EVALUATION OF RICE TRANSPLANTER AT DIFFERENT AGE OF SEEDLINGS AND SPACINGS

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PADDY TRANSPLANTER

Rice transplanters were first developed in japan in the 1960s, whereas the earliest attempt to mechanize rice transplanting dates back to late 19th century. [1]In Japan, development and spread of rice transplanters progressed rapidly during the 1970s and 1980s.

1. The paddy planter can transplant more than 0.2-0.4 hectare field per hour.
2. Time saving and labor saving. The rice transplanter machine can transplant the seedling quickly and with less than two people.
3. The machine is with compact structure and small volume can operate in the field easily.
4. Machine transplanting involves planting young rice seedlings into puddled soil by machine

- The use of mechanized transplanter increased rice yields by 3.5 to 4.0 q/acre and decrease of cost by 50 %((Harish Damodaran, 2000)
- Mechanical transplanter saves about 78% labour and 48% of cost of operation compared to manual transplanting with higher grain yield (Giri Rao, 2008 and Katyal, 2008)

Basis for prioritization

- Transplantation in paddy is becoming more and more expensive due to increased labour wages and unavailability of labour during peak agricultural season. So mechanization is the only substitute to the human labour which reduces the drudgery and allows timely transplanting. Hence, to find out the technology needed for the efficient performance of transplanter under field conditions, this experiment is proposed.

How to Transplant Rice by Machine?

- Raise seedlings in special mat nurseries or in seedling trays. Use 12-15 kg of good seed per acre
- Seedlings will be ready for transplanting in 12-18 days after seeding (DAS).
- Ensure that fields are well puddled and leveled.
- Drain fields and allow mud to settle for 1-2 days after the final puddling.
- The subsurface soil layers need to be hard enough to support the transplanting machine.
- The soil is ready when a small “V” mark made in the puddled soil with a stick holds its shape. At this moisture level, the soil can hold the seedlings upright.
- Soil should not be so dry that it sticks to and interferes with planting parts or wheels of the transplanter.
- Load the seedling mats on the machine and transplant the seedlings at the selected machine setting

Advantages: Machine transplanting

- Fast and efficient (1-2 ha/d), uses less labor and ensures timely planting.
- Reduces stress, drudgery and health risks.
- Ensures uniform spacing and plant density.
- Seedlings recover fast, tiller vigorously, and mature uniformly.

Limitations

- Seedlings must be planted while still young, and so mechanical transplanting is best suited for irrigated areas only.
- Special nursery management is needed (mat nursery or seedling trays).
- Good land preparation, levelling and water management are required.
- Fields need good access for machine transport and field entry.
- Transplanting machines are expensive; so poor farmers cannot afford them (contract hiring of transplanters is available in some countries).
- Problems in poorly prepared and leveled land, or with poorly designed machines.
- Good training is needed to operate the machine properly.

MACHINE TRANSPLANTATION



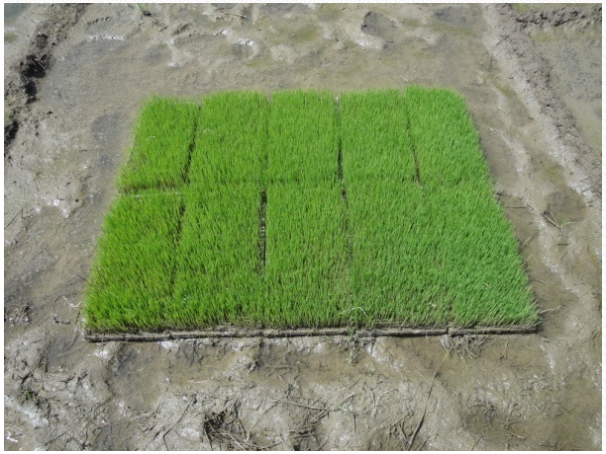
KUBOTA (6 row)



YANMAR (8 row)

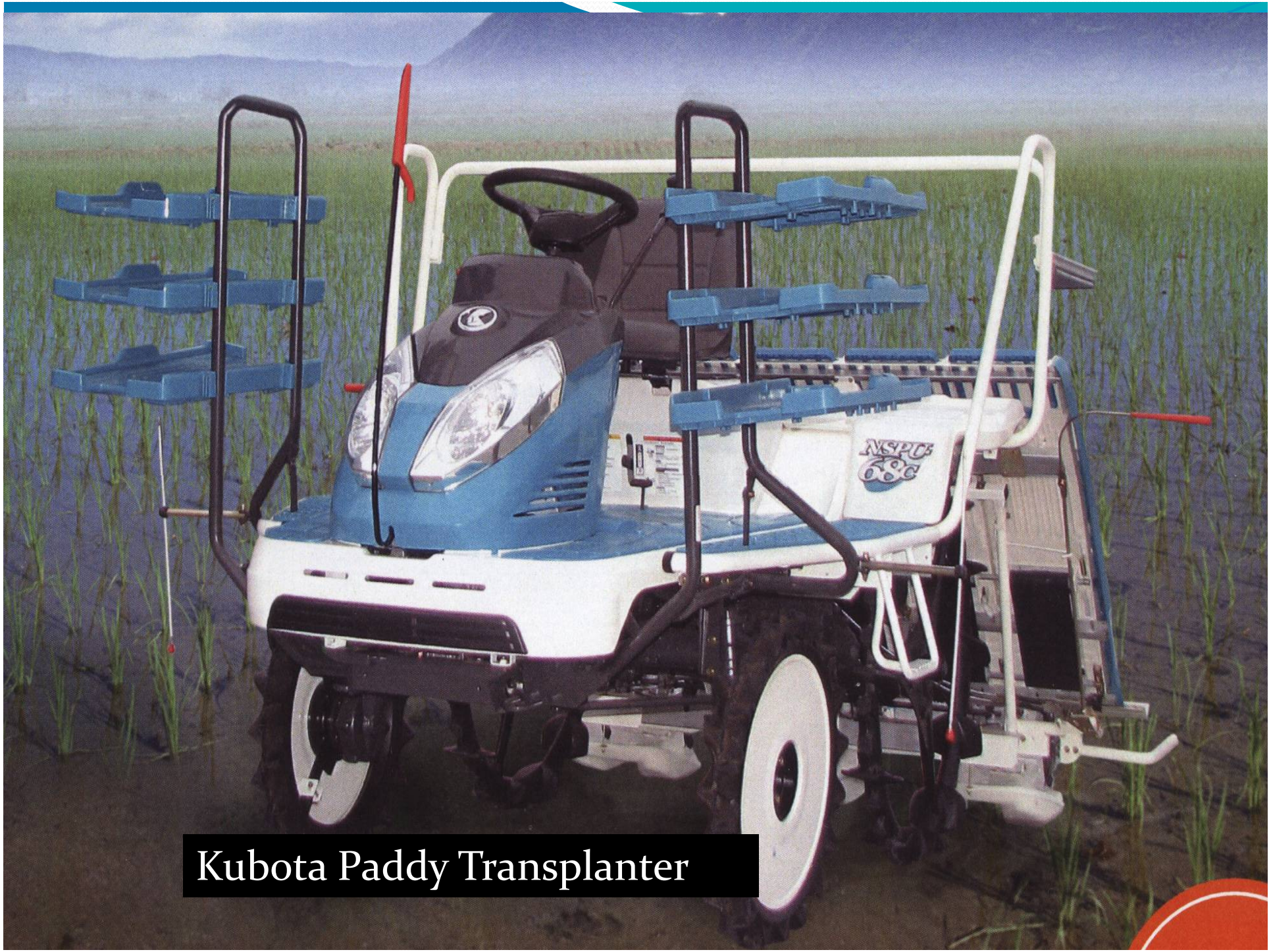


YANJHI SHAKTI (8 row)









Kubota Paddy Transplanter

Mechanized System of Rice Intensification

Soil pulverizer



Paddy seeding unit




AP3tv
6599

Evaluation of rice transplanter (kubota) at different age of seedlings and spacings

Design: Split plot

Replications: 3

Main plots:

Age og seedlings

A_1: 12 days

A_2: 15 days

A_3: 18 days

Sub plots:

spacings

S_1: 30x12

S_2: 30x14

S_3: 30x16

S_4: 30x18

S_5: 30x21

- **Variety: NLR 3042**

Objectives

1. To find out optimum age of seedlings for planting with rice transplanter
2. To findout the optimum spacing for mechine transplanting in rice






AGRONOMY
Rabi 2012-13
EVALUATION OF RICE TRANSPLANTER AT DIFFERENT AGE OF SEEDLINGS AND SPACINGS
Variety: NLR 3042
Design: Split plot design
Replications: 2
D.O.S : 1) 15.11.12
2) 18.11.12
3) 21.11.12
D.O.P : 6.12.12
TREATMENTS :
Main plots:
Age of seedlings:
12 days
15 days
18 days
Subplots:
Spacings:
30 cm Inter row spacing
Intra row spacing
1) 12 cm
2) 14 cm
3) 16 cm
4) 18 cm
5) 21 cm


Agronomy
Rabi 2013-14
Evaluation of rice transplanter at different age of seedlings and spacings
Design: Split plot
Replications: 3
Treatments
Varierty : NLR3042
Age of seedlings (Main plots)
Spacings: (Subplots)
A 1 – 12 days
S1 - 30x12 cm
A 2 – 15 days
S2 - 30x14 cm
A 3 – 18 days
S3 - 30x16cm
S4 - 30x18 cm
S5 - 30x21cm
Fertilizers : RDF
Date of sowing: 1) 16.11.13
2) 20.11.13
3) 24.11.13
Date of Planting: 10.12.13

12 DANS

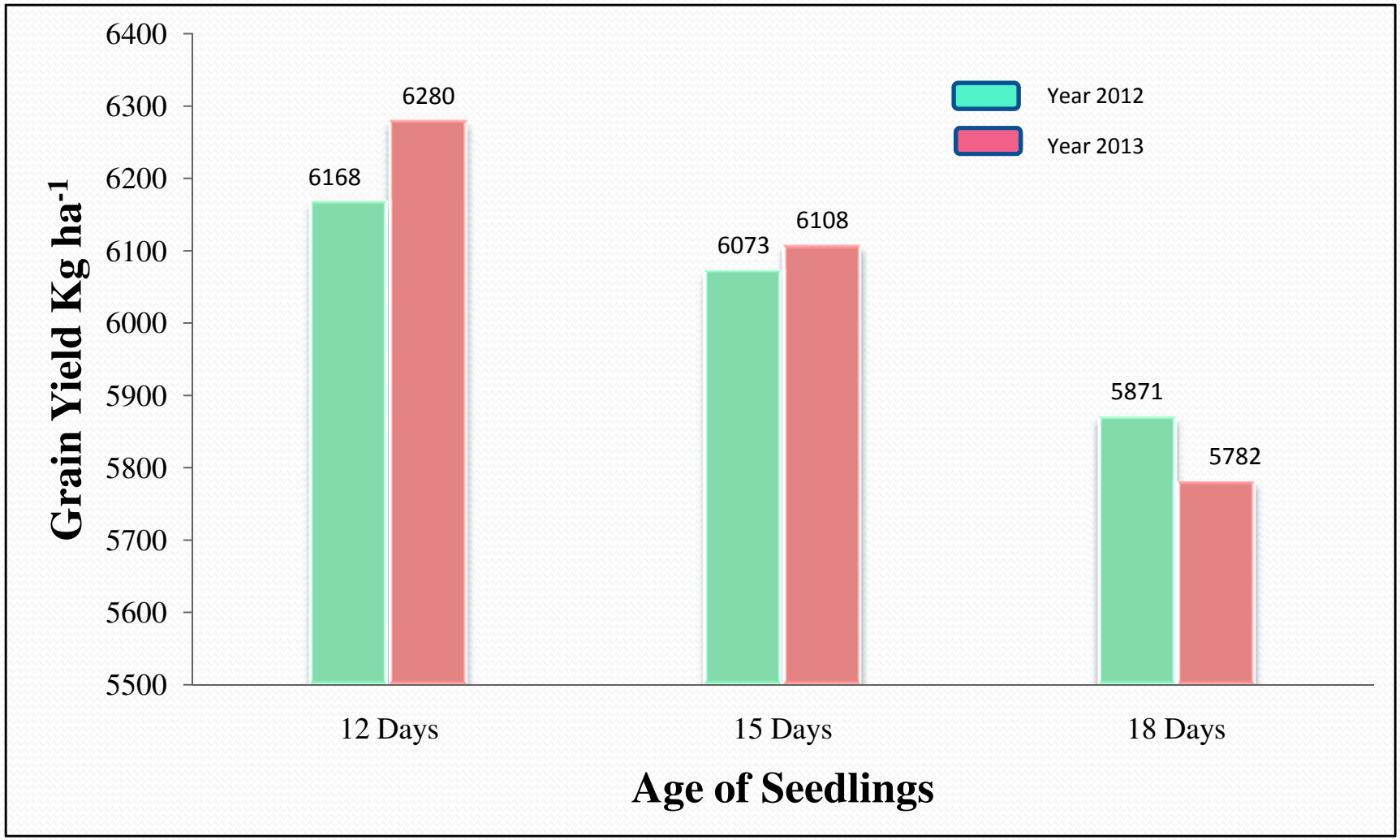
Evaluation of rice transplanter at different age of seedlings and spacings(Kubota)(Rabi, 2012)

Treatments	No. of Seedlings hill^{-1}	Plant popn m^{-2}	Plant Height (cm)	No of panicles hill^{-1}	Panicle Length (cm)	No. of filled grains panicle^{-1}	No. of un filled grains panicle^{-1}	Test Weight (g)	Grain yield kg ha^{-1}
Age of seedlings									
12 Days	4.1	26	81.3	17.0	18.2	169	13.9	18.0	6168
15 Days	3.9	27	80.8	16.5	18.9	181	15.0	18.5	6073
18 Days	4.1	27	74.2	17.1	19.7	189	15.9	17.8	5871
CD@5%	NS	NS	3.1	NS	NS	7.2	NS	NS	NS
Spacings									
30x12	4.0	30	80.2	15.6	18.3	172	15.7	18.2	5896
30x14	3.7	28	78.3	15.9	18.5	174	16.0	18.6	6017
30x16	4.1	25	78.2	16.7	18.6	181	14.3	18.1	6118
30x18	4.2	25	77.8	18.1	19.4	184	14.2	18.2	6106
30x21	4.3	24	77.3	18.1	19.7	187	14.4	17.4	6018
M at S									
CD@5%	NS	2.5	1.7	2.7	NS	NS	NS	NS	NS
S at M									

Evaluation of rice transplanter at different age of seedlings and spacings(Kubota)(*Rabi*, 2013)

Treatments	Plant popn m^{-2}	Plant Height (cm)	No. of tillers $hill^{-1}$	No. of panicles $hill^{-1}$	Panicle Length (cm)	No. of filled grains $panicle^{-1}$	No. of un filled grains $panicle^{-1}$	Test Weight (g)	Grain yield kg ha^{-1}
Age of seedlings									
12 Days	28	78.1	36	31	17.6	162	54	17.0	6280
15 Days	27	76.6	31	30	18.1	173	36	17.6	6108
18 Days	27	74.4	30	30	17.7	148	37	17.3	5782
SEm±	0.4	0.9	2.5	1.6	0.2	4.2	6.6	0.3	173
CD@5%	NS	3.6	NS	NS	NS	16.3	NS	NS	NS
Spacings									
30x12	32	76.8	27	25	18.1	147	42	17.6	6091
30x14	31	76.8	32	28	17.7	158	49	17.6	5980
30x16	28	76.1	32	31	17.9	169	42	17.0	6237
30x18	26	76.6	34	30	17.7	163	38	17.4	6073
30x21	21	75.9	37	33	17.7	161	39	17.0	5905
SEm±	0.7	0.8	2.5	1.3	0.3	5.3	5.9	0.5	150
CD@5%	2.0	NS	7.2	3.9	NS	15.5	NS	NS	NS
Interaction									
CD@5%									
MatS	2.0	NS	7.2	3.9	NS	15.5	NS	NS	NS
SatM	2.0	2.5	7.2	3.9	0.8	15.5	17.0	1.3	439
MxS	2.4	3.1	NS	NS	NS	19.0	NS	NS	NS
CV%	5.3	2.4	16.3	9.5	3.2	7.1	19.5	5.6	5.3

Age of seedlings on grain yield



Effect of spacings on grain yield



Influence of age of seedlings and spacing on yield of rice

Treartments	Grain yield kg/ha		
	2012	2013	Mean
Age of seedlings			
12 Days	6168	6280	6224
15 Days	6073	6108	6091
18 Days	5871	5782	5827
SEm±	205	173	
CD@5%	NS	NS	
Spacings			
30x12	5896	6091	5994
30x14	6017	5980	5999
30x16	6118	6237	6178
30x18	6106	6073	6090
30x21	6018	5905	5962
SEm±	150	150	
CD@5%	NS	NS	
Interaction			
CD@5%			
MatS	NS	NS	
SatM	NS	439	

There is no significant yield difference with different age of seedlings from 12-18 days and also with different intra row spacings i.e from 12-21 cm (Inter row spacing of 30 cm is constant) when transplanting was done with 6 row Kubota transplanter.

Thank you

