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Effect of Seed Priming and Organic manures on growth and yield performance of *Brassica juncea* L. under *Populus deltoides* L. based agroforestry system

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ABSTRACT
A field experiment was conducted with Brassica juncea L.under Poplar during rabi season of 2020 at crop Research Farm, Department of silviculture & agroforestry, SHUATS, Prayagraj, (U.P.). It combines agricultural and forestry technologies to create more various, productive, profitable, healthy and sustainable land use systems, the most important use of poplar wood is pulp and paper. Poplar wood substitutes well for aspen for pulp and paper products, and is being grown for pulpwood. Growth of Brassica juncea L. crop T_6(Poultry Manure +24 hrs primed seed)Number of seedlingemergence (41.67 no.) and plant height (168.57cm), Number of branches per plant (8.36 no.), yield Number of siliqua per plant (222.32 no.) and length of siliqua per plant (6.01 cm), Number of seeds per siliqua (14.51 no.), Test weight (5.10g), Seed yield (1.97t/ha), Stalk yield (5.16t/ha), Harvest index (27.58%).The result obtained in this research work was found significant.
Key words:*Seed Priming,Brassica juncea L., Populus deltoides L., Yield analysis, Poultry Manure, FYM,Vermicompost.*

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INTRODUCTION

Agroforestry is an integrated approach of using the interactive benefits from combining trees andshrubs with crops and livestock. It combines agricultural and forestry technologies to create morediverse, productive, profitable, healthy and sustainable land use systems, In agroforestry systems,trees or shrubs are intentionally used within agricultural systems, or non-timber forest resourcesare cultured in forest environment [7]. *Populus deltoides* L. belong to the family Salicaceae. It is commonly called in English asEastern cottonwood or Eastern poplar. It is an exotic species introduced to India during 1950s [4]. The most important use of poplar wood is pulp and paper. Poplar wood substitutes well for aspenfor pulp and paper products, and is being grown for pulpwood extensively in all parts of theworld [2]. Priming allows some of the metabolic processes necessary for germination.In priming seeds are soaked in different solutions with high penetration potential. This prevents the seeds from absorbing in enough water for radical protrusion, thus suspending the seeds in the lag phase [8]. Mustard (*Brassica juncea* L.) is a member of the Brassicaceae family and in spite of beingone of the most important sources of edible oils rapeseed-mustard is generally grown onmarginal lands with poor fertility under rainfed conditions mostly. It is third in terms of oilproduction in the world and second most important edible oilseed crop in India after soyabean, accounts for nearly 20-22 per cent of total oilseeds produced in the country [1]. Oilseeds cultivated in India, rapeseed-mustard contributes 27 percentin the total oilseeds production after groundnut sharing 27.8 per cent in the India's

oilseedeconomy. It is estimated that 58 mt of oilseeds will be required by the year 2020, wherein theshare of Rapeseed- mustard would be around 24.2 metric tons, [3]. Farmyard manure is generally considered as best and reliable source in organic systems. FYM is a primary source of nitrogen for crops, continuous use of these manures for substitution of inorganic fertilizers leads to Phosphorus accumulation in the soil [6].Vermi-compost produces due to activity of earthworms. It is a rich source of macro and micronutrients, vitamins, growth hormones and micro-flora. Vermi-compost produce from different organic residues can supply 30 percent of total crop requirement as it is a potential source of readily available nutrients for plant growth [5]**.** Poultry manure is one of the potential organic sources of nutrients. Poultry production is one of the fastest growing enterprises @ 5-20% among the animal husbandry activities worldwide. It is estimated annually that about 500 million chicken populations is reared in India and poultry manure of 3.8 Metric tons is obtained.

MATERIAL AND METHODS

The present research entitled "Effect of organic manures on growth performance of mustard (*Brassica juncea* L.) Under poplar (*Populus deltoides* L.) based agroforestry system". Comprised of a field experiment which was carried out in the field offorestry research farm, Department of silviculture and agroforestry, Sam HigginbottomUniversity of Agricultural, Technology and Sciences, Prayagraj, 211007 (U.P.) during the *rabi* season 2019-2020. Prayagraj is situated in the south-eastern part of Uttar Pradesh.Geographically, Allahabad is located at 25^0 45' North latitude $81^0$85' East longitude and at analtitude of 98 m (322 ft.) above mean sea level (MSL). Prayagraj has a semi-arid climatic with both the extremes of temperature during winter season. During November – March' the temperature may drop down to as low as 20°C-30°C. The average annual rainfall is about 102 mm with maximum concentration with occasional showers during winter season.Treatments (80 kg N + 40 kg P_2O_5 + 40 kg K_2O/ha) through FYM, Vermicompost, Poultry manure. The field experiment was laid out in RBD with three replications and seven treatments. Mustard seeds were hydro-primed by soaking in distilled water for 0hr, 12hrs and 24hrs and seeds were dried before sowing. Seeds were being sown in poplar based agroforestry system with spacing involved 45×15 cm. To see the performance of mustard following parameters were recorded- Seedling emergence (no.), Plant height (cm), No. of branches per plant, No. of siliqua per plant, No. of seeds per siliqua, Length of siliqua (cm), Test weight (gm), Seed yield (t/ha), Stalk yield (t/ha), Harvest index (%).

RESULTS AND DISCUSSION

Growth attributes

Results obtained from the investigation undertaken to study the Effect of organic manures on growth and yield performance of mustard (*Brassica juncea* L.).Effect of Seed Priming and Organic Manures on Growth of *Brassica juncea* L. crop T_6 (Poultry Manure +24 hrs primed seed) seedling emergence number (41.67no.) and plant height (168.57cm), Number of branches per plant (8.36no.), T_4 (Vermi-compost+24 hrs primed seed) seedling emergence number (41.33no.) and plant height (166.23cm), Number of branches per plant (7.87no.), T_2 (FYM+24 hrs primed seed) seedling emergence number (40.67no.) and plant height (164.23cm), Number of branches per plant (7.22no.), T_5 (Poultry Manure +12 hrs primed seed) seedling emergence number (38.00no.) and plant height (162.89cm), Number of branches per plant (6.92no.), T_3 (Vermi-compost +12 hrs primed seed) seedling emergence number (37.67no.) and plant height (161.17cm), Number of branches per plant (6.46no.), T_1(FYM+12 hrs primed seed)seedling emergence number (37.33no.) and plant height (159.62cm),Number of branches per plant (5.82no.),T_0 (Control) seedling emergence number (29.00no.) and plant height (157.24cm), Number of branches per plant (4.58no.), at Poplar based Agroforestry system. The result obtained in this research work was found significant.

Table 1: Effect of Seed Priming and Organic Manures on Growth of *Brassica juncea* L. under *Populus deltoides* L. based Agroforestry system.

	Growth Attributes		
Treatments	**Seedling Emergence (no.) at 8DAS**	**Plant Height (cm) at 90DAS**	**Number of branches per plant (no.) at 90DAS**
T_0	29.00	157.24	4.58
T_1	37.33	159.62	5.82
T_2	40.67	164.23	7.22
T_3	37.67	161.17	6.46
T_4	41.33	166.23	7.87
T_5	38.00	162.89	6.92
T_6	41.67	168.57	8.36
F test	S	S	S
C.D. at 5%	2.56	0.48	0.12
S Ed(m)	0.82	0.15	0.04

Yield Attributes

Effect of Seed Priming and Organic Manures on Yield of *Brassica juncea* L. crop T_6 (Poultry Manure +24 hrs primed seed) Number of Siliqua per plant no. (222.32) and length of siliqua per plant (cm) (6.01), Number of seeds per siliqua no. (14.51), Test weight (5.10g), Seed yield (1.97t/ha), Stalk yield (5.16t/ha), Harvest index (27.58%), T_4 (Vermi-compost +24 hrs primed seed) Number of Siliqua per plant no. (219.74) and length of siliqua per plant (cm) (5.91), Number of seeds per siliqua no. (13.46), Test weight (4.89g), Seed yield (1.76t/ha), Stalk yield (4.91t/ha), Harvest index (26.34%), T_2 (FYM +24 hrs primed seed) Number of Siliqua per plant no. (212.24) and length of siliqua per plant (cm) (5.82), Number of seeds per siliqua no. (12.34), Test weight (4.75g), Seed yield (1.48t/ha), Stalk yield (4.67t/ha), Harvest index (24.10%), T_5 (Poultry Manure +12 hrs primed seed) Number of Siliqua per plant no. (205.25) and length of siliqua per plant (cm) (5.71), Number of seeds per siliqua no. (12.11), Test weight (4.63g), Seed yield (1.38t/ha), Stalk yield (4.32t/ha), Harvest index (24.16%), T_3 (Vermi-compost +12 hrs primed seed) Number of Siliqua per plant no (200.14) and length of siliqua per plant (cm) (5.67), Number of seeds per siliqua no. (11.85), Test weight (4.48g), Seed yield (1.28t/ha), Stalk yield (4.10t/ha), Harvest index (23.80%),T_1 (FYM+12 hrs primed seed) Number of Siliqua per plant no. (192.74) and length of siliqua per plant (cm) (5.41), Number of seeds per siliqua no. (11.60), Test weight (4.32g), Seed yield (1.15t/ha), Stalk yield (3.85t/ha), Harvest index (23.91%), T_0 (Control) Number of Siliqua per plant no. (154.08) and length of siliqua per plant (cm) (5.10), Number of seeds per siliqua no. (10.33), Test weight (4.23g), Seed yield (0.79t/ha), Stalk yield (3.37t/ha), Harvest index (18.98%), at Poplar based Agroforestry system. The result obtained was found significant.

Table 2: Effect of Seed Priming and Organic Manures on Yield of *Brassica juncea* L. under *Populus deltoides* L. based Agroforestry system.

	Yield Attributes				Yield		
Treatments	**Number of siliqua per plant (no.)**	**Length of siliqua per plant (cm)**	**Number of seeds per siliqua (no.)**	**Test weight (g)/(1000) seeds**	**Seed yield (t/ha)**	**Stalk yield (t/ha)**	**Harvest Index (%)**
T_0	154.08	5.10	10.33	4.23	0.79	3.37	18.98
T_1	192.74	5.41	11.60	4.32	1.15	3.85	23.91
T_2	212.24	5.82	12.34	4.75	1.48	4.67	24.10
T_3	200.14	5.67	11.85	4.48	1.28	4.10	23.80
T_4	219.74	5.91	13.46	4.89	1.76	4.91	26.34
T_5	205.25	5.71	12.11	4.63	1.38	4.32	24.16
T_6	222.32	6.01	14.51	5.10	1.97	5.16	27.58
F test	S	S	S	S	S	S	S
C.D. at 5%	0.69	0.18	0.13	0.25	0.09	0.14	1.82
S Ed(m)	0.22	0.06	0.04	0.08	0.03	0.05	0.59

CONCLUSION

Field experiment conducted on the "Effect of priming and organic manures on growth and yield performance of mustard (*Brassica juncea* L.) under poplar (*Populus deltoides*L.)based agroforestry system". It may be concluded that treatment T_6 rapeseed-mustard with(Poultry manure + 24 hours primed seed) is maximum in seedling emergence (41.67no.), plant height (168.57cm), number of branches per plant (8.36no.), number of siliqua per plant (222.32no.), length of siliqua per plant (6.01cm), number of seeds per siliqua (14.51no.), Test weight (5.10g), Seed yield (1.97t/ha), Stalk yield (5.16t/ha), Harvest index (27.58%)was found to be the best treatment recommended for cultivation under Poplar based Agroforestry system during *ravi* season.

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