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PROMISING WEEDICIDES FOR USE IN FOOD CROPS

by

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At the first Annual General Meeting of the Caribbean Food Crops Society held in 1963, Mr. L. Kasasian presented a paper entitled Chemical Weed Control in Tropical Food Crops. In that paper reports were made on the performance of forty one weedkillers. Of this number about a dozen have proven to be especially useful.

The present paper seeks to define some of the characteristics and conditions of use of these currently recommended weedkillers. This is because results obtained may vary according to three main factors. Factor (a) the soil type may be first mentioned since any variable behaviour induced by this factor may be dealt with in usage recommendations (a scale of dosages is given to suit different contents of clay and organic matter). Factor (b) the climate (especially rainfall), and (c) the stage of plant growth (both of crop and weeds) have been analysed for their relevance to local practice in experiments conducted by the Herbicide Research Unit in Trinidad.

Table 1 charts the weedkillers against certain food crops in which they may be used.

Some information on each chemical is given below, together with a guide to usage.

Amiben

Chemical name - 3-amino-2, 5, dichlorobenzoic acid

Available as liquid and granules.

Properties - Amiben is active mainly on germinating weed seeds, and must therefore be used pre-weed emergence. It is effective on annual broadleaf and grass weeds to a lesser extent. Persistence in the soil is short, usually 3 - 6 weeks. The chemical is tolerated by a wide range of horticultural crops.

Uses - The granular formulation is somewhat more persistent than the spray and is particularly useful for post-transplanting use e.g. in tomatoes whereas the spray is used before crop emergence. Application rates are about 1 - 2 lb/ac. of the active ingredient.

Toxicity - Mammalian toxicity is low.

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Atrazine (Gesaprim, Primatol)

Chemical name - 2-chloro-4-ethylamino-6-isopropylamino-1, 3, 5-triazine.

Prometryne

Chemical name - 2-methylmercapto-4, 6-bis (isopropylamino) 1, 3, 5-triazine Both compounds are available as wettable powders; atrazine available also as granules.

Properties - Atrazine and prometryne are persistent herbicides which are active mainly as pre-emergence sprays on many annual grasses and broadleaf weeds; at higher rates they may be also effective on perennials. These compounds tend to be less active, less persistent but more selective than diuron. Atrazine and prometryne lack post-emergence activity and where it is desired to kill emerged weeds they should be mixed with paraquat. Both compounds act mainly through the roots and therefore they are in general most active, least selective and least persistent in soils in which leaching occurs readily and where rainfall is high. In the absence of precipitation to carry the compounds into the soil, intense sun-light for 1 or 2 weeks after application causes considerable breakdown resulting in their losing much of their activity. They are very much more effective if application periodical agitation of the spray liquid is necessary. Symptoms usually show as interveinal chlorosis, chlorotic blotches and necrosis.

Uses - Atrazine is less selective and more persistent than prometryne. Rates of application are 1 - 3 lb/ac of the active ingredient of both compounds dependent upon the tolerance of the crop, environmental conditions and the period of control required. At selective rates they will give up to 8 weeks control.

Toxicity - Both compounds are non-corrosive and of low mammalian toxicity.

Diphenamid (Dymid)

Chemical name - NN-dimethyl-2, 2-diphenylacetamide.

Properties & Uses - Diphenamid has short soil persistence usually 4 - 8 weeks. The compound is effective on weed seeds of grasses and of broadleaf plants to a lesser extent. Normal rates of application are about 4 - 8 lb/ac of the active ingredient.

Toxicity - It is of low mammalian toxicity.

TCA

Chemical name - Trichloroacetic acid.

Dalapon

Chemical name - 2, 2-dichloropropionic acid.

Both compounds are available as water soluble formulation. TCA also available as pellets.

Properties - Both compounds are active primarily against grasses. Dalapon is absorbed both by leaves and roots, while TCA is thought to be absorbed mainly by the roots. When absorbed through the leaves dalapon is much more active than TCA; when absorbed through the roots there is much less difference in activity. Dalapon is a translocated herbicide and gives best results on actively growing plants, application to regrowth 1 - 2 ft. tall can be expected to give the best results. Where pre-sowing applications are made soil persistence is unlikely to be much of a problem; in the wet season it should be safe to plant a treated area about 2 - 4 weeks after treatment.

Symptoms - include browning and chlorotic blotching of foliage and distortion and cessation of growth. Both, particularly TCA, are slightly corrosive to metals.

Uses - Selective rates of application are 2 - 5 lb/ac Dalapon and 5 - 10 lb/ac TCA dependent upon soil type, rainfall, the risk being greatest under conditions of high leaching.

Toxicity - Mammalian toxicity of both herbicides is low. Dalapon may cause slight skin irritation while TCA is highly corrosive to the skin. Occasional individuals suffer respiratory irritation from dalapon.

Paraquat (Gramoxone)

Chemical name - 1, 1'-dimethyl-4, 4'-bipyridylium-2A.

Properties - The compound is highly effective for top-killing herbaceous perennials and annuals; weeds with poorly developed root systems may fail to recover. It has no residual effect and is inactivated when it comes in contact with the soil. Entry into the plant is very rapid indeed and thus rain soon after application five minutes or so should have little or no effect. Paraquat may successfully be applied in 5 - 30 gallons per acre depending upon the density of the vegetation.

Uses - Selectivity seems to depend solely on soft growth escaping the spray. The compound is useful as a pre-crop emergency spray if the weeds emerge before the crop. Paraquat may be added to

atrazine and prometryne to kill emerged weeds. Rate of application is about 1/2 lb/ac active ingredient, equivalent to two pints per acre of Gramoxone. Agral 90, a wetting agent, should be added at a rate equal to 0.1% of the total spray volume.

Toxicity - The compound is considered to be of low mammalian toxicity.

2,4-D

Chemical name - 2,4-dichlorophenoxyacetic acid.

Available as liquid, granules and pellets.

Properties & Uses - 2,4-D is used primarily as a translocated foliage spray, and is active against broadleaf weeds. Care should be taken to avoid spray drift and use of the non volatile amine salt is recommended. Selective rates are 1 - 2 lb/ac of the active ingredient. The early injury symptoms are distortion of leaves and stems. 2,4-D contaminates spray equipment which should therefore carefully be washed with detergent.

Stam F-34 (Propanil)

Chemical name - N-(3, 4-dichlorophenyl) propanamide.

Available as emulsifiable concentrate.

Properties - Stam is a post-emergence herbicide mainly active on seedling weeds.

Uses - The compound is used selectively as an overall application in rice fields when the rice is in the 3 - 4 leaf stage. Normal rates of application are about 3 lb/ac of the active ingredient.

Toxicity - Mammalian toxicity is low.

Kerosene

Properties - This oil will give a top kill of annual and perennial broadleaf weeds and grasses. It may eradicate seedling weeds.

Uses - Carrots will tolerate overall kerosene sprays. Rate of application is 20 gallons per acre and above. Kerosene has been found to be a more effective weedkiller when applied soon after sunrise (when the dew is still on the leaves and light intensity is low).

Toxicity - not a problem in normal usage.