

**New Weed Control Approaches in Small Grains
and Off-Target Movement Challenges**
Steve Wright¹, Mick Canevari², Lalo Banuelos¹, Matt Mills¹, Anna Brown¹

¹University of California Cooperative Extension, Tulare & Kings Counties
4437B S Laspina St, Tulare, CA 93274, sdwright@ucdavis.edu
420 South Wilson Way, Stockton CA 95205 wmcanevari@ucdavis.edu

There are approximately 700,000 acres of small grains planted in California. This represents wheat, triticale, barley, oats, and small grain forage mixes. Some of the major broadleaf weeds infesting small grains include mustards, fiddleneck, chickweed, malva, and burning nettle. Some of the important broadleaf herbicides used include 2,4-D, MCPA, Dicamba, and Carfentrazone (Shark).

These herbicides are most effective when applied to small and actively growing weeds. Small grains vary in their sensitivity to these herbicides; for example, oat is more tolerant to MCPA than to 2,4-D. MCPA is often easier to tank mix with foliar nitrogen than some formulations of 2,4-D.

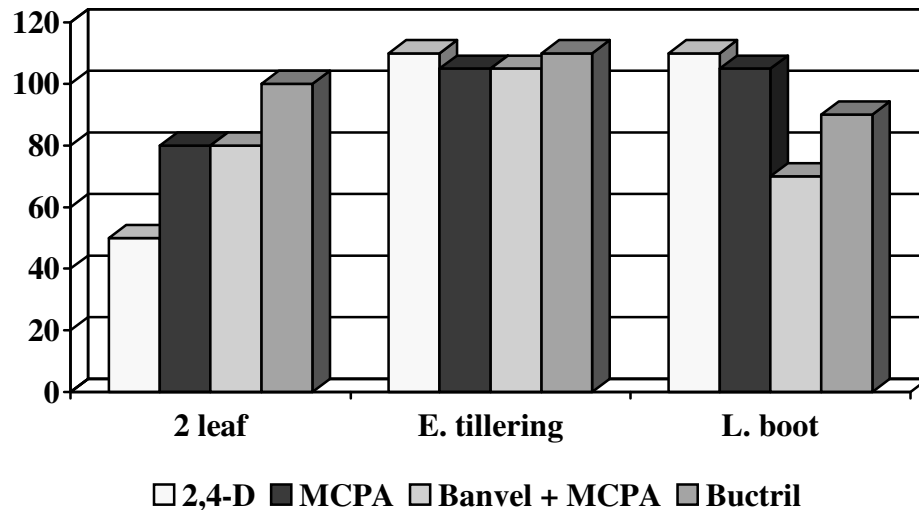
Bromoxynil (Buctril), a contact herbicide, is effective on young seedling weeds. It is less effective on older weeds and must be tank-mixed with other herbicides when larger mustards are present. Therefore, higher volume application and thorough coverage is more important with bromoxynil than with phenoxy herbicides. An advantage of bromoxynil is that it controls fiddleneck. Bromoxynil also is recommended in areas with phenoxy-sensitive crops. The use of Bromoxynil has declined since the introduction of Shark herbicide.

Weeds such as burning nettle, malva, and chickweed are increasing as more uncomposted manures are being applied to fields. In addition the lack of cotton rotations is also increasing the weed pressure. Carfentrazone (Shark) is a contact herbicide that is effective at very low use rates on fiddleneck, malva sp., burning nettle, chickweed and other weeds that are difficult to control with other herbicides. Adding surfactants to carfentrazone often causes temporary crop burn. Tank mixing with UN-32 may enhance weed control. Tank mixing with dicamba provides good control of chickweed. Combining carfentrazone with phenoxy herbicides broadens the weed spectrum controlled, lowers herbicide application rates, and can reduce the risk of weeds building up herbicide resistance.

Dicamba (Banvel, Clarity) controls many broadleaves and gives partial control of chickweed, fiddleneck, pineappleweed, mayweed, malva, and knotweed. It is safer when applied at early growth stages 4 to 5-leaf stage. Later applications such as late tillering through early jointing often cause a flattening effect. The addition of foliar fertilizer often reduces this effect. Dicamba usually is combined with Shark or MCPA to increase the weed spectrum controlled compared to either of the herbicides used alone.

Work conducted by Ron Vargas, Mick Canaveri, and Jack Orr demonstrated it is safest to apply phenoxy herbicides after the small grains are well tillered in order to avoid yield reductions caused by phytotoxicity. Best control is obtained when weeds are small and before the crop has reached the jointing stage (Fig. 1.).

**Fig. 1. Effect of Broadleaf Herbicides on Yecora Rojo Wheat
Ron Vargas, Madera Co. 1991**



In 2005 there was considerable off target herbicide damage to tree crops and vegetables in the southern San Joaquin Valley. The small grain and cotton fallow ground burndown herbicide carfentrazone (Shark) and another cotton fallow ground burndown glyphosate was implicated in several instances. The outcome of this was that several postemergent herbicides ended up with greater restrictions depending on the county. Some of these included the following: 2,4-D, 2,4-DB, 2,4-DP, bromoxynil, Carfentrazone (Shark), Dicamba, Flumioxazin (Chateau), Glyphosate, MCPA, Oxyflouren, (Goal), Paraquat, Propanil, and Pyraflufen (ET). There was also a change in application dates not allowing air applications after February 1 depending on the county for some of these herbicides and additional requirements for aircraft applications.

Grass Control-Wheat, Barley

Grass weeds are increasing due to lack of crop rotations and more use of dairy manures. Fenoxaprop (Puma) controls wild oat canarygrass and several *Setaria* spp.. It also suppresses mustards. It has a wide window of application, providing effective control when applied between the 1-leaf and 6th leaf grass stage. For best control of wild oat, delay application until most wild oat plants have emerged. A tank mixture with bromoxynil allows for a wide range of weed control at an early timing. Fenoxaprop cannot be tank-mixed with phenoxy herbicides because it may reduce grass control when

tank mixed. Most growers are applying a carfentrazone application and then coming back 7-10 days with Puma to keep up with early weed competition.

Mesosulfuron (Osprey) is especially effective on Italian ryegrass, wild oat, little seed and hood canarygrass, and annual bluegrass. It controls riggut brome and other brome species depending on weed size at application. It also controls many broadleaf weeds such as mustard, w.radish, and chickweed in wheat. Most California wheat cultivars have good tolerance to the herbicide. However, wheat often turns a lighter green color for a couple weeks following application.

It also provides partial control of many other broadleaf weeds including common groundsel, common malva, fiddleneck, yellowstar thistle and milk thistle. Mesosulfuron can be tank mixed with bromoxynil and MCPA and may be applied from the 1-leaf to 1-tiller wheat stage and up to the 2-tiller stage of grass weed development. A methylated seed oil or a non-ionic surfactant is required; ammonium sulfate or low rates of UN-32 added will enhance weed control on difficult to control weeds. Restrictions on crop rotations are greater than with Fenoxaprop.

During 2004-2006, several herbicides were evaluated for chickweed and wild oat control. In addition non label combinations of UN-32 were included. Treatments giving the highest control of chickweed were Osprey, Shark + Clarity, Shark + Clarity + UN-32, and Shark + 2,4-D (Fig. 1,2). ET combinations gave good control of chickweed. Puma and secondly Osprey gave excellent control of wild oat (Fig.5,7). Additions of 5 gal. of UN-32 or Shark to Puma or Osprey did not reduce weed control. Additions of 5 gal. of UN-32 or Shark to Puma caused only a temporary stunting which quickly grew out of it (Fig.8). Additions of 5 gal. of UN-32 or Shark to Osprey caused severe stunting but eventually grew out of it by harvest time (Fig 6.).

References:

Canaveri, M., Vargas, H. Carlson, S. Wright. 2003. Weed Control in Small Grains. UC IPM Pest Management Guidelines Publication.

Wright, S. D. 1993. Weed Control in Small Grains. California Weed Conference Proceedings. pp. 88-92.

Wright, S. D. 1992. Benefits of Weed Control in Field Crops. California Weed Conference Proceedings. Vol. 44, pp. 142-145.

Wright, S. D., and H. Kempen. 1989. Effect of Foliar Nitrogen on Broadleaf Weed Control in Irrigated Wheat. Western Society of Weed Science Proceedings. p. 189.

Wright, S. January 1987. Cost Effective Weed Management in Cereals. California Weed Conference Proceedings.

Broadleaf Control in Wheat
Tulare Co. – Visalia – 2005
Chickweed % Control

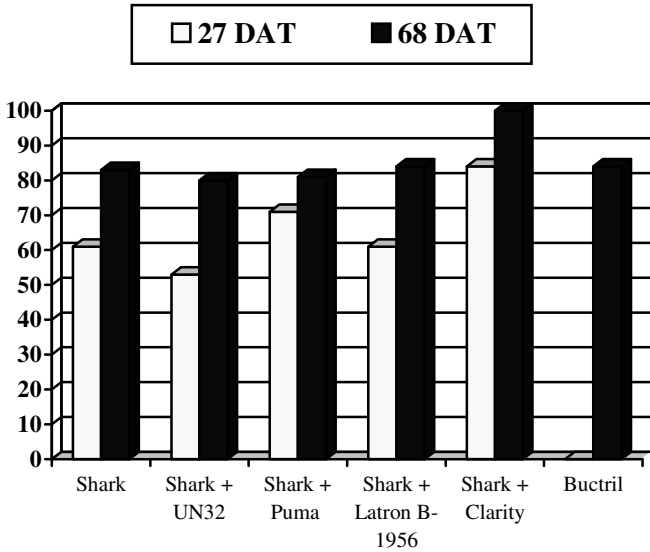


Figure 1. Percent control of chickweed in wheat

Broadleaf Control in Wheat 2005
Wheat Injury, Visalia

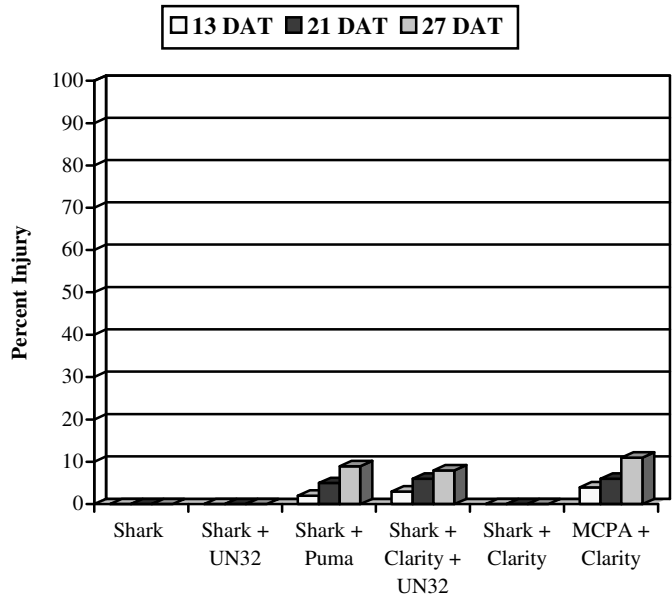
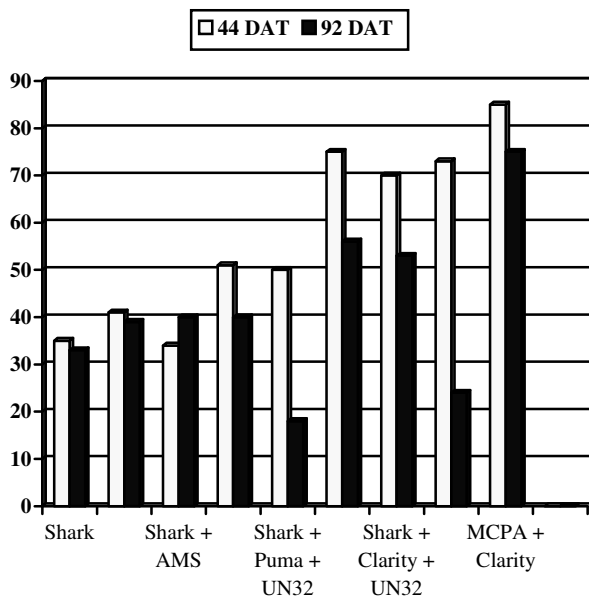


Figure 2. Percent of injury in wheat

Chickweed Control in Wheat
Tulare Co. – Visalia – 2006



Broadleaf Control in Wheat
Tulare Co. – Visalia – 2006
Chickweed % Control

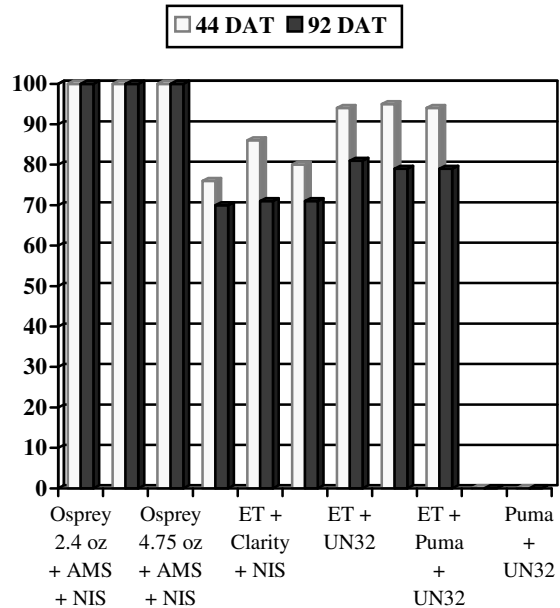


Figure 3. Control of chickweed in wheat
Wild Oat Control in Wheat 2005

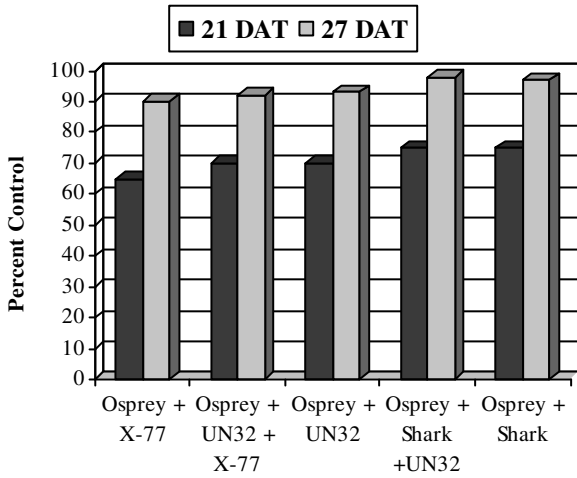


Figure 4. Broadleaf control in wheat
Wild Oat Control in Wheat 2005

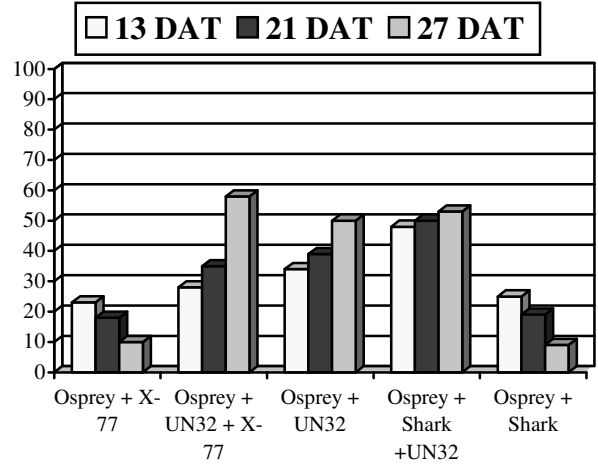


Figure 5. Percent control of wild oat in wheat

Wild Oat Control in Wheat 2005

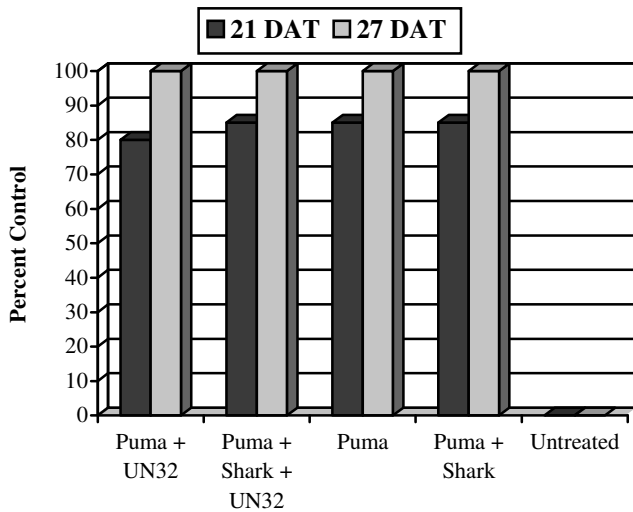


Figure 6. Injury in wheat

Wild Oat Control in Wheat 2005
Wheat Injury, Visalia

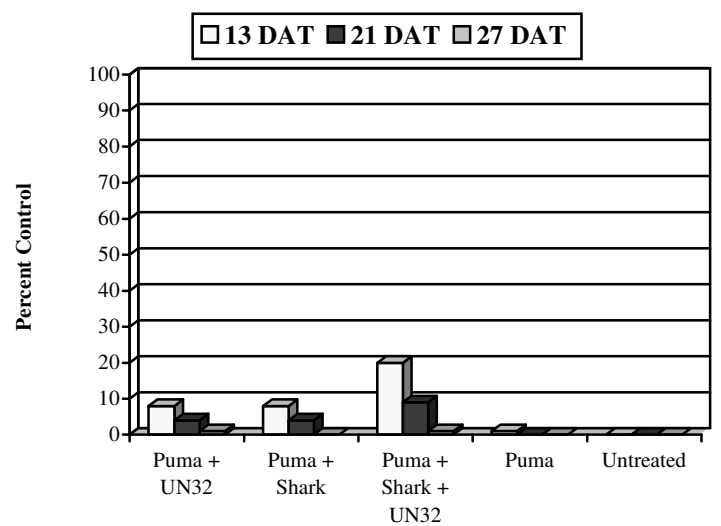


Figure 7. Percent control of wild oat in wheat

Figure 8. Percent control of injury in wheat