☆ Efficient Farming

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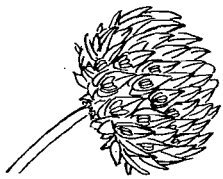
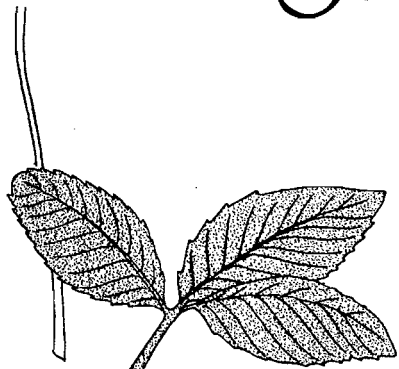
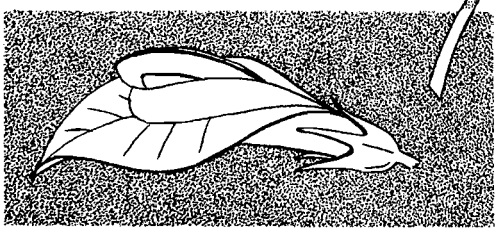


how to grow

Alsike Clover Seed





university of california

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about alsike clover

Alsike clover comes from Europe where it is common in the high mountain meadows. Though related to white clover, **Trifolium repens**, *it is a much more vigorously growing plant. The usual variety of alsike for commercial growing is* **Trifolium hybridum**. *At present, no certified seed is available, but alsike's true characteristics reproduce with little variation.*

In this publication you'll find information about

- **Extent of California's alsike seed production, pages 3-4.**
- **How to prepare seedbed and how to seed, pages 4-5.**
- **Cultural practices that help, pages 5-7.**
- **Some of the insects that attack the crop and how to control them, pages 7-14.**
- **Harvesting suggestions, pages 14-21.**
- **Costs of growing the crop, pages 22-23.**

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Where Alsike is Grown

Alsike clover is used in pasture mixtures in the eastern half of the United States and in the northern counties of California, extending northward in the western region. It is especially useful in wet meadows and in acid soils where other clovers will not do as well.

To supply the demand for seed, the Klamath Basin of northern California and southern Oregon produces about two-thirds of the total alsike clover seed raised in the United States.

An increase from 260,000 pounds of seed in 1943 to 2,040,000 pounds in 1953 has made California one of the important alsike clover seed producing areas of the United States. California in 1953 had about 16% of the total U. S. production. With yields per acre about three times the U. S. average, California was able to produce this 16% of the U. S. seed on 7% of the U. S. acreage. Oregon is the only other producing area which has yields comparable to those obtained in California.

Yields in California have about doubled since 1943. Prices of alsike seed increased over the pre-war levels to a peak in 1951 and then dropped drastically due to excess supplies on the market.

ALSIKE CLOVER SEED PRODUCTION IN CALIFORNIA

YEAR	ACRES HARVESTED	YIELD PER ACRE POUNDS	CLEAN SEED PRODUCED 1,000 LBS	AVERAGE PRICE PER CWT. REC'D BY FARMERS
1943	1,100	235	260	$28.30
1944	1,300	340	440	30.50
1945	1,900	290	550	30.70
1946	3,200	320	1,000	33.70
1947	3,800	395	1,500	32.80
1948	3,300	335	1,100	27.50
1949	3,500	260	910	29.20

1950	3,000	465	1,400	34.20
1951	4,300	440	1,900	38.50
1952	4,600	490	2,254	25.50
1953 (est.)	4,800	425	2,040	

Seedbed Preparation

The land should be properly leveled prior to planting. Allow a slight grade to make irrigation easier, since the distribution of water is often a determining factor in a good seed crop. The seedbed should be firm, uniform, and well-drained. The field checks should be put in prior to planting; checks should not be over 40 to 70 feet wide, depending upon the grade of the field. A good seedbed is essential.

Inoculation

Alsike clover will thrive only if sufficient proper bacteria are present. These may be lacking in soils where true clovers (Trifolium species) have not been grown recently. Seed should be inoculated artificially with commercial cultures, available at most seed stores.

Seed Treatment

In general, seed treatment has not been necessary. However, under certain conditions "damping off" may occur. Treatment of the seed with either Ceresan M at 6 ounces or with Arasan at 4 ounces per 100 pounds of seed will give improved stands.

Costs of producing alsike clover seed will vary with the size and efficiency of operation, but the most important factor affecting cost is the yield per acre. Proper cultural methods to produce the largest volume of seed and harvesting procedures which recover a large per cent of the seed produced will determine whether you can stay in production.

Production of alsike clover seed in the United States during the 10 years preceding 1953 varied from 9,930,000 to 20,196,000 pounds, but the general trend of production has been slightly downward. Production has been decreasing in other areas faster than the California production has increased.

Planting Methods

Broadcast seeding requires 8 to 12 pounds per acre, while 6 to 8 pounds are enough where the crop is seeded with a drill. There are 700,000 alsike clover seeds per pound. Seed needs to be covered to a depth of one-fourth to one-half inch, with the ground well-firmed. Row plantings are not used.

Spring Seeding. Drill alsike in an established cereal planting provided the cereal is not over 4 to 6 inches high. Immediately after the seeding, roll or culti-pack the field and irrigate. Very little injury to the cereal crop will occur from the rolling or packing. Alsike clover can also be planted at the same time the cereal crop is seeded. If this is done, it should be drilled in the field by the use of a grass seeder attachment on the drill. The clover should be drilled at right angles to the barley seeding, thereby minimizing early plant competition with the cereal.

Fall Seeding. Most fall seedings are made in barley stubble fields. Combine the barley as early as possible, remove the straw from the fields, and drill the alsike into stubble. The field should than be irrigated. If the fall is warm and dry, a second irrigation may be necessary. The stubble affords some protection against losses from wind damage, heaving, and winter injury. It also catches and holds the snow, which is beneficial to the young alsike plants.

Care of Stands

Heaving Problem. Winter and spring soil heaving can be problems in alsike clover fields. If the soil has heaved excessively, it is usually advisable to roll the field with a cultipacker or ring roller during the early spring. Never roll the field when the temperature is below 32° F.; otherwise severe injury to the alsike clover may occur.

Water Requirements. The small alsike seedlings are slow in establishing roots and require an abundance of moisture. This is particularly true where the alsike is competing with a companion crop. The soils should never be allowed to dry to a depth greater than 1 to 1½ inches during the seedling stage. Organic soils usually require two to three irrigations. Sandy soils may require additional applications of water.

The first seed-producing year the irrigation schedule should be according to the plant needs. The first irrigation is normally applied in late May, the second in late June or early July, depending upon spring rains.

Too much water may encourage Colletotrichum, Sclerotinia rot. Too frequent irrigations also may cause excessive plant growth and may result in poor seed set. A good rule to follow is to irrigate when the first 1 to 1½ inches of soil have become dry enough to crumble in your hand. Alsike clover raised on high organic or peat soils should not be allowed to dry out during the first seed-producing year before early August. However, irrigation should be withheld beginning about two to three weeks prior to harvest. This tends to mature the seed for the harvesting operation.

Fertilization

On many soils in the Tulelake area, legumes respond to phosphorus. An application of 300 pounds of single superphosphate at the time of planting may be beneficial. It should be disced or plowed into the soil. If necessary, other applications can be made in the early spring. Laboratory tests to determine soil phosphate levels are available and they give some useful information. These should be interpreted on the basis of local tests and experience.

Pest Control (1)

Insect control in alsike clover is a matter of keeping populations of the more serious species below a point of economic damage. The grower should watch his fields closely, taking steps to reduce pest population whenever it becomes large enough to be a hazard.

Inasmuch as insects migrate freely from field to field and their reproductive rate is high, satisfactory control measures will be community-wide in organization. This is especially true where, as in the Tulelake district, the fields are concentrated in a limited area.

Major insect pests in alsike are the clover seed weevil *(Miccotrogus picirostris)*, the clover root curculio *(Sitona hispidula)*, and Lygus bugs of several species. The pea aphid *(Macrosiphum pisi)* and clover aphid *(Anuraphia bakeri)* may require periodical control. So far, none of the spider mites has given any trouble to alsike in northern California.

The clover leaf weevil *(Hypera punctata)*, the lesser clover leaf weevil *(Hypera nigrirostris)*, and several species of grasshoppers may be

(1) *Courtesy of Loring White, Agricultural Commissioner, Modoc County.*

regarded as potential pests. So far, they have been held in check by insect diseases, parasitism, or other biological means.

Clover Seed Weevil is a long-snouted weevil about 1/10 inch long. It hibernates along fence rows and similar locations. The weevil enters fields when the clover is somewhat past full bloom to feed upon and lay eggs in the immature seed pods. The hatched larvae destroy developing seed. The mature larvae drop to the ground, pupate in the soil and emerge as adults, which gradually leave the fields for winter hibernating locations.

For effective control, adults must be killed after they have migrated to fields but before too many eggs are laid. This will usually be about the time 10 to 20 per cent of the blossom heads have turned brown. If the population averages 1 per sweep, this is considered an economic level for treatment. Twenty pounds of 10 per cent DDT dust per acre has proven a satisfactory control.

At present, one dusting each season is enough to control this weevil in the Tulelake region. However, experience in other parts of the continent has shown that the seed weevil is difficult to control once large populations have built up in a district. Under such conditions, repeated dustings during the blooming period are necessary to prevent the loss of a large portion of the crop.

Clover Root Curculio, or "root weevil", feeds on large numbers of leguminous plants but usually is not considered of much economic importance. In alsike, however, it is most destructive.

The adult, a brownish or black beetle about 3/16 inch long, spends the winter in hibernation. It comes out with the first growth of

clover in the spring when it lays eggs on the ground around the clover plants. The hatched grubs burrow into the soil and feed on the clover roots. When mature, the grubs attack the main taproot of the plants causing extensive scars, frequently girdling the entire root.

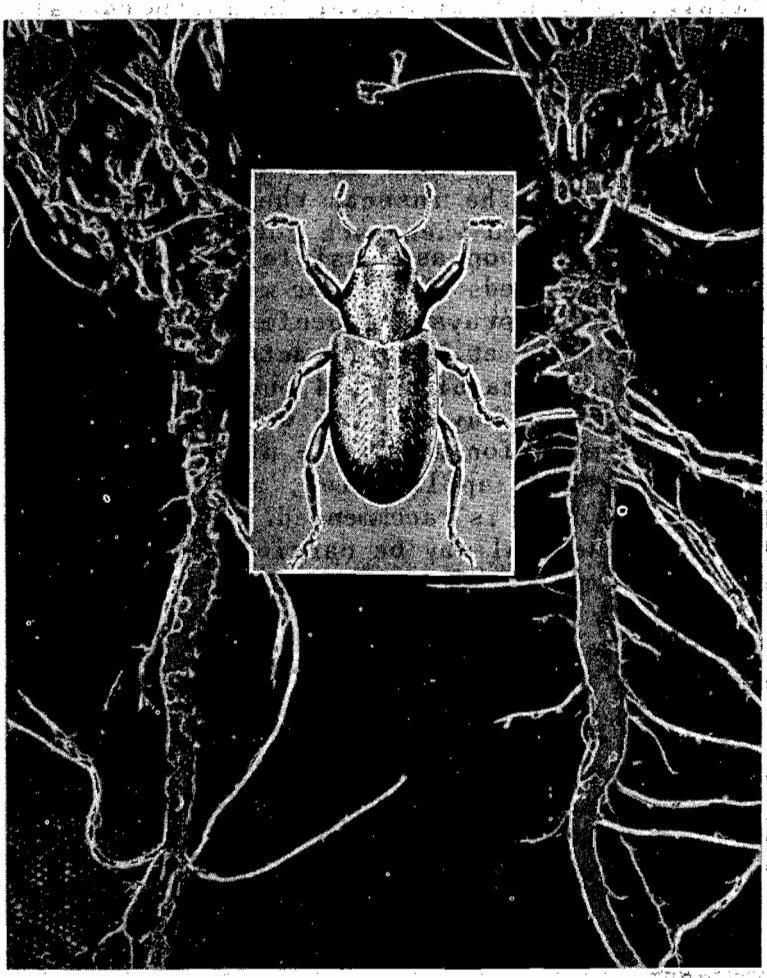

Fig. A--Roots of alsike clover plants showing damage done by clover root curculio. The drawing shows the pest.

The damage is usually not immediately evident since the plants have gained most of their growth for the season. Severely injured fields may look perfectly normal and even produce a satisfactory crop. However, the following winter or early spring, badly damaged plants begin dying out. Much of the so-called "winter killing" of clover in northern California is a result of just such injury.

Alsike should be inspected in the fall and again in early spring for evidence of the curculio. The adults eat semi-circular holes in the leaf margins, and these are more easily found than are the insects themselves. Fields should be sprayed when such notches are found.

Spray as soon as possible, but after the temperature exceeds 55° F. for more than 5 hours a day. Liquid sprays are preferable to dusts. DDT or chlordane at 2 pounds actual per acre and dieldrin or heptachlor at 4 ounces actual material per acre have worked well. The emulsifiable formulation should be used.

For ground application, a minimum of 10 gallons per acre is recommended. When applied by air, the chemical may be carried in diesel oil at a minimum rate of 2 gallons per acre.

Heavy infestations of the clover root curculio may make control by chemicals impossible. In such a case, the alsike should be plowed up at the end of the first crop year.

Lygus bugs also may damage alsike, Ordinarily large populations do not occur until adjacent alfalfa hay fields have been cut. The first cutting of alfalfa in the Tulelake district occurs at about the same time that alsike is ready to be dusted for seed weevil. Since the DDT dust used for seed weevil also effectively controls lygus, one dusting will ordinarily take care of both insects. Any later population of lygus can be controlled with 20 pounds of 10 per cent DDT dust or 30 pounds of 5 per cent DDT.

Fig. B--Alsike clover also is attacked by the lygus bug, one of which is shown on an alfalfa bloom.

Aphids of two species sometimes damage alsike--the pea aphid, a green species, and the clover aphid, a brown species. The pea aphid usually is not numerous enough to justify control. The clover aphid, which is a threat, is more effectively controlled with sprays containing TEPP than with those containing DDT.

Aphids, which multiply faster than many other insects, would be almost impossible to control chemically were it not for the fact that they are constantly being attacked by syrphid flies, ladybird beetles, and other insects. Because of the importance of these beneficial insects, indiscriminate use of insecticide should be avoided. Secure competent technical advice when an insect problem arises, before beginning treatment.

Minor pests of the alsike are the adult clover leaf weevil and the lesser clover leaf weevil.

The larvae of the clover leaf weevil are heavy feeders on leaves and young stems in the fall and early spring. This insect is usually held in check by fungus disease, but occasionally it becomes very destructive during dry seasons.

The lesser clover leaf weevil adult is a small bright green species. The pale-yellowish larvae feed beneath the leaf sheaths at the stem or in the floral heads. Although potentially it is a serious pest, it has never become numerous enough to cause trouble. No effective control is known.

Rodents. Field mice and gophers are often problems in alsike clover fields. Fair control on mice can be obtained by poisoned grain; poisoned carrots will control gophers. Excellent control of field mice has been obtained from the use of toxaphene. The toxaphene is applied in water at the time the field mice are feeding on the plants above the ground. Applications as low as 4 to 5 pounds of toxaphene in 25 gallons of water per acre have given excellent control of mice in clover and alfalfa fields.

Weed Control-first year

Annual weeds may be a problem. Application of 2,4-D at the rate of three-fourths pound of active ingredient in 20-50 gallons of water is used to control broad-leaf species. This application is made when the grain is 4 to 6 inches high but before seeding of the alsike. Application of the 2,4-D in the grain stubble a week or two before seeding is sometimes practiced. The clover is than drilled into the stubble and irrigated immediately. Though this method keeps

2,4-D injury to the seedling clover to a minimum, conditions sometimes may cause greater injury.

Excessive spring weed growth can be controlled by mowing with the cutter bar set high. Most fields will need to be mowed because of weeds the first seed-producing year. Where excessive weed growth is a problem, a second mowing may be required.

Weed Control-second year

The mowing of second-year alsike clover fields is required since weeds are usually more serious than in the first year. Mowing should be done when the annual weeds are just coming into blossom.

The wise use of a spring-toothed harrow has proven valuable in control of weeds in second-year alsike fields. Properly timed spring-toothing will eliminate most annual weeds.

IPC has given fair control of annual grasses. IPC should be applied immediately before the grasses germinate. As a spray, the recommended rates are 3 to 5 pounds of active material in 60 to 100 gallons of water per acre. To be effective, IPC must remain in the root zone. Excessive water leaches it below this depth, and insufficient amounts may not carry the material deep enough.

Pollination

Alsike clover is highly self sterile. In order to accomplish cross pollination, an adequate supply of bees is essential. Usually one strong colony per acre is sufficient. Wild bees perform the same function as domestic bees, but are usually too limited in number.

Most California alsike seed producers are dependent on the beekeeping industry for a sup-

ply of pollinators. In order to encourage beekeepers to supply bees to the alsike growers, bees should be protected from careless applications of insecticides. California state law limits the time of day any insecticide can be applied. Growers should check with the local agricultural commissioner's office to determine when they are allowed to apply insecticides.

Many insecticides used in the control of clover insects are highly toxic both to honeybees and wild bees. Through the wise use of these insecticides bee death can be kept to a minimum. No insecticide should be applied to clover fields when the bees are working the field. Usually the insecticide should be applied before 7 a.m. or after 7 p.m. Generally speaking, dusts are more destructive to bees than are sprays and have a greater tendency to drift.

Only through community cooperation can a satisfactory supply of honeybees be well distributed over seed-producing fields. Beekeepers and seed producers are partners in this enterprise and should work out cooperative agreements.

Harvesting

In harvesting, these points need to be considered: Time of harvest, method of curing, use of suitable pickup, adjustment of combine, ground speed, special attachments, and care of seed.

Harvesting should start when 90 per cent or more of the seed heads have turned brown. Harvesting must be done before an appreciable amount of seed head deterioration begins. The crop normally matures during late August or September. Seed from second-year stands, if not cut back, will mature somewhat earlier.

The harvesting of alsike clover is divided into two distinct operations: (1) the curing and preparation and (2) combining or the threshing,

which includes picking up, hulling, and separation. The curing is by windrowing and contact spraying.

Curing Methods

Windrow curing is the most commonly used method. For windrowing the standard mower with "curler" attachment or the windrow swather can be used. The curler, a series of curved bars attached to the rear of the mower cutter bar, leaves a tightly rolled windrow which cures more slowly and is more susceptible to wind and rain damage. When used in sparse stand, the curler also tends to leave the windrow somewhat bunchy and often non-continous.

The windrow swather has a cutter bar on the front end of a cross conveyor very much like the header of a combine. It is usually equipped with a pickup reel. The cut material is conveyed either to the center or to one side, and deposited as a loose, open windrow. Though more expensive, the windrow-swather can be used successfully on all types of stands.

Windrowing must be done only when the humidity is high or when dew is present on the plants. To minimize shattering losses, windrowing is generally done in conjunction with the mowing.

Spray-curing. Preharvest spraying and direct combining have been very successful in areas where strong winds, rains, and low humidity are a hazard to seed production. The spray, a dinitro general (Dow or Sinox), applied by airplane at from 1 to 3 pints in 10 to 15 gallons of diesel oil per acre, is used to condition the crop. Ground-rig application is satisfactory but requires 50 to 100 per cent more oil and sufficient water to make an emulsion that can be applied at rates ranging from 25 to 60 gallons per acre. Spraying is most effective

when stands are uniformly mature, open, and erect.

Combining should follow spraying as soon as the leaves are dry--usually about 3 to 5 days after treatment. It should be completed within 8 to 10 days or before regrowth and head shatter occur to any great extent.

Combining. When properly adjusted, all commercial harvesters will thresh alsike clover satisfactorily. The main functions of a combine are concerned with the header in cutting, lifting, or feeding the material into the machine; the cylinder in hulling or threshing the seed out of the pods; and the walkers, shoe, and return system, in separating the seed from the straw and chaff.

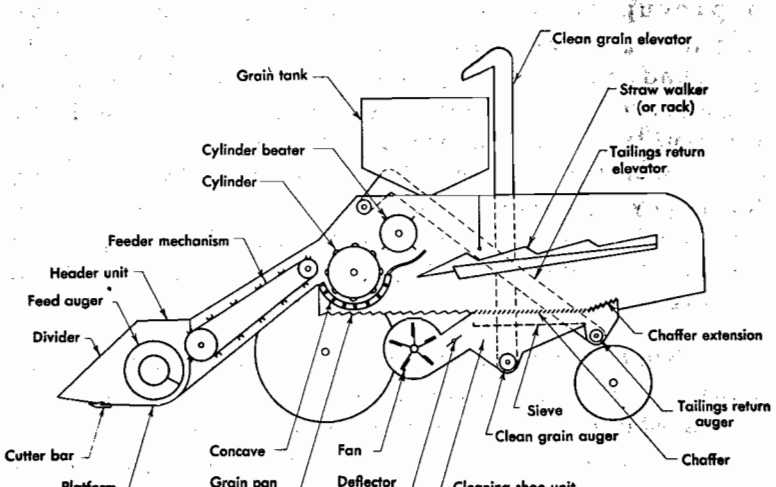

Fig. C--Cross section of typical combine.

The department of agricultural engineering cooperated in the harvesting studies with alsike clover.

Fig. D--Combine harvesting alsike clover seed.

Feeding

With a windrowed crop, a pick-up attachment is used to lift and put the material into the harvester. The attachment should be ground-powered with a peripheral speed 10 to 15 per cent faster than the forward speed of the combine. This provides a steady tension on the windrow without pulling it apart. The mounting on the header should be such as to prevent back-feeding to the ground. The conventional cutter bar equipped with lifter guards can also be used as a windrow pick-up device. In this case, the auger is usually slowed down to produce a more uniform feed.

For direct combining, the standard cutter bar is used. On lodged stands lifters spaced evenly along the cutter bar aid in lifting and properly guiding the material.

Threshing

The hulling is the biggest problem in threshing, and the type of cylinder will affect the efficiency to varying degrees. The rasp-bar cylinder and spike-toothed cylinder do a similarly good job of threshing, except that the latter chops the straw somewhat finer. In limited tests the V-bar has shown a more positive hulling action, and it does a little better job of threshing, but causes slightly more seed damage.

Clearance. The clearance between cylinder and concave should be between 1/16 and 3/16 of an inch, with greater clearance at the front of the cylinder when possible. Openings in the concave should be blanked off so that the pods will travel the entire length of the concave. Augers and lifts that come in contact with seed should have at least 1/8 of an inch clearance. When flax rolls are used, the clearance between the rolls should be from 0.010 to 0.040 of an inch.

Cylinder Speed. Proper cylinder speed depends on the condition of the crop, type cylinder, make of machine...and to some extent, on the performance of a particular machine. Excessive seed damage will occur if the peripheral speed of the cylinder (speed of tips of teeth or bars) is too high. The seed from stands conditioned by spraying contains more moisture than windrow material and is less subject to threshing damage. Under these conditions the cylinder can be run faster, but in no case should it exceed the upper range of the recommended speeds (table 1). Uniform and proper machine load is very important. Even at the proper cylinder speed, increasing damage will occur as the cylinder load is reduced.

Suggested peripheral cylinder speed for different crop conditions are listed on table 1.

TABLE I

Recommended cylinder in ft/min

Method of Curing	Condition of Crop		
	When Tough or Damp	Good Condition	Very Dry
Spray Curing	6000 to 6500	5500 to 6000	5000 to 5500
Windrowed	5500 to 6000	5000 to 5500	5000

TABLE II

Revolutions per minute for various peripheral speed and cylinder diameters

CYLINDER DIAMETER IN INCHES	RPM TO GIVE 5000' PER MIN	RPM TO GIVE 5500' PER MIN	RPM TO GIVE 6000' PER MIN	RPM TO GIVE 6500' PER MIN
14	1360	1510	1645	1776
16	1190	1315	1435	1555
18	1060	1165	1270	1375
20	955	1050	1145	1240
22	870	950	1040	1130
24	795	875	955	1035

$$\text{peripheral speed, feet per min} = 3.1416 \times \frac{\text{cylinder diameter in inches}}{12} \times \text{RPM}$$

Separation

Straw carriers (walker, rack, or slatted conveyor) in windrowed alsike clover normally handle about one third of the total material passing through the machine. When less than this amount is handled, it is either because the

cylinder is chopping up the straw excessively or because the openings in the carriers are too large. These openings should then be reduced but not to the point where there is an appreciable loss of free seed over the carriers.

Cleaning Shoe. Chaffers and the air blast in the cleaning shoe must be carefully adjusted and properly operated to function satisfactorily. An improperly adjusted shoe can cause large amounts of seed to be lost.

For best performance, the chaffer should be well opened. A minimum clearance through the openings of about ½ inch has been found satisfactory under usual conditions. If the openings are too small, separation is inadequate and too much seed may be lost over the rear of the shoe. Openings that are too large result in overloading the lower sieve and the tailings-return system.

Wind adjustments should be made by starting out with too much air and then gradually reducing it until the adjustment for minimum seed loss over the rear of the shoe is found. Too much air causes free seed to be blown out in the air stream above the chaff. Insufficient wind causes seed to be carried out in the main body of the chaff stream, and also results in overloading of the lower sieve and the tailings return. In addition, the seed in the bin or sack will have more dirt in it.

For the best performance the chaffer extension should be raised to slightly above horizontal, and the openings should have a little more clearance than is required for those on the main chaffer.

A 1/10 inch round-hole sieve under the chaffer is recommended in place of the adjustable sieve with which the machine is normally equipped for grain.

Ground Speed

Operating ground speed is important in regulating machine load. An insufficient load promotes increasing seed damage, especially with V-bar cylinders. An excessive load may cause feeding difficulties and increased seed losses over the rear of the machine. Correct ground speed is determined by the free seed losses over the cleaning shoe. It is usually not economically practical to try to reduce seed losses below 5 to 10 pounds per acre because of reduced machine capacities. Ground speeds will vary from 0.5 mph in heavy growth to 1 mph or more in medium to light stands.

Special Attachments

Certain special attachments are optional. A pan or canvas suspended under the machine will catch seed that might leak from around the cleaning shoe, elevator doors, joints between header and combine, and elsewhere.

A reel is necessary only when direct-combining very thin stands. It should be ground-powered and driven slightly faster than ground speed.

A reverse gear, or at least a clutch, on the feeder mechanism drive is desirable.

Flax rolls, though not essential in alsike clover, do retard the incoming material and hold it so that the cylinder has more of a combining action.

Care of Seed. Threshed seed is moved from the field directly to seed warehouses either in sacks or in bulk. Bulk handling reduces labor requirements and eliminates the use of sacks. Seed harvested from spray-cured fields should be cleaned or dried immediately to prevent heating.

This publication deals with efficiency in farming, one of the seven points of emphasis for the University of California Agricultural Extension Service. Others are market expansion through consumer education, efficiency in marketing, resource development and conservation, work with farm labor families, building better citizens through 4-H Club work, and facts about public affairs. Your county extension office can give you more information about these as well as other programs in agriculture and home economics.

SAMPLE INPUTS AND COSTS FOR ALSIKE CLOVER SEED PRODUCTION IN TULELAKE AREA

Based on 1953 Conditions and a Yield of 450 Pounds Clean Seed per Acre

COSTS TO ESTABLISH STAND - planted with barley. One-half of costs charged to each crop.

		COST PER ACRE
Seed bed preparation - land plane, plow, disc, harrow, check 1 man, medium tractor ½ of 3.5 hours @ $3.25		$ 5.70
Drill - 1 man, medium tractor ½ of 1/3 hour @ $3.25	$ .55	
Seed - 10 lbs. @ 25¢	2.50	
		3.05
Roll - 1 man, light tractor ½ of 1/3 hour @ $2.25		.40
Irrigate - Labor - 1 man hour @ $1.25	1.25	
Water - ½ acre-foot	2.00	
		3.25
Remove straw - 1 man, light tractor, rake 1/3 hour @ $2.25		.75
Miscellaneous - Taxes ½ of $4.50	2.25	
Interest - ½ of $400 @ 5%	10.00	
		12.25
Total cost to establish stand.....		$25.40

CULTURAL COSTS YEAR AFTER PLANTING		
Irrigate - Labor - 1 man hour @ $1.25	1.25	
Water - ½ acre-foot	5.50	
		6.75
Bees - 1 colony per acre		4.00
Fertilize - 1 man, light tractor .2 hour @ $2.25	.45	
Single superphosphate - 300# @ $38 ton	5.70	
		6.15
Root weevil control - 1 man, light tractor .2 hours @ $2.25	.45	
DDT - 10% dust - 20# @ 15¢	3.00	
		3.45
Lygus & seed weevil control - plane	1.50	
DDT - 10% dust - 20# @ 15¢	3.00	
		4.50
Defoliation - plane	1.50	
Dinitro and oil - 10 gal. @ 60¢	6.00	
		7.50
Combine - 1 man, 12' self-propelled combine 1 hour		22.50
Haul - 450 lbs. @ $2.00 ton		.45
Clean - 450 lbs. @ 2¢		9.00
Bag - 450 lbs. @ ½¢		2.25
Miscellaneous - Taxes	4.50	
Interest	20.00	
		24.50
Total cost second year		91.05
Total cost per acre		116.45
cost per pound		25.9¢

Labor - $1.25 per hour Medium tractor - $2 per hour
Light tractor - $1 per hour

In this publication trade names are used to make the information more understandable. No endorsement of any product is intended, nor is criticism implied of any product not mentioned.

4-54-1500

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