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Validation of Integrated Crop Management (ICM) Practices over Farmers' Practices in Mungbean

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A B S T R A C T

The experiment was conducted at Main Agricultural Research Station (MARS), University of Agricultural Sciences, Dharwad during the rainy season of 2015 under rainfed condition to validate the integrated crop management practices with farmers' practice. DGGV-2 variety was used for the experiment. Treatments consisted of two dates of sowing [Normal sowing date of the location (June 16th) and 15 days after normal sowing date] and two types of practices *i.e.* ICM v/s farmers' practice [Improved nutrient, weed and pest and disease management practices v/s farmers' practice] and they were sown in four blocks of 100 m^2. There was 30.6 per cent decrease in yield in ICM practice is due to delay of wowing by 15 days, where in farmer's practice it was 41.3 per cent under normal sowing due to farmer's practice yield was reduced by 24.7 per cent (855kg/ha) compared to ICM practice (1066 kg/ha). The yield reduction in farmers practice under delayed sowing was 76.8 per cent compared to ICM under normal sowing. Maximum net returns were obtained in normal sown ICM (50120 Rs/ha) when compared to normal sown farmer's practice (36350 RS/ha), 15 days late sown ICM (32620 Rs/ha) and 15 days late sown crop with farmers practice (18710 Rs/ha) The overall analysis of the study revealed that adoption of ICM technologies in greengram cultivation results in high profits.

Introduction

In India mungbean is grown in an area of 4.32 m ha with a total production of 2.17 m t and average productivity of 502 kg per hectare. In Karnataka it occupies an area of 4.23 lakh ha with a production of 1.17 lakh tonnes and an average productivity of only 277 kg/ha.

Integrated Crop Management (ICM) is a pragmatic approach to the production of crops, which combine a range of complementary methods to reduce a pest population below its economic injury level while minimizing impacts on other components of the agro-ecosystem, thus taking into account the needs of producers, wider society and the environment (Kogan, 1998).

Among the different agronomic practices, time of sowing, weed control, nutrient management and pest and disease control play an important role to exploit genetic potentiality of a genotype. Sowing at optimum time is important non cash input that results in considerable increase in the yield.

Materials and Methods

The experiment was conducted at Main Agricultural Research Station (MARS), University of Agricultural Sciences, Dharwad during the rainy season of 2015 under rainfed condition to validate the improved crop production techniques with farmers' practice.

The geographical co-ordinates of Dharwad are 15°26' N latitude and 75°7' E longitude and an altitude of 678 m above mean sea level. It is located in the Northern Transition Zone of Karnataka which has semi-arid climate.

The soil of the experimental site was clayey in nature and having available N, P and K of 210, 19.5 and 342.8 kg/ha, respectively. Organic carbon (%) and pH of the soil were, respectively, 0.52% and 7.2.DGGV 2 variety was used for the experiment.

Treatments consisted of two dates [Normal sowing date of the location (June 16$^{th)}$ and 15 days after normal sowing date] two types of practices [Integrated crop management includes nutrient management (5t FYM/ha with 25:50 kg N:P_2O_5 and *Rhizobium and PSB* inoculation at the time of sowing and 2% DAP spray at flowering and pod initiation stages), weed management (pre-emergent application of pendimethalin 33% EC @1kg/ha followed by one hand weeding at 25 DAS for the control of major weeds *i.e*. *Commelina bengalensis*, *Digitaria marginata*, *Alternethra sessail*, *Acarynthus aspera*, *Euphorbia hirta*, *Echinoclova crussgalli and Amaranthus viridis*) disease management (Leaf spots and powdery mildew were controlled by spraying hexaconazole @ 1 ml per litre [Fig. 1 (a)] and pest management (with insecticides such as monocrotophos @ 1.5 ml per litre for the control of aphids and whiteflies, imidacloprid @ 1 ml per litre of water for the control of *spingid moth* and *bihar hairy catterpiller* and Lambda cylothrin @ 0.5 ml per litre of water for the control of *apion beetle* [Fig.1 (b)] and farmers' practice (100 kg DAP/ha, two intercultivations at 15 and 30 DAS fb one hand weeding at 20 DAS, monocrotophos @ 1.5 ml per litre for control of sucking pests and hexaconazole @ 1 ml per litre for control of leaf spots and powdery mildew). Treatments were sown in four blocks of 100 m^2 [Fig 2(a) and (b)].

Results and Discussion

There was 30.6 per cent decrease in yield in ICM practice due to delay of sowing by 15 days, where in farmer's practice it was 41.3 per cent.

Under normal sowing due to farmer's practice yield was reduced by 24.7 per cent (855kg/ha) compared to ICM practice (1066 kg/ha).

The yield reduction in farmers practice under delayed sowing was 76.8 per cent compared to ICM under normal sowing (Table 1. and Fig. 3).

These results were similar with the findings of Reddy *et al.,* 2011; Salla Sowjanya *et al.,* 2017 in chilli crop and Wang *et al.,* 2017 in rice crop.

Maximum net returns were obtained in normal sown ICM (50120 Rs/ha) when compared to normal sown farmer's practice (36350 RS/ha), 15 days late sown ICM (32620 Rs/ha) and 15 days late sown crop with farmers practice (18710 Rs/ha) (Fig. 4).

Major pests in late sown crop with farmers' practice were *sphingid moth, aphids, whiteflies*, *bihar hairy catterpiller* and *apion beetle* and the percent disease incidence (PDI) of the powdery mildew, cercospora leaf spot and anthrachnose leaf spot were 35 to 45% higher in 15 days late sown crop with farmers, practice when compared to normal sown ICM.

Table.1 Yield, yield parameters and economics as influenced by ICM and farmer's practice under normal and late sowing in greengram

Parameters	Normal sowing			15 days late sowing	
	ICM	Farmers practice		ICM	Farmers practice
Plant ht(cm)	50.00	49.00		46.00	46.33
Branches	2.66	2.33		2.33	1.66
Pods/plants	11.66	10.00		8.00	6.66
Dry wt (g)	12.30	11.30		9.00	7.90
100 Seed wt(g)	4.74	3.955		3.05	2.64
Yield (kg/ha)	1066	855		816	603
Gross return Rs/ha	74620	59850		57120	42210
Cost of cultivation Rs/ha	24500	23500		24500	23500
Net return Rs/ha	50120	36350		32620	18710

Fig.1 (a) Important diseases observed in the experiment **(b)** Important pests observed in the experiment

Fig.2 (a) Field view of the experiment under normal sowing

Mungbean with ICM practice **Mungbean with farmer's practice**

Fig.2 (b) Field view of the experiment under 15 days delayed sowing

Mungbean with ICM practice **Mungbean with farmer's practice**

Fig.3 Yield and yield parameters as influenced by ICM and farmer's practice under normal and late sowing in greengram

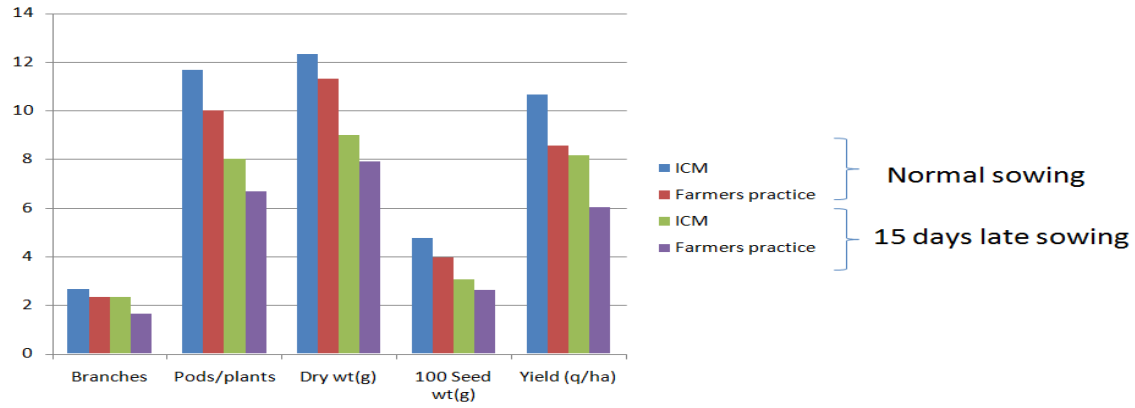
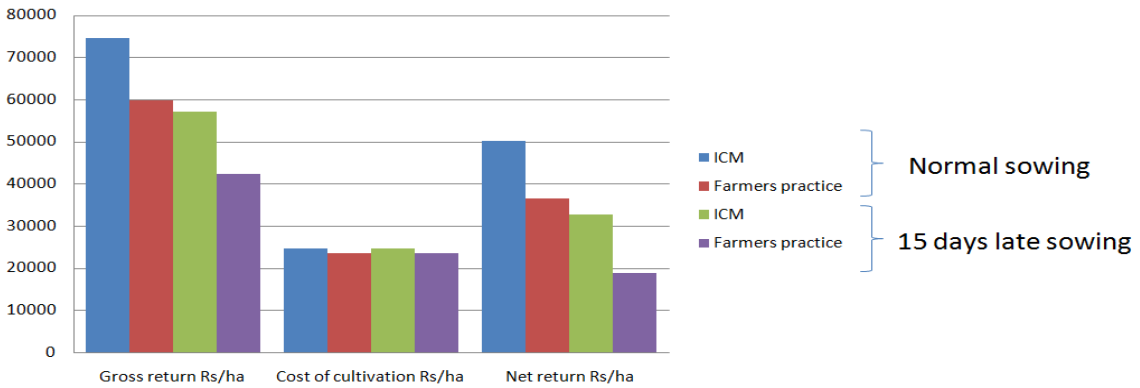


Fig.4 Yield and Economics of greengram as influenced by normal and late sowing



Present study indicated that ICM is definitely better over farmer's practices under different weed, pest and disease infestation. ICM implies the rational integration of various methods of weed, insect, pest and disease control to suppress them below ETL. Therefore, farmers should be made aware of its benefits and motivated to critically analyze and make decisions regarding ICM practices.

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