

**CYTOLOGICAL AND PHYSIOLOGICAL
STUDIES ON TOPOGARD HERBICIDE**

THESIS
Submitted for the Degree
Of
Doctor of Philosophy
In
Plant Physiology



By

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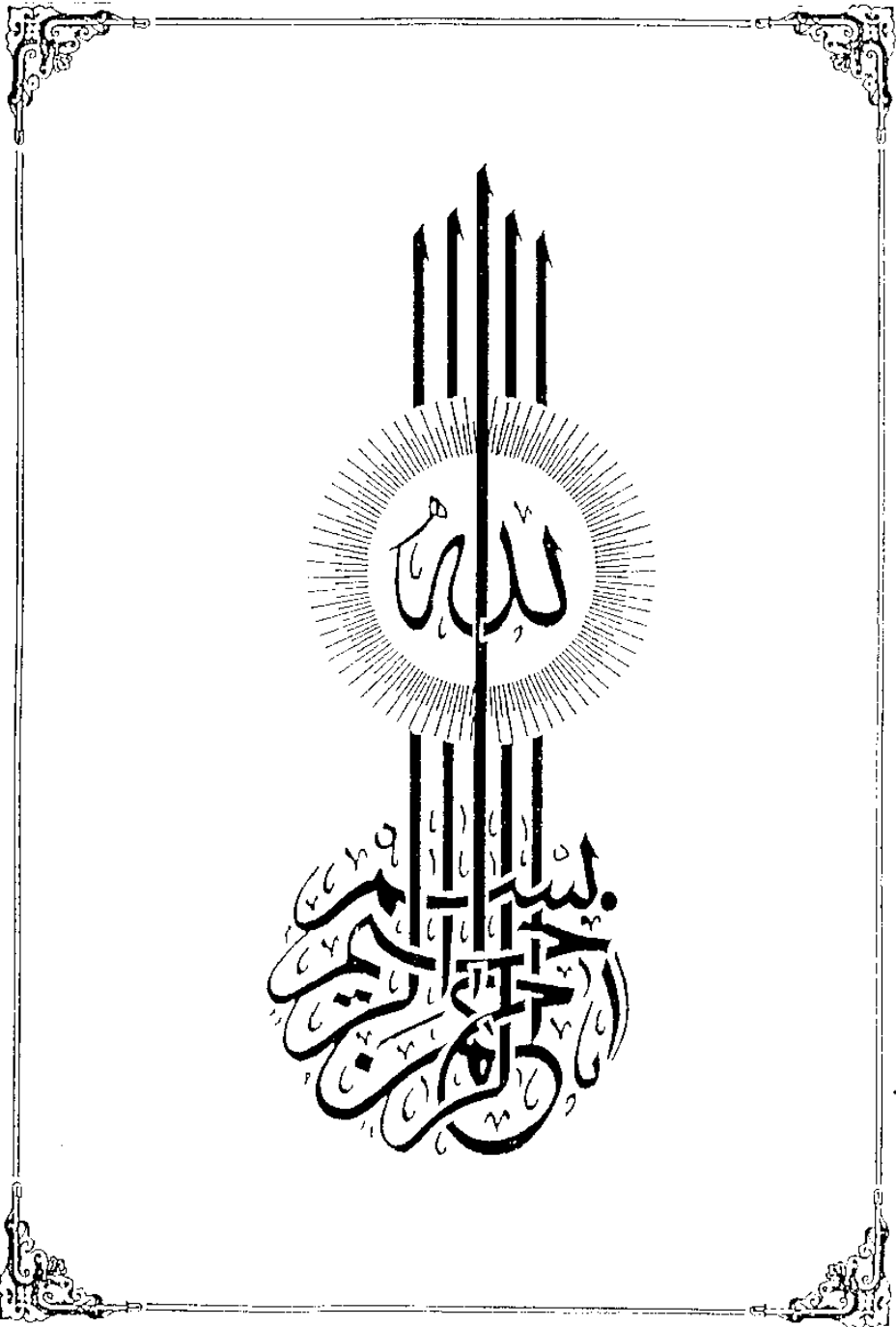
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DECLARATION

I hereby declare that this thesis has not been submitted for a degree at this or any other university.

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*Sincere thanks, to my sweet heart my
husband and sons, for their strong back-up
and patience.*

*I am also eternally gratefull to my dear
parents, sisters and brothers for their spiritual
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INTRODUCTION

INTRODUCTION

Weeds have been a part of the agricultural scene since man first started cultivating crops, more than 10000 years ago and they are still a major problem today. Weeds are harmful to crops as they compete for water, compete for light, for nutrients, for space above and below ground. In addition some weeds as Cuscuta may be parasitic on crop. They also sharply reduce the productivity per acre. Thus, weeds reduce rice yield by 64-68% in Latin America, maize yield was reduced by 54% by allowing weeds to grow (Fletcher & Kirkwood, 1982). Weeds also increase the difficulty of harvesting and entail seed cleaning. Even in area not under crops they may be harmful, for example in railway tracks, canal and open grazing country.

Conclusively, anything that we can do to reduce this heavy toll must be done to face the problem of feeding not only our present population but that which is rapidly increasing.

The mechanical revolution completely altered agricultural methods and now the chemical revolution

is carrying on to new heights of efficiency. A major component of the chemical revolution is the use of herbicides to control undesirable plants.

Chemical weed control is a miracle of our technological age. Long known as one of the most arduous of agricultural operations, weed killing has taken on an entirely new aspect as chemical after chemical is added to our arsenal of herbicides.

This century has showed an increase in both the production and use of herbicides and as a result yields of cereals, soybeans, cotton, sugar beets and many other crops have increased in some cases of 100% or more.

Thus, while the use of fertilizers and new high-yielding crop varieties have contributed greatly to the "green-revolution", chemical weed control has been at the forefront in technological achievement, Ashton and Crafts, 1981.

Although the future of chemical weed control seems bright and continued testing and adoption of new compounds is proceeding at an accelerating rate, a new element has been thrust into the field.

With the discovery that certain types of microorganisms persist for years in organisms, and in fact, in the total environment, all microorganisms are now being viewed with suspicion by people interested in protecting our world from possible pollution, health and crime [1].

The solution to this problem may come from increasing the resources dealing with non conventional food control methods as the physical and biological ones.

However, the important in the number of official countries which are expected to be efficient in food control, seems to be the use of the physical methods in the market as well as their application. Thus, physical control is necessary to the techniques applied to the detection in food control. In this connection, the physical properties of microorganisms are determined by their size, shape and resistance to heat [2].

According to the most important characteristics of the microorganisms in food preservation and detection as a physical method, the most important method to the food control, seems to be the use of physical properties of the microorganisms as well as their resistance to heat. However, the physical properties of microorganisms are determined by their size, shape and resistance to heat [2].

are not injured crops). However a given herbicide is selective to a particular crop only within certain limits of rate, environmental conditions and method of application. The desired selectivity is the result of favorable interaction of three components - the plant, the herbicide, and the environment (Sutton & Crafts 1967).

Also absorption and translocation of herbicides are of major interest, since a compound must enter the plant and move to its site of action to be effective as a herbicide. Such processes depend primarily on the molecular configuration, which in turn determines its chemical and physical properties (Sutton & Crafts 1967).

The absorption and translocation of the aliphatic herbicides following foliar application has been fairly intensively compared with studies of root application. In this respect, Jones et al., 1961 reported that almost no absorption of aliphatic herbicides occurred through intact leaves of maize, cotton or cucumber. Doss Bailey and Hann (1961) stated that no appreciable translocation of aliphatic occurred following the foliar use. In addition, Roy (1964); Dexter et al., 1966; Jones & Roy (1972); Hilton et al., 1974; Miller & Smith

(1975); Kern et al. (1975) studied the foliar application of different triazines and found that there was no appreciable movement of triazines downward or even out of the treated leaf. Acropetal movement, on the other hand, of all triazines tested occurred readily. Thus, distribution pattern of the triazines was suggested to be in the transpiration stream; apoplastic movement (Burt, 1974). In this connection, Shone and Wood (1976) said that, in general, root uptake is more important than shoot uptake on the herbicidal action of the triazines. In addition, Eshel et al. (1975) stated that terbutryn is absorbed well by root but not by emerging shoot of broad bean and other species.

Keeping the above reports in mind together with the recommendation provided by the producing company, Topogard a herbicidal triazine used in the present work was applied as a pre-emergence one. In this connection one may refer to the work of Lawson (1978) who insure that Topogard was one of the best herbicides that control weeds when used as pre-emergence. Terbutryn (one of Topogard constituents) was stated by Kukula et al. (1985) to be highly effective in broad-leaved weeds control when used as