

and provide one complete air exchange per minute at the following static pressure differential ranges.

Pad and Fan .05 to .10" W.G.
Package Cooled .10 to .125" W.G.
Tower and Plenum .25 to .375" W.G.

Ventilation. Windowless houses (Figures 1, 2, 3, and 4) require continuous ventilation even during the coldest weather to provide oxygen, remove moisture and reduce odors. A minimum continuous ventilation rate of one CFM per bird is needed. This rate is about 1/6 the recommended air flow for evaporative cooling.

Insulation. No special insulation is recommended for the walls, but a maximum roof insulation resistance value of eight ($R = 8$) is recommended.

Evap-Pad Cabinet. For a detailed description of horizontal pad cabinet design procedures see plan A-186, *Progressive Agriculture*, January-February 1975.

Standby Emergency Power

The confinement of poultry in windowless shelters with mechanically controlled environments involves considerable financial risk in the event of a power or equipment failure. On a hot summer day, birds will start dying after about two hours following a power failure. An adequate alarm system to indicate failure of ventilation equipment and an automatic standby electric generator are highly recommended.

There are many types of alarm systems for detecting failure of the ventilation system ranging from inexpensive 'power off' alarms to more extensive systems for sensing interruption of air flow, temperature extreme and certain gases. Automatic telephone dialing systems are also available for alerting personnel at distant locations.

Power sufficient to operate at least half the lights and fans plus the feed and water supply system should be available on a standby basis. Both stationary engine and tractor driven generators are available. At least 2 kilowatts (kw) of standby generating capacity should be provided for each horsepower essential for emergency operation. A tractor should be capable of developing two horsepower for each kw of generating capacity required. Stationary units should be operated for a few minutes every two weeks to assure its immediate availability in an emergency.

Increasing the Leaf Area of Alfalfa

by M. A. Brick, A. K. Dobrenz and M. H. Schonhorst*

Leafiness of alfalfa is an important factor for quality and maximum light interception. Alfalfa plants which have leaves with more than the normal three leaflet complement have been called multifoliolate by Bingham (1964). The size, shape and number of leaflets comprising one leaf vary considerably on a single multifoliolate plant. Leaves which display the variation in the multifoliolate characteristic are shown in Figure 1.

New alfalfa varieties have increased yield due in part to protection of the crop from insect and disease damage. Other factors which have contributed to the increased yields of alfalfa include improved management practices such as high fertility and appropriate harvest intervals (Thompson and Schonhorst, 1971).

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Variation in leaf morphology has received comparatively little attention among researchers despite the importance of the leaf in photosynthesis and nutritive value of the plant. It is important for alfalfa breeders to seek new ways to more fully utilize the potential of alfalfa. Leaf area and canopy design present a potential mechanism whereby the plant breeder can improve body yield and quality of alfalfa.

This study was designed to determine if the multifoliolate characteristic could be transmitted and expressed in the progeny of a cross between a normal Mesa-Sirsa and multifoliolate plants. Other objectives were to evaluate the effect this trait had on leaflet-to-stem-petiole ratio, internode length, and specific leaf weight (SLW-mg leaflet dry wt/cm² leaf area).

Four multifoliolate plants were selected from the progeny of a cross be-

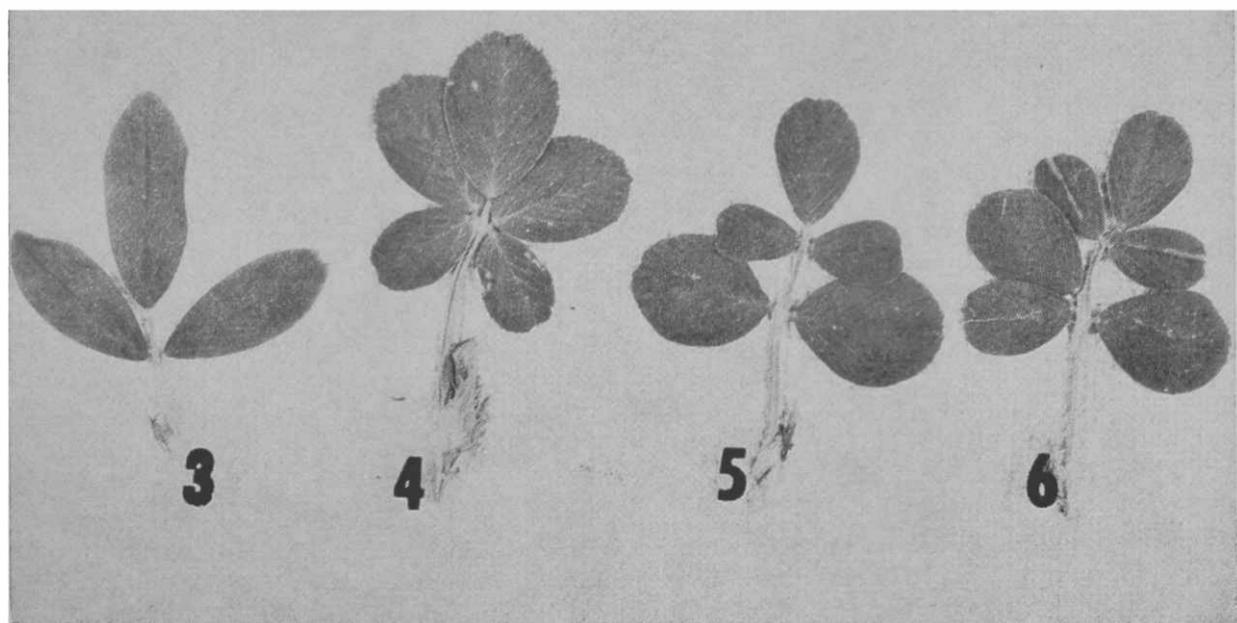


Table 1. Morphological characteristics of parent clones.

	Clone					
	1	2	3	4	Multifoliolate clone average	Mesa-Sirsa
Specific Leaf Weight (mg/cm ²)	4.69	4.78	4.08	5.35	4.73	4.42
Leaflet to stem-petiole ratio	0.80	0.96	0.70	1.06	0.88	0.72

tween a 'Mesa-Sirsa' plant (used as the paternal parent) and a 'Ladak 65' plant, discovered by Dr. A. K. Dobrenz, which expressed the multifoliolate characteristic. These plants were selected because they displayed a high degree of fertility and expression of the multifoliolate characteristic during the entire growing season. The Mesa-Sirsa parent clone was selected for the trifoliolate parent because of its high forage productivity during the growing season and, its high rate of photosynthesis.

Controlled, hand-pollinated crosses of each multifoliolate clone and the Mesa-Sirsa clone were made in the greenhouse during the winter of 1973-74. Reciprocal crosses were made between the Mesa-Sirsa clone and each of the four multifoliolate clones. The seed produced from these crosses was planted in the greenhouse. The first regrowth from these progeny was used to evaluate morphological characteristics.

Thirty-nine percent of all these progeny expressed the multifoliolate characteristic, indicating that this trait could be transmitted and expressed in the first generation. The progeny of the four multifoliolate parent clones differed in percentage expression of this trait. Only 23% of the progeny of clone 3 had multifoliolate leaves when it was used as the maternal parent. In contrast, when clones 1 and 4 were used as the maternal parent, 63 and 60% of their progeny were multifoliolate, respectively. These results suggest that this characteristic is controlled by more than one gene, thus a recurrent selection program could increase the expression of this characteristic.

An evaluation of the relationship between internode length and leafiness of the multifoliolate parent plants indicated the possibility of increasing leafiness of alfalfa by incorporating this trait into an alfalfa variety. When

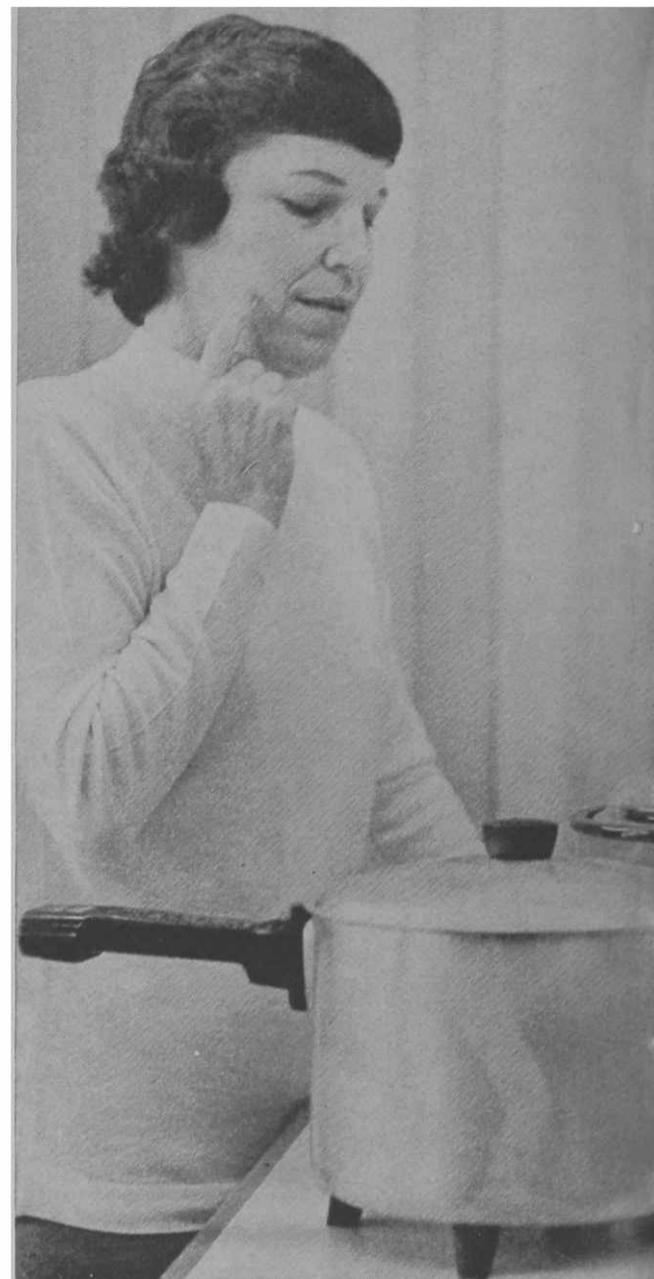
grown under spaced-field conditions, three of the four multifoliolate parent clones had a higher average leaflet to stem-petiole ratio and greater specific leaf weight (Table 1) than the Mesa-Sirsa clone. Since the greatest portion of the nutritive value of alfalfa is found in its leaves (Dobrenz, Schonhorst and Thompson, 1963), a variety with a higher leaflet to stem-petiole ratio should be more nutritious. An alfalfa variety which initiates leaves and produces a leaf canopy faster after cutting could utilize sunlight more efficiently.

Conclusions

The multifoliolate leaf characteristic appears to have an advantage for increased leaf percentage of dry matter. No problems were encountered which would limit the development of a multifoliolate variety. The quality of alfalfa forage could potentially be improved by combining the multifoliolate characteristic with other desirable characteristics. As a result of these findings, a breeding program has been initiated at the University of Arizona to incorporate the multifoliolate leaf characteristic into our non-winter-dormant, insect and disease resistant varieties.

Literature Cited

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2. Dobrenz, A. K., M. H. Schonhorst, and R. K. Thompson. 1969. *Yield and protein production of alfalfa cultivars.* Prog. Agr. in Arizona 21(3):4-5.
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by Mary Jo Yrun*

"Toward the end of his final summit speech, President Ford turned away from the austere gathering of experts and seemed to suggest that we form our own kitchen-table summit meeting when he said: 'The success or failure of our fight against inflation rests with every individual American.'"¹ Accordingly, for this period of economy, I propose that homemakers find multiple uses for already-owned appliances rather than buy additional specialized appliances.

Admittedly, when I am exposed to promotion media of each new appliance as it comes into the market, my first impulse is to purchase it. If I had weakened to similar "calls" for

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¹ Weaver, Peter, "The Personal Level: Savings Can Be Made . . .", THE NEW YORK TIMES, October 6, 1974.