RESPONSE OF CITRUS TREES AND ASSOCIATED WEEDS TO WEED CONTROL TREATMENTS

By

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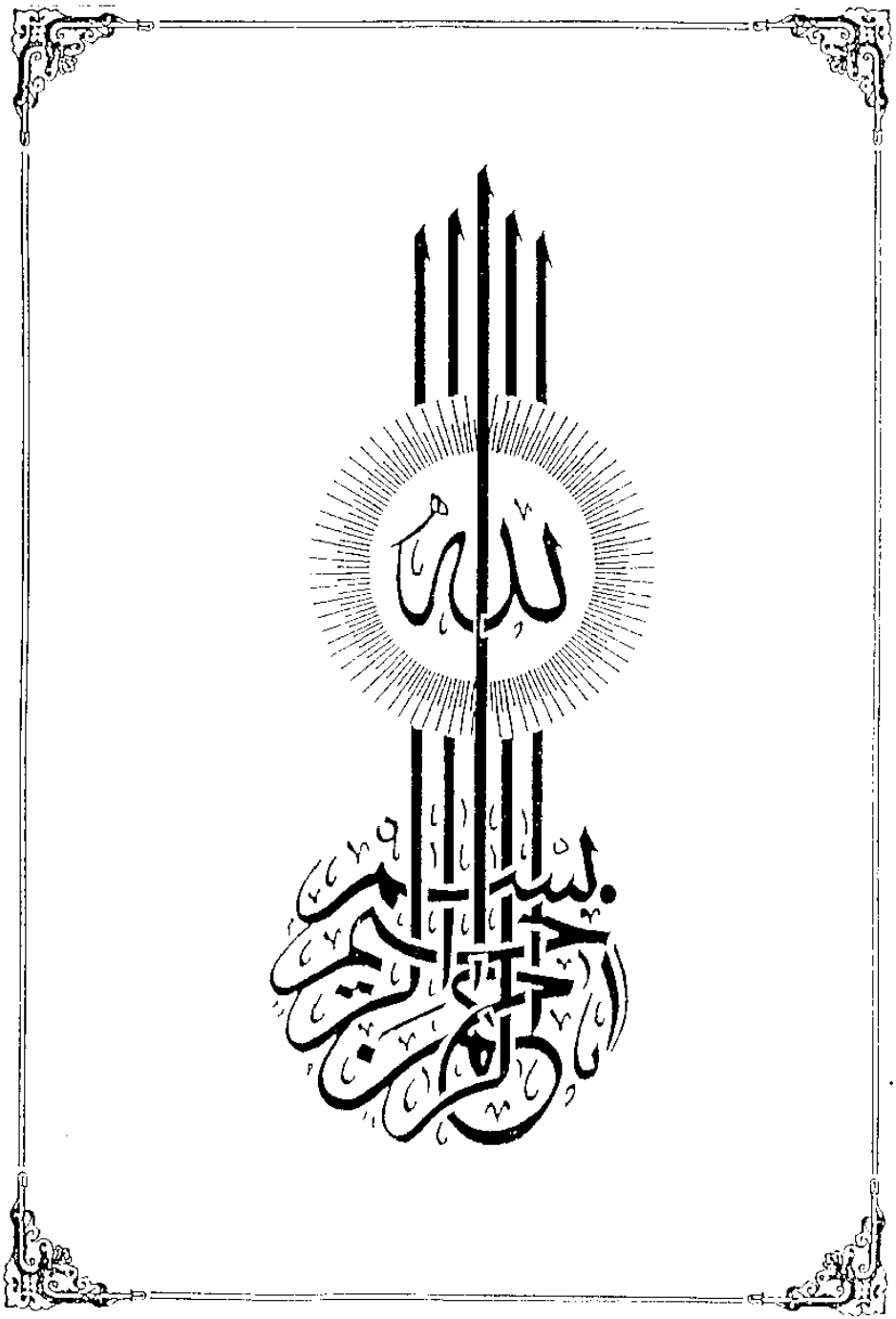

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CONTENTS

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INTRODUCTION

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Weed erradication is necessary in all Orchards including citrus. The objective of citrus weed control program is to prevent or to reduce weed competition, thereby improving or facilitating cultural practices such as irrigation, harvesting and pest-control thus consequently improving yields and fruit.

Several non-chemical methods of weed control have been used with various degrees of success in citrus. These methods include different practices such as hand and mechanical tillage, mowing, competitive intercropping, smothering mulching and to a limited degree the use of biological agents that provides some measure of weed control, (Jordan and Day (1973).

Washington Navel Orange tree is practically sensetive to environmental stresses, particularly water-stress, microclimate stability to a degree that they may suffer in many years from excessive drop, that normally occur during May - June period due to high temperature.

The use of mechanization for weed control in citrus orchard (which normally is generally characterized by shallow root distribution) has proved to cause damage for the active root system of the tree specially when rotivation is carried out in summer time where the roots are in their active stage.

It also may cause a reduction in the ground cover and increase in the temperature. Normally the orchard cultivation is done at Winter-time parallel to manure addition in a period of relative low activity of the roots, (Burger and Vincent, 1970).

Chemical weed control, in spite of it's possible effect on micro climate polution is the only solution for eradication of orchard weed specially when using an intigrated program to cope with the weeds rapid spread before and after emergence.

This work was originally conducted to establish an intigrated program of chemical weed control in Orange orchards after the main Winter-cultivation or without it under a given conditions.

Hoping to find a concrete solution for this problem puting in mind their effect on yield, fruit quality, growth and nutritional status of Washington Navel Orange trees.

REVIEW OF LITERATURE

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The review of literature could be divided under the following heading and subheadings :

A) Orchard weeds as affected by some herbicidal treatments:

Several herbicides have been evaluated for their effect on different weed species and residual effect in the soil.

1. Gesapax : (2-ethylamino-4-isopropylamino-6-methylthio-5-triazine).

Gomez de Barreda (1974), studied the behaviour of two new herbicides namely; Simazine and diuron in the citrus orchards during 3 year at rates of 3, 6 and 9 kg/ha. He found that high rate controlled Cyperus rotundus, but Convolvulus arvensis, Rumex sp. and Aster sp. were tolerant.

Bosco et al. (1974), from testing seven herbicides in citrus orchard during Autumn, found that atrazine 25 % + ametryne 25 % at 15 kg/ha. on clay and 25 kg/ha. on medium - textured soils provided excellent and long-lasting weed control.

Gesapax is an atrazine herbicide, it controls most annual monocotyledoniys and di-cotyledonous weeds as well as some perennial species accompanied with tropical crops such as pineapple, tea, coffee, bananas and citrus. It can be used

either before or after the emergence of the weeds (Ciba-Geigy Agriochemicals Division, 1974).

Perez (1977), noticed that; atrazine (80% W.P.) in citrus seedbeds and nurseries efficiently controlled monocotyledonous weeds except Cyperus rotundus.

Maurya and Shankar (1982), found that; in a mini-plot experiment, performances of different herbicides for guava, karma khatta and kagzi lime, grasses were reduced in number when atrazine was applied as a preemergence treatment.

2. Krovar I; Krovar II :

Molecular formula: $C_9H_{13}BrN_2O_2$

IE.1. Dupont de Nemours & Co. (INC.).

In trials carried-out on 5-year old mandarin orchard, Nanaya et al. (1974), observed that; bromacil and diuron applied separately at 4-5 kg/ha or as mixture at 2 kg/ha each pre-em. controlled both grass and broad-leaved weeds for 4 months. Bromacil at 6.75 kg/ha gave effective control for 8 months. Diuron at 4 kg/ha post-em. was ineffective as was in a mixture with bromacil.

Oren (1976), in a 5-year old grape fruit and tample mandarin grove where several treatments were given through the fertilizer tank and the sprinkler irrigation system, found that bromacil at 0.48, 1.60 + diuron 1-2 kg/ha provided excellent control of annual weeds for 8 months (from April to November).

In a study on controlling annual weeds in citrus groves Oren et al. (1976), revealed that; when herbicides were applied by direct injection into the irrigation system, and through a fertilizer tank, or by both methods, bromacil at 0.8 kg/ha + diuron 2-8 kg/ha controlled annual weeds for 8.5 months.

Valsangiacomo and Marco (1976), found that ; bromacil at 4.8 kg/ha gave 100% control of annual and perennial weeds for 6 months, whereas bromacil 40% + diuron 40% at 8 kg/ha gave 100% control of annual but only 80% control of perennial weeds and only for 5 months.

In a trial in citrus orchard, Takahashi et al. (1977) showed that bromacil was effective at 20-200 mg/100 m^2 against Digtaria sanguinals and Commelina communis and other summer weeds but failed to control Amaranthus blitum and Setaria virds and was only partially effective against Italian ray grass (Lolium multiflorum and Veronica persica. Weed control increased with increasing the rate of bromacil applied. Bromacil remained effective longer in a season of low precipitation.

Tucker (1977) found that; on light and medium soils, six stands of citrus were treated with bromacil at 5 kg product/ha pre-em. and diquat 1 L. + paraquat 2 L. product/ha gave best control of Brachiaria subquadriparia,Digitaria sanguinalis, Cynodon dactylon and Cyperus rotundus.

Brown and Newson (1978) obtained that in a non-tilled nursery of Washington Navel Orange trees on Poncirus trifoliata rootstock, Krovare II at 3 Ib/acre sprayed in May or June gave complete control of all seedling weeds and most grasses including nutgrass(Cyperus sp.) for 5-6 months and did not control Johnson grass or bermuda grass.

Cassin (1978) cleared that diuron + bromacil applied at 1.6 + 0.8 kg/ha failed to control Cynodon dactylon, Cirsium arvense and Convolvulus arevensis. However, bromacil at 6.4 kg + a mineral oil at 10 L./ha all applied to active growing Cynodon dactylon gave good control.

Gursoy (1978) showed that Krovare II applied post-em., gave an adequate control of grasses, with the exception of Sorghum halepense.

Hirose et al. (1978), in their studies on weed control in citrus groves, observed that; soil-active types such as promacil and diuron and pre-em. types were not suitable because they encouraged erosion.

In a trial to compare the effectiveness of bromacil and diuron (herbicides) in Citrus sinensis var. Navel, Perez(1978), showed that; bromacil at 4 kg/ha controlled Cyndon dactylon, Cyperus rotundus and other weeds but diuron at 4.8 kg/ha was effective against annual weeds.

Santaballa and Borres (1978), studied the effect of bromacil + diuron at 6 kg product 1 ha on 12 years-old Navel orange. They found that this treatment did not controlled Veronica spp., Cyperus spp., as so as Convolvulus spp. over the 5-year period, no shift in the weed flora towards resistant species was observed.

Working in a mandarine grove, Ulug (1978) showed that Krovare II at 4.5 and 9 kg/ha, controlled annual weeds and gave acceptable control of perennials such as Sorghum halepense, Cynodon dectylon, Cyprus rotundus and Convolvulus arvensis.

Ito and Ueki (1979), observed that bromacil at 2 kg/ha and dichlobenil 5.36 kg/ha rotation, was the most effective in total weed control and they were slightly effective on dominant perennial weeds.

Puente and Guzman (1980), showed that, Krovare I (bromacil 40% + diuron 40%) and Krovare II (bromacil 53% + diuron 27%) both at 4 kg/ha when applied pre-em. of weeds in forst-march grape fruit on 4-yr-old sour-orange rootstock, both gave excellent control of Cynodon dactylun and Cyperus rotundus but failed to control Sorghum halepense.