Media optimization for turf bermudagrass experimental line FB1628 callus development

Adina Y. Grossman*[1], Rebecca O. Arias[1], Kevin Begcy[2], Kevin E. Kenworthy[1], Esteban F. Rios[1]

[1]Agronomy Department, University of Florida, [2]Environmental Horticulture Department, University of Florida *Corresponding Author: adinaygrossman@ufl.edu

Introduction

- Bermudagrass (Cynodon spp.) is a widely grown warm-season forage and turfgrass crop.
- Tropical Sod Webworm (TSW) (Herpetogramma phaeopteralis) is a destructive turfgrass pest in FL.
- Conducting Agrobacterium-mediated transformation to insert cry1Ac for delta-endotoxin of Bt.
- Low calli growth with hormone concentrations from Hu et al. (2005).
- Auxin and cytokinin concentration and ratio for callus development differ by genotype (Beyl, 2010).

Objectives

- Optimize callus induction media (CIM) for bermudagrass line FB1628 to regenerate calli

Figure 1.Tropical Sod Webworm Larval Stage (Tofangsazi et al., 2014)

References

Beyl, C. A. (2010). PGRs and their use in micropropagation. *Plant tissue culture, development and biotechnology*.

Hu, F., Zhang, L., Wang, X., Ding, J., & Wu, D. (2005). Agrobacterium-mediated transformed transgenic triploid bermudagrass (Cynodon dactylon× C. transvaalensis) plants are highly resistant to the glufosinate herbicide Liberty. *Plant cell, tissue and organ culture*, *83*(1), 13-19.

Tofangsazi, N., Cherry, R. H., Meagher, R. L., & Arthurs, S. P. (2014). Tropical sod webworm (Lepidoptera: Crambidae): a pest of warm season turfgrasses. *Journal of Integrated Pest Management*, *5*(4), C1-C8.

Materials and Methods

- Media: MS (4.4 g/L), L-proline (2.0 g/L), Myo-Inositol (100 mg/L), CH (300 mg/L), Sucrose (30 g/L), Phytagel (3g/L), Plant Preservative Mixture (0.5 mL)
- 9 treatments: combinations of 2,4-D (auxin) and Benzyladenine (BA - cytokinin).
- [2,4-D]: 0.5 ml/L, 1 ml/L, 1.5 ml/L
- [BA]: 0.1 ml/L, 0.2 ml/L, 0.3 ml/L
- Sterilized FB1628 nodes, placed on CIM, stored at 28 ºF in the dark.
- Recorded % regenerated shoots, roots, and calli, 1 and 2 weeks after treatment initiation, using 3 reps.

Figure 2. Experimental line FB1628

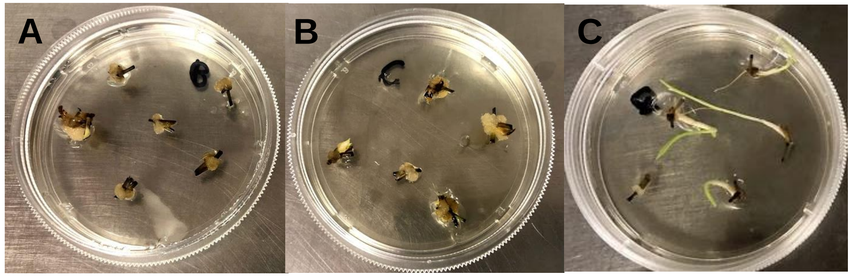

Figure 3. Callus formation of FB1628 for 1 mg/L 2,4-D, 0.2 mg/L BA (A), 1.5 mg/L 2,4-D, 0.3 mg/L BA (B), and 1.0 mg/L 2,4-D, 0.1 mg/L BA (C).

Results

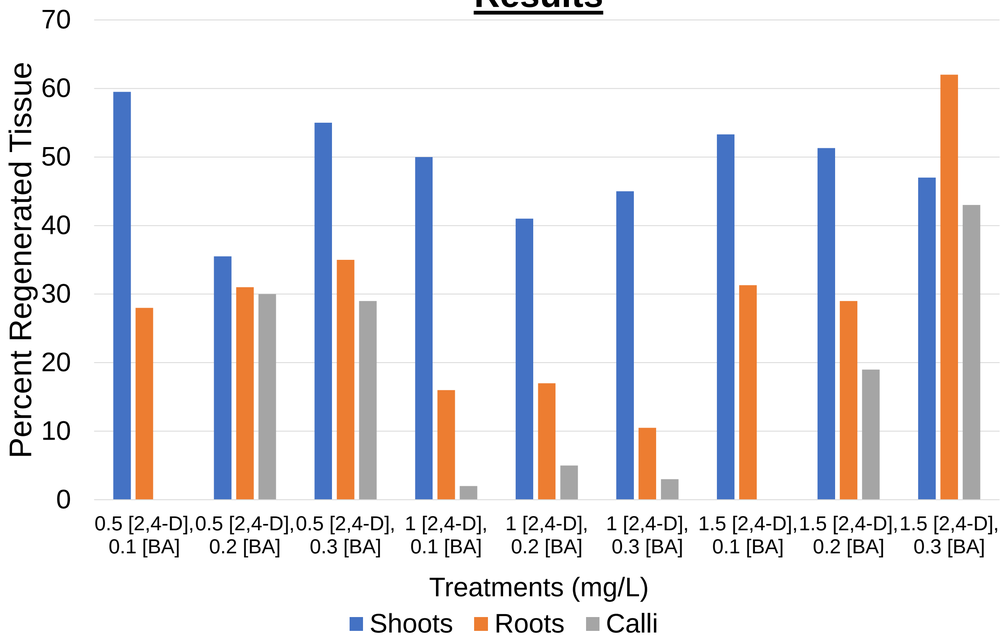

Figure 4. Comparison of regenerated tissue for each treatment of 2,4-D and BA ratio, and concentration.

Conclusions

- Higher concentrations of 2,4-D and BA are required for calli formation in FB1628.
- Shoot and root development does not inhibit callus growth with high concentrations of 2,4-D.
- This study can serve as a guideline for optimization of CIM for any monocot species.
- Next steps will be infection of FB1628 callus with *A. tumefaciens* to insert the gene *cry1Ac* for TSW resistance