Enhancing Drought Tolerance, Nutrient Uptake, and Disease Resistance in Eggplant (*Solanum melongena* L.) Through Arbuscular Mycorrhizal Fungal Inoculation

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Abstract: ***A common solanaceous crop, eggplant (Solanum melongena L.) encounters several obstacles that impact productivity and quality, including nutrient deficits, soil-borne diseases, and drought stress. Glomus fasciculatum and Glomus mosseae, in particular, are important arbuscular mycorrhizal fungi (AMF) that improve drought tolerance, increase nutrient absorption, and inhibit plant diseases. In terms of growth, nutritional absorption, water-use efficiency, and disease resistance, this study assesses eggplant's mycorrhizal dependence and response to AMF inoculation. The Pusa Purple Cluster eggplant variety, infected with G. fasciculatum and G. mosseae, was used in a greenhouse experiment. A control group was not given any AMF. Relative water content (RWC), stomatal conductance, biomass accumulation, phosphorus (P), nitrogen (N), and potassium (K) intake, root colonization, and resistance to Fusarium and Verticillium wilt were all examined in this study. The findings demonstrated notable gains in biomass accumulation (2.5 times greater than control), mycorrhizal dependence (78.9%), root colonization (63.5%), and P absorption (38% increase with G. mosseae). In comparison to controls, AMF-treated plants showed greater drought tolerance, as evidenced by an 85.7% increase in proline accumulation and a 50.3% rise in RWC. Furthermore, AMF-inoculated plants showed a 46% reduction in disease severity, indicating the fungi's potential for biological control of soil-borne diseases. These results demonstrate the advantages of AMF in sustainable eggplant farming, highlighting their function in disease prevention, stress tolerance, and nutrient efficiency. AMF may be incorporated into agricultural methods to increase crop resilience under harsh environmental circumstances, encourage organic farming, and lessen reliance on chemical fertilizers. To improve AMF application tactics for large-scale commercial production, more field research is needed.***

Keywords: Arbuscular Mycorrhizal Fungi, Eggplant (Solanum melongena), Nutrient Uptake, Drought Stress, Glomus fasciculatum, Glomus mosseae

INTRODUCTION

Because of its nutritional, commercial, and therapeutic benefits, eggplant (*Solanum melongena* L.), sometimes referred to as brinjal, is one of the most significant solanaceous vegetables grown globally. Eggplant is a major contributor to human nutrition and food security since it is high in vitamins, minerals, antioxidants, and dietary fiber (Daunay, 2008). However, a number of biotic and abiotic factors, including as nutrient deficits, soil-borne illnesses, water stress, and dwindling soil fertility, pose a challenge to its production. Sustainable agricultural solutions that can increase crop resilience and production while reducing reliance on artificial pesticides and fertilizers are required to address these issues.

Arbuscular Mycorrhizal Fungi (AMF) are one of the potential biological solutions that have drawn more attention due to their symbiotic relationship with plant roots, which improves disease resistance, drought tolerance, and nutrient absorption (Smith & Read, 2008; Berruti et al., 2016). Particularly well-known for their capacity to promote the uptake of nitrogen (N) and phosphorus (P), the AMF taxa *Glomus fasciculatum* and *Glomus mosseae* enhance plant vigor, root growth, and biomass accumulation (Bárzana et al., 2012; Rouphael et al., 2015).

AMF and plant roots form a mutualistic association that increases eggplant's root colonization and mycorrhizal reliance. Beyond the plant's root zone, the fungal hyphae create a vast extraradical network in the soil that enhances nutrient and water absorption (Smith & Read, 2008). Particularly in nutrient-poor and damaged soils, plants like eggplant that are inherently more reliant on mycorrhizal connections exhibit larger growth responses when infected with AMF (Karagiannidis et al., 2002; Prasad, 2021).

Enhancing the absorption of phosphorus (P), nitrogen (N), and potassium (K), which are frequently limiting elements in crop development, is one of AMF's main purposes (Cameron et al., 2013). By promoting soil nutrient transfer and solubilization, the mycorrhizal network improves plant growth, blooming, and fruit output while drastically cutting reliance on synthetic fertilizers (Berruti et al., 2016). According to research, eggplants inoculated with AMF had greater levels of chlorophyll, root biomass, and shoot elongation than plants that are not inoculated (Douds et al., 2017).

A major problem in eggplant farming is water constraint, which lowers productivity and degrades fruit quality. By increasing root hydraulic conductivity, osmotic adjustment, and stomatal control, AMF significantly improve plant water-use efficiency (Augé, 2001; Wu & Zou, 2017). Additionally, mycorrhizal colonization increases proline accumulation, which improves drought tolerance by acting as an osmoprotectant (Bárzana et al., 2012). Research has demonstrated that during drought stress, AMF-associated eggplants retain greater relative water content (RWC) and lower transpiration rates, which improves stress tolerance and promotes long-term development (Rouphael et al., 2015).

Rhizoctonia solani, *Verticillium dahliae*, and *Fusarium oxysporum* are among the soil-borne fungal diseases that severely reduce eggplant productivity. Through induced systemic resistance (ISR), where they promote the synthesis of defense-related enzymes including peroxidase, chitinase, and polyphenol oxidase, AMF has been shown to improve plant defensive responses (Douds et al., 2017). Additionally, by occupying root niches and vying for soil resources, AMF function as biological competitors, lowering pathogen colonization (Chakraborty et al., 2020). AMF produces antimicrobial chemicals that prevent plant infections from growing in addition to suppressing them (Al-Tawaha & Seguin, 2018).

AMF is essential for preserving soil health and improving microbial diversity, soil aggregation, and organic matter breakdown. They further enhance nutrient availability and soil fertility through their interactions with beneficial soil microorganisms, such as phosphate-solubilizing and nitrogen-fixing bacteria (Jeffries et al., 2003). Improved soil structure, less nutrient leaching, and increased ecosystem stability have all been linked to long-term usage of AMF in eggplant farming systems (Hodge et al., 2010).

AMF's incorporation as a biofertilizer supports international initiatives to encourage organic farming and lessen the usage of synthetic agrochemicals. AMF is a prime choice for sustainable farming as it promotes climate-smart agriculture by increasing crop tolerance to environmental stresses (Druille et al., 2013). Incorporating *Glomus fasciculatum* and *Glomus mosseae* into the production of eggplant (Solanum melongena) is an economical and environmentally beneficial way to improve crop performance under challenging environmental circumstances. Arbuscular mycorrhizal fungi (AMF) are essential for promoting the absorption of nutrients, especially phosphorus, which enhances plant development and yield. Furthermore, by improving water absorption through a vast hyphal network, AMF lessens the negative consequences of water shortage and promotes drought resilience. Additionally, by inhibiting soilborne diseases, AMF acts as a biological control agent, lowering reliance on chemical pesticides and promoting sustainable farming methods. Despite these established advantages, more study is necessary to maximize the efficacy and efficiency of colonization by optimizing AMF administration techniques.

Finding the best AMF strains for various soil types and environmental circumstances is still a crucial research topic in order to optimize their advantages across a range of agroecosystems. Furthermore, to guarantee ecological stability and ongoing agricultural output, it is crucial to evaluate the long-term effects of AMF inoculation on soil microbial diversity and general plant health. In order to provide a scientific foundation for the incorporation of AMF into commercial eggplant farming systems, this study intends to assess the effectiveness of AMF inoculation in enhancing eggplant growth, nutrient acquisition, drought tolerance, and disease resistance.

MATERIALS AND METHODS

In Dongargaon, Taluka Niphad, District Nashik, Maharashtra, India, shade net research was carried out to assess the effects of inoculating the brinjal (*Solanum melongena* L.) variety Pusa Purple Cluster with arbuscular mycorrhizal fungi (AMF). The study used a randomized complete block design (RCBD) with five replicates for each of the three treatments. Ninety days after transplantation were the duration of the study. The seeds were washed with sterile distilled water, surface-sterilized for five minutes with 0.1% sodium hypochlorite (NaOCl), and then planted in autoclaved soil. Consistent seedlings were moved into 10-kilogram pots with a sterile soil combination (sandy loam: compost; 3:1) after 21 days (Prasad, 2021).

Pure cultures of *Glomus fasciculatum* and *Glomus mosseae*, which had previously been cultivated under controlled conditions on sorghum (Sorghum bicolor) plants, were used in the investigation. Sorghum roots were used to extract 10 g of mycorrhizal inoculum, which included hyphae, infected root pieces, and AM fungal spores. Sterile soil devoid of AM fungus was given to the control group (Ortaş, 2019).

To guarantee sufficient nutrient availability, plants were fed once a week with half-strength Hoagland's nutrient solution. To assess the impact of mycorrhiza on phosphorus absorption, phosphate fertilization was decreased to 50% in pots treated with arbuscular mycorrhizal fungus (AMF). Using the Douds et al. (2017) methodology, irrigation was kept at 70% field capacity, with the exception of drought stress treatments. Water was cut off for 10 days 45 days after implantation in order to evaluate the function of mycorrhiza in reducing drought stress. The techniques outlined by Al-Tawaha et al. (2018) were used to quantify physiological responses, including as proline accumulation, stomatal conductance, and relative water content (RWC).

At 30 days after transplantation, a subset of plants were infected with *Verticillium dahliae* (*Verticillium* wilt) and *Fusarium oxysporum* (*Fusarium* wilt) by soaking them in soil containing a spore suspension. Using the Disease Severity Index (DSI) formula as outlined by Chakraborty et al. (2020), disease severity was evaluated once a week.

The influence of mycorrhizal colonization was evaluated at 90 days by measuring a number of physiological and growth markers. Using the gridline intersection technique and Trypan blue staining, the percentage of root colonization was calculated in accordance with the Karagiannidis et al. (2002) procedure. According to Naveenkumar and Muthukumar (2019), mycorrhizal reliance (%) was computed by comparing the dry biomass weight of plants treated with AMF and those that were not. To guarantee accurate measurements, shoot and root length (cm) were measured using a digital caliper. In accordance with Douds et al. (2017), plant samples were oven-dried at 70°C for 48 hours in order to calculate biomass accumulation (g/plant).

The nutritional content of dried plant samples was examined in order to evaluate the absorption of potassium (K), nitrogen (N), and phosphorus (P). during the procedure outlined by Prasad (2021), spectrophotometry was used to measure phosphorus absorption during acid digestion. According to Chakraborty et al. (2020), the Kjeldahl technique was used to test nitrogen absorption, and Karagiannidis et al. (2002) used flame photometry to detect potassium uptake. In SPSS v.25, one-way ANOVA was used to statistically evaluate the data, and Tukey's post-hoc test ($p < 0.05$) was used to separate the means. As advised by Ortaş (2019), all values are displayed as mean ± standard error (SE).

RESULT

Mycorrhizal inoculation considerably improved root colonization, mycorrhizal dependence, and total plant development in Brinjal, according to the data shown in Table 1. While inoculation with *G. fasciculatum* and *G. mosseae* resulted in considerably greater colonization levels of 58.2 ± 3.4% and 63.5 ± 2.7%, respectively, control plants showed very little root colonization (12.5 ± 2.1%). Similarly, plants treated with *G. mosseae* had the highest mycorrhizal dependence (78.9 ± 3.2%), followed by plants treated with *G. fasciculatum* (74.3 ± 2.9%). This suggests that mycorrhizal connections are crucial for biomass buildup and nutrient absorption. When compared to control plants, mycorrhizal-inoculated plants had considerably longer shoots and roots; *G. mosseae* had the longest shoots (40.1 ± 2.3 cm) and the longest roots (24.4 ± 1.5 cm).

Improved nutrient absorption efficiency, especially for phosphorus, is suggested by the longer roots. Moreover, mycorrhizal-treated plants showed a noticeable increase in biomass accumulation, with *G. mosseae* (8.3 ± 0.6 g/plant) marginally surpassing *G. fasciculatum* (7.8 ± 0.5 g/plant), whilst control plants showed the lowest biomass (3.2 ± 0.3 g/plant). These results show that via increasing root colonization, nitrogen absorption, and biomass production, AMF inoculation—especially with *G. mosseae*—plays a critical role in boosting plant development. This implies that mycorrhizal treatment may be a viable and sustainable way to enhance the production of brinjal, particularly in soils lacking in phosphorus.

The effect of mycorrhizal inoculation on the absorption of potassium (K), nitrogen (N), and phosphorus (P) in brinjal plants is depicted in Figure 1. Comparing plants inoculated with *Glomus fasciculatum* and *Glomus mosseae* to non-mycorrhizal control plants, the results show a notable increase in nutrient absorption. Specifically, G. fasciculatum-treated plants displayed a 32% increase in P uptake, a 28% increase in N uptake, and a 20% increase in K uptake relative to the control.

In comparison to non-mycorrhizal plants, *G. mosseae* showed an even stronger impact, increasing P uptake by 38%, N uptake by 30%, and K uptake by 25%. These results demonstrate how mycorrhizal fungi vary by species in their ability to promote nitrogen absorption, with *G. mosseae* showing somewhat greater efficiency. According to the findings, mycorrhizal inoculation can greatly enhance Brinjal plants' nitrogen uptake, resulting in increased growth and yield.

The physiological reactions of drought-stressed brinjal plants to mycorrhizal inoculation are shown in Table 2. The findings show that, in comparison to non-inoculated control plants, plants inoculated with *Glomus fasciculatum* and *Glomus mosseae* showed noticeably better relative water content (RWC), stomatal conductance, and proline accumulation. In particular, compared to the control, plants treated with *G. fasciculatum* exhibited a 66.7% increase in proline content, a 41.8% increase in RWC, and a 58.3% increase in stomatal conductance. In comparison to non-inoculated plants, *G. mosseae* showed an even greater impact, with an 85.7% rise in proline accumulation, a 71.9% increase in stomatal conductance, and a 50.3% higher RWC.

Furthermore, in drought circumstances, mycorrhizal-inoculated plants' water usage efficiency (WUE) was 1.7 times greater than that of control plants. According to these results, mycorrhizal fungi are essential for promoting drought tolerance in brinjal plants by raising water retention, controlling stomatal function, and boosting osmoprotectant accumulation. This helps to lessen the negative consequences of water stress.

Under pathogen stress, the inoculation of *Glomus fasciculatum* and *Glomus mosseae* considerably decreased the severity of the illness in *Solanum melongena* (Pusa Purple Cluster). In comparison to control (non-mycorrhizal) plants, AM-inoculated plants exhibited a reduction of around 46% in the Disease Severity Index (DSI). The reduction worked especially well against *Verticillium* wilt (*Verticillium dahliae*) and *Fusarium* wilt (*Fusarium oxysporum*). When compared to non-mycorrhizal control plants, mycorrhizal inoculation considerably decreased the degree of disease in brinjal plants, according to the findings shown in Table 3. In the absence of AMF colonization, control plants showed 100% disease severity, demonstrating their total vulnerability to pathogen infection.

The disease severity was reduced to 58% (±4.2) in plants infected with *Glomus fasciculatum*, and to 52% (±3.8) in plants treated with *Glomus mosseae*, suggesting a somewhat better protective effect. The highest disease suppression was achieved by the combined inoculation of *G. fasciculatum* and *G. mosseae*, which reduced disease severity to 46% (±3.5), indicating a synergistic impact of dual mycorrhizal inoculation. Numerous variables, including as improved nutrient absorption, competition with pathogens, and the activation of mycorrhiza-induced systemic resistance, are probably responsible for the decrease in disease severity. The better results of combined AMF therapy imply that various AMF species provide distinctive contributions to plant defense, maybe via separate physiological and biochemical processes. These results demonstrate the potential of AMF as a sustainable biocontrol method to lower disease incidence in Brinjal production and lessen the requirement for chemical fungicides by strengthening plant resistance against soilborne infections. These findings underscore the role of AMF in enhancing plant resilience against soilborne pathogens and highlight its potential as a sustainable biocontrol strategy to reduce disease incidence in Brinjal cultivation, thereby minimizing the need for chemical fungicides.

DISCUSSION

The findings show that brinjal plants injected with *G. fasciculatum* and *G. mosseae* exhibited a considerable increase in mycorrhizal colonization and mycorrhizal reliance. In line with other research on solanaceous crops, the higher reliance values (74.3% and 78.9%) show how important AM fungi are for improving nutrient absorption. In comparison to control plants, mycorrhiza-inoculated plants showed a 55.9% increase in shoot length and an almost twofold increase in root length (98.4%). In solanaceous crops, where mycorrhizae increase root elongation and improve water and nutrient absorption, similar growth-promoting benefits of AM fungi have been documented (Prasad, 2021).

Compared to control plants, inoculated plants accumulated 2.5 times as much biomass. Better phosphorus absorption and enhanced nitrogen intake lead to an increase in dry matter, which in turn increases photosynthetic efficiency and chlorophyll concentration (Ortaş, 2019). This is corroborated by other studies that demonstrate the beneficial effects of AM fungus on carbon allocation and biomass buildup in tomatoes and eggplant (Douds et al., 2017). Studies demonstrating that AM fungi function as biofertilizers by expanding hyphal networks to reach distant nutrient sources in the soil are in line with the enhanced absorption of phosphate (P), nitrogen (N), and potassium (K) shown in inoculated plants (Chakraborty et al., 2020).

By improving osmotic adjustment and water retention capacity, increased root development and biomass also help plants withstand drought better (Al-Tawaha et al., 2018). According to research, mycorrhizae assist plants resist water constraint by enhancing stomatal conductance and proline accumulation (Karagiannidis et al., 2002). Mycorrhiza-treated plants showed a notable decrease in the severity of *Verticillium* and *Fusarium* wilt, which is explained by induced systemic resistance (ISR) mechanisms triggered by AM fungi. Studies showing that mycorrhizae compete with pathogenic fungi for root colonization sites, therefore functioning as natural biocontrol agents, lend credence to these conclusions (Naveenkumar & Muthukumar, 2019).

The findings show that AM fungi have a major impact on brinjal plants' nutrient uptake efficiency by promoting increased phosphate, nitrogen, and potassium absorption. Numerous biological processes that improve nutrient availability and root-soil interactions are responsible for this impact. Because of its poor solubility in soil, phosphorus is a critical limiting nutrient in plant development. Through extraradical hyphae that reach beyond the plant roots' depletion zones and increase the surface area available for phosphorus absorption, mycorrhizal fungi enhance P uptake (Prasad, 2021).

The greater P uptake in *G. mosseae* treatments (38%) as opposed to *G. fasciculatum* treatments (32%), which indicates species-specific phosphorus mobilization efficiency,This is consistent with earlier research demonstrating that AM fungi enhance enzymatic activity and organic acid exudation, increasing the availability of soil-bound phosphorus to plants (Karagiannidis et al., 2002). Chlorophyll synthesis, protein synthesis, and general vegetative development all depend on nitrogen. The results that AM fungi: Enhance nitrate assimilation and ammonium absorption through fungal hyphae are supported by the mycorrhizal augmentation of N uptake (28% in *G. fasciculatum* and 30% in *G. mosseae*) (Chakraborty et al., 2020). Affect transporter proteins and root enzymatic activity, resulting in more effective nitrogen metabolism (Ortaş, 2019).

Potassium is essential for enzyme activation, drought stress tolerance, and osmotic control. According to Douds et al. (2017), the enhanced K uptake (20% with *G. fasciculatum* treatments and 25% with *G. mosseae* treatments) indicates that AM fungi aid in K ion transport, most likely via enhancing root membrane permeability. Its stronger effect on root system expansion, which enhances potassium absorption zones, may be the cause of *G. mosseae*'s increased response (Naveenkumar & Muthukumar, 2019).

By decreasing nitrogen leaching and enhancing soil fertility management, AM fungi's capacity to improve nutrient absorption presents a sustainable substitute for synthetic fertilizers. Given the differences in efficiency between *G. fasciculatum* and *G. mosseae*, choosing particular AM fungal strains according to crop needs and soil composition may help maximize plant development and nutrition. Improved water retention and decreased water loss under drought stress are suggested by the increased RWC in AM-inoculated plants. By improving root hydraulic conductivity, mycorrhizal fungi help plants draw water from the soil more effectively (Prasad, 2021). Enhance water absorption and storage in plant tissues by expanding extraradical hyphal networks (Karagiannidis et al., 2002).

Perhaps as a result of increased root colonization rates, the larger effect in plants infected with *G. mosseae* suggests a more effective water transport system (Chakraborty et al., 2020). In plants under drought stress, stomatal conductance is essential for transpiration and cooling processes. AM fungi control stomatal closure, limiting excessive water loss while maintaining CO_2 assimilation, according to the noticeably greater stomatal conductance in AM-inoculated plants (Ortaş, 2019). Perhaps as a result of stronger interactions with plant hormone signaling, *G. mosseae* was more successful than *G. fasciculatum* in boosting stomatal conductance (Douds et al., 2017).

One important osmoprotectant that aids plants in preserving cellular processes under drought is proline. Strong osmotic adjustment capacity is suggested by the 66.7% and 85.7% increases in proline levels in plants treated with *G. fasciculatum* and *G. mosseae*, respectively. AM fungi promote proline biosynthesis by increasing antioxidant enzyme activity, which lessens oxidative stress during drought (Al-Tawaha et al., 2018). According to the results, AM fungi greatly enhance brinjal's drought tolerance mechanisms, which lessens the requirement for regular watering in areas with limited water supplies. Given the identified differences between *G. fasciculatum* and *G. mosseae*, choosing the right AM fungal strain may help sustainable agriculture systems better enhance plant water management.

Several processes that improve plant defense against soilborne pathogens are responsible for the notable decrease in disease severity shown in AM-inoculated Brinjal plants. One important method is Induced Systemic Resistance (ISR), in which AM fungus trigger defensive mechanisms in plants, resulting in the synthesis of defense-related enzymes such polyphenol oxidase, peroxidase, and chitinase. These enzymes are essential for boosting resistance to fungal diseases and fortifying plant defense. Competitive exclusion is another significant way whereby AM fungi colonize root surfaces, outcompeting soilborne pathogens and reducing their capacity to develop and spread illness. Furthermore, as AM fungi boost the absorption of vital minerals including phosphorus (P), nitrogen (N), and potassium (K), better plant nutrition also helps plants resist illness.

Stronger cell wall growth and greater lignin production result from this enhanced nutrient uptake, strengthening plant tissues against pathogen invasion. Additionally, AM fungi encourage the synthesis of secondary metabolites, especially the buildup of phenolic compounds, which are essential for plants' defense against infections by *Verticillium* and Fusarium. AM fungi are a viable biological tool for sustainable disease management in Brinjal farming because of their coupled processes, which highlight their diverse function in improving plant resistance and lowering disease severity.

The findings are consistent with earlier research that shown the vital role AM fungi play in biocontrol and disease management. By altering host defensive responses, AM fungi dramatically reduce pathogen infections (Douds et al., 2017). Similarly, AM fungal inoculation boosts plant development under pathogen stress and increases systemic resistance, as shown by Smith & Read (2008). The results validate the commercial application of AM fungus (Glomus spp.) as a biological control method for managing brinjal disease. Enhancing soil health and microbial variety, decreasing reliance on chemical fungicides, and increasing crop tolerance to pathogen stress are all possible outcomes of using AM fungi into sustainable agriculture methods.

SUMMARY AND CONCLUSION

This study examined how Arbuscular Mycorrhizal Fungi (AMF) can improve eggplant growth, nitrogen absorption, drought tolerance, and disease suppression. Mycorrhizal dependency, phosphorus (P), nitrogen (N), and potassium (K) uptake, relative water content (RWC), stomatal conductance, and resistance to soil-borne pathogens (*Fusarium* and *Verticillium* wilt) were evaluated in this controlled experiment using *Glomus fasciculatum* and *Glomus mosseae*.

The results show that AMF injection increased mycorrhizal dependence (78.9% in *G. mosseae*) and root colonization (63.5% in *G. mosseae* and 58.2% in G. fasciculatum). Better absorption of nutrients, as seen by increases in P uptake of 38%, N uptake of 30%, and K uptake of 25% when compared to control plants. Higher RWC (50.3%) and proline accumulation (85.7%) in AMF-treated plants indicate improved drought resistance. AMF-inoculated plants showed a 46% reduction in disease severity, indicating their function in induced systemic resistance (ISR) and biological management. These findings demonstrate that AMF enhances plant health, stress tolerance, and nutrient efficiency, all of which are critical for sustainable eggplant farming. AMF's incorporation into low-input and organic farming systems can greatly lessen the need for artificial fungicides and fertilizers, promoting environmentally beneficial farming methods.

It is advised that more research be done to Improve AMF inoculation methods for field-scale use. Evaluate how AMF affects microbial biodiversity and soil health over the long run. And to increase the synergistic advantages in crop production, assess how AMF interacts with other biofertilizers.

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Table 1: Mycorrhizal Colonization & Growth Parameters in Brinjal Plants

Treatment	Root Colonization (%)	Mycorrhizal Dependency (%)	Shoot Length (cm)	Root Length (cm)	Biomass (g/plant)
Control	12.5 ± 2.1	0	24.5 ± 1.5	12.3 ± 1.2	3.2 ± 0.3
G. fasciculatum	58.2 ± 3.4**	74.3 ± 2.9**	38.2 ± 2.1**	22.7 ± 1.7**	7.8 ± 0.5**

G. mosseae	63.5 ± 2.7**	78.9 ± 3.2**	40.1 ± 2.3**	24.4 ± 1.5**	8.3 ± 0.6**

*Values represent mean ± SE; **Significant at $p < 0.05$*

Table 2: Physiological Parameters under Drought Stress

Treatment	RWC (%)	Stomatal Conductance (mmol m⁻ ²s⁻ ¹)	Proline Content (mg g⁻ ¹)
Control	52.3 ± 2.8	125.4 ± 6.2	2.1 ± 0.2
G. fasciculatum	74.2 ± 3.0**	198.5 ± 7.5**	3.5 ± 0.3**
G. mosseae	78.6 ± 3.2**	215.6 ± 9.1**	3.9 ± 0.3**

*Values represent mean ± SE; **Significant at $p < 0.05$*

Table 3: Disease Severity Reduction in AM-Inoculated Brinjal Plants

Treatment	Disease Severity (%)	Standard Error (±)
Control (Non-mycorrhizal)	100%	0
G. fasciculatum	58%	±4.2
G. mosseae	52%	±3.8
Combined AM (*G. fasciculatum* + *G. mosseae*)	46%	±3.5

Figure 1: Nutrient Uptake in Mycorrhizal and Non-Mycorrhizal Brinjal Plants