kg/ha and average oil content of 20% in the seeds, yielded only 400 Kg/ha of oil.

INTRODUCTION

The sunflower (*Helianthus annuus* L.) is one of the most important species because of its high oil percentage and excellent quality. The sunflower presents low photoperiodic sensibility and high tolerance to temperature variations (Robinson, 1978). According to Silva (1981), 400 mm of rainfall during its cycle could be sufficient for a satisfactory production. Due to those characteristics and a growing demand for vegetable oil, the sunflower crop has attracted the attention of both government and the private sector Brazilian crushing companies. There is an incentive to

research and sunflower production in Brazil, however, there is no agronomic information for production. Planting date is one of the most important information for success this crop in Brazil. Most countries the sowing period of sunflower is in the spring/summer periods, although, in some cases, it has been anticipated at the end of the winter, (Robinson, 1978). In Brazil the sunflower crop can be sowing at winter/spring periods in some regions because since the temperatures are not severe (August and September) (Garcia & Silveira, 1983; Silva & Mundstock, 1990). The plant development during period is not affected and it occurs with increasing temperatures and is important when it occurs in physiological maturity/harvest phase. The crushing companies (whose soybean is the main product) could receive sunflower on December/January, and reduce its inactive period. The present work evaluate the potential of winter/spring sowing of sunflower in southern Brazil.

#### MATERIAL AND METHODS

A field research was conducted with the following treatments: a) planting time with 30 days interval in August, September, October and November, b) four commercial genotypes were used: the early season hybrids CONTI-621 and GR-16 (120-130 days), and two full season hybrids GR-10 and DK-180 (more than 135 days). The experiments were conducted in Londrina (14/08, 21/09, 03/11 and 08/12), Campo Mourao (22/08, 26/08, 24/10 and 26/11), Palotina (23/08, 27/09, 25/10 and 27/11), Guarapuava (24/08, 25/09, 12/11 and 28/11), and Ponta Grossa (04/09, 24/09 and 30/10, the fourth planting time was lost); as representative regions in Parana State (southern Brazil) (Figure 1). Experimental design was RCB (Randomized complete Blocks) with the treatments in split-plot arrangement and four replications. Planting time were in main plots and genotypes in subplots. Analysis of variance was performed for each location. Plots consisted of six rows of sunflower, six m length, 0,70 m row spacing and four plants/m (57,142 plant/ha). Fertilizer was broadcasted before planting to provide 40-80-80 kg/ha of N-P-K. Achenes yield (kg/ha), oil percentage (%) and oil production (kg/ha) were determined. The oil percentage was determined using organic solvent (soxhlet extractor).

## RESULTS

The amount of rainfall was similar for all locations and were sufficient on August, December, February and March (Table 1); the temperature was higher in Palotina and Campo Mourao (West of Parana) compared with the other locations and in Guarapuava and Ponta Grossa (South of Parana) were lower. The analysis of variance by local for yield of achenes was significant for planting time, genotype and planting time-genotype interaction; the coefficient of variation were the following: Londrina, 8.96%; Campo Mourao, 7.73%; Palotina, 6.01%; Ponta Grossa, 6.88% and Guarapuava with 12.40%. The highest yield of achenes was obtained when sunflower was planted in August and September (Table 2). The highest yields were obtained in Palotina and Campo Mourao (2674 and 1915 kg/ha, respectively). The hybrid DK-180 was the most productive (1979 kg/ha), followed by GR-16 (1709), CONTI-621 (1702 kg/ha) and GR-10 (1437 kg/ha). The percentage of oil (%) varied with planting time and location; the highest percentage of oil was obtained with the hybrid CONTI-621 at any planting time and location, followed by the hybrids GR-10, GR-16 and DK-180. There was a tendency for higher percentage of oil when sunflower was planted in August and September than in October and November, except in Guarapuava and in Palotina where oil percentage was high during any period studied. The production of oil (kg/ha) calculated through to achenes yield and oil percentage, was higher in sunflower planted on August and September; the best yields were obtained in Palotina and Campo Mourao (1172 and 817 kg/ha, respectively), compared with the yields of the other locations.

## DISCUSSION AND CONCLUSION

The high temperatures rainfall affected the genotypes differently in each planting time; the early season sunflower hybrids (CONTI-621 and GR-16) showed during August and September months, a better development than the medium - full season GR-10 and DK-180 hybrids. This is probably due to influence of high temperature during critical periods of development, and low availability of water in the soil. The average yield of achenes and oil production (1800 Kg/ha and 761.4 Kg/ha of oil, respectively), can be considered better than soybean, the most oilseed planted crop in Brazil.

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