DEVELOPING A PROPER HARVESTING MACHINE FOR PEANUT CROP

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A thesis submitted in partial fulfillment

of
the requirment for the degree of
Doctor of Philosophy of science

in
Agricultural Science
(Agricultural Mechanization)

Department of Agricultural Mechanization
Faculty of Agriculture
Ain-Shams University

1993

Approval sheet

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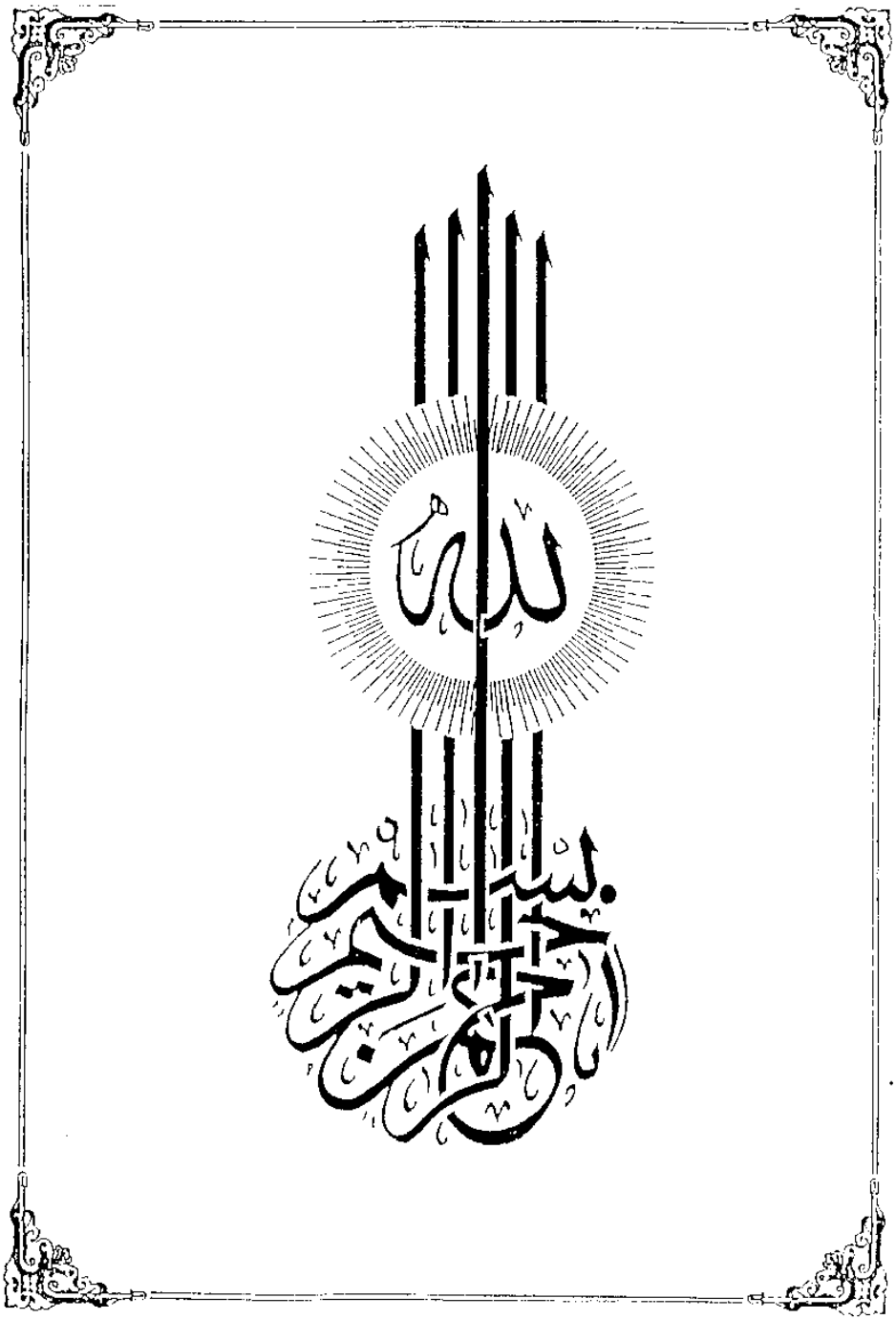
Date of examination : 3 /11 / 1993.



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Abstract :- Apeanut combine-picker was developed to perform peanut harvesting (from digging up to bagging) . A few systems were used in this work for peanut harvesting : five systems at El-Ismaelia Research Station and two systems at West of Nobaria. One of these systems was specially developed for this work .

The effects of harvesting system on harvest losses, harvesting time , power required, and fuel consumption were studied . Productivity of the machine , man power, fuel , and cost were considered in the course of study in order to compare between systems and developed combine.

It has been found that the developed combine had saved peanut losses, harvesting time, and criterion (real) costs. The statistical analysis showed highly significant advantage for the developed combine over the other studied systems of peanut harvesting .

Keywords :- Combine , Combine-picker , Developed combine , Digger , Peanut , Peanut harvesting , Picker .

ACKNOWLEDGMENT

The author is greatly indebted to Prof. Dr. Mohamed Nabil El Awady for his supervision, valuable guidance, suggestion and discussion, providing facilities and continuous encouragement throughout this work.

The author would also like to express his gratitude to Prof. Dr. Abd El-Gany Mohamed El-Gendy for his supervision and help.

Special thanks to Prof. Dr. Ahmed Farid El-Sahrigy the director of Agricultural engineering research institute for his great help and continuous encouragement throughout this work.

Also special thanks to engineers Mohamed Ahmed El-Naggar and Nazmi Ahmed El-Sayed for their help and encouragement throughout this work.

The author would also like to express his gratitude to all members of research and testing station of tractor and agricultural machinery workshop starting with engineers Mousa Mohamed Soliman and Mohamed Aly Hassan to last one for their help and cooperation .

All members of research and testing station of tractor and agricultural machinery are to be thanked by the author for their help and cooperation.

CONTENTS

SUBJECT	page
Introduction	1
I . Review of literature	4
1.1. Peanut culture and practices	5
1.2. Peanut harvesting problems	7
1.2.1 . Harvesting losses	7
1.2.2 . Manual labour	9
1.3. Different designs of harvesting machinery and proposed modifications	9
1) Diggers	10
2) Peanut combine machines	11
1.4. Knife angle and forward speed	17
II . Materials and methods	18
2.1. Equipment	19
2.1.1 . Peanut digger	19
2.1.2 . Peanut combine picker	23
2.1.3 . Tractor	28
2.2. Materials	29
2.2.1 . Equations	30
2.2.2 . Metallic materials used	30
2.3. The design	31
2.3.1 . Development idea	31
2.3.2 . Design and development considerations	31

2.3.3 . Fixed parameters 32

2.3.4 . Digger-conveyer design 34

a) Share design 34

b) Design of chaine-driver sprocket 34

c) Bar-conveyer design 37

d) Shaft design 37

e) Digger-frame design 39

f) Power transmission 39

g) Equipment assembling 39

2.4. Measurments 45

2.4.1 . Soil texture 46

2.4.2 . Moisture content of soil and plants 46

2.4.3 . Distribution and deep of pods in soil 47

2.4.4 . Required force for separating pods 47

2.4.5 . Rotating speed 47

2.4.6 . Forward speed 47

2.4.7 . Draught force 48

2.4.8 . P.T.O. power 52

2.4.9 . Determination of fuel consumption 53

2.4.10. Depth of digging measurment 54

2.4.11. Cutting width of equipment 54

2.4.12. Theoretical productivity 55

2.4.13. Actual productivity 55

2.4.14. Efficiency 56

2.4.15. Crop losses from equipment 56

2.4.16. Labour and losses 57

2.4.17. The costs 58
2.5. Instrumentation 60
2.6. Experiments 61
2.6.1 . Laboratory experiment 61
2.6.2 . Field experiment at West of Nobaria in summer season 1991 61
2.6.3 . Field experiment at El-Ismaelia season 1992. 62
2.6.4 . Field experiment at West of Nobaria season 1992 63
III. Results and discussion 64
3.1. Soil analysis 65
3.2. The pods distribuation in soil 66
3.3. Moisture content of plants 68
3.4. Laboratory test of development equipment 69
3.5. Experimental field data 70
3.5.1. West of Nobaria season 1991(Dec.,14)..... 70
3.5.2. El-Ismaelia Resarch Station of season 1992 (Oct.,14) 71
a) Side experiments 71
b) Field experiment 72
3.5.3. West of Nobaria season 1992 (Nov.,8) 95
Conclusion 108
Summary 112
Referances 117
Appendexs 122
Arabic summary and abestract 129

INTRODUCTION

INTRODUCTION

The peanut is considered as an important oil and leguminous crop. Its importance can be referred to the high food value for the peanut seeds, where they contain about 50% oils, 20% proteins, 14 % carbohydrates, and the remainder is salts, vitamins and solid materials. The shells are also considered good food for animals, where they contain a high percentage of proteins and oils. In addition, they are used to give oils, for sweets industry and its seeds are used directly for food in all countries.

In Egypt, peanut is widely planted in sandy and new reclaimel land in summer season , where the planted area is over 60,000 feddans producing 51,000 tons. The mean productivity per feddan is considered one of the highest means of production in the world (850 kg/fed. in 1984) (Nor El Deen, 1990).

A main problem in peanut production is harvesting. Generally problems can be summarized in following :-

1) Labour shortage and high wages .

2) Peanut losses in soil throughout harvesting (digging , picking-up , separating and bagging.).

This research was carried out to find solution for the manual labour cost and scarcity, increased losses, and time

delays, by developing a peanut harvester, starting from picking up to separating, to approach peanut-combining including digging, picking-up, feeding, separating and bagging to reduce harvest losses, and harvesting time.

CHAPTER I

REVIEW OF LITERATURE

I-REVIEW OF LITERATURE

1.1. Peanut culture and practices:-

Keshin and Abd El-Bary (1980), stated that, the peanut is one of the leguminous family - species Arachis hypogea. This is a herbage, annually, short stem crop, and horizontal or vertical as divided to two sub species (Wolderm, 1909)

1) A. H. Fastigata, and
2) A. H. Procumlous (prostrate type).

Its root is firm and carries the bacteria that fixes nitrogen in soil. The leaves are of the composed type and the flowers are single or groups from two to three flowers per each group under leaves and gonophore per peg, are one of the important parts for peanut. Pods grow under soil. They take a way under soil surface from two to seven centimeters depth. After that, pods grow under soil and shells grow as nut frames.

The field conditions suitable for peanut growing are :-

1) Warm weather.
2) A lot of sun-light.
3) A lot of rain-water or enough water for irrigation (from 12-23 irrigations.
4) Light, sandy and loamy soils with good drainage system for proper growth and easy harvesting.

The peanut planting season is summer, where the crop is planted through March to May.Row spacing ranges from 65 to 70 cm. Harvesting is carried out through Oct. and Nov. before the plants become completely dry for less losses in soil.

Marks to indicate ripeness of peanut are:-

1) Leaves : colour is changed.

2) Stems are dried.

3) The pods are matured under soil.

Ahmed (1984), stated that, the peanut grows best in soil which is well drained, light- textured, and with a pH of 6 - 6.5. Also, Hwang (1983), reported that, the peanuts are mostly grown in sandy soil or silt sandy loam, they are traditionally manually harvested by pulling stems. He also found that the resistance to pulling of pods apart from their stubble is 5-28 N. A force of just 4-17 N is enough if torn off at their side.

Altisent and Canavate (1976) tested eight different varieties for detachment force (F.d.). This force was found between 5.85 to 10.87 N. He also explained that the moisture of pods and plants is important on the incidence of damage.

Woodroof (1973), stated that, the time of peanut harvesting is critical, since it can greatly affect yields and nut quality. If the peanuts are harvested too early, many of the pods will be

immature, with shriveled seeds. If the harvesting is too late, many of the pods may be lost. The type, variety, and date of planting are rough guides, but the best way to judge their maturity is to examine some of the pods themselves.

Knauft, et al. (1986), stated that, five peanut genotypes were examined with three digging dates for two seasons. The study showed that, the oil content is increased and the yield is decreased with earlier digging date.

1.2 Peanut harvesting problems:-

Peanut harvesting problems are : pod losses in soil and scarcity of manual labor .

1.2.1 Harvesting losses:-

Nirmal (1984), reported that, the peanut cut-off losses are observed to take place in two ways:-

1) The top-root along with some nuts come out. Some of the individual nuts are left in the soil, either without or along with the pegs.

2) All the nuts remain in the soil. Only 10 % come off at the root joint, under average soil-moisture conditions.