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Ecofallow under Colorado conditions—herbicide application requirements

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K. G. Brengle[1/]

no. .106

Quick Facts

Herbicide application is a critical phase of ecofallow.

Proper spraying equipment, calibration and operation are essential for a successful ecofallow program.

Even herbicide distribution at proper rates is necessary to control weeds and prevent residual crop damage.

Application of chemical herbicides is a critical phase of the ecofallow system. Under-application, over-application, skips and overlaps all contribute to unsatisfactory results with ecofallow. Spraying equipment must be set up, calibrated and operated properly. General requirements for a satisfactory sprayer are listed in Table 1.

The following outline points out desirable characteristics and operation guidelines for spraying equipment used in ecofallow.

Nozzles:

- Flat fan nozzles are preferable for most herbicides since they produce finer drops and more uniform spray patterns.
- Nozzles should be turned slightly so spray from one nozzle does not strike that from the next nozzle.
- Spray from flood nozzles should be directed straight down when applying Paraquat in wheat stubble.
- Spray should be directed slightly to the rear when spraying uneven ground or tall wheat stubble with flood nozzles.

Spacing:

- Maximum width between nozzles should not exceed 40 inches (102 centimeters).
- 20-inch (51-cm) spacing may give better pattern.

Operating pressure:

- Pressure affects droplet size, nozzle flow rate, spray angle and pattern uniformity.
- The nozzle flow rate is proportional to the square root of the pressure.
- Nozzles are designed to operate within a specified pressure range, so major changes in volume should be made by changing nozzle size or ground speed.
- Pressure should be uniform across the boom.
  a. The feeder line should enter the center of the boom.
  b. Hose size must be adequate to prevent a pressure drop across the boom.
  c. Larger hose or more feeder lines should be installed if the boom is lengthened.
- All pumps are not satisfactory for spraying herbicides. Centrifugal or turbine pumps usually are satisfactory.
- A pressure gauge should be put on the boom.

Water used per acre:

- Sprayer should be put on 5 to 40 gallons-per-acre (47 to 374 liters-per-hectare) depending upon herbicides. Roundup performance is better at low gallonage (5 to 10 gallons-per-acre or 47 to 94 liters-per-hectare).
- The higher rate should be used with contact herbicides for heavy weed infestation.

Table 1: General requirements for a satisfactory sprayer.

Nozzle type	Maximum spacing	Operating pressure	Water used per acre	Boom height	Maximum travel speed	Spray pattern overlap
Flat fan	40 in.	30-40 psi	20-40 gal	See	12 mph	100-200%
Flood	40 in.	15-35 psi	20-40 gal	below	12 mph	100-200%

[1/] *K. G. Brengle, CSU associate professor, agronomy; material for this summary was taken from the proceedings, Colorado Ecofallow Conferences, Feb. 1981, from papers presented by Darryl E. Smika, Gail A. Wicks, Robert H. Schieferstein, Greg J. Miley and John A. Knapp (12/1/81)*

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To simplify technical terminology, trade names of products and equipment occasionally will be used. No endorsement of products named is intended nor is criticism implied of products not mentioned.

Boom height:

- Boom height affects wind drift and distribution pattern.
- A well-designed wind guard can reduce drift and bend tall stubble so spray can reach the weeds.
- Boom height should be adjusted so that overlap is at weed height.

Maximum travel speed:

- Faster speed distorts spray pattern and raises more dust; dust will inactivate Paraquat, Roundup and 2,4-D.
- Speed must be constant over the field for uniform application.
- There is more boom whip and bounce at higher speed.

Spray pattern overlap:

- The spray pattern must overlap each nozzle for even distribution.
- Minimum and maximum overlap are illustrated in Figure 1 and Figure 2.

Figure 1: Minimum overlap pattern of spraying equipment.

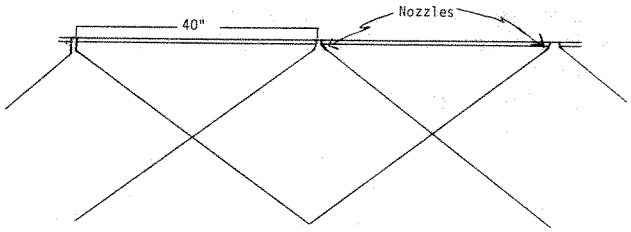
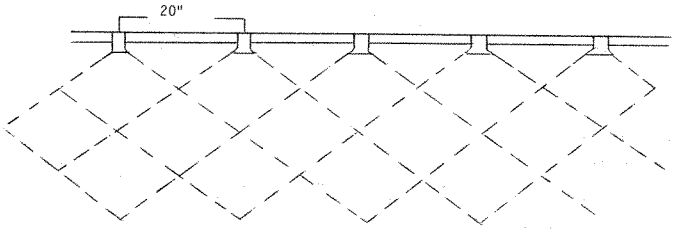


Figure 2: Maximum overlap pattern of spraying equipment.



Miscellaneous:

- Wetable powders or liquids can contain particles large enough to plug small nozzle orifices.
  a. Mix chemicals before they are put in the tank.
  b. Use a 10- to 20-mesh/inch strainer in manhole.
  c. Use a 16- to 50-mesh/inch strainer in line after pump with nozzles having small orifice.
- Marking systems
  a. Flagmen are probably best at present.
  b. Do not use mechanical systems that raise dust.
- Stainless steel tips have better pattern than nylon tips.
- Brass tips wear faster than either stainless steel or nylon; adjustments have to be made for worn tips.
- Boom must be stable.
  a. Gauge wheels should be used on long boom ends.
  b. Lower boom height is needed for close-spaced nozzles.
  c. Gauge wheels or skids may be needed if boom is lowered to maintain height.
- These criteria apply whether application is by the farmer or a commercial applicator.
- Calibration and careful operation are necessary for satisfactory application of herbicides.