

# OIL CONTENT OF OILSEED SUNFLOWER (*HELIANTHUS ANNUUS* L.) HYBRIDS GROWN IN TEXAS, USA.

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## ABSTRACT

Oil contents were analyzed from over 3800 seed samples of commercial sunflower hybrids grown in Texas during 1979 and 1980. Seed analyses were carried out by A & L Plains Agricultural Laboratories, Lubbock, Texas. Oil content of seed was reported on "as received" moisture basis in 1979, and on a 10% seed moisture basis in 1980. Data from the samples were grouped according to date of analysis, which closely followed the harvest date. In 1979, August delivered seed lots were highest in oil content, averaging 41.6% oil (moisture as received), followed by September deliveries which averaged 41.0% oil. Oil content followed a consistent downward trend, with December deliveries averaging 37.4% oil. In 1980, September deliveries averaged 39.7% oil (10% moisture basis), which was higher than August and October deliveries. December deliveries averaged 39.0% oil. The trend was for only a very slight decrease in oil content late in the year. As 1980 rainfall was significantly below normal and temperatures were significantly above normal, the higher temperatures appeared to favorably influence oil content of the later plantings.

## INTRODUCTION

Oil content data from sunflower hybrids are readily available from research plots in various locations in the world, but little or no information has been available on oil content of commercial plantings at the time the seed is harvested and delivered to the storage facility. The following study was undertaken to investigate the level of seed oil in early-planted to late-planted hybrids produced on farms in Texas during 1979 and 1980.

## MATERIALS AND METHODS

Oil percentage data were analyzed from over 3800 seed samples of commercial sunflower hybrids grown in Texas

during 1979 and 1980. Samples were taken from each truck load of seed as it was delivered to one of 19 storage facilities, immediately after the field was harvested. The harvested fields represented several different hybrids and seed sources; no attempt was made to identify sample as to hybrid. Seed analyses were carried out by A & L Plains Agricultural Laboratories, Lubbock, Texas, using AOCS method Ai 3 — 75 (Anon, 1975). Oil content of seed was reported on "as received" moisture basis in 1979, and on a 10% seed moisture basis in 1980. Data from the samples were grouped according to date of analysis, which closely followed the harvest date, and were subjected to a simple linear regression analysis.

## RESULTS

Seed lots from early planted oilseed sunflower hybrids contained significantly higher oil percentages than later planted hybrids in 1979 (Figure 1). August delivered seed lots were highest in oil content, and averaged 41.6% oil, moisture as received. September deliveries were slightly lower in oil content, with an average of 41.0%. With the exception of slightly below normal oil content in seed delivered October 16 through November 15, oil content followed a consistent downward trend, with December deliveries averaging 35.5% oil. In 1980, September deliveries averaged 39.7% oil (10% moisture basis), which was higher than October, November and December, with 38.5%, 38.8% and 39.0% oil, respectively (Figure 2). Combining the analyses for 1979 and 1980 shows a consistent downward trend for oil content in later planted sunflower (Figure 3).

**Figure 1. Relationship of oil content of seed produced from hybrid sunflower in Texas, 1979, and dates of oil analyses (analyzed immediately after harvest).**

**Figure 3. Summary of relationship of oil content of seed produced from hybrid sunflower in Texas, 1979 and 1980, and dates of analyses.**

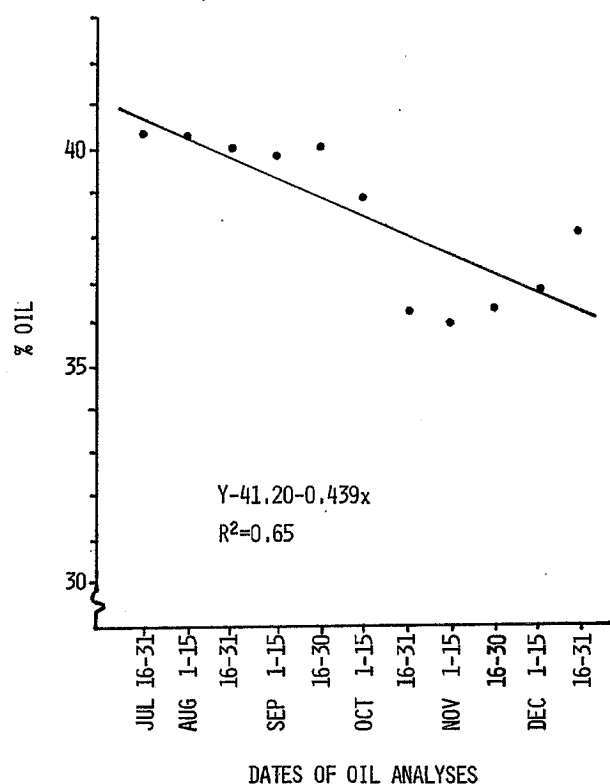
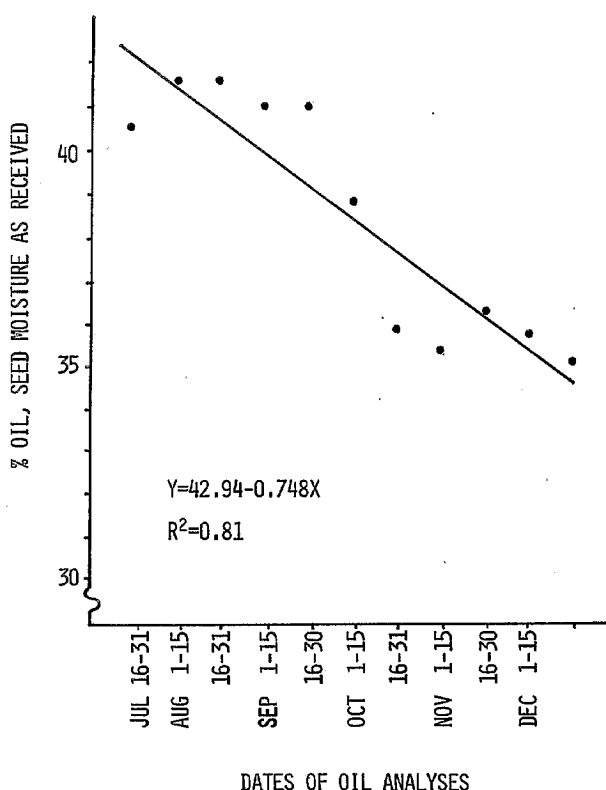
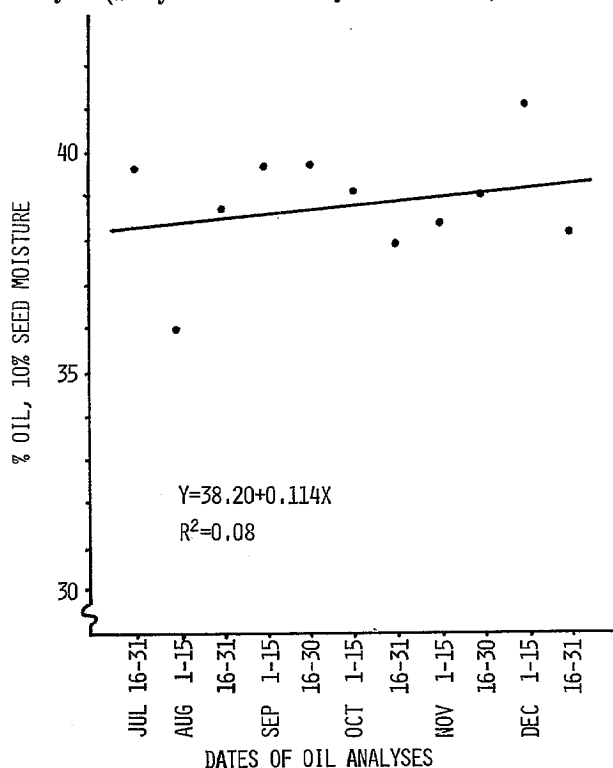


Figure 2. Relationship of oil content of seed produced from hybrid sunflower in Texas, 1980, and dates of oil analyses (analyzed immediately after harvest).



## DISCUSSION

Rainfall was above average and temperatures were near normal at Lubbock in 1979, and early delivered seed from early plantings was significantly higher in oil content than that from later plantings. In contrast, temperatures during the summer of 1980 were above normal and rainfall was below normal, and oil content of the early planted and late planted hybrids was very similar. The higher temperatures appeared to favorably influence oil content of the later plantings in 1980. From these data, it appears that a grower or processor can get an indication of the expected oil content of seed produced by hybrid sunflower from weather conditions during the crop growing season.

## LITERATURE CITED

ANONYMOUS. 1975. Official and tentative methods of the American Oil Chemists' Society. Method Ai 3 — 75. The American Oil Chemists Society, Champaign, Illinois.

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## EFFECT OF THE PLANTING DATE OF SUNFLOWERS ON THE AGRONOMIC CHARACTERISTICS AND ON THE QUANTITY AND QUALITY OF OIL.

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## ABSTRACT

Five sunflower cultivars were sown at fifteen different planting dates at Rio Bravo, Tamps., and these showed a significant variation in: days to the flowering stage and to physiological maturity; plant height; head diameter; viability of the seeds; seed yield; oil content; and instearic, palmitic, oleic, and linoleic acid contents due to the effects of diverse genotypes and planting dates.

Oil contents showed a direct correlation with number of days to physiological maturity. In addition, oleic acid content was positively correlated with seed yield; with the reverse effect in linoleic acid content. Temperature expressed as heat unit and cumulative light-hours from the end of blooming to physiological maturity, was negatively correlated with the linoleic acid content, which varied from 30.9 to 72.9%.

The performance of the different genotypes and the best conventional balance between seed yield, seed oil content and oleic — linoleic ratio, suggested that March 16th is the best planting date for the Rio Bravo, Tamps., region in Mexico.

## INTRODUCTION

High grain yield and an oil content above 40% in the sunflower seed, is important for the farmer and deep frying oil industry. The adequate proportion of oleic and linoleic acid is

also important for human metabolism and from the viewpoint of nutritional value (Owen, 1977).

The fatty acid composition of sunflower oil is known to vary depending on genetical and environmental factors (Knowles, 1970; Robertson, 1979). Putt (1969) found high genetic variability in stearic, oleic and linoleic acid contents of sunflowers, but palmitic acid was relatively constant. Robertson (1980) studied the effect of planting date on yield and on oil quantity and quality, and found differences in the mean oil content between planting dates, but these differences did not appear to be related to temperature. Variation in oleic and linoleic acid contents was found to be related to temperature, with increasing oleic acid contents at higher temperatures.

In the present study, the oil quantity and quality of three sunflower hybrids and two open pollinated varieties were determined for fifteen planting dates at Rio Bravo, Tamps., Mexico, for the purpose of selecting the planting date on which the seed yield, oil content and oleic-linoleic acid ratio was most suitable in relation to production, processing and oil-consumption.

## MATERIALS AND METHODS

The sunflower hybrids, Sunhi 301A, Big-top, Sunhi 338 and the open-pollinated varieties Peredovik and Rib 77 were seeded on February 16th, and at fifteen-day intervals until