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STUDY ON WHEAT-LEGUME-MAIZE CROPPING SEQUENCE ON FARMER'S FIELD IN ADOPTED VILLAGES IN ROHILKHAND REGION OF U.P.

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ABSTRACT

Third crop maize (Sweta) after second crop viz. T_1 Wheat-Sesbania-Maize (Green Fodder 850.3 q/ha, grain 17.6 q/ha), T_2 Wheat-Urd-Maize (Green Fodder 725.8, grain 16.3 q/ha), T_3 Wheat-Mung-Maize (Green Fodder 825.9 q/ha), grain 17.3 q/ha), T5-Wheat-maize-maize (Green fodder 625.5 q/ha, grain 15.1 q/ha), T_6-Wheat (Bio-fertilizer)-Maize (Bio-fertilizer)-Maize (Green Fodder 800.2 q/ha, grain 17.1 q/ha). Farmers adapted the cropping system for sustainable crop yields. The yields were high in 2010-11 because of more adoptability of package of practices, soil productivity and fertility.

Key words : Maize, variety, forage, yield, adopted.

Soybean (*Glycine max*) is presently grown almost exclusively as a protein and oil seed crop in the USA, but it was provisionally a popular summer annual soft legume. The forage yield of potential of soybean can be as high as 5 to 10 tons per acre. Yield of soybean can be maximized by planting early. Like other forage legumes, soybean forage has many valuable traits as fodder, soybean leaves and stems can be grazed, ensiled or dried to machinery. The foliage in veg palatable to cattle and has a high nutritive value and good digestibility (Kolvisto, 2006). Soybean was initially used as forage crop when introduced into the United States in the 1980s. Cluster beans (Guar) (Cyamopsis tetragonoloba) is an errect, bushy annual herbaceous length upto 3 meters high with tetra trifoliate leaves upto 10 cm long. Which is very much suitable for mixed cropping to enhance leguminous part of fodder. Maize produces rich nutrition green fodder which is a good source of carbohydrates. The green fodder is particularly suitable for silage making. It contains 8-10% protein and 60% total digestible nutrients. Maize grains contain trypsin inhibitor.

MATERIALS AND METHODS

Field trials were conducted in Adopted villages Mohanpur and Kalapur in Kharif 2004 and 2010 in Khata and Bhandsar villages of Rithora town (Veterinary Health Camp Station) area in Bareilly District of UP. African tall variety of forage maize was grown for comparative evaluation for fodder production. High yielding varieties namely Vijay Composite, Sweta, Pragati, Kanchan, Amar and Surya were grown for green forage during March to July (Kharif season) in the adopted villages. Agronomic practices and inputs were provided by IVRI, Izatnagar, Extension Education Division under Institute Project "Fodder Production System" in Bareilly district. It is to be recorded that crops were harvested at 52 to 68 DAS as per farmers requirement. Crops were used for green fodder for 15 days for animal feeding. Trials were conducted as per the requirement of the farmers. The calculation was done under the RBD experimental design with 3 replications.

RESULTS AND DISCUSSION

Table-1, data shows that wheat-sesbania-maize gave 17.6 q/ha maximum grain yield.

Effect of green manuring on 3rd crop of maize in sequence : Sesbania might increase plant nutrients in the soil and health soil conditions. Similar results were reported by Singh and Singh (1987) and followed by crop sequence T-4, Wheat-Cowpea-Maize grain yield 17.3 q/ha. Followed by T6 crop sequence Wheat-Bio-F-Maize Bio-F produced maize grain yield 17.1 q/ha during 2003-04. The crop sequence wheat-maize-maize T5 treatment least yield of grain (15.1 q/ha) and green fodder 625.5 q/ha. Cultivation of leguminous crop after wheat harvest and before sowing of 3rd crop found to be significantly higher yielding cropping system. Crop residue was used as green manuring crop in situ. at harvesting stage.

Effect of organic matter on soil productivity : Data presented in table-2 shows that cropping sequence has significant role in maize crop productivity during 2010-11 after 6 year of similar trend was found as of the increased in soil condition. Due to few adaptation of leguminous or green manuring crop after harvest of wheat in April. It has better effect on soil physical, chemical and biological conditions of soils. Soil organic

Table-1 : Effect of cropping sequence on forage and grain yield of maize as a 3rd crop in sequence (2003-04).

Treatment			Maize yield qha^{-1}		Plant Height (cms)	Dry Matter qha^{-1}
1st Crop	2nd Crop	3rd Crop	Fodder	Grain		
Wheat	Sesbania	Maize	850.3	17.6	215.8	350.4
Wheat	Urd	Maize	775.8	16.3	203.7	289.2
Wheat	Mung	Maize	750.6	16.9	205.4	302.3
Wheat	Cowpea	Maize	825.9	17.3	209.5	307.5
Wheat	Maize	Maize	625.5	15.1	198.1	248.4
Wheat BF - Maize BF - Maize - BF			802.2	17.1	204.3	320.1
CD at 0.05%			11.3	1.01	7.03	6.15

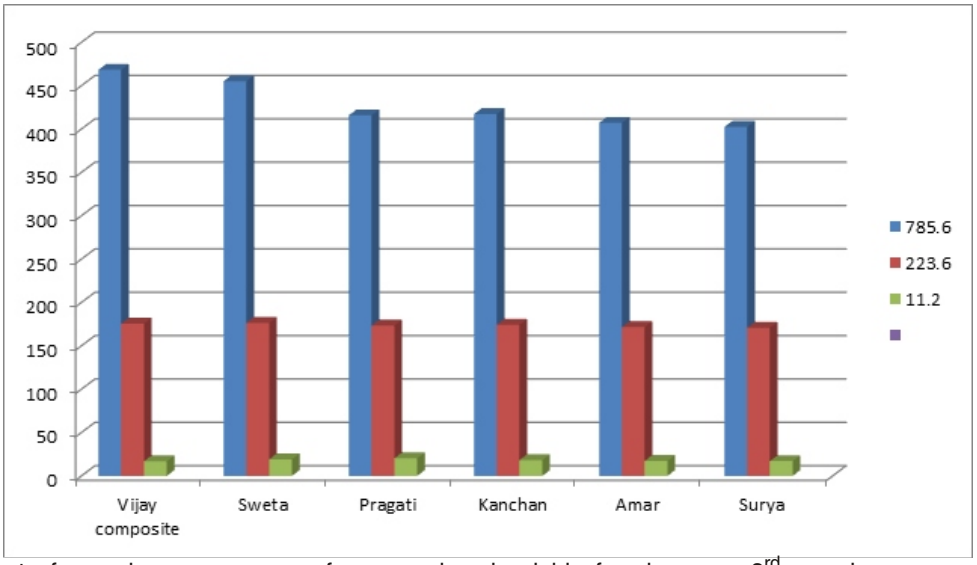

Fig.-1 : Effect of cropping sequence on forage and grain yield of maize as a 3rd crop in sequence (2003-04).

Table-2 : Effect of cropping sequence on forage and grain yield of maize as a 3rd crop in sequence (2010-11).

Treatment			Maize yield qha^{-1}		Plant Height (cms)	Dry Matter qha^{-1}
1st Crop	2nd Crop	3rd Crop	Fodder	Grain		
Wheat	Sesbania	Maize	850.3	17.6	215.8	350.4
Wheat	Sesbania	Maize	903.4	27.8	215.2	360.2
Wheat	Urd	Maize	782.2	19.1	211.3	320.1
Wheat	Mung	Maize	805.7	20.3	213.3	335.4
Wheat	Cowpea	Maize	836.1	20.7	215.0	340.5
Wheat	Maize	Maize	645.2	17.5	213.6	281.2
Wheat BF - Maize BF - Maize-BF			803.3	20.4	214.5	337.3
CD at 0.05%			9.53	0.86	8.16	7.65

matter content was increased from 0.43 to 0.64 and pH 5.5 to 6.9 during 2010-11. T_1, T_5, T_6 treatment had positive significant effect on grain yield and fodder yield (q/ha).

Effect of Wheat plant height and dry matter on yield: Soil having legumes after cereal (wheat) in Rabi season found to be more productive than cereal-cereal cropping sequence. Plant height and higher T_1, T_3, T_4 and T_6 respectively.

Data shows that yields were increased in 2010-11 over the 2003-04 years. All parameters and yields were increased might be due to better Agronomic practices, Soil organic matter, irrigation facilities and plant protection practices over the previous years. Farmers adapted the practices in the Rice-wheat system i.e. cereal system. Inclusion of leguminous based system improved the soil physical, chemical and biological conditions in the fields. Sesbania green manuring gave maximum yield of maize grain 27.8 q/ha followed by wheat-mung-maize yield 20.7 q/ha.

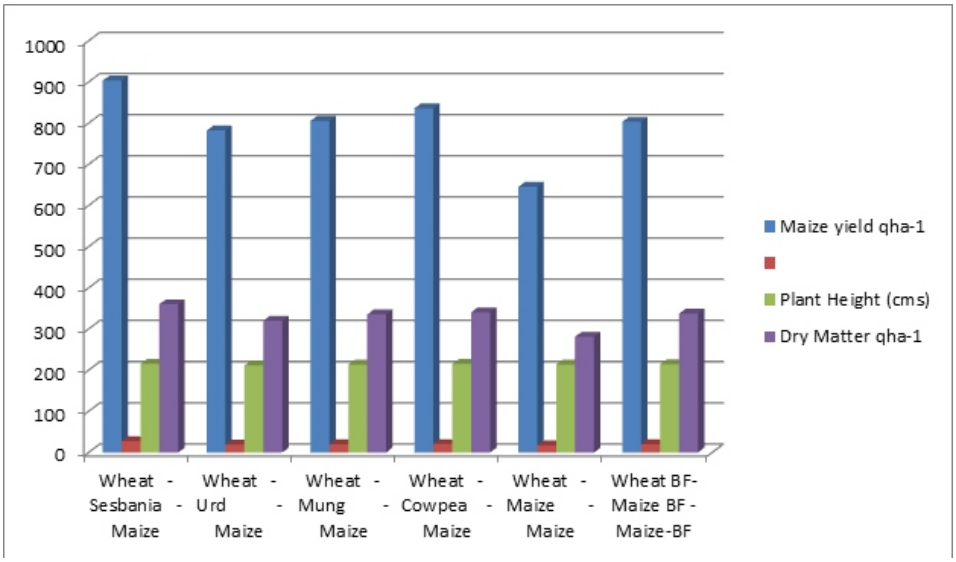

Fig.-2 : Effect of cropping sequence on forage and grain yield of maize as a 3rd crop in sequence (2010-11).

CONCLUSION

It may be concluded that inclusion of leguminous crops sesbania, cowpea, mung and urd in the cereal based systems found to be superior. Therefore farmers suggested to adopt cereal–legume based system rather than cereal-cereal system (Rice-Wheat-Sugarcane System). Grain yield from the data given in the table shows that crop legume based cropping sequence grown with 6 leguminous found to be more productive. Crop sequence cereal-cereal T5 found to be less productive. Second time crops performed better during 2010-11. Organic matter enhanced during the last 6 years though leguminous crops and green manuring.

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