

Research Paper :

## Development and field evaluation of tractor operated onion transplanter

P.A.TURBATMATH, Y.C.BHATT AND P.B.KADAM

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### ABSTRACT

The onion (*Allium cepa* L.) is one of the important commercial vegetable crops grown on a large area in India and abroad for local consumption as well as export purpose. Onion growers are facing lot of problems in transplanting of onion seedlings with the shortage of farm labourers during transplanting seasons. Therefore, efforts were made to develop tractor operated semi automatic onion transplanter. Engineering physical properties like height, weight, diameter, moisture content and compressive strength etc. were determined for VI<sup>th</sup>, VII<sup>th</sup>, and VIII<sup>th</sup> week age of onion seedlings. Two metering mechanism *i.e.* Fingure type and Plug type were studied in laboratory with three different travel speed of 0.75 km/h, 1.00 km/h and 1.25 km/h for different age group of onion seedlings. It was observed that plug type metering mechanism at speed of 0.75 km/h with VII<sup>th</sup> week age seedling were more suitable for transplanting. The field trials of semi - automatic transplanter revealed that with the plug type metering mechanism the row to row spacing of 20.4 -21.20, plant to plant spacing of 11.00 – 11.6 and depth of placement was observed 2.8 -4.00 cm. The missing percentage was 9.00 -10.9. The capacity of the machine was 0.1088 – 0.1174 ha/hr with field efficiency of 70.49 -71.60 per cent. The draft of machine was in the range of 450.00 – 469.80 kgf. The saving in cost of operation over manual transplanting was 40.17 per cent.

See end of the article for authors' affiliations

Correspondence to:

**P.A. TURBATMATH**  
Department of Agricultural Engineering, Mahatma Phule Krishi Vidyapeeth, Rahuri, AHMEDNAGAR (M.S.) INDIA  
Email : prakashpat@rediffmail.com

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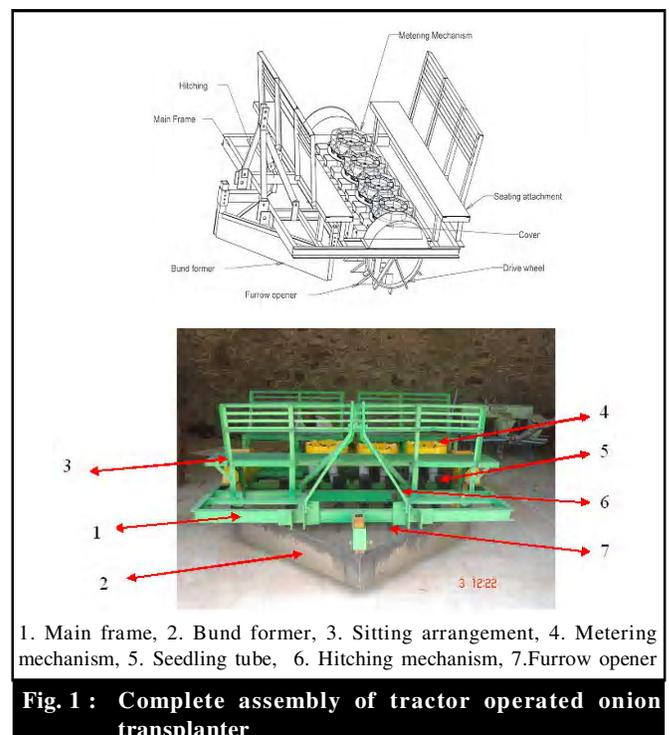
The onion belongs to the genus *Allium*, which contains about 300 species widely distributed in Northern temperate regions as biennials and perennials. The commonly used onion as dry bulbs is *Allium cepa* L. It is one of the important commercial vegetable crops grown for local consumption as well as for export purposes. Onions may be classified into two groups, green and dry green (Scallions).

### METHODOLOGY

Based on past review and considering different therotical considerations the final prototype *i.e.* semi-automatic tractor operated onion transplanter has been developed (Fig. 1).

### Development of tractor operated onion transplanter:

The newly developed tractor operated rear mounted onion transplanter (as shown in above Fig and Plate) was a semi automatic machine having overall dimensions of 1950.5 mm, 2030 mm and 1045 mm with respect to length,



1. Main frame, 2. Bund former, 3. Sitting arrangement, 4. Metering mechanism, 5. Seedling tube, 6. Hitching mechanism, 7. Furrow opener

**Fig. 1 : Complete assembly of tractor operated onion transplanter**