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The production potential of leafy spurge

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It has been reported that some *Euphorbia* species produce adequate amounts of oil and hydrocarbon compounds to serve as economical alternatives to petrochemicals. This experiment was established to determine the agronomic potential of leafy spurge (*Euphorbia esula* L.) following applications of fertilizer and irrigation.

Plots were established in an area heavily infested with leafy spurge. Grasses were removed by applying .75 kg BAS90520H per ha on Sept. 15, 1981 and April 3, 1982. Phosphorus fertilizer (80 kg P_2O_2 per ha) was applied on Oct. 29, 1981 by banding in rows 18 cm apart. Ammonium nitrate fertilizer (80 kg per ha) was hand applied to individual plots on April 3, and July 22, 1982. Irrigation water (5 cm) was applied to individual plots once a week with a garden sprinkler starting on June 29, 1982 and extending through the summer. Leafy spurge production was measured by cutting plants at the soil surface with a one-meter wide sickle bar mower once or twice during the growing season. Cut plants were oven-dried and weighed. Oil, polyphenol, hydrocarbon, and residual biomass fields were measured on dried material from fertilized and unfertilized treatment. Acid soluble protein was measured on dry harvested spurge material.

Harvest Dates	Non-Fertilized Ave. Dry Wt. Production Metric Tons/ha	Fertilized Ave. Dry Wt. Production Metric Tons/ha
7-17-82	2.7	6.3
8- 3-82	2.0	4.3
8-17-82	2.7	4.3
LSD 5%	2.39	3.21

Highest yields of leafy spurge were obtained with two cuttings, however the amount of regrowth following the first cutting was minimal. Leafy spurge is slow to resume growth and is nonvigorous. Highest production from a single cutting occurred when plant material was harvested in mid-July.

Leafy spurge was quite responsive to fertilizer in overall production. Yields increased nearly two-fold for each fertilized treatment compared to the unfertilized plots. There was no response to irrigation, possibly because the experimental area was subirrigated and water was not limiting. The highest yielding treatment produced nearly 9 metric tons of dry material per ha.

Harvest dates	% of Total Biomass			
	Protein*	Oils*	Polyphenols*	Hydrocarbons*
7-15-82	14.2	3.9	2.3	.7
8- 3-82	12.2	9.7	4.7	.5
8-17-82	8.2	5.8	5.4	.5
LSD 5%		0.87	0.42	1.00

*Data from fertilized treatments only.

A peak oil production (9.7% of total biomass) was achieved in fertilized plots during mid-August. Oils in unfertilized treatments showed a similar pattern with peak production (7.6% of total biomass) in mid-August. There was a continual increase in polyphenol production throughout the harvest season in both fertilized and unfertilized treatments. Hydrocarbon yields never exceeded 0.7% of total biomass and thus constitute a negligible plant resource.

The data from this study indicate the potential economic value of leafy spurge produced under optimized agronomic conditions is minimal.