

# Chemical Watch Factsheet

A Beyond Pesticides/ NCAMP Factsheet

## Clopyralid

Clopyralid (3,6-dichloro-2-pyridinecarboxylic acid) is an herbicide sold under trade names such as Confront, Curtail, Lontrel, Millennium Weed and Feed, and Transline<sup>1</sup>. Manufactured by Dow AgroSciences and registered for use in the US since 1987<sup>2</sup>, clopyralid is used to control broadleaf weeds on lawns and turf, range, pastures and rights-of ways. Over 890,000 lbs of clopyralid is used per year in the US<sup>3</sup> on agricultural crops, and it is commonly used to kill dandelions, clover and thistle.

### Mode of Action

Clopyralid works like a plant growth regulator by mimicking natural plant hormones called auxins. Auxins, which are found in all members of the plant kingdom, are responsible for regulating the amount, type and direction of plant growth, and are mostly found at the tips of plant roots and shoots. Clopyralid enters treated vegetation through the leaves and roots, and replaces natural auxins at binding sites, causing abnormal growth patterns and disrupting the growth processes of the plant. The chemical accumulates in the growing points of the plant, leading to rapid growth, and eventu-

ally plant death. Death usually comes within a few days or weeks.

Commercial products containing clopyralid contain either the acid form, or one of its three salts; triethylamine, triisopropylamine, or monoethanolamine salts.<sup>4</sup> It is also compatible, and often formulated, with other synthetic growth regulators such as 2,4-D, triclopyr and MCPA<sup>4</sup> for a broader spectrum of post-emergent control. Clopyralid is similar to the herbicide picloram, which also acts as a growth regulator but has now given prevalence to resistance among grasses.<sup>5</sup>

### Toxicity

There are few available studies

#### *chemicalWATCH* Stats:

**Chemical Class:** Pyridine carboxylic acid

**Use:** Herbicide

**Toxicity Rating:** Slightly Toxic

**Signal Words:** Caution, Warning

**Health Effects:** Causes severe eye irritation and may cause some skin sensitization.

**Environmental Effects:** Toxic to some beneficial insects. It is very persistent and moves quickly through soil.

that have evaluated the toxicity of clopyralid. The US EPA has placed clopyralid in the acute toxicity III category.<sup>6,7</sup> Laboratory studies have shown that clopyralid is a severe eye irritant.<sup>4,7,8</sup> Dermal irritation has also been noted, which can lead to skin sensitization for prolonged skin exposures.<sup>4</sup> Rats have been able to

eliminate clopyralid relatively unmetabolized via urine and fecal matter to a lesser extent<sup>8</sup>.

Some developmental and reproductive effects have been observed in laboratory animals. Changes to liver and kidney weights as well as, hyperplasia of the stomach lining were found in rats fed moderate to high doses in a 2-year study.<sup>4,6</sup> A one-year study with dogs showed increased liver weights and decreased red blood cell count at all but the lowest dose tested.<sup>4</sup> Another study found that weights of rabbit fetuses decreased at both low and high doses of clopyralid. Skeletal abnormalities were also observed in these fetuses at all doses and at the highest dose, accumulation of excess fluid around the brain was evident, which resulted in small brain and enlarged skulls.<sup>4</sup>

Even though there is a lack of published studies on the long-term effects of clopyralid, the EPA has classified clopyralid as 'not likely to be carcinogenic to humans.'<sup>9</sup>

### Environmental Fate

Clopyralid is non-toxic to fish but is slightly toxic to birds<sup>6</sup> and is toxic to some beneficial insects like the ladybug and lace-

wings.<sup>4</sup> The EPA has identified several endangered species of plants and other non-target species that are vulnerable to clopyralid, including five species of rare cactus.<sup>4</sup>

Clopyralid is persistent in soil, with recorded half-life of 2-14 months,<sup>10</sup> and is degraded primarily by microbial activity. However, it does not readily bind to soil and is highly soluble in water. As a result, it is very mobile in soil and has the potential to move towards groundwater and contaminate surface water. Clopyralid has even been found in soil water samples taken at depths of 6 feet, up to 30 days after initial surface treatment.<sup>4,8</sup> Since microbial activity decreases with depth, clopyralid has the potential to persist longer at lower soil depths. Persistence of clopyralid in vegetation was evidenced by the contamination of composts from harvested lawn and grass

clipping sprayed with clopyralid. Clopyralid has been detected in vegetation 365 days after initial treatments.<sup>11</sup>

### **Clopyralid Contamination of Compost**

In 2000, greenhouse and garden crops were severely injured after application of compost and manure in Spokane, Washington. Upon investigation it was found that high concentrations of clopyralid were present in composts made from lawn clippings, straw, and leaves collected by curbside programs.<sup>11</sup> The Spokane area had a large residential population that utilized lawn care services, most of whom applied clopyralid as part of their weed control scheme. Clopyralid, which does not breakdown during the composting process, stunts the growth of crops such as potatoes, tomatoes, peas, beans, lettuce, pepper, alfalfa and sunflowers at very low levels- even as low as 1ppb.<sup>12,13</sup> Organic farmers were also severely affected since they rely of manure and composts to supply

soil fertility. In 2002, the state of Washington banned the use of clopyralid on lawns and turf in order to keep the chemical from contaminating compost supplies<sup>1</sup>. That same year, California found that 65% of the composts samples tested positive for clopyralid, which led to the cancellation of residential uses for clopyralid in the state<sup>12</sup>. Other states including Ohio, New Jersey and Pennsylvania have all reported compost contamination problems. The EPA has since taken action to officially place restrictions on the residential use of clopyralid upon the request of the registrant. These include label amendments stating that grass clippings are not to be used as compost material. Use of clopyralid on golf courses was not affected in keeping with the practice that grass clipping are cycled onsite.

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## **Clopyralid *chemicalWATCH* Factsheet Bibliography**

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