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Integration of *SINA* gene for drought tolerance in Moroccan durum wheat by biolistic approach

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In this study, the effect of nitrogen source in the induction media and the nature of phytohormone in the regeneration media on the genetic transformation efficiency were studied. Mature embryos of three Moroccan durum wheat varieties (Amria, Marouane and Isly) and the pANIC5E plasmid were used. This plasmid contained the *SINA* gene linked to drought tolerance and bar gene as selectable marker. Two different induction media cultures have been tested: MS and Modified MS with ammonium nitrate as a single source of nitrogen. The effect of phytohormones AIA or Zeatin on the regeneration media were also tested. The results showed an important embryogenic callus induction for both media without a significant difference for the three varieties tested with an average of 72% for MS medium and 67% for modified MS. Plantlets regeneration rate after the bombardment was affected by the nature of phytohormones used; Medium with Zeatin induced the highest rate of regenerated plantlets for Isly and Merouane varieties with an average of 40% and 32% respectively, against 18% and 12% with the AIA auxin. However, Amria has shown an average of 27% with the AIA and 18% with Zeatin. Evaluation of the expression of the bar gene in leaves by basta painting and molecular analysis are underway.

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Symbiotic nitrogen fixation of melilot in Northern Kazakhstan

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It is known that deficiency of nitrogen in the soil can to a large extent be compensated for by biological means, from stocks of nitrogen in the soil which have been accumulated by nitrogen-fixing microorganisms. The symbiotic nitrogen fixation is done by strains of bacteria of the genus *Rhizobium*, isolated from nodules of melilot and genetic identification of bacteria was conducted by 16S RNA. On the basis of the selected bacteria strains inoculum was created for the pre-seed treatment of 20 samples of melilot. For this purpose liquid yeast extract was placed in a flask with biomass of the genus bacteria *Rhizobium* and incubated on a shaker at 24 °C until the optimal titer. Research on the study of nitrogen fixation was conducted on southern black carbonate soil in the period from 2015 to 2016 at the stationary field A.I. Barayev SPCGF. In the flowering phase of different varieties samples of *Melilotus officinalis* (L.) Pall., and *Melilotus wolgicus* Poir., 10 plants with inoculation and without inoculation (control) were identified from each plot and the numbers of nodules formed were counted. Calculations of symbiotic nitrogen fixation were carried out by comparison with the non-legume crop. As a result of these studies, it was found that the highest nitrogen fixation was in crops of *Melilotus officinalis* (L.) Pall., (from inoculation) in 5 samples KD-1824, KD-1825, KD-1683, KD-1683a and KD-1823. The controls exceeded an average of 1.2-3%. In crops of *Melilotus wolgicus* Poir., a high nitrogen fixation in comparison to the control (no inoculation) was observed in the samples: KD-1687 (92.3%) and KD-1823 (88.9%). In other cases, molecular nitrogen fixation was negligible. The most promising examples of the *Melilotus wolgicus* Poir., are KD-1687, KD-1823 and *Melilotus officinalis* (L.) Pall., KD-1824, KD-1683, KD-1683a with the most symbiotic potential, which will be studied for further research in the selection process.

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