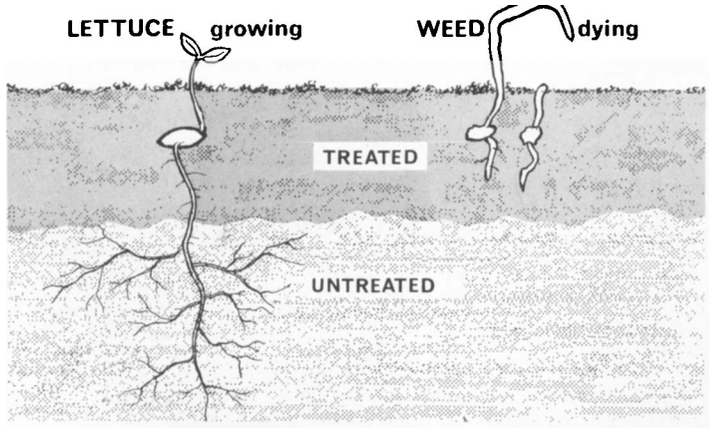
SUMMARY OF WEED SPECIES RESPONSES TO 32 HERBICIDES

HERBICIDES Common Name	AMARANTHACEAE	CHENOPODIACEAE	COMPOSITAE	CRUCIFERAE	GRAMINEAE	LABIATAE	LEGUMINOSAE	MALVACEAE	SOLANACEAE	EUPHORBIACEAE	HORDEUM VULGARE	POLYGONUM AVICULARE	PORTULACA OLERACEA	STELLARIA MEDIA	TRIBULUS TERRESTRIS	URTICA URENS	CONVOLVULUS ARVENSIS	CYNODON DACTYLON	CYPERUS SP.	SORGHUM HALEPENSE
ALACHLOR	●	○	○	○	●		○	○	●	◡	◡	○	●			●	○	○	◡	○
ATRAZINE	●	●	●	●	○		●	◡	●	◡	●	●	●	●	◡	●	○	○	○	○
BENEFIN	●	●	○	○	●		○	○	○	○	○	●	●	●	○	○	○	○	○	○
BENSULIDE	●	●	○	○	●		○	○	○	○	○		●	●	○	○	○	○	○	○
PHENMEDIPHAM	○	●	●	●	○				●	○	○	◡	●	◡	◡	●	○	○	○	○
BROMOXYNIL	○	●	●	●	○			◡	●	●	○	●	○	●		◡	○	○	○	○
CDEC	●	●		○	○	●		○	○		◡	○	●	●		◡	○	○	○	○
CHLOROPROPHAM	●	●	◡	●	●		●	◡	●	○	●	●	●	●	○	●	○	○	○	○
CHLOROXURON	●	◡	●	●	○			◡	◡		●	○	◡	●	○	●	○	○	○	○
CYCLOATE	●	◡	◡	○	●		○	○	○	◡	◡	●	●	●	○	○	○	○	◡	○
2,4-D	●	●	●	●	○	●	●	◡	●	●	○	◡	◡	○	◡	●	●	○	◡	○
DCPA	◡	●	○	○	●		○	○	◡	●	◡	◡	●	◡	◡	○	○	○	○	○
DICAMBA	●	●	●	◡	○		●	●	●	●	○	●	●	●	●	●	●	○	◡	○
DICHLOBENIL	●	●	●	◡	◡		◡		●	◡	●	●	●	●	○	●	●	◡	●	◡
DIPHENAMID	●	◡	◡	○	●			◡	○	○	●	◡	◡	●	○	●	○	○	○	○
DIURON	●	●	◡	●	●	○	●	◡	●	○	◡	●	●	●	○	●	○	○	○	○
EPTC	●	◡	◡	○	●		○	○	●	●	●	●	●	◡	○	◡	○	○	●	○
LINURON	●	●	◡	●	●	○	◡	◡	●		○	◡	●	●	○	●	○	○	○	○
NITRALIN	●	●	○	○	●		○	○	○	◡	○	●	●	●	●	○	◡	◡	○	◡
NITROFEN	●	●	○	○	◡	●		●	●		○	●	●	○		●	○	○	○	○
NPA	●	●		●	○		○	●	●	○	○	◡	○	●	○	●	○	○	○	○
MSMA	◡	◡	○	◡	◡		○	○	◡	◡	○	○	◡	◡	◡	◡	◡	○	●	●
PEBULATE	●	◡	◡	○	●		○	○	○		◡	●	●	●		○	○	○	◡	○
C 6989	●	●	●	○	●						○			○			○	○	○	○
PROMETRYNE	●	●	◡	●	◡			◡	●	◡	●	◡	●	●	○	●	○	○	○	○
PROPHAM	○	◡	○	◡	●			○	◡	○	●	◡	◡	●	○	●	○	○	○	○
PYRAZON	○	○	●	●	○	●	●	●	●		○	●	◡	●	●	●	○	○	○	○
R 7465	●	●	●	○	●		●	○	○		●	●		●	◡				●	
RH 315	◡	◡	○	●	●	●	○	○	●		●	●	●	●		●			○	
SIMAZINE	◡	●	●	●	○			◡	●	○	●	●	●	●	○	●	○	○	○	○
TERBACIL	●	●	●	●	◡	○		●	●	●	●	●	●	●	●	◡	◡	◡	●	○
TRIFLURALIN	●	●	○	○	●		○	○	○	◡	○	●	◡	●	●	○	◡	◡	○	◡

○ Usually not controlled ◡ Partial or erratic control ● Usually controlled

Amaranthaceae	= Pigweed family	Polygonum aviculare	= knotweed
Chenopodiaceae	= Lambsquarter family	Portulaca oleraceae	= purslane
Compositae	= Sunflower family	Stellaria media	= chickweed
Cruciferae	= Mustard family	Tribulus terrestris	= puncture vine
Labiatae	= Mint family	Urtica urens	= stringing nettle
Leguminosae	= Cheeseweed family	Convolvulus arvensis	= bindweed
Solanaceae	= Nightshade family	Cynodon dactylon	= bermuda grass
Euphorbiaceae	= Spurge family	Cyperus sp.	= nutsedges
Hordeum vulgare	= barley	Sorghum halepense	= johnson grass

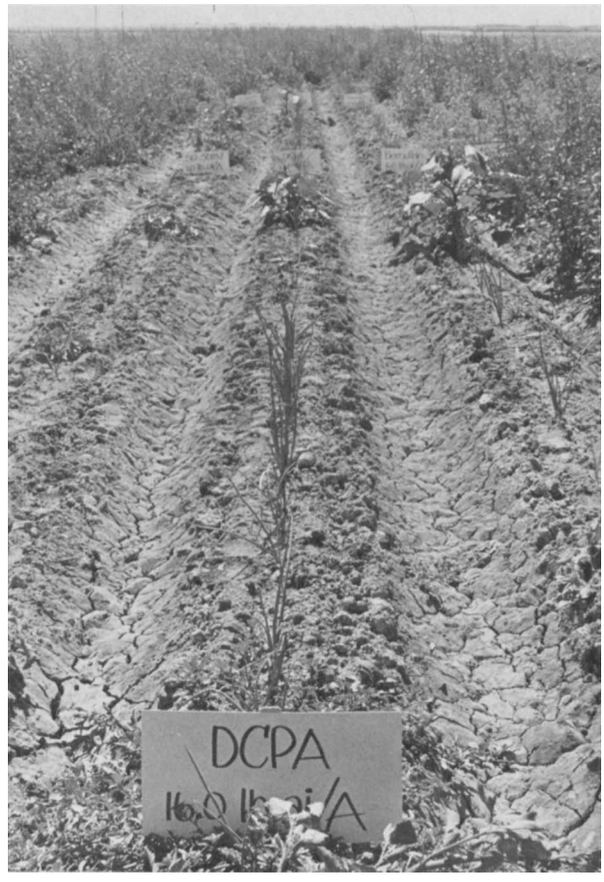


Physiologically resistant lettuce seedling (left) germinating in treated soil and growing down into untreated soil. A susceptible weed (right) being killed as it germinates in treated soil.

Family and SELECTIVITY in HERBICIDES

A. H. LANGE · H. AGAMALIAN

Annual weeds controlled by DCPA (Dacthal) a pre-emergence herbicide, without injury to onion plants even at excessive rates of application.



Species

B. FISCHER · J. BIVINS

Photo comparison of an untreated weedy carrot plot (left) with a carrot plot that had been treated with linuron (Lorox) a pre-emergence herbicide most effectively used post-emergence.

WEED COMPETITION and the variable response of weeds and crops to modern selective herbicides are basic to row-crop agriculture. The total number of weeds known to taxonomists is so great that it would be impossible for agriculturists to identify all of them, let alone know their responses to the more than 150 herbicides now available.

Within a plant family (an aggregation of similar plants) response is often fairly consistent to a given herbicide. The number of plant families important to agriculture is sufficiently small to offer some hope that their reaction to herbicides can be learned, even if it can not be fully understood. It is for this reason, that the data from weed species responses to herbicides have been summarized here (see list). This summary of data and observations has been double checked with work from other areas of the country with generally good agreement.

The species responses were recorded as follows: If the herbicides consistently controlled weed species commercially (70 to 100 per cent), it was labeled with a black circle. If the herbicide consistently failed to control the weed species, it was designated with a white circle. If continued use of the herbicide resulted in a build-up of the species, it was also indicated with a white circle. If the herbicides controlled the weed sometimes, but failed part of the time, it was ranked intermediate with a black half circle. If the herbicide partially controlled (50 to 70 per cent) the species, it was also ranked intermediate.

Weeds of the same plant family often react similarly to herbicides applied at the same rate per acre; for this reason the list groups species by family. There are exceptions: some species in a family are more susceptible to a particular herbicide than others. However, the plants in a family were usually more alike in their response to herbicides than species from other families.

Some resistant

In some plant families, some species may be resistant and others susceptible to the same herbicides. On the other hand, some groups of families respond similarly. For example, *Solanaceae*, *Cruciferae*, *Compositae*, and *Malvaceae* are resistant to trifluralin, diphenamid, bensulide, and—to some extent—DCPA. These same herbicides are excellent for the control of most annual grasses (Graminae), *Amaranthaceae* and *Chenopodiaceae*.

Varied susceptibility

Variations in the susceptibility of weed species are due in part to physiological differences; but can be attributed to some extent to the shallow soil depths in which most weed species germinate. Many selective herbicides are very insoluble and move very slowly into the first inch of soil where most weed seeds germinate. Row crops are often seeded deeper than the germinating zone of most weed seeds. Furthermore, crop seeds have been selected for their viability (usually, with more than 90 per cent germination); whereas, many weed seeds have a very low germination percentage. Many crops have genetically built-in plant vigor sufficient to outstrip most weeds. Given only a slight physiological resistance to an herbicide, a crop plant can usually find a competitive advantage over the herbicide-injured weed seedling (see diagram).

Some crops and weeds are physiologically quite resistant to specific herbicides. Realizing this, herbicide usage must be


Bensulide