The new cultivation models and profit analysis of oilseed rape

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Abstract

Six new cultivation models are tested in Hubei Province under uniform experiment design and with random sampling methodology. The models are transplanting in plowed paddy-field (TPP), direct seeding in plowed paddy-field (SPP), transplanting in untilled paddy-field (TUP), direct sowing in untilled paddy-field (SUP), relay transplanting in untilled cotton field (TUC), and relay sowing in untilled cotton field (SUC). And yield per unit area (YPA), yield per unit material input (YPM), yield per unit labor (YPL), and cost per kg rapeseed were used to review all these models. Results showed that direct seeding and no-tillage cultivation models characterized by simplicity with lower cost, higher efficiency and profit for saving working days. However, these simplified cultivation models are relatively of lower material utilization rate and lower unit area yield compared with the traditional model of transplanting.

Key words: oilseed rape, cultivation technique, profit analysis

Introduction

Hubei Province is the biggest province of oilseed production. The annual production area is 1700mu, about 18% of China production area and 4-5% of the world total area. The planting model consists of rice-rape system, rice-rice-rape system and cotton-rape system. The former two systems are over two thirds of the total area. In the past, seedling-raising transplanting was the main method of oilseed rape planting and covered 80% of the planting area. Nowadays, with the development of rural economy, more and more labors move from the countryside to the city, consequently there are not enough labors for the transplanting required for transplanting model. Therefore, the area and quality drop markedly for the transplanting but increase moderately for no-tillage direct seeding. At the same time, the utilization of chemical herbicide and farm machine leads to great change of input for the oilseed production, especially the decrease of manpower. In order to study the oilseed production models practically practiced in Hubei Province, we investigate the technique application in the whole province and compare the production efficiency of different cultivation models on the basis of results of random sampling and typical family survey.

1 Materials and Methods

1.1 Materials

The samples are from the farmers applying the specific oilseed production models and the statistical unit is one county.

1.2 Methods

1.2.1 Investigation Standards. TPP: former crop rice, seedling-raising transplanting, field plowing and bed and furrow completion. SPP: former crop rice, bed and furrow completion and direct seedling. TUP: former crop rice, seedling-raising transplanting, non-tilled and bed and furrow completion. SUP: former crop rice, non-tilled field, bed and furrow completion and direct seeding. TUC: former crop cotton, seedling raising, transplanting in between cotton plants, non-tilled field with co-growing days 35. SUC: former crop cotton, seeding in cotton plants, non-tilled with co-growing days 35. In the same county only one cultivar is investigated for transplanting and direct seeding respectively. Wuxue City is the only city applying oil-rice-rice planting system and the rest counties are carrying rice-oil planting system.

1.2.2 Investigation methods. Face to face talk with farmers by the local technicians of agricultural technique.

1.2.3 Investigation Items. Yield per unit area, material input (seed, fertilizer, pesticide, herbicide and growth regulator), manpower input (farm machine rent and farmers' own labor input calculated according to the local statistical department).

2 Results and analysis

2.1 Investigation Results

In order to make the results more comparable and accurate, 30 questions are screened and only those complete data for the six planting models are calculated (Table 1).

In order to analyze the six planting models in detail, yield per unit area (YPA), yield per unit material input (YPM), yield per unit labor (YPL) and cost per kg oilseed (CP1KO) were calculated (Table 2).

Table 1: Input and output investigation results of six models in seven counties (cities).

Content	Place	TPP	SPP	TUP	SUP	TUC	SUC
Output	Yield	142.47	122.94	137.43	128.64	142.36	131.66
	Profit	341.93	295.06	329.83	308.74	341.66	315.98
Input	Materials	88.03	87.83	91.23	98.62	84.55	87.61
	Labor	180.75	122.05	164.91	105.03	151.73	128.71
	Total	268.78	211.31	256.14	203.65	236.23	216.32
Net profit		73.14	83.75	73.69	105.39	105.08	99.66

Note: oilseed price is 2.4yuan/kg

Table 2 The profit analysis factors of different planting models

	YPA	YPM	YPL	Cost (yuan/kg)
TPP	142.47	1.6184	18.1754	1.89
TUC	142.36	1.6837	22.2936	1.66
SUC	131.66	1.5106	24.7082	1.64
TUP	137.43	1.5065	19.8639	1.86
SUP	128.64	1.3044	29.5819	1.58
SPP	122.94	1.3997	22.9610	1.72

2.2 Results Analysis

2.2.1 No-tillage direct seeding model can greatly reduce production cost and promote production efficiency by decreasing labor force input. From Table 2, the manpower input of SUP is 105.03yuan/667m^2 and decreases 41.89% compared with the input 180.75yuan/667m^2 of TPP, the difference of which is due to the different production cost. For the two models with the least production cost, SUP and SUC, the costs per kg oilseed are 1.58yuan and 1.64yuan, and decrease 16.40% and 13.22% respectively compared with the plowing seedling-raising models.

2.2.2 Seedling-raising transplanting model can obtain higher unit area yield by increasing the utilization rate of material input. As indicated in Table 2, both the Plowing Transplanting and the No-tillage Transplanting (or Relay Transplanting) can obtain higher yield than the Direct Seeding. The yield of TPP is 15.89% higher than that of SPP. For the yield per unit material input of the six models, the highest model is TUC (yield 1.6837Kg), and the second is TPP (yield 1.6184Kg). The yields of the two models are 29.08% and 24.07% higher respectively than SUP (the lowest model and the yield 1.3044Kg).

2.2.3 The general profit of all the models can be evaluated by the Net Profit values in Table 1. The Net Profit of TUC is 105.39yuan/667m^2, the highest profit in all the six models. The lowest model is TPP with the profit of 73.14yuan/667m^2. The difference between them is 32.25yuan/667m^2.

3 Conclusion and discussion

3.1 The oilseed yield and profit of cotton field rape is higher than that of paddyfield rape. For the YPA and YPM input, TUC is 142.36Kg/667m2 and 1.6837Kg/yuan respectively, which are higher than that of TUP (137.43Kg/667m2 and 1.5065Kg/yuan respectively). And then for the two factors, TUC is 131.66Kg/667m2 and 1.5106Kg/yuan respectively, which as well is higher than that of SUP (128.64Kg/667m2 and 1.3044Kg/yuan). Analysis showed that cotton field applies more fertilizer than paddyfield and the fallen flowers and fruits make cotton field more fertile, which lead to the difference of yield and material utilization rate.

3.2 The profit calculation method of different planting models. The oilseed price is the key factor to influence the final results of profit. When the oilseed price is more than 1.86yuan/Kg, the profit of TUC is higher than that of SUC; when the oilseed price is more than 2.51yuan/Kg, the profit of TPP is higher than that of TUP; when the oilseed price is more than 1.94yuan/Kg, the profit of TPP is higher than that of SPP. It should be noted that the manpower price is according to the market price of the local counties, but this price is higher than the actual price it pays. Therefore, if the farmers work by themselves, the production cost will be lower than the figures shown in this paper. In fact, about what planting model a farmer should choose, this, to a great extent, depends on the farmer's own conditions. However, the No-tillage Direct Seeding model can greatly lessen the labor strength, which of course is a quite important factor to consider.

References

Omitted.