

WEED CONTROL IN NEWLY ESTABLISHED ALFALFA

W. D. McClellan, V. Schweers, J. Hill and D. Tisher
Tulare County Farm Advisors, Extension Weed Scientist
and Staff Research Associate, respectively

Weed control in newly established alfalfa is not an easy task, and the best method of control will vary from grower to grower. In the Central Valley, alfalfa is planted from October to March and the weed problems in seedling alfalfa vary with the planting date, previous cropping pattern, and management practices. Cultural and chemical alternatives are available to the grower to assist him in getting the best stand establishment possible. A vigorous competitive seedling stand provides the most sound basis for good weed control and profitable alfalfa production.

Good weed control in previous crops is one of the best methods of minimizing weed pressure in seedling alfalfa. Preirrigation and subsequent working of the ground allows the preparation of a more desirable seedbed and helps to reduce the weed seed population.

Herbicides are important "tools" to control weeds in seedling alfalfa stands; however, if the grower relies entirely on chemical control in seedling alfalfa, the results may be less than satisfactory. Herbicides will not substitute for good land preparation and a preplant irrigation. Table I lists weed susceptibility for certain herbicides registered for use in seedling alfalfa. Although many pre and postplant herbicides are presently available for weed management in seedling alfalfa, there is little information available on their performance in relation to the production and persistence of the alfalfa plant in the field. Reported here are the results of trials examining the effect of pre and post-plant herbicides in fall and spring planted alfalfa on: (1) control of weeds; (2) yield of alfalfa and weeds; and (3) stand persistence.

MATERIALS AND METHODS

Spring Planting:

Herbicides were applied preplant to a spring seeding of alfalfa on the Lerda Ranch near Tulare, California. The variety Joaquin II was broadcast February 27, 1976 at a rate of 18 lbs/A. The soil type was Chino clay loam. The plot design was a randomized complete block with each of the five treatments replicated four times. Individual plots were 20' x 80' in size. The herbicide treatments and rates used are the same as the pre-plant treatments given in the fall planting.

Fall Planting:

Herbicides were applied preplant to a fall seeding of alfalfa (October 15, 1976) on the W. George Ranch, Strathmore, California. The variety was WL508 and the soil type was Cajon fine sandy loam. The plot design was a randomized complete block with each treatment replicated 6 times. Individual plot size was 27' x 440'. Postplant herbicides were applied in February when most of the broadleaf weeds were less than 3" in diameter. These treatments were applied as subplots on top of the preplant plots in a randomized split block design. Each treatment was replicated 6 times with an individual plot size of 27' x 30'.

The herbicide treatments and rates used were as follows:

<u>Preplant</u>	<u>Postplant</u>
Untreated control	1. Untreated control
2. Benefin (Balau®) - 1.5 lb ai/A	2. 2,4-DB ester - 1.0 lb ai/A
3. EPTC (Eptam®) - 3.0 lb ai/A	3. Dinoseb, Ammonium salt (Dow Selective®) - 1.0 lb ai/A
	4. Green chop (early harvest)

These materials were applied at the above rates in 20 gallons of water per acre. The herbicides were incorporated with a double disc and harrow to a depth of 3 to 5 inches. Yields reported here represent 12' x 40' harvested areas in the spring planting and 3' x 25' harvested areas in the fall planting from each plot with the yields adjusted to 0% moisture. Within each plot were three areas from which stand counts, plant growth and weed competition data were obtained.

RESULTS

Spectrum of Weeds:

Spring - The major grass weeds present were watergrass (*Echinochloa* sp.), foxtail (*Setaria* sp.), and cupgrass (*Eriochloa* sp.). The predominant broadleaf weeds were lambsquarters (*Chenopodium* sp.), pigweed (*Amaranthus* sp.), wild lettuce and others.

Fall - The major weeds were shepherdspurse (*Capsella bursa-pastoris* L.), London rocket (*Sisymbrium irrio* L.). Other weeds including fiddleneck and lambsquarters were present to a minor extent.

Yield Data:

In the spring planting both Eptam[®] and Balan[®] were effective in suppressing weed competition in the first, second and subsequent harvests (Fig. 1 and 2). In the untreated control plots the grasses (especially watergrass) became established early and provided heavy competition for the alfalfa plant throughout the season (see Weed Control in Seedling Alfalfa, W. D. McClelland and V. Schweers, Sixth California Alfalfa Symposium, pp. 64-65 for complete data). Although the yields of alfalfa alone were significantly higher in the herbicide treated plots, the total seasonal yield of alfalfa hay (alfalfa and weeds) was highest in the untreated control (Table I).

In the fall planting the preplant herbicides did little to reduce the amount of weeds present in the first harvest. However, Eptam[®] did initially suppress the development of shepherdspurse. This apparently allowed the alfalfa plants to develop and grow well in spite of later weed pressure. The Eptam[®] treatment had the highest yields of alfalfa alone among the preplant treatments in the first harvest. The use of postplants in a fall planting (Fig. 3) showed that both 2,4-DB ester and dinoseb (dinitro on the graph) were effective in suppressing the weed population. It should be noted that 2,4-DB ester caused some stunting of the alfalfa plant prior to the first cutting and resulted in some yield reduction. Green chopping, a practice used by many growers, reduced the amount of weeds, but the early cutting also reduced the alfalfa yield in the first harvest. In the second harvest (Fig. 2 and 4) none of the treatments resulted in significant yield differences and subsequent harvests followed this pattern. Very few weeds developed in this field after the first cutting. The total seasonal yield of alfalfa hay was highest in the untreated control (Table II).

Stand Persistence:

Stand persistence is an important part of any alfalfa weed study (Fig. 5). In the spring planting the early heavy weed pressure in the untreated control resulted in significant reduction in seedling stand establishment and the effect of the weeds on stand persistence continued throughout the season. The number of alfalfa crowns per square foot in the fall planting were higher in the best herbicide treatment initially, but as the season progressed, the differences were eliminated.

Summary:

The data presented here support grower and researcher observations that herbicides, when properly chosen and used in addition to good management practices, can suppress weed competition in seedling alfalfa.

In the spring planting when grasses (especially watergrass) provided heavy weed pressure, alfalfa yield and stand persistence were affected. Preplant herbicides were effective in suppressing weed competition. In the fall planting both preplant herbicides

Eptam[®] and Balan[®], were ineffective in reducing the amount of weeds in the first harvest. The postplant herbicides were effective, although 2,4-DB ester did cause some stunting of the alfalfa plant's growth. Most of the weeds in the fall planted alfalfa were not evident until after the alfalfa had emerged and good seedling growth had begun. These seedlings tolerated heavy weed competition from shepherdspurse and London rocket through the first harvest. The subsequent harvests and stand data indicated that the initial weed pressures affected neither yield of alfalfa nor stand persistence.

Table II gives a summary of fall vs. spring planted alfalfa. Spring planted alfalfa has two less harvests than the fall planting. The yield of alfalfa alone is 3 to 4 tons per acre less than what may be obtained from a fall planted first year yield. Under heavy grass infestations spring planted alfalfa showed reduced vigor and hay yields reflected a high percentage of weeds.

In the San Joaquin Valley good management practices utilizing proper land preparation, preirrigation and the judicious use of a good weed control program will lead to excellent alfalfa stand establishment. Growers who are disappointed with their yields, stand persistence and weed control in spring planted alfalfa may want to consider planting in the fall as one alternative.

Acknowledgments:

We gratefully acknowledge the assistance provided by J. Lerda, Tulare And W. George, Porterville. Dairymen's Creamery Cooperative Association, Agri-Tech Analytics, Stauffer Chemical and Elanco cooperated in these trials. Technical assistance included M. Bailey, G. Weinberger and D. Henson.

This article should be considered as a progress report and not a recommendation by the University of California.

TABLE I: A WEED SUSCEPTIBILITY CHART FOR CERTAIN SELECTIVE
HERBICIDES USED IN SEEDLING ALFALFA¹

Weeds	Herbicides						
	Preplant				Postemergence		
	benefig Balan [®]	profluralin Tolban [®]	EPTC Eptam [®]	propham Chem Hoe [®]	dinoseb Dow Selective [®]	2,4-DB* ester	2,4-DB* amine
Broadleaf							
chickweed	C	C	C	C	C	N	N
common groundsel	N	N	P	N	C	C	C
fiddleneck	P	P	P	N	C	P	P
filaree			C	N	P	C	P
knotweed	C	C	P	N	C	P	P
lambsquarters	C	C	C	N	C	C	C
London rocket	N	N	P	P	C	C	C
miners lettuce	P	P	N	P	C	P	P
mustard	N	N	P	P	C	C	C
nightshade	N	N	C	C	C	C	C
pigweed	C	C	C	N	P	C	C
shepherdspurse	N	N	P	P	C	C	P
sowthistle	N	N	C	N	P	C	
wild radish	N	N	P	P	C	C	P
Grasses							
annual bluegrass	C	C	C	C	N	N	N
barnyardgrass	C	C	C	C	N	N	N
canarygrass	C	C	C	C	N	N	N
foxtail barley	C	C	C	C	N	N	N
volunteer cereal	P	P	C	C	N	N	N
wild oat	P	P	C	C	N	N	N
yellow nutsedge	N	N	C	N	N	N	N

¹ C = controlled, P = partially controlled, N = not controlled

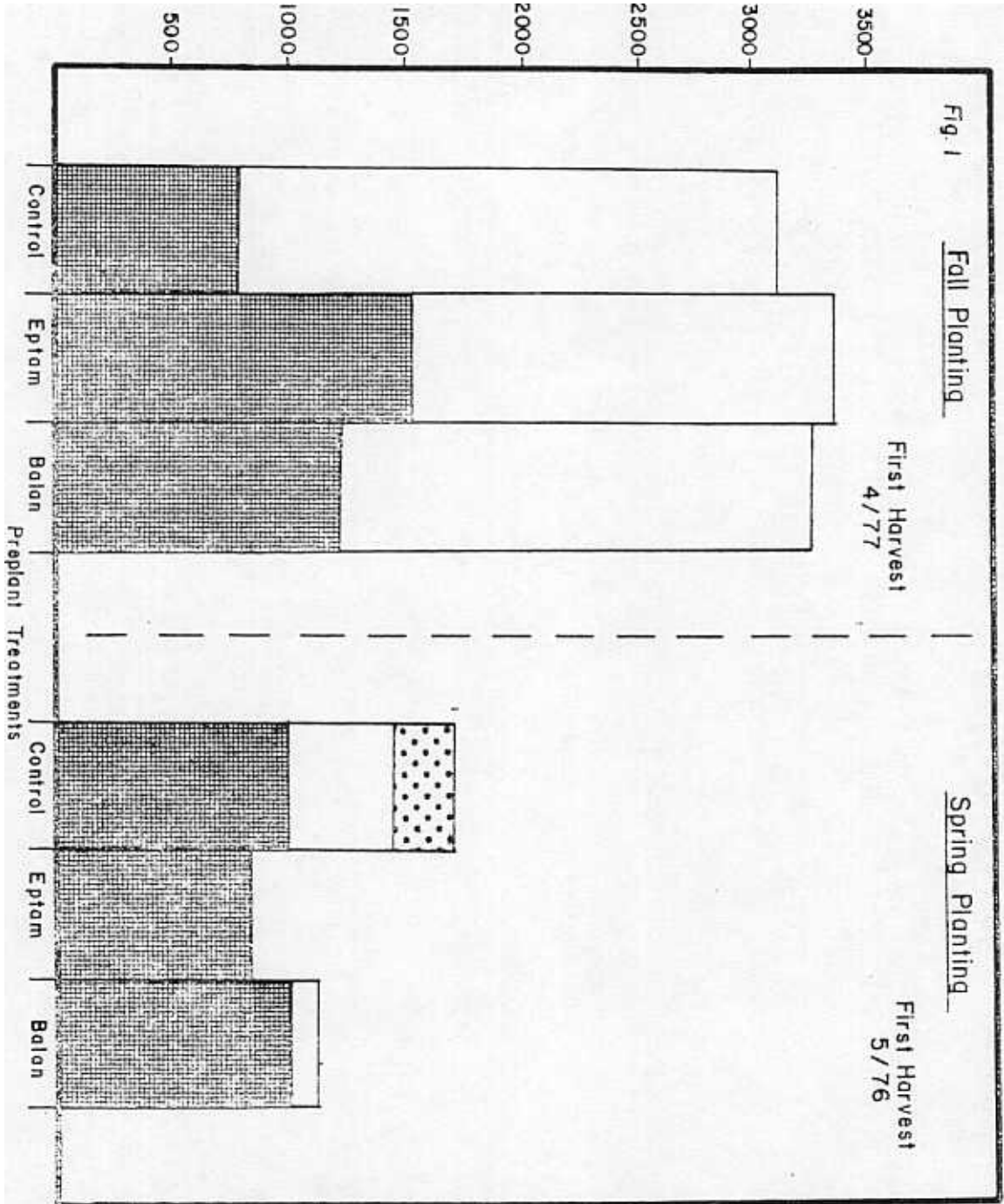
* Restricted herbicide; permit required from County Agricultural Commissioner

TABLE II: EFFECT OF WEED CONTROL IN SEEDLING ALFALFA ON FIRST SEASON YIELDS.
 Yields are expressed as lb/A at 0% moisture.

<u>Planting date</u>	<u>Weed¹ control</u>	<u>Number harvests</u>	<u>First Season Yields (lb/A)</u>		
			<u>Alfalfa</u>	<u>Weeds</u>	<u>Total</u>
Spring 1976	No	4	3,573	5,619	9,192
Spring 1976	Yes	4	5,370	1,332	6,702
Fall 1976	No	6	13,036	2,320	15,356
Fall 1976	Yes	6	12,628	33	12,661

¹ Weed control - this represents the herbicide treatment that gave the best weed control in our trials.

Pounds Per Acre



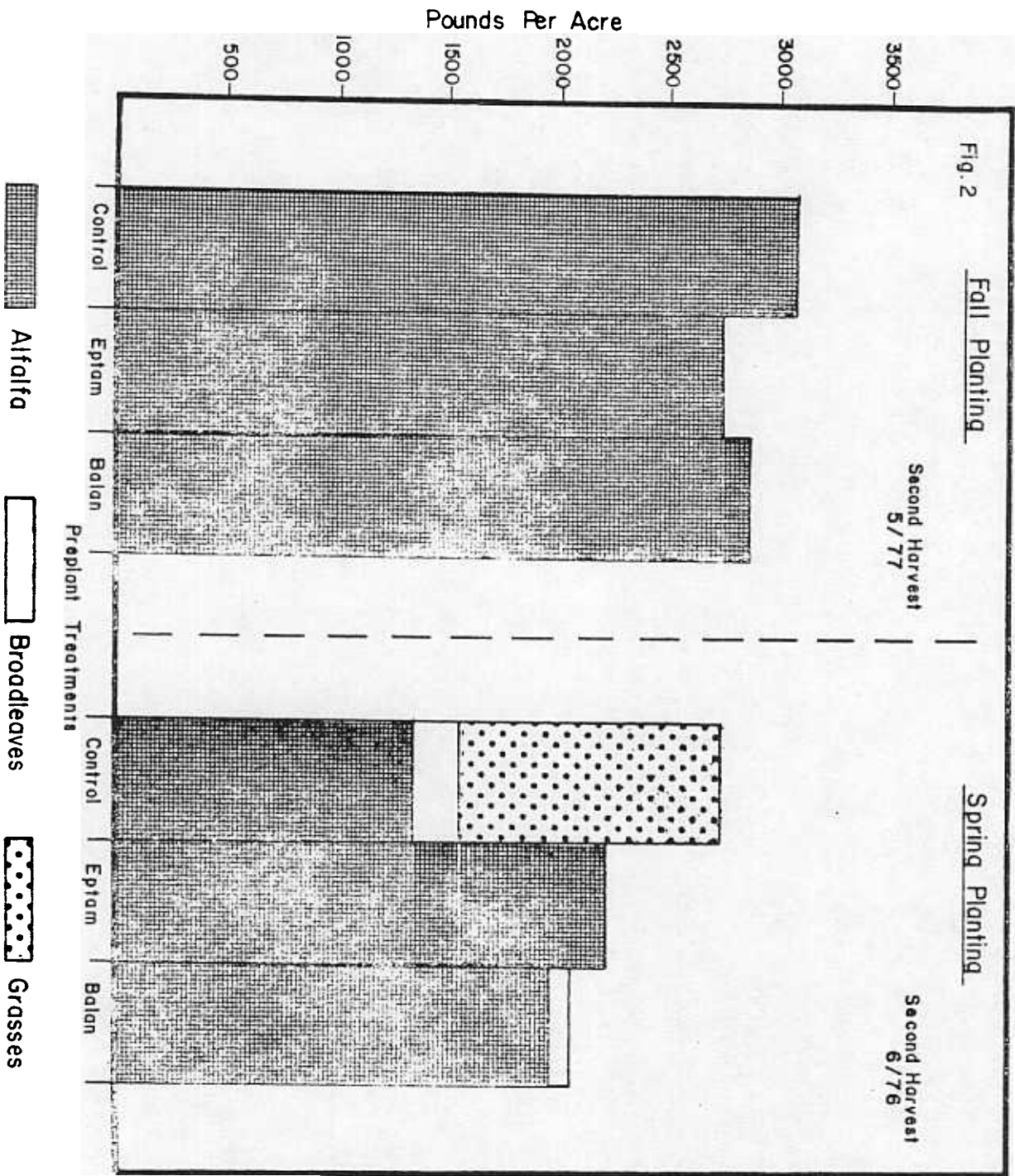
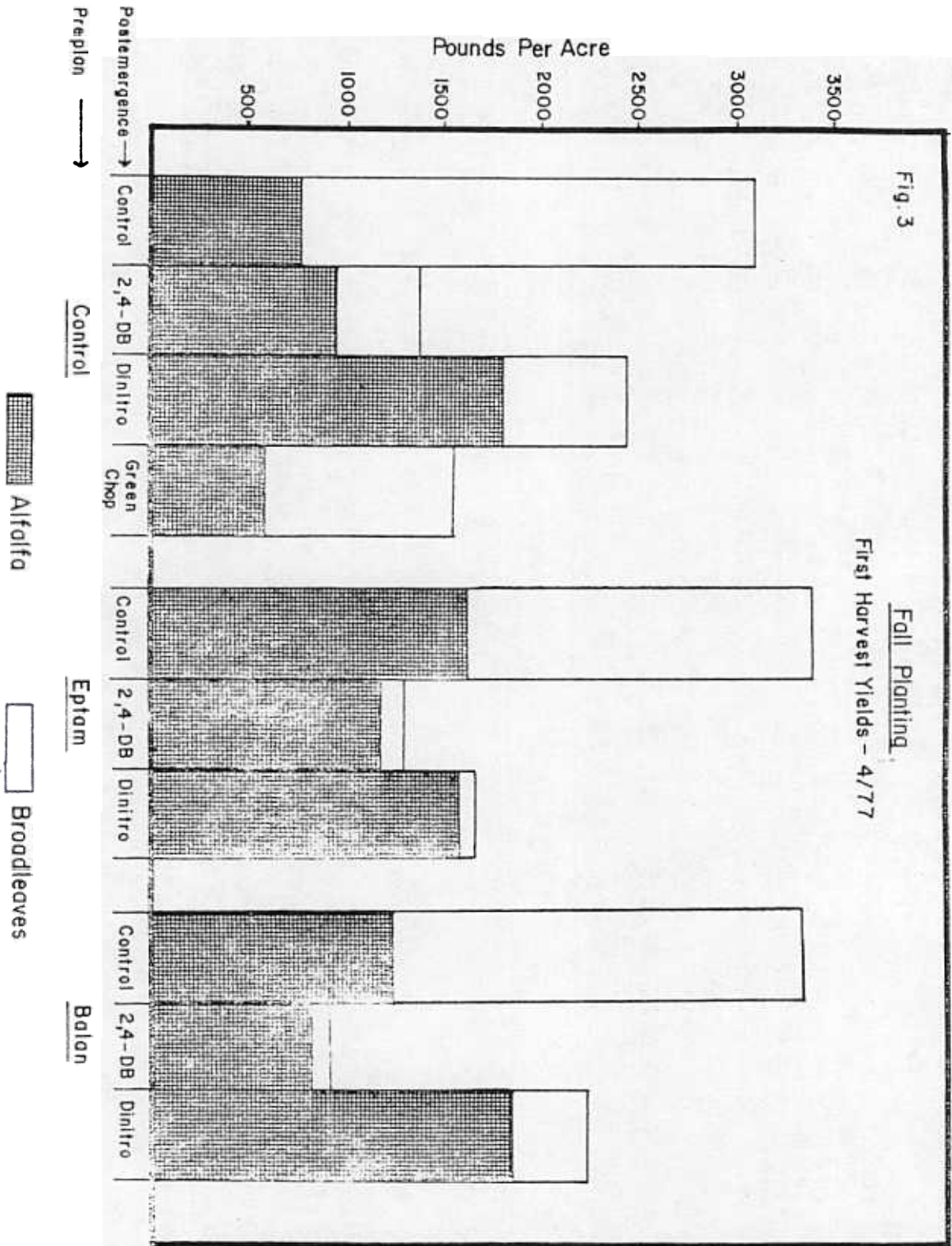


Fig. 3

Fall Planting
First Harvest Yields - 4/77



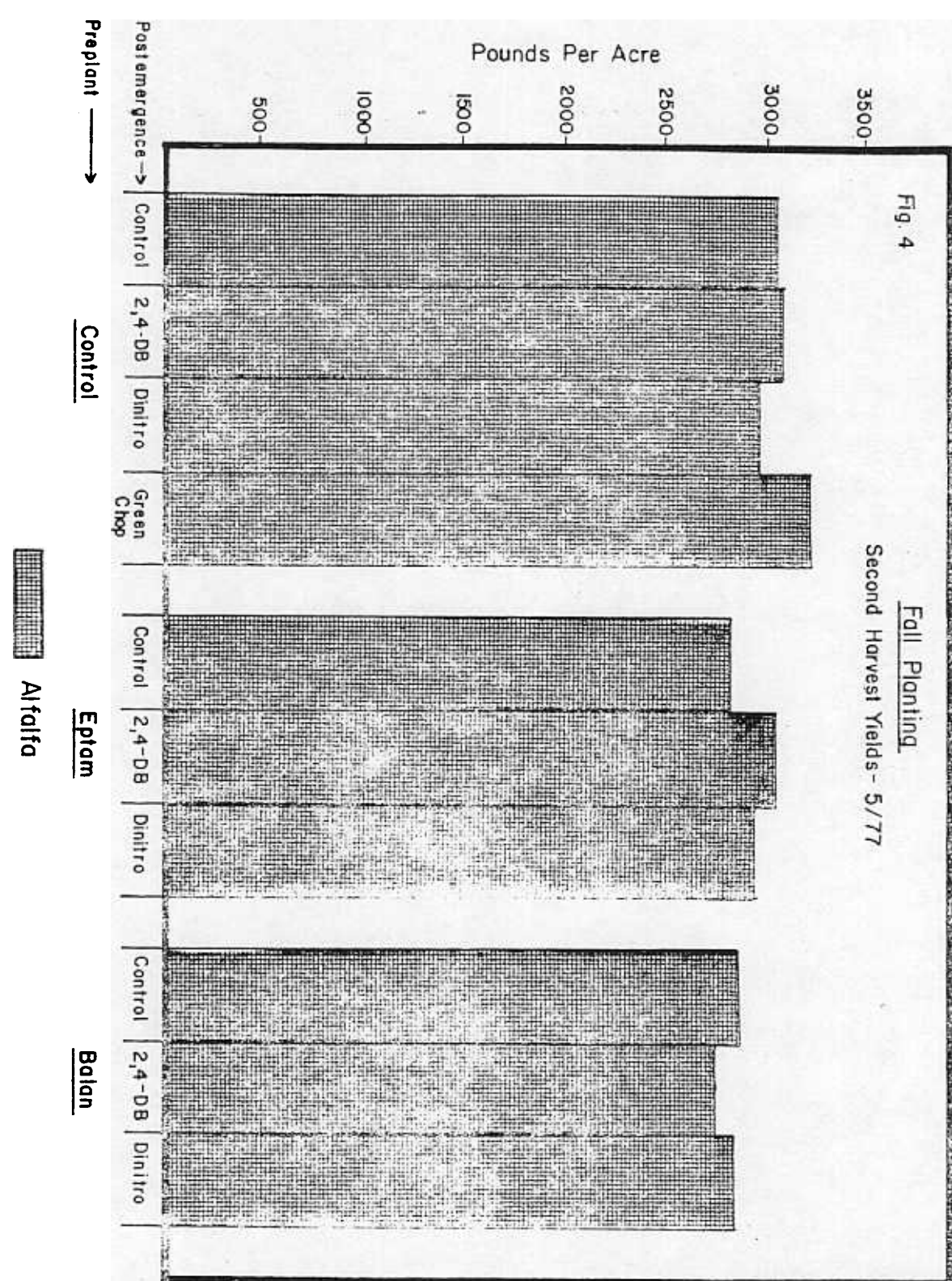


Fig. 4

Fall Planting
Second Harvest Yields - 5/77

