

ARYL-OXY PHENOXY

Important Members (Table 6)

Table 6. Important members of the aryl-oxy phenoxy family *

Common Name	Trade Name(s)	Manufacturer	Water Solubility (ppm)	Vapor Pressure (mm Hg @ 20-30° C)
Diclofop	Hoelon Illoxan	Hoechst-Roussel	3000	3×10^{-7}
Fenoxaprop	Whip Acclaim Horizon	Hoechst-Roussel	1	0.19×10^{-7}
Fluazifop	Fusilade	ICI/Zeneca	2	5.5×10^{-5}
Haloxifop	Verdict	DowElanco	9	6.5×10^{-7}
Quizalofop	Assure	DuPont	1	3×10^{-7}

*Due to its similar post-grass activity, sethoxydim is often classified as an aryl-oxy phenoxy.

Uses

All are used primarily for postemergence grass weed control. **Diclofop** is used specifically for goosegrass control in bermudagrass. **Fenoxaprop** provides annual grass control in selective cool-season and warm-season turfgrasses.

Behavior in Plants

Absorption and translocation

Aryl-oxy phenoxy herbicides are applied primarily postemergence and rapidly absorbed by plant foliage. Varying degrees of translocation occur in the symplast and these herbicides accumulate in meristematic regions. **Diclofop** is rapidly absorbed by plant foliage but has limited translocation. This may be the reason it is ineffective for perennial grass control compared to the other members listed.

Selectivity

Selectivity in tolerant species is believed to be due to the alteration of the acid form. Hydroxylation of one of its rings and subsequently conjugation appear to be involved in detoxification. Virtually all broadleaf plants and sedges are tolerant to these herbicides. Control is greatest at its two to five leaf stage. Treated grass nodes react by blackening of grass weeds and dying. Their leaves are then easily pulled from the nodal region.

Mechanism of Action

These herbicides accumulate in meristematic tissue where they are primarily active. The mode of action is believed to be interference with lipid metabolism (specifically 'acyl' lipids), possibly fatty acid and/or phospholipid synthesis. More specifically, as a class, these may inhibit acetyl-coA carboxylase, which acts as a catalyst in the steps in fatty acid biosynthesis. This leads to cell membrane dysfunction, leakage of amino acids, and eventual cell and plant death.

Degradation

All are formulated as esters and must be hydrolyzed by plant esterases to become activated. The resultant acid is the mobile form, and presumably the toxic form, in the plant.

Behavior in soils

Adsorption

The esters of the herbicides are rapidly hydrolyzed in soils, releasing the acid.

Leaching

The ester forms of these herbicides would leach slowly, whereas the hydrolyzed forms would leach more readily. **Diclofop** and **fenoxaprop** do not leach downward nor move laterally.