

CYANOACRYLATE HERBICIDES

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Abstract. 3-N-methylanilino-2-cyanoacrylic acid esters (Figure 1) represent a new group of experimental herbicides in which optimum activity appears to be associated with α branched alkyl chain derivatives e.g. R = isopropyl or sec-butyl.

These compounds are toxic to a variety of plant species growing under glasshouse conditions when applied either pre-emergence at 1 to 4 kg ha⁻¹, or post-emergence at 0.25 to 2 kg ha⁻¹. Sensitive species include mustard (*Sinapis alba*), linseed (*Linus usitatissimum*), buckwheat (*Fagopyrum esculentum*) and barnyard grass (*Echinochloa crus-galli*).

When applied pre-emergence the cyanoacrylates have no effect on seed germination or seedling emergence, but if the amount applied is sufficient the newly-emerged leaves become chlorotic, desiccation of the leaf and shoot tissue occurs and the plant dies within a short time. Similar effects are observed within a few days of a post-emergent application. Such phytotoxic symptoms are characteristic of phenylurea, triazine and uracil herbicides. These compounds have been shown to interfere with photosynthetic electron flow and are believed to act by damaging the mechanism that normally protects the photosynthetic system from excessive illumination (Wright and Corbett 1979). Cyanoacrylate herbicides have also been found to be potent inhibitors of photosynthetic electron flow (the Hill reaction) in isolated chloroplast systems and, moreover, there is a broad correlation between their Hill reaction inhibitory activity and their herbicidal effectiveness.

Cyanoacrylates differ from many other photosynthetic inhibitor herbicides in being highly toxic to aquatic plant species including common duckweed (*Lemna minor*), elodea (*Elodea canadensis*), common water milfoil (*Myriophyllum propinquum*) and red azolla (*Azolla filiculoides*).

Wright, K. and J.R. Corbett. 1979. Z. Naturforsch. 34C: 966.

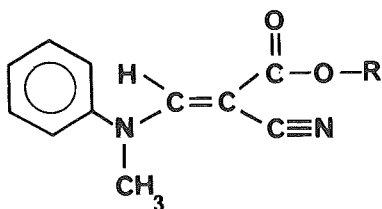


Figure 1. General structure of 3-N-methylanilino-2-cyanoacrylic acid esters.