DIRECTED SPRAYS FOR WEED CONTROL

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Several factors influence the use of herbicides as postemergence directed sprays whether they are used in minimum tillage or prepared seed bed plantings if a herbicide is labeled only for directed application, then any other post-emergence application is illegal. Another factor is the lack of effective herbicides for which the crop has sufficient physiological tolerance to allow a non-directed application. This necessitates the use of highly toxic compounds whose utility depends on minimized crop contact. While these compounds are generally very effective herbicides, little or no crop tolerance exists, and if they are applied over-the-top, excessive crop damage can be expected.

Crop leaves can form a canopy over small weeds. This canopy intercepts sprays and protects the small weeds underneath. Because of the canopy effect of the crop, over-the-top applications, even with herbicide tolerance by the crop, are often less effective than directed applications unless high pressures are used for carrier atomization. Atomization is undesirable with herbicides since it materially increases the potential for drift and volitization which could damage non-target crops.

Although directed postemergence applications are seldom made earlier than three weeks after planting, preparation for these treatments should start in the summer or at harvest time of the year before the postemergence directed applications are to be made. Fields should be surveyed and a list of weed species and densities should be made.

The establishment of crop/weed height differential is essential for successful directed postemergence applications. Cocklebur, sicklepod (coffeewed), ragweed, and morningqlories are weeds most commonly found at the time that directed postemergence applications are needed. Selection and use of pre-emergence herbicides which are effective on these weeds (or others from your survey list), and if the growing season warrants, the use of an early post-emergence herbicide application, will help achieve the crop/weed height differential needed for successful control of these weeds.

Nozzle stability is a very important factor in successful directed post-emergence herbicide applications. Seedbed condition contributes to nozzle stability. The better the seedbed condition, the more effective the direction of postemergence applications. In minimum tillage plantings, seedbeds often erode over winter or during the growing season of the preceeding crop in a rotation. However, effort should be made whenever possible to provide a smooth, level track for the nozzle carriers to move over.

Several acceptable methods are available for mounting nozzles for directed postemergence applications of herbicides. One of the most effective, where straw conditions permit use, is skid mounts, the so-called oiling shoe. This equipment has mounting brackets which allow precise positioning of

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nozzles, and support arms are weighted or spring loaded for good ground Contact. Units of this type which are mountable under the middle of the tractor are commercially available. This mounting position also improves accuracy of spray placement. If skid units cannot be used, nozzles may be mounted effectively on a cultivator frame or a preemergence boom can be used. This type of mounting requires support wheels for stability. Direct mounting to the tractor frame is less satisfactory since vertical mobility of the nozzles is lost. With the latter mountings, rigid nozzle drops should be used to position the tips below the top of the crop. Flexible drops are unsatisfactory.

In conventional planted crops, the grower has the option of cleaning row middles with cultivation. This facilitates the application of postemergence herbicides to a band centered on the crop row. In minimum tillage plantings where the maintenance of previous crop stubble and mulch is desirable, this option is seldom available and both plant row and crop middles must be cleaned and maintained chemically.

If crop/weed height differentials have been established by previous operations, there are several choices of nozzles which will direct sprays into the row middles and the crop row simultaneously. Single or double swivel nozzle bodies allow accurate spray pattern placement and give flexibility to the spray unit. Nozzle tips are machined in a variety of delivery angles (Fig. 1)

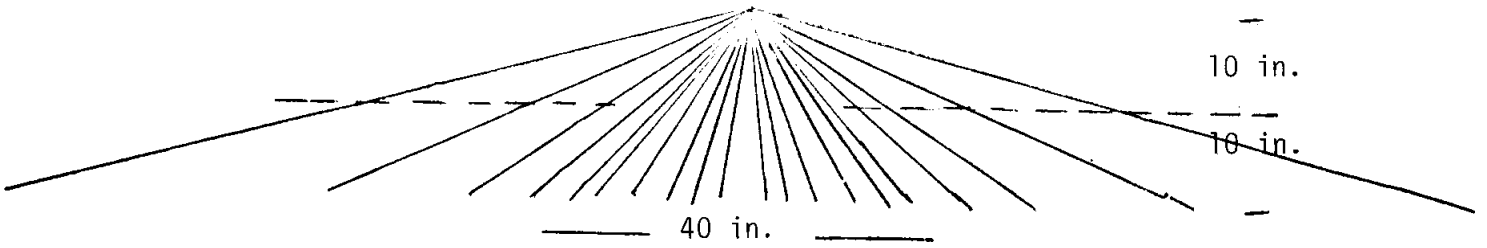

Figure 1

and selections can be made to fit the spray pattern which is needed. Flat fan tips (Fig. 3, 4, & 5) deliver either elliptical or even edge patterns on the ground. The tapered edge tips are designed for boom spraying and the even edge tips for band application. Flood tips (Fig. 2) also deliver a tapered pattern which is spred over a wide band, the' fan angle of flood tips varies with output. Even edge tips are available in 80" and 95" fan angles and in sizes which will deliver spray volumes of 100 and 75 gallons per acre at 3 mph and 40 psi respectively. Tapered edge fans are available which will deliver over 2000 gpa under the same conditions.

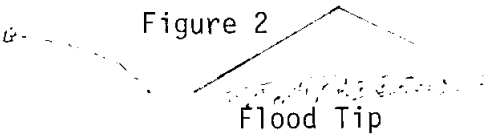
Figure 2
Flood Tip

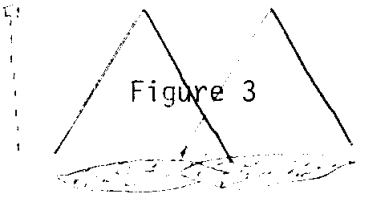
Figure 3
Tapered Edge Fan

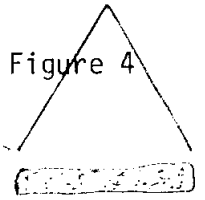
Figure 4
Even Edge Fan

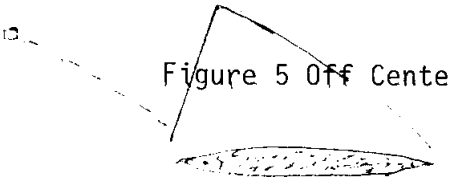
Figure 5 Off Center Fan

If crop/weed height differential has not been maintained, it is advisable to clean the row middles in one aperation and to clean the crop row in a second operation after the weeds in the row middles have been knocked down. Thorough coverage of the weeds is very important to the success of directed postemergence sprays. To assure this coverage, higher carrier volumes are

used in directed postemergence spraying than are generally used in pre-emergence applications. Where 20 gpa of diluent or less is often sufficient for preemergence boon: spraying, a minimum of 40 gpa and preferably up to 80 gpa of diluent is desirable for directed postemergence spraying with the higher volumes being used when weeds are thick or tall. For maximum weed kill and crop protection, nozzle tips which deliver a spray pattern which is even to the edge, rather than tapered, should be used. If weeds are particularly high or for added crop protection from translocated herbicides, shields which run close to the crop and extend to the ground on either side of the row middles are often effective. Shield units are available commercially or they can be assembled in a farm shop with little difficulty.

Whichever type of tip configuration is used, the spray pattern in the field is of major importance. The sprayer should be set up to correspond to the row number used at planting -- if four row planters were used, a four row sprayer should also be used. Further, the sprayer should follow an identical path as that made by the planters. If the planter pattern is not closely followed, minor differences in row direction can cause excessive spray contact with the crop plants and result in serious damage to the crop.

Recirculating sprayers are specialty equipment which directs a stream of herbicide mixture horizontally above the crop. Residual spray which was not intercepted by weeds is collected and returned to the spray tank for use. This equipment is currently used primarily for johnsongrass control in soybeans where the grass has materially over-topped the beans. Several versions of this type of sprayer are commercially available.

With proper planning and equipment adjustment, directed postemergence herbicide applications can often compensate for ineffective preemergence treatments by removing weeds in the crop and/or be very effective in keeping a crop weed free until harvest.