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JUN 3 1988

CHEMICAL DRYING SPRAYS FOR
AID FOR SEED PRODUCTION

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A new tool, "desiccants," has been added to those already in use by modern seed producers. It enables seed producers to harvest more seed of greater purity and higher quality and at less cost. A highly toxic chemical is sprayed on the seed crop a few days before harvest. This chemical dries the leaves and stems of the standing crop which in turn causes the seed to lose moisture. There are several advantages for this method of handling seed production fields:

1. Cures the standing crop in the field.
2. Makes direct combining possible.
3. Eliminates seed losses which occur when the crop is mowed, windrowed and threshed or when bound and threshed.
4. Reduces seed losses due to rolling of windrows by high winds.
5. Reduces shattering losses due to rain showers.
6. Dries green undergrowth including weeds.
7. Kills only the top growth--not the roots--and allows normal regrowth of perennial crops.
8. Does not affect germination of the harvested seed.
9. May result in more uniform color and quality of seed.
10. May double the seed harvest on some legume crops.
11. May advance harvest date as much as three weeks.

CROPS WHERE CHEMICAL DRYING CAN BE USED

The legume seed crops appear to be well suited for pre-harvest treatment with crop drying chemicals. Alfalfa, sweetclover, and red clover seed fields are commonly mowed, windrowed, and then combined using

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a pick-up attachment. Varying amounts of seed are lost in this way. Experiments indicate an average loss per acre of 40 to 50 pounds of alfalfa and as much as 100 to 150 pounds of sweetclover seed may be lost from wind-row handling. These losses can be compared with losses from chemically cured fields which amount to 10 to 15 pounds per acre. Increased seed harvest often more than pays for the cost of the crop drying chemicals which usually runs around \$4 to \$5 per acre.

Chemical drying may also be used profitably in the case of weedy soybeans. It is not recommended as a method for hastening maturity of soybeans because of the adverse effect on seed size and yield. The need for chemical drying would probably occur most often in solid drilled soybeans.

Combine-type grain sorghum was chemically dried in 1953 and 1954. The spray treatment permitted a clean dry harvest approximately one month ahead of the first freeze. A moisture content of 11.5% on grain direct from the combine where chemical drying was used permitted immediate grain bin storage. Unsprayed sorghum at the same time was unsafe for storage at 18.5% moisture. A moisture content of 12% is generally considered the upper limit for safe seed storage. The cost of this treatment is justified in the production of a high value seed crop where seed of good quality and high germination is needed.

Additional seed crops where chemical drying may have a valuable place in seed production are (1) certain grasses, (2) hybrid corn, (3) small grain where harvest is difficult or impossible due to a heavy growth of late weeds, and (4) hairy vetch.

CHEMICALS AND RATES OF APPLICATION

Materials used for chemical drying are classified as contact herbicides. This means that sprays kill only the leaf and stem tissue that is contacted by the spray solution. Therefore, it is important that good spray coverage is obtained. Some of the crop drying chemicals are applied in number 2 diesel fuel or diesel fuel-water emulsions because the oil spreads more on plant surfaces than does water and thereby aids in obtaining uniform coverage.

The chemicals presently available may be classified into two main groups: those with a rapid killing action (24 to 72 hours) and those with slower action, which require 7 to 10 days between treatment and harvest. The dinitro compounds (4, 6-dinitro-o-secondary butyl phenol and amyl phenol) and penta (pentachlorophenol) give rapid drying action which may permit harvesting in as little as 24 hours after treatment when hot, dry conditions prevail. A period of 2 to 3 days is a more common interval with most of the legume seed crops. A somewhat longer period is needed for grain sorghum. Chemicals which are slower acting are endothal (3, 6-endoxohexahydrophthallic acid), sodium chlorate-borate mixtures, and magnesium chlorate applied in water solutions.

Under Nebraska conditions dinitro and pentachlorophenol have given the most consistent results. They have been especially superior in drying up weed growth which may occur in the seed crops. No effect on germination has been found with any of the seed crops tested.

In exceptionally heavy growth a second application is sometimes advisable to get adequate drying. The second treatment can be made at a reduced rate of both chemical and carrier.

For alfalfa, 2 to 3 pints of dinitro (general) in 5 gallons of diesel fuel per acre applied by airplane has become a standard rate of application. One gallon of 40% pentachlorophenol concentrate also in 5 gallons of diesel fuel often will do as well. Airplane application is recommended over ground sprayers to avoid shattering caused by the sprayer wheels. Where 10 gallons of oil can be applied, the amount of chemical used may be reduced to one-half the amount needed when only 5 gallons per acre are used. Treatments should be applied after most of the seed pods have turned brown.

NOTE: Endothal at 4 to 6 quarts per acre in 5 to 10 gallons of water has given acceptable drying results in alfalfa, red clover, and sweetclover, but under Nebraska conditions it has not been effective in drying up the weed growth.

For sweetclover, use 2 to 3 pints of dinitro in 5 gallons diesel fuel or 1 pint in 10 gallons of diesel fuel when approximately 1/2 of the seed pods are brown. Use 4 quarts of 40% pentachlorophenol in 5 gallons of diesel fuel or 2 quarts in 10 gallons of diesel fuel at the same time as dinitro. Combining should normally follow treatment within 3 days.

For red clover, use the same rates as for sweetclover. Spray after the heads are brown and the seed is colored.

For hairy vetch, it is suggested that the sweetclover rates be used.

For soybeans, where weeds are a problem, use 2 to 3 pints of dinitro or 1 gallon of 40% pentachlorophenol in 5 gallons of diesel fuel. On clean soybean fields 1 pint of dinitro or 2 quarts of penta can be used successfully after the pods are brown.

For grain sorghum for seed, use 5 to 6 quarts of 40% pentachlorophenol or 3 pints of dinitro in 5 gallons of oil per acre. Similar results could be expected from 4 quarts of 40% pentachlorophenol or 2 pints of dinitro in 8 to 10 gallons of oil per acre. At the time of application the grain should be fully colored. If the grain is to be fed or the stover pastured, dinitro and penta should not be used.

Other chemicals which have given satisfactory results are 6 quarts of 40% magnesium chlorate ("Magron") or 20 pounds of a sodium chlorate-soluble borate combination ("Shed-a-Leaf", "Chem-Frost", or "Tumbleleaf") in 8 to 10 gallons of water per acre. One-half pound Amizol could be substituted for 2 quarts of magnesium chlorate or 5 pounds of the sodium chlorate-soluble borate combination.

WARNING!

The dinitro and pentachlorophenol compounds are poisonous to warmblooded animals. Handle them with care. Foliage treated with these chemicals should not be used for hay or grazed by livestock. Injurious effects are cumulative and may appear only after several weeks of feeding on treated foliage. Accidental grazing or feeding will not injure livestock if further feeding is prevented. Grain of dinitro treated crops should not be used for feed under any circumstances.

No known dangers exist with the use of any of the other chemicals listed.