PIE-3566: EVALUATION OF CORESET OF MULBERRY GERMPLASM FOR PHYSIOLOGICAL EFFICIENCY AND LEAF QUALITY

Period : March, 2016 – March, 2019

Investigators : K. Jhansilakshmi, G.Thanavendan, & N. Boopathi, SRF

Introduction :

Though mulberry leaf yield increased gradually through crop improvement, most of the variations observed were for yield associated traits. Hence, further increase in yield potential is possible only through utilizing other unexploited variations available in mulberry germplasm. One such possibility is improving photosynthetic efficiency for improved yield at high CO_2, reducing yield loss under high temperature which is anticipated in lieu of climate change while maintaining/ improving leaf quality. The project was thus taken up to evaluate the mulberry accessions for different physio-biochemcial and leaf quality/nutritional parameters to identify promising mulberry accessions through high physiological efficiency traits with leaf yield.

Objectives:

- To identify important physiological parameters associated with high leaf yield
- To estimate variability for different leaf nutritional components which reflect leaf quality
- To identify MGRs with high physiological efficiency and leaf quality to enhance mulberry leaf yield and leaf quality.

Outcome:

- Highest variability observed in physiological parameters in early vigour (LAI) (CV - 60.83%) followed by Sprouting percentage (34.45%), Leaf fall per cent (45.45%), Total chlorophyll (19.60%), Glutamine synthetase (42.28%), Stomatal conductance (40.36%), Intrinsic WUE (51.37%) and Transpiration rate (34.89%).
- With regard to Leaf nutritional components, highest variability were in Leaf yield (CV – 61.88%) followed by Nitrogen (56.98%), Water use efficiency (38.36 %), Leaf area (35.28%), Ascorbic acid (35.13%), Potassium (23.87%), Phosphorus (22.05%), Leaf Temperature (17.72%), Protein (12.81%), Water soluble carbohydrates (12.99%) and Moisture (6.50 %).
- Identified 15 top performing mulberry accessions for different physio-biochemical and leaf quality parameters and physiological efficiency with leaf yield cum nutritional components based on multiple traits in all the seasons at par with the respective checks.

Acc. No.	No. of Traits	Parameter (value)
MI-0099	12	1(100), 2(1.077), 3(0.58), 4(14.513), 6(5.003), 7(2.901), 8(38.667), 13(0.854), 14(2.148), 15(2.622), 16(68.67), 18(1315.667)
MI-0011	12	1(87.5), 2(1.405), 3(0.564), 4(16.73), 5(0.565), 6(5.036), 7(3.322), 8(32), 9(3.29), 13(0.878), 14(2.166), 17(952)
ME-0033	12	1(87.5), 5(4.972), 6(2.675), 7(23.667), 8(70.66), 9(2.59), 10(0.936), 12(0.24), 13(1.76), 15(13), 17(511.444), 18(1136)
MI-0108	11	1(87.5), 2(1.395), 3(0.478), 6(3.683), 7(3.211), 9(2.45), 10(0.29), 11(2.03), 13(0.923), 15(2.503), 18(801)
MI-0214	11	1(87.5), 2(1.738), 4(15.59), 6(5.437), 7(2.867), 10(0.23), 11(1.93), 12(0.496), 13(0.96), 16(73.48), 18(696),
MI-0286	11	1(70), 4(14.471), 6(4.75), 7(3.047), 9(2.73), 10(0.24), 13(0.892), 14(2.574), 15(3.124), 16(71.78), 18(1089.667)
MI-0665	11	1(87.5),3(0.602),5(0.415),8(36.54),9(3.08),12(0.492),13(0.841), 14(2.159), 15(2.78), 16(76.92), 18(646.333)
MI-0376	11	1(75), 4(22.498), 7(2.968), 8(30.333), 9(2.8), 10(0.23), 13(0.837), 14(2.699), 15(2.53), 16(71.29), 18(717.667)
Victory -1	11	1(87.5), 2(15.496), 5(4.038), 7(20.628), 8(72.09), 10(0.851), 13(2.132), 14(17.478), 15(12), 17(685), 18(1068.25)
MI-0341	10	4(17.114), 6(3.714), 7(4.608), 8(35.167), 9(2.45), 10(0.24), 12(0.426), 14(2.235), 16(70.62), 18(1121.667)
ME-0220	10	4(20.892), 5(0.474), 8(25.333), 10(0.3), 11(1.78), 13(0.909), 14(2.158), 15(3.243), 16(70.29), 18(792.333)
MI-0173	10	1(87.5), 2(2.278), 4(15.606), 6(4.764), 7(3.276), 10(0.31), 11(2.06), 13(0.902), 14(2.519), 16(72.33)
MI-0197	10	1(75), 2(1.368), 4(18.506), 6(5.404), 7(3.425), 9(3.71), 10(0.26), 11(1.8), 13(0.874), 15(2.67)
MI-0290	10	1(75), 2(1.094), 4(14.106), 6(2.659), 7(5.305), 8(17), 12(0.493), 13(0.877), 14(2.646), 16(68.33)
MI-0068	10	1(87.5), 2(15.835), 3(0.476), 6(2.955), 7(16.333), 10(0.882), 12(0.31), 13(2.13), 14(13.136), 16(4.46)
MI-0231	10	1(87.5), 2(2.019), 6(3.131), 7(2.968), 10(0.862), 12(0.598), 14(2.427), 15(3.096), 16(71.82), 17(1136)
Vishala	10	1(87.5), 2(1.372), 3(0.458), 4(14.77), 5(0.42), 8(18.7), 12(0.431), 13(0.848), 14(2.214), 16(69.014),
S.13	9	2(0.987), 5(1.316), 8(19.3), 9(2.555), 10(0.242), 12(0.499), 15(3.098), 16(70.13), 18(1086.667)

Recommendations/ Utilization:

- ✓ The top15 performers, viz., MI-0099, MI-0011 ME-0033, MI-0108, MI-0214, MI-0286, MI-0665, MI-0376, MI-0341, ME-0220, MI-0173, MI-0197, MI-0290 MI-0068 and MI-0231 in all the seasons at par with the respective checks.
- ✓ These identified mulberry genetic resources could be utilized by other institutes as potential parents for crop improvement programmes.