

TRACTOR DRAWN CHECK ROW PLANTER FOR COTTON



Design and developed by: MPKV, Rahuri Centre



All India Coordinated Research Project on
FARM IMPLEMENTS AND MACHINERY
Central Institute of Agricultural Engineering
Nabi Bagh, Berasia Road, Bhopal - 462 038, India

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Nabi Bagh, Berasia Road
Bhopal-462 038, India
- Design and developed by: **PA Turbatmath
DT Pacharne**
MPKV, Rahuri
- Compilation and editing : **PA Turbatmath
DT Pacharne**
MPKV, Rahuri
- MM Pandey
CR Mehta
RK Tiwari**
CIAE, Bhopal
- Art, Cartography &
Proof Reading : **RK Tiwari
Yashwant Bhokardankar**
CIAE, Bhopal
- Word Processing : **Zackaria V John**
CIAE, Bhopal
- Reprography : **Radheyshyam Kushwaha**
CIAE, Bhopal

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Introduction

India ranks first in the world in the area under cotton and is third in production after China and USA. India is having 9.10 million ha land under cotton cultivation, which is 27% of the total area of the world under cotton cultivation. However, production and productivity is very low i.e. 308 kg/ha. In Maharashtra cotton is grown on an area of 29.09 lakh hectare having average productivity 135 kg/ha. Maharashtra ranks first in India for cotton production

Traditional practices and necessity of development of equipment

Traditionally the planting is done manually in check rows. The check row spacing ranges from 900 to 1200 mm depending upon the period of planting, crop variety and type of soil. The present method is laborious and time consuming.

Evolution and design

In order to meet the need of precision in planting, a machine has been developed for check row planting.

Salient features of machine

The developed check row cotton seed planter (Fig. 1) consists of:

Main frame

The main frame for mounting seed boxes and furrow opener was made from mild steel box section.

Furrow opener

Three spear headed furrow openers were mounted at spacing of 900 mm. It was supported at the front soil-working end by 10 mm rod fixed on a horizontal square pipe.



Fig. 1. Tractor drawn check row planter

Seed box with metering device

Three seed boxes were mounted on these furrow openers with seed metering plate fitted in aluminium housing. Each seed plate had one cell, and driven by straight spur gears mounted on a common shaft.

Fertilizer box with metering device

Three trapezoidal fertilizer boxes are fitted beside the seed box on the same shaft. The single grooved roller made of nylon material was used for metering fertilizer.

Power transmission unit

Power from the ground wheel is transmitted directly to the common shaft for metering seeds and fertilizer. An eccentric weight is provided on the groundnut wheel to maintain cell orientation at head lands.

Marker

To maintain spacing between successive rows marker were fitted at the end of main shaft.

Performance Evaluation

The tractor drawn check row planter was tested (Fig. 2) to evaluate performance of seed metering unit in laboratory as well as on the field. Uniform metering was observed. Average displacement of seed was observed as 1.48%. The seed was placed at a depth of 49 to 55 mm. The row to row spacing obtained was 906 mm against the required 900 mm. The plant to plant spacing was 1330 mm against 1350 mm. It gave an effective field capacity 0.613 ha/h. More than 50% of the hills were planted with two seeds and 33% of the hills were with single seed, while 8.3% hills with three seeds. The missing hills observed were 8.3%.

Field performance results

Sl. No.	Particulars	Average value
1	Plant to plant spacing, mm	1350
2	Row to row spacing, mm	900
3	Number of rows	3
4	Effective working width, mm	2700
5	Effective field capacity, ha/h	0.613
6	Field efficiency, %	79.09
7	Seed rate obtained, kg/ha	1.21
8	Average row to row spacing obtained, mm	902.5
9	Plant population, no./ha	11995
10	Missing hill, %	8.30
11	Cost of operation Rs/ha	250.23

Present status of technology

The laboratory testing and field evaluations of machine have been conducted. Keeping in view the significance of machine in precision planting the large scale field trials are planned.

Specifications

Name	Cotton planter (check row)
Type	Tractor drawn

Furrow openers

Type	Spear headed
Number of furrow opener	Three
Depth control	Hydraulic system of the tractor

Metering mechanism

Type	Vertical seed rotor with cell on the periphery
Method of feed rate control	By changing rotor of required number of seed cells

Ground wheel

Number of wheels	Two
Type of wheel	Spoke wheel with lugs at the peripheral end
Power transmission	Through spur gears comprising of drive and driven gears

Available from

Principal Investigator
AICRP on FIM, Mahatma Phule Krishi Vidyapeeth,
Rahuri, District: Ahmednagar, Maharashtra