

# Investigation of techniques for interseeding alfalfa into pangola grasslands using the no-till method <sup>(1)</sup>

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## Abstract

Mixing alfalfa with grasslands can enhance the nutritional value of forage, balance soil nutrient utilization, and provide a cost-effective nitrogen source through the nitrogen-fixing ability of legumes. This study developed a no-till seeding system suitable for interseeding alfalfa into compacted pangola grasslands. Two field experiments were conducted using this seeding system to investigate the effects of seedbeds width, seeding density, irrigation, and fertilization on establishing mixed grasslands. The developed system can be fitted into domestic standard vacuum seeders, which overcomes the challenges in cutting grass and breaking soil and allows for simultaneous trenching, seeding, and compaction operations in one action. The seedbeds width can be adjusted from 1 cm to 6 cm. Results of experiment I showed that increasing seedbeds width can initially increase alfalfa height and lower grass height. However, the yield survey showed that in the proportion of alfalfa did not increase but rather elevated the level of soil breaking and crushing improvement of pangolagrass yields. Increased alfalfa seeding density enhanced first-year alfalfa yield and proportion, which showed no significant effect on the second-year proportion but significant decreases in the second-year alfalfa yield. Experiment II revealed that irrigation significantly promoted alfalfa growth compared to fertilization treatments that did not have any significant effect. Alfalfa showed greater responsiveness to irrigation than pangolagrass. Fertilizer application helped with early growth of pangolagrass but did not lead to a significantly yield increase. Although alfalfa and pangolagrass did not form a stable and lasting mixed planting combination, the simple interseeding process allows alfalfa to reseed every 2-3 years and maintain a desired proportion. The emphasis on irrigation and minimization of initial grass competition can effectively establish a mixed planting grassland of alfalfa in existing compacted pangola grasslands.

Key words: Grass-legume mixture, Alfalfa (*Medicago sativa*), *Digitaria decumbens*.

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