SEED CROP NOTES

July 17, 1969

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INSECT DAMAGE SURVEY--~~1969~~ 70

The Fresno County Pure Seed League is helping again this year to sponsor a survey of alfalfa seed fields to help determine the extent of damage resulting from alfalfa seed chalcid and from sucking insects prior to harvest. Money provided by the Fresno County Pure Seed League will be used to hire a laboratory technician on an hourly basis to help identify the insect damage in the seed samples taken from each of the alfalfa seed fields in the survey.

This will be the ~~second~~ third year for this type of survey which is designed to sample fields of each alfalfa seed grower in the county. The purpose of this survey is to identify the extent of damage by these insects for each grower under his own combination of cultural practices. A uniform sampling procedure has been developed and explained to fieldmen who represent alfalfa seed companies and some chemical companies. To have fields included in this survey, growers should contact their field representative before harvest.

A report concerning the results of each sample will be made to each grower for his own fields, to each seed company for the fields sampled by their fieldmen, and to the Fresno County Pure Seed League and other interested parties concerning the general level of chalcid damage and sucking insect damage by geographic areas. Progress reports of this survey will likely be available in October, 1969 and a complete report will be available by the end of May, 1970. The final report will include the emergence of adult chalcid wasps from samples over the winter months.

HARVESTER SEED DAMAGE

The following report is from a paper given by Luther Jones, Department of Agronomy, U. C., Davis at the Seed Industry Conference in 1966. A review of this information is timely just prior to alfalfa seed harvest. Particular attention should be paid to the suggested program for limiting mechanical damage during harvest. Copies of the U. C. publication, "Adjustments and Operation of Self-Propelled Combine" are available from this office upon request.

Sincerely,

Bob Sheesley

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Enclosure

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Co-operative Extension Work in Agriculture and Home Economics, U.S. Department of Agriculture, University of California, and Fresno County Co-operating

HARVESTER SEED DAMAGE

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Seed injury acquired by rough treatment in equipment handling is the most important factor contributing to the poor quality and low germination of alfalfa seed. Mechanical injury holds this position because injury is always present, to some degree, whenever and wherever machinery is used in handling seed. It is estimated that more than 70% of the failure of newly-harvested alfalfa seed to germinate is due to injury acquired in the harvesting and processing operations. Even though there is considerable information dealing with the relationship of injury to the quality of harvested seed, its elimination has not been achieved in the magnitude desired. There is still a very real need for emphasizing ways and means of combating injury in order to retain the full vigor and lengthening the storage life of seeds.

The quality of alfalfa seed has steadily improved in purity, weed seed content, other crop seed content through better cultural practices including chemical weed control, and better processing techniques.

The type of alfalfa seed injury is identifiable, and can be detected through the use of a microscope to locate fractures or breaks of the seed-coat or in the seed proper. The magnitude of injury can be defined from the type fracture, bruise, crack or break inflicted upon the seed. In tests the influence of injury on germination will show a close and positive relationship between the observed injury and the dead seed content. The relation of germination (live seed content) to injury (dead seed content) is shown in the table below.

Treatment Number	Way Threshed	Observed Injury %	Dead seed content %	Live seed content %
1	Hand	0.0	0.8	99.2
2	Combine once	6.0	5.6	94.4
3	Combine twice	16.7	13.2	86.8

Treatments 1, 2, and 3 were harvested on the same date and from the same seed fields. Treatment 1 was hand threshed and showed no mechanical injury to seed. Treatment 2 was threshed once through the combine. The injury to seed threshed once averaged 6% compared with 16.7% for seed threshed twice. Treatment 1 showed a germination of 99.2; Treatment 2 - 94.4%; and Treatment 3 - 84.8%. Threshing once increased the dead seed content over hand threshed by 4.8%. The two threshing operations increased the dead seed content over the hand threshed by 12.6%.

Mechanical injury and water damage are the two most important contributors to low quality seed and poor germination. The use of injury readings to aid in adjusting combines to reduce damage would greatly improve the quality of harvested seed. The identification of seed injury and the evaluation of injury in terms of dead seed point out that preventive measures of control of elimination are the most useful in improving seed quality of forage crop seeds. It is clear that once seeds are injured mechanically or otherwise the loss in viability is rapid and irreversible.

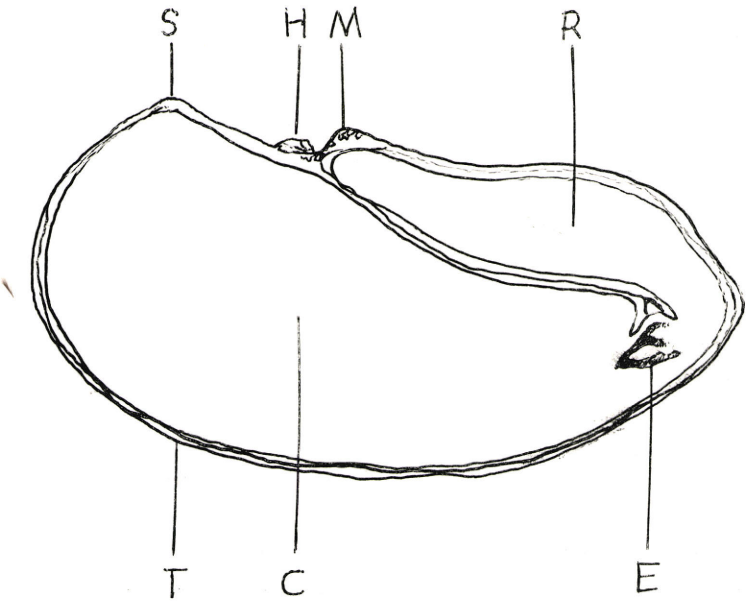
If the grower, the fieldman, the processor and the seller of alfalfa seed desire to improve its quality a program can be suggested which would assure an average germination of more than 90%.

The procedure of such a program would be as follows: inspect each grower's combine immediately upon the starting of harvests, calibrate the cylinder concave clearances, and adjust the cylinder speed (RPM) of each combine to conform to the recommendations contained in "Adjustments and Operation of Self-Propelled Combine." 1/

Draw a sample of seed from the harvester bin, determine the percent injury by a visual reading. Make an evaluation for germination (injury percent equals dead seed content or the percent reduction in germination). If the percent visible injury (dead seed) is 5% or more, adjust combine cylinder speed downward until the damage index falls below 5%. Seed samples should be tested throughout the harvest period to determine if conditions of weather, crop or combine have changed to cause an upward trend in the damage index.

If such a program were put into operation the minimum germination of alfalfa could be raised to 90% and the germination of more than 90% of the total alfalfa seed produced in the state could be raised to 95% or higher.

1/ J. R. Goss, L. G. Jones and R. G. Curley. Adjustments and Operations of Self-Propelled Combine. University of California Extension Service mimeograph.



PICTURE 1. DIAGRAM OF ALFALFA SEED STRUCTURE

S -- Strophiole (or chalaza) - Nature not definitely known (pronounced stroph' i ol)

H -- Hilum - The scar where the seed broke away from the pod

M -- Micropyle - A small opening in the seed coat at the end of the embryonic root (radicle)

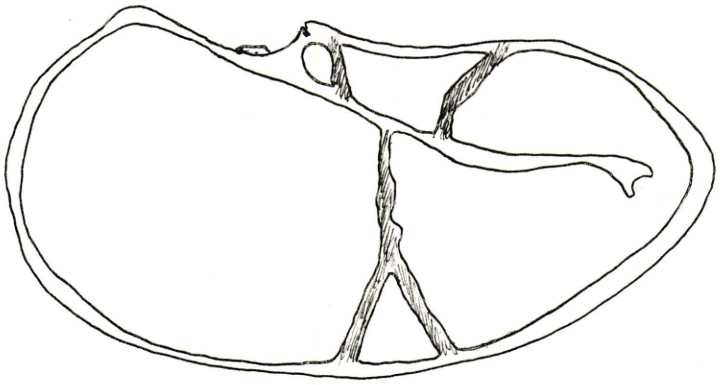
C -- Cotyledon - "Seed leaf", the bulk of the seed content

R -- Radicle - The rudimentary "root" of the embryo

E -- Epicotyl - Growing point in stem development

T -- Testa, or seed coat - covers the seed. In dry alfalfa seed it is brittle and subject to fracturing.

The internal portion of the seed is the embryo, consisting of the cotyledons, the radicle, and the epicotyl.



MECHANICAL DAMAGE CAUSES

BROKEN EMBRYO OF ALFALFA SEED

In this diagram the broken seed coat has been removed to show the severe damage to the embryo. One cotyledon has been broken, and the radicle has been broken in two places. This seed cannot germinate because of the damage to the radicle or "root". Bruises, without actual fractures, located in critical areas (such as the radicle or the epicotyl) can also prevent germination or emergence of a seedling.