ABSTRACT

Six soybean (*Glycin max,* L.) varities namely, Giza 111, Giza 83, Giza 35, Giza 22, Giza 82 and Crowford were used in this investigation to study the relationship between seed quality measurements and field emergence. Laboratory tests and seed index (Hundred seed weight) were conducted for two successive seasons after harvesting and processing the seed crop during 2008 and 2009 years. Standard germination, Tetrazolium and Cold tests were carried out at Seed Laboratory of Faculty of Agriculture, Zagazig University, while Electrical conductivity test was carried out at Laboratory of Seed Technology Research Department at Giza ARC.

Field emergence experiments were conducted during both testing seasons (2008 and 2009) at Kafr El- Hamam Research Station on May, 25th , 2008 and June, 1^{st,} 2009, for the first and second seasons, respectively. The results indicated that seed weight of soybean had no definite effect on field emergence. Then, it could not be accepted as an indicator to seed viability or a basic trait to predict the field emergence of soybean seeds. The results revealed that Giza 111 and Giza 83 cultivars gave the high values in most results of viability and vigour tests while Crowford and Giza 82 gave the lowest values in that regard. This confirmed the potential differences in viability and vigour between cultivars and seed lots. Then, soybean seed lots should be tested well before planting. The results revealed highly significant correlation between field emergence and vigour tests (Good seedling %,

Tetrazolium energy 1-3, Cold germination % and Tetrazolium potential) while it was negatively correlated with Electrical conductivity. These results impressed the importance of those tests to predict the field emergence for soybean seeds and limitation the seed rates based on the results of those seed vigour tests and of course the required density.

CONTENTS

I. INTRODUCTION……. 1

II. REVIEW OF LITERATURE……. 2

III. MATERIALS AND METHODS……..……. 30

IV. RESULTS AND DISCUSSION ……..… 37

A- Hundred seed weight "g"...…..……. 37

B- Standard germination test ……...…… 39

B-1- Germination percentage.…… 39

B-2- First count %…… 40

B-3- Good Seedling %…….……..…… 41

B- 4- Good + Fair seedling percentages ……...…… 43

B-5- Germination index ……..……...… 43

B- 6- Dormant seed %……....…...… 45

B-7- Root legnth “cm”…….……...…...… 46

B-8- Stem length cm …….……...……...….. 46

B-9- Seedling length “cm”……..……... 48

B-10- Seedling length rate "cm/day"…… 48

B-11- Seedling fresh weight "g" …… 50

B-12- Seedling dry weight "mg"…… 52

B-13- Seedling growth rate "mg/day"…… 52

B-14- Abnormal seedling percentage…… 53

C- Tetrazolium Test (TZ)…… 55

D- Cold test ……..……. 59

E- Electrical conductivity (EC) test. "µs/g" ……
F- Field emergence…….. 62
F.1- Field emergence at 7th, 10th and 15th day…… 64
F.2- Field emergence at 20th and 25th day…… 69
F.3- Seedling growth of field emergence after 15th and 25th day from sowing …….. 71
F4- Field emergence index (FEI) 86
G. comparison and correlation studies…… 89
G.1. comparison between seed viability tests and field emergence……. 89
G.2 – comparison between seed vigour tests and field emergence…….. 94
G-3- Correlation among seed quality measurements…… 98
V- SUMMARY…….. 105
VI- REFFERENCES …….. 114
VII- ARABIC SUMMARY……..