J Biotechnol Biomater 2017, 7:4 (Suppl)
DOI: 10.4172/2155-952X-C1-080

Effects of different seedling-raising substrates on physiological characters and grain yield for mechanized-transplanted rice

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Statement of the Problem: With the expansion area of the mechanized-transplanted rice, rice seedling-raising substrate becomes the development tendency because of its wide material sources, low production cost and strong compatible of mechanized transplanting techniques.

Methodology & Theoretical Orientation: In this study, light soilless substrate (LSS), mixed substrate (MS, containing 35% of the soil), and nutrient soil (control) were used to determine the effects of substrate characters on physiological characteristics and grain yield for mechanized-transplanted rice.

Findings: The result showed that bulk density for LSS and MS were 85.19% and 74.07% lower than the control, while the aeration porosity, water-holding porosity and their nutrient content were significantly higher than the control. Rice seedlings qualities for LSS and MS treatment showed advantages compared with that of the control treatment. The intertwining force for rice seedlings roots and the missing mechanized-transplanted rice seedlings for LSS and MS treatment were 4.17% and 4.32% lower than the control, respectively. After 7 days of mechanized-transplanted, rice root dry matter for LSS was 10.0% and 30.8% higher than the MS and the control treatment, shoot dry weight were higher by 7.8% and 25.7% than the MS and the control treatment, respectively. With more dry matter accumulation in rice seedling stage, the seedlings from LSS treatment revived quickly and tillers started earlier after transplanted in field. Rice grain yield for LSS and MS treatment was 5.30% and 6.14% higher than the control treatment, respectively.

Conclusion & Significance: Light soilless substrate is made of crops, straw, which is easy to be decomposed completely in soil. Rice grain yield from light soilless substrate was almost the same with the mixed substrate treatment, but was significant higher than that of control. With the obvious application advantages above, light soilless substrate was better for the production and application of seedling substrate

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