# No-Till Planting in Alfalfa: Effect of Ground Speed & Setting of the Seeder Over Plant Stand

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Argentina has more than 90% of its crop surface production under no-till system and the second world place of alfalfa total surface. This production system, which maintains the stubble from previous seasons on the surface, reduces soil degradation and improves water use, among other advantages. However, in alfalfa production this system adoption is lower, therefore, to increase the use of this practice and to achieve a good establishment whit dense stand (i.e. 250-350 plants $m^{-2}$) at 90-120 days after sowing, It is necessary to set the seeder taking into account different agronomic factors. The goal of this experiment was to study the interaction between the ground speed of the seeder and furrow closure, on the emergence speed (ES), establishment such as field emergence (FE), total biomass production, and coverage of the alfalfa crop in no-till planting under dryland conditions. The experimental design was a completely randomized design with a factorial arrangement with three replicates. Factors were: Two different ground speed: 5 and 7 km $h^{-1}$ and two treatments of furrow closure: with cover wheel and without cover wheel. Plots (5.40*600 m) were sowed in March 2021 with 16 kg $ha^{-1}$ seeding rates (435 viable coated seeds $m^{-2}$) at 1.5 cm deep. No-till seeder with 17.5 cm row spacing was used. The experiment was carried out at EEA INTA Manfredi, Córdoba, Argentina from March 2021 to April 2022. The soil was Entic Haplustoll, deep, well-drained, and developed on silty loam materials. The ES and establishment up to 150 days after sowing (DAS) were quantified and emergency percentage (%E) was estimated. From 45 to 150 DAS, the total biomass (aerial + root) was quantified. In April 2022, drone coverage was estimated. The variables evaluated were statistically analyzed where significant differences occurred, Fisher's L.S.D. mean comparison test ($P \leq 0.05$) was applied. The interaction of the ground speed*way of closure of the furrow, on the ES, and FE and %E was significant ($p<0.05$). The ES was higher at 5 km $h^{-1}$ without cover wheel than at 5 km $h^{-1}$ with cover wheel and at 7 km $h^{-1}$ with and without cover wheel. At three DAS at 5 km $h^{-1}$ without cover wheel, it presented 21% of emerged seedlings with unfolded cotyledons while in the other treatments it was 4%; at 15 DAS at 5 km $h^{-1}$ without cover wheel the %E was 61% while at 5 km $h^{-1}$ with cover wheel and at 7 km $h^{-1}$ with and without cover wheel was only 34%. This performance was similar along the rest of the counts, therefore at 150 DAS at 5 km $h^{-1}$ without cover wheel FE was 265 plants $m^{-2}$ (61%) while in the rest of the treatments it was 149 plants $m^{-2}$ (34%). These results show that sowing at 5 km $h^{-1}$ without cover wheel a higher %E was achieved. At 150 DAS, root biomass (root + crown) was similar in all treatments ($p>0.05$), with average values of 4.09 DM t $ha^{-1}$. However, 5 km $h^{-1}$ without cover wheel, the root biomass (DM t $ha^{-1}$) presented a lower coefficient of variation, indicating similar development between plants, as a consequence of a ES. The biomass presented a similar performance. Further research will include the field surface evaluation through drone flights. In conclusion, alfalfa sowing with no-till planting plus the adequate calibration of the seeding equipment and ground speed at 5 km $h^{-1}$ without cover wheel, allowed to achieve high field establishment.

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