



EVOLUTION OF BROCCOLI LINE BASED ON GERMINATION

Kamal Iohana, Saleem Raza and Prabhat Pardhan

1. Department of Plant Breeding & Genetics, Sindh Agriculture University Tandojam-Pakistan
2. Department of Pre –Engineering science AJ Science Collage Mirpurkhas Pakistan

Abstract: The current investigation was explored in Mirpurkhas district of Sindh province by evaluating broccoli line in different soil based on germination test under normal conditions. The research was conducted in the month of November 2022 during the Rabi season, initially experiment was carried out in pots, the F1 hybrid of broccoli was grown in 8 pots, and these pots were grown in two types of the soil. Pot with organic compost which contain 10 seeds per pot revealed that the maximum germination percentage was recorded in POT-III resulted 90% germination, followed by POT-II 80% while the minimum germination percentage was noticed in POT-VIII 30%, the overall germination percentage regarding pot with organic compost soil was observed (61.25%). It indicates that soil possess rich source of organic matter is best for cultivation of this crop. In case of pot with garden top soil which was sown 15 number of seeds per pot the maximum germination percentage was noted in POT-VI (80%), while minimum was recorded in POT-IV (40%) the overall germination percentage was remained (57.5%). after the one month of germination these plants were transplanted in field, these plants were transplanted in rows randomly, at the time of maturity the whole growth was successful. Transplanted plants were grown successfully with all parameters, it is proposes that broccoli can be grown in Mirpurkhas district of Sindh province and it possess good genetic resource and necessary for future selection and it must be included in horticultural research program.

Key words: Broccoli, Different soils, Germination, pots and field.

1-Introduction: A significant wintertime vegetable from the Brassicaceae family is broccoli (*Brassica oleracea* L.var *italica* Plenck). Green, white, and purple are the three different head colours, with the green form being the most nutrient-dense. With the exception of secondary heads, which grow in the leaf axils and may make up to 50% of the overall production, it resembles cauliflower in terms of shape. When comparing Cole crops, broccoli is more nutrient-dense than others like cabbage, cauliflower, and kohlrabi. It has respectable levels of thiamin, riboflavin, niacin, and iron as well as being fairly high in carotene and ascorbic acid. Similar to cauliflower, it is eaten as a cooked vegetable and is very useful in soup, salad, and mixed vegetable dishes. Since a few years ago, broccoli consumption has been rising steadily, and recently, emphasis has been placed heavily on broccoli's ability to promote health. Antioxidant and anticancer chemicals are abundant in broccoli. It has been demonstrated to be successful in preventing some malignancies. Isothiocyanates, dithiolethiones, and indoles are examples of sulfur-containing substances found in the normal broccoli photochemical. It has been demonstrated that a number of isothiocyanates can prevent cancers brought on by chemical carcinogens. (Thapa et al 2019).

Several additional *italica* vegetables are known. The sprouting broccoli type is a distinct vegetable and is characterized by many lateral inflorescences, a small apical crown typically bisected by cauline leaves, later heading and flowering, and prized culinary properties. (Stansell and Thomas, 2020). Broccoli (*Brassica oleracea* L.), is a healthy vegetable for human consumption known to combat obesity (FAO, 2006.) a disease that has grown worldwide (OMS, 2012) as well as acting as anticancer agent (Ares et al, 2014). For these reasons it is important to develop methods to increase the production of this plant species.

The use of bio fertilizers in combination with chemical fertilizers and organic manures offers a great opportunity to increase the production as well as the quality of broccoli (Shree et al., 2014). Integrated nutrient management having chemical fertilizers applied along with organic sources of nutrients is an effective method for economization of production cost as well as maintenance of soil fertility (Kumar et al., 2011). Organic manure can serve as an alternative practice to mineral fertilizers and microbial biomass (Suresh et al., 2004). The crops grown with integrated nutrient management techniques are nutritionally and environmentally superior. One of the four attributes

of seeds that affect its productivity is their physiological quality, which is evaluated by the germination test (De Moraes et al, 2012). Therefore, keeping in view the above facts in mind, an attempt has been made in the present investigation to study the Effect of INM practices on growth and yield characters of sprouting broccoli (*Brassica oleracea* L. var. *italica*).

2- Material & Method.

The experiment was conducted in the month of November 2022 during winter season by using green magic F1 hybrid Variety of broccoli based on germination percentage, the research was laid out to observe germination percentage in various soils of Mirpurkhas district of Sindh province, the experiment was carried out in two places initially it was observed in pot experiments in green house, later it was tested in fields. Good management practices (GMP) are required for optimal growth, yield, and quality.

Two types of the soils were utilized for analyzing germination percent in pots as well as in main fields

Sample A: Garden Soil is used (Garden soil is just topsoil that has additional organic matter, such as compost, peat, crushed bark added throughout. It is meant to be used in the garden, where the additional fertility and nutrients help your plants. Even some garden soils are designed particularly for growing flowers or vegetables.)

Sample B: Organic Compost Soil is used (a combination used for fertilizing and conditioning land that is mostly made up of decomposed organic debris. Decomposed carbon-based material including fruits, vegetables, manure, grasses, dead leaves, and woody debris makes up the majority of compost)

Other applications: there are many other crop management practices were applied such as seed soaking, irrigation, fertilizer etc. The seeding rate depends on the spacing. Two rows were planted in a bed for this investigation, with the bed center 2 inches apart and the seed 0.5 inches apart inside the row. During the growth phase, Nitrogen, potash and phosphorous are the most common fertilizers applied through the furrow irrigation method. Around five times as much nitrogen as potash is provided.

STASTICAL ANALYSIS

The study was based on germination the calculated data was assessed by using the germination percentage formula recommended by (Khalaki et al, 2019).

$$\text{Germination percentage (\%)} = \frac{\text{Germinated seeds}}{\text{Total seeds}} \times 100$$

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3-Result and Discussion

Broccoli is an important vegetable crop which is significantly utilized globally. The aim of this research to cultivate broccoli in Mirpurkhas district, because Mirpurkhas district possess horticulture research institutes and various stations and sub stations for vegetables and fruits. Our research was based on evaluation of broccoli line by checking germination percentage. Germination percentage is an important parameter for any successful growth of plants, therefore our study comprised single line of F1 hybrid which was tested in pots there are eight pots were grown these pots were checked with two different soil applications organic compost soil and with normal garden top soil. The result regarding germination percentage for Pot with organic compost is represented in table-1 each pot was sown with 10 number of seeds per pot which revealed that the maximum germination percentage (90%) was noted in POT-III, while the POT-II was remained next (80%), while the minimum percentage was noted in POT-I (30%) and the total germination percentage was observed (75%) in pot with organic compost. In case of pot with testing of garden soil in which is presented in table-2 each pot was sown with 15 seeds the POT-VI exhibited maximum germination percentage (80%), followed by POT-I (60%). Whereas the overall germination percentage was remained (56.6%). It indicates that Mirpurkhas soil and environment possess good resources for broccoli cultivation, could be essential marketable source if it is included in horticultural research program. Later these germinated plants were transplanted into main field in seed bed rows randomly, the transplanted plants were recommended with normal crop application such as fertilizer applications and irrigation applications the remarkable results were obtained from utilized resources, suggesting that broccoli possess good environment for this growth and can be obtained maximum yield hence, it is necessary that it must be included in horticultural breeding program. Our finding related with the research of (Martínez et al, 2014) they reported almost similar germination percentage under intensities of variable magnetic field.

Conclusion

From the whole research it is concluded that broccoli is an important vegetables and possess good market it must be included under scientific research in Mirpurkhas and can be grown successfully, the overall germination percentage was remained good it indicates that broccoli comprised majority of good resources and feasible for cultivation.

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