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Path coefficient analysis of three faba bean cultivars sprayed with Nano-iron

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In the 2020/2021 agricultural season, a farmer's field in Al-Rumytha, 25 km north of Almuthanna governorate, was used to test the effects of spraying Nano-iron at three concentrations (0, 100, 200) mg Fe l-1 on three faba bean cultivars (Equadelji, Luz De otono, Equadules) on growth and productivity. The split-plot experiment used three replications of the Randomized Complete Block Design. The mai (Gutierrez) plots had cultivars, and the sub-plots had Nano-iron fertilizer. Spraying Nano-iron at 200 mg Fe l-1 significantly increased the average number of pods per plant, weight of 100 seeds, and total seed yield, with the highest averages of 18.10 pods per plant-1, 113.10 g, and 3420 kg ha-1, respectively. Nano-iron spraying does not affect pod length or seed count. The cultivars studied varied greatly. Equadules outperformed the other two cultivars in pod length, pod count per plant, and seed yield with 3795 kg ha-1. The cultivars had similar seeds per pod and 100 seed weights. The interaction significantly affected pod number and seed yield. Spraying Equadules cultivar with 200 mg Fe l-1 yielded 22.00 pods plant-1 and 4280 kg ha-1 of seed. The genetic correlation study found a positive correlation (0.308, 0.745**, 0.098, and 0.165) between total seed yield, pod length, pod number per plant, seeds per pod, and 100 seed weight. 100 seeds' weight, pod length, and pod number per plant were (0.439* and 0.139). Pod number and pod length were also strongly correlated (0.673**). Path Coefficient analysis showed a positive and significant effect of pod quantity per plant on seed yield (1.062 and 0.370). Seed yield was directly affected by pod length and seeds per pod (0.254 and 0.109). Based on the above, subsequent breeding programs can use pod numbers per plant and weight per 100 seeds as selection guides to select seed yield.
Keywords: Path coefficient analysis; faba bean cultivar; nano-iron; spray fertilizer; sprayed by Nano-iron.

INTRODUCTION

The faba bean (Vicia faba L.), which is a member of the legume family, is a crop that can be grown. The seeds of this plant contain high levels of protein (up to 40%) and carbohydrates. The percentage reaches 56% in most cultivars (Natalia *et al.*, 2008). It will raise the relevance of this crop because it has a high nutritional value for human life and is a less expensive source of protein than pricey animal protein. Additionally, faba beans have considerable fiber, vitamins, and mineral components. Nitrogen in the atmosphere is fixed by the root nodes in the soil (Carmen *et al.*, 2005).

Nanotechnology applications in agriculture are one of the current ways to enhance growth and yield by increasing water and nutrient uptake and being economical. Nanotechnology applications in agriculture are one of the modern approaches (Noaema *et al.*, 2020). When compared to other types of fertilization, foliar fertilization is among the approaches that are both the most effective and the most cost-effective. When the plant's roots have difficulty keeping up with the growing demands, it is essential to feed the plant with the essential nutrients it requires (Martin, 2002). Iron is an essential nutrient for leguminous plants because it is a necessary component in the formation of the nitrogenase enzyme, which plays a role in the process of fixing the nitrogen that is present in the atmosphere, and because iron plays an essential role in the formation of the leguminous hemoglobin pigment (Malvi, 2011).

Planting high-yielding varieties of faba bean and following effective field practices are the foundations for increasing faba bean production. The goal is to get the latent energies of such cultivars and determine the extent of their adaptation to the environmental circumstances of the region. There is a direct relationship between the phenotypic and anatomical

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