Poster Presentations

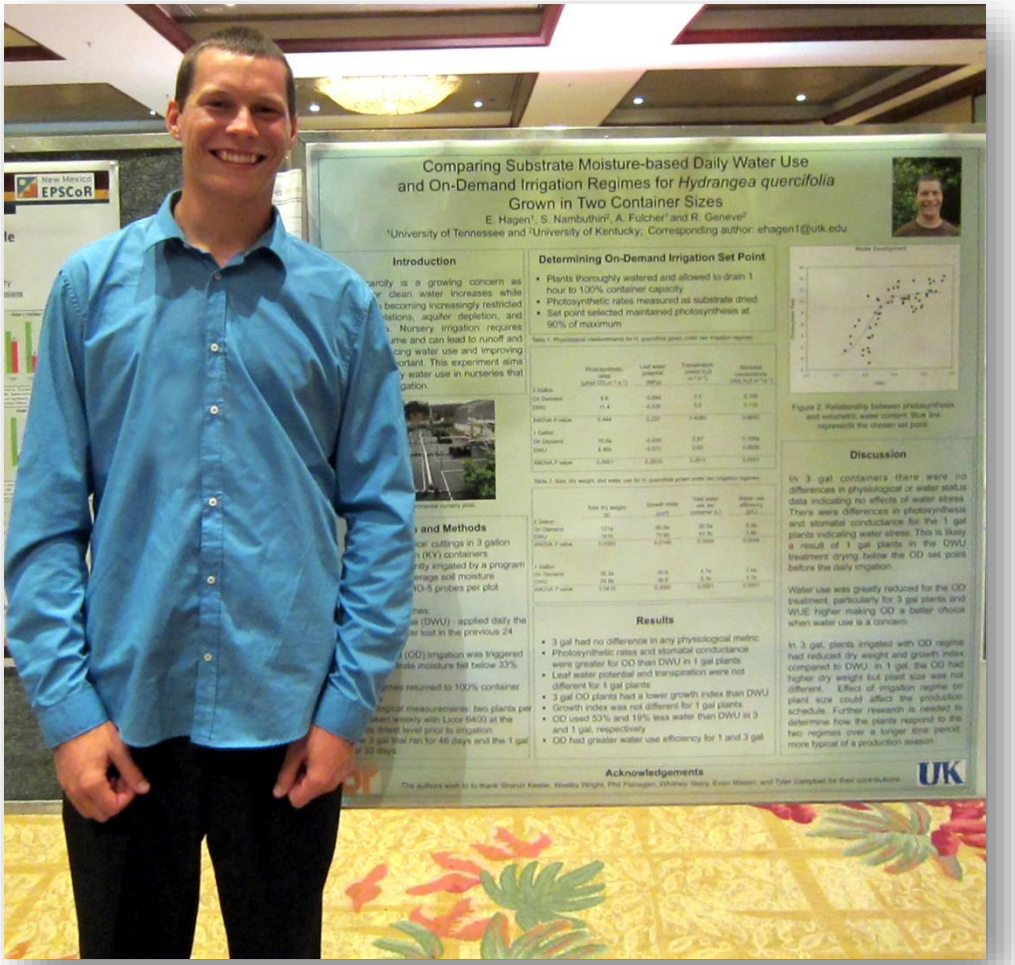
The poster session at the annual ER-IPPS meeting is an excellent opportunity for members to "seek and share" information.

We have two basic poster types presented at the annual meeting:

Research-based posters

and

Practices-based posters

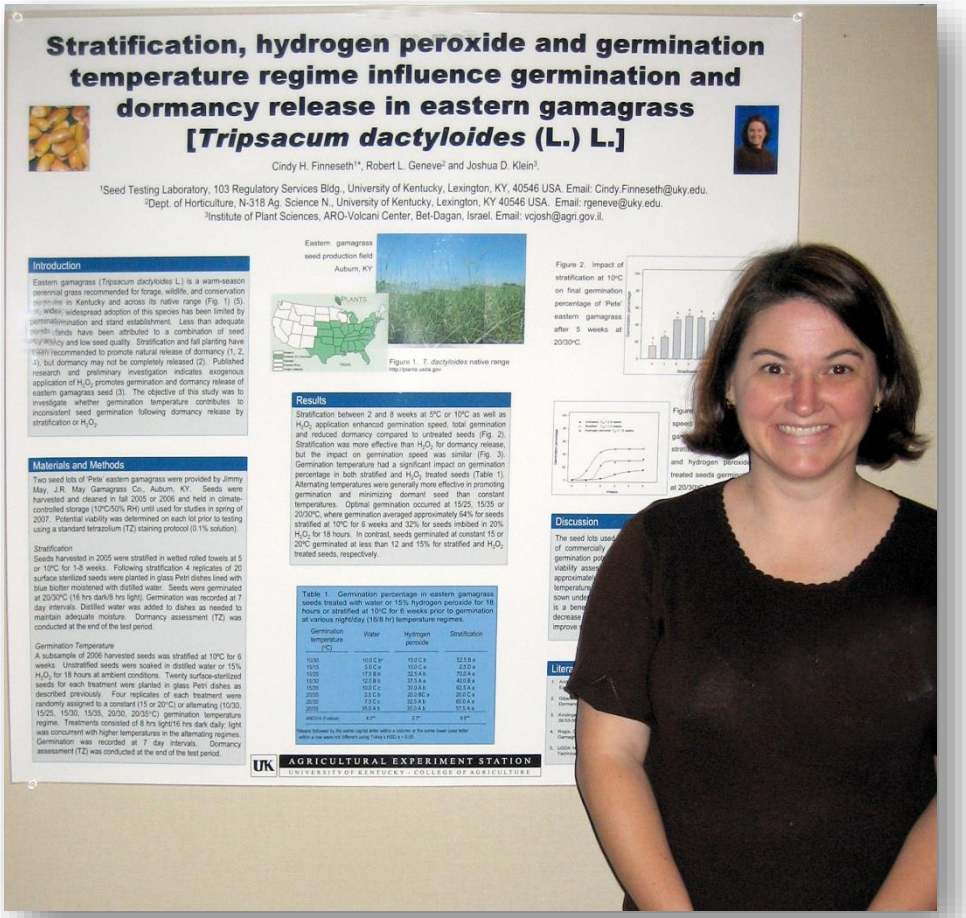


Poster Presentations

The purpose of this presentation is to provide members with some of the basics for making a poster.

The first part of the presentation will provide suggestions for physically making a poster.

The second part will provide examples of either research-based or practices-based posters.



Poster Presentations

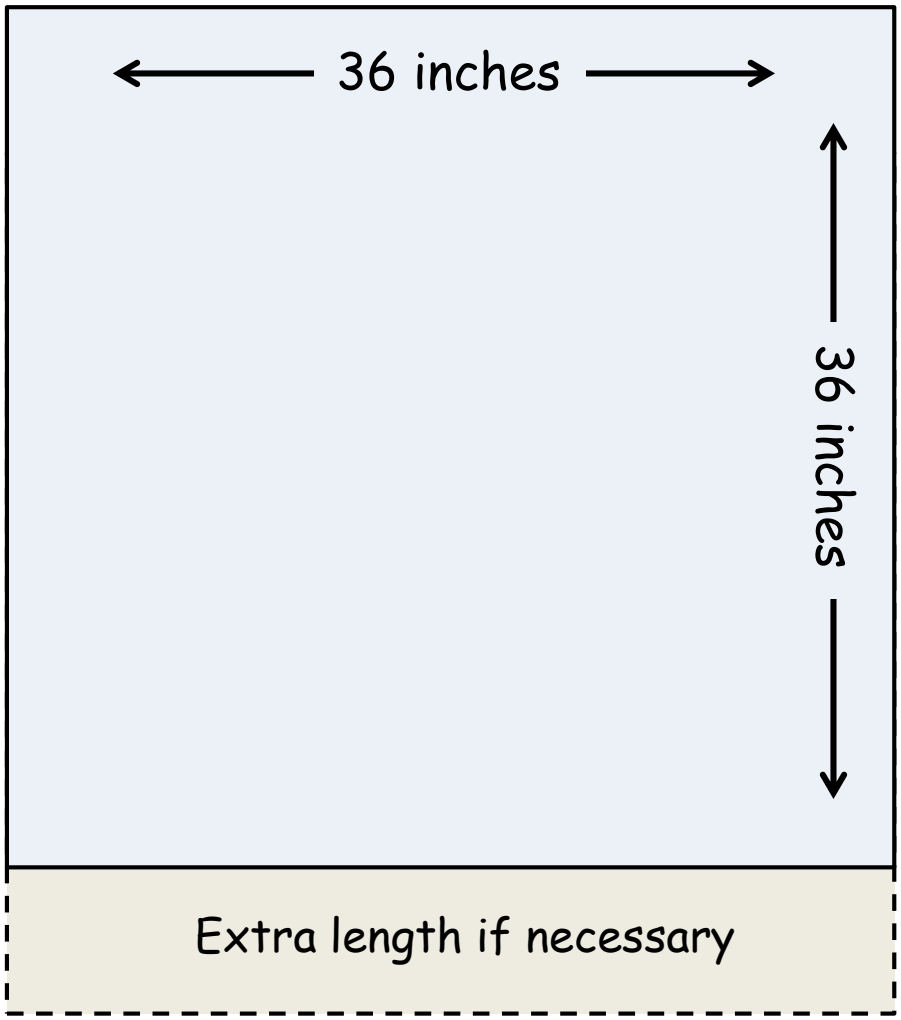
Poster size

The poster dimensions is most often 36 x 36 inches.

This is a size that fits most poster boards supplied at the meeting.

Also, most poster printers and poster paper rolls are 36 inches wide.

It is possible to make the poster longer than 36 inches (up to 42 inches) if space becomes a critical issue.



Poster Presentations

Poster size

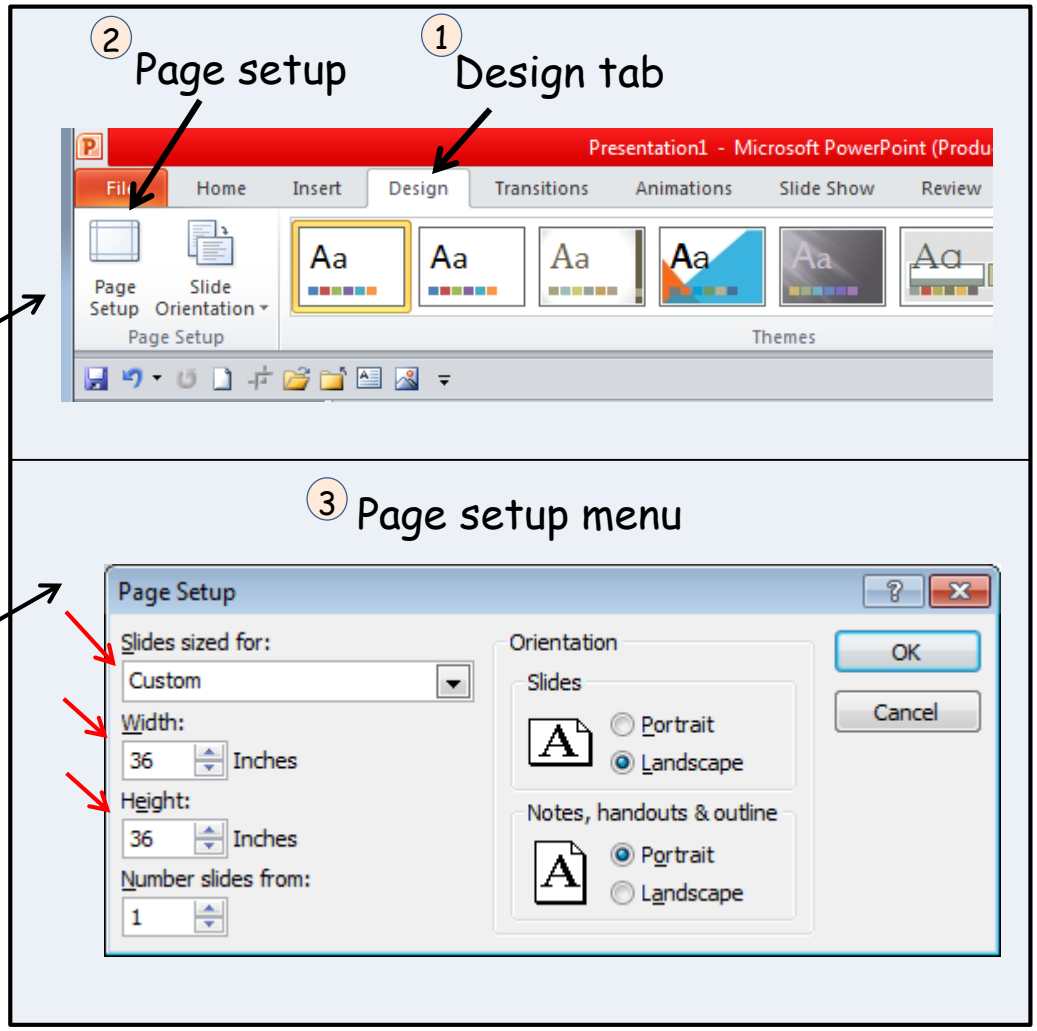
A 36 x 36 inch PowerPoint slide is not the default setting.

Therefore, the first thing you will need to change is the paper size.

Do this by going to the "Design" tab at the top left of the PowerPoint program page.

Next select "Page Setup". The left top line of this dropdown box says "slides sized for". Select custom.

Then select the width and height for 36 inches.



Poster Presentations

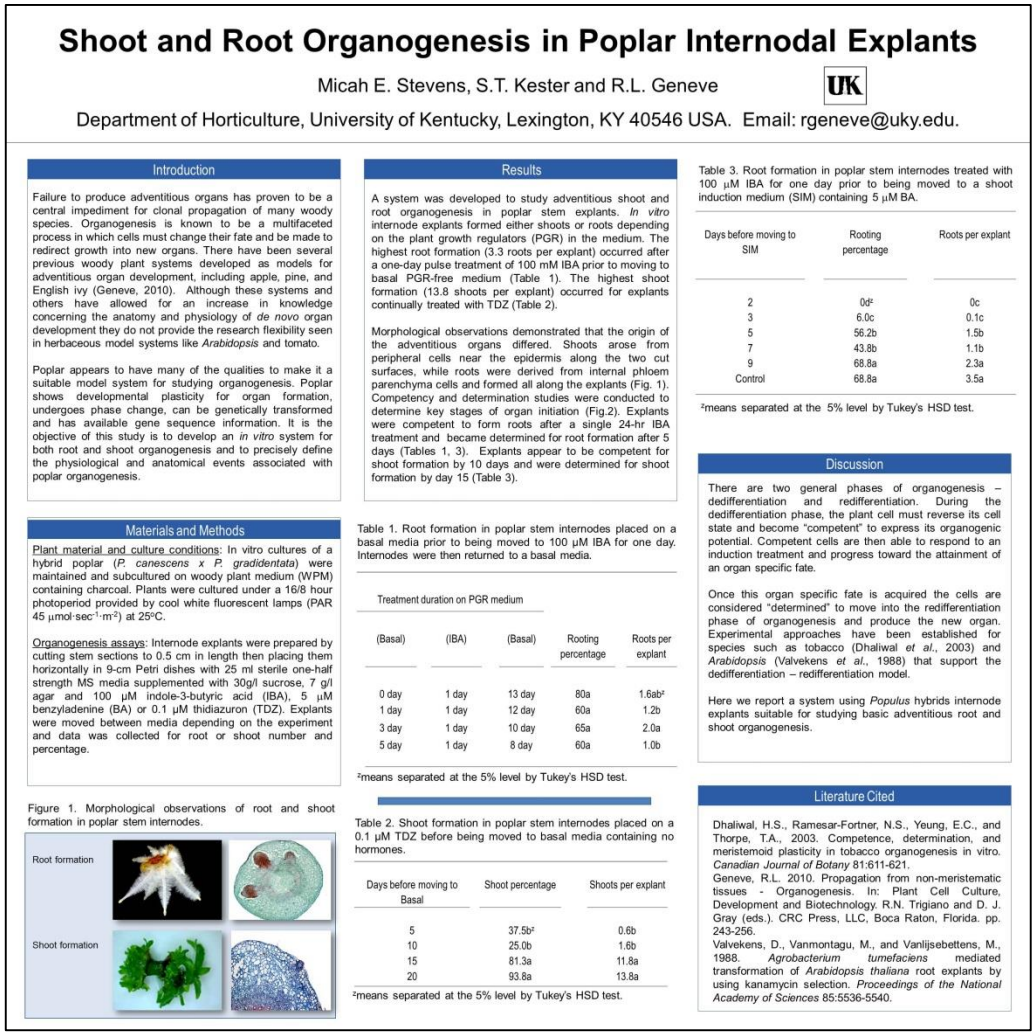
Poster colors

In most cases, it is most practical to avoid using a background color or background image for your poster.

It simply costs more money to print a background-colored poster because it uses more printer ink.

It is best to reserve color for highlighting text in the poster and for color images.

A black font color on a white background is easiest to read.



Shoot and Root Organogenesis in Poplar Internodal Explants

Micah E. Stevens, S.T. Kester and R.L. Geneve

Department of Horticulture, University of Kentucky, Lexington, KY 40546 USA. Email: rgeneve@uky.edu.

Introduction

Failure to produce adventitious organs has proven to be a central impediment for clonal propagation of many woody species. Organogenesis is known to be a multifaceted process in which cells must change their fate and be made to redirect growth into new organs. There have been several previous woody plant systems developed as models for adventitious organ development, including apple, pine, and English ivy (Geneve, 2010). Although these systems and others have allowed for an increase in knowledge concerning the anatomy and physiology of *de novo* organ development they do not provide the research flexibility seen in herbaceous model systems like *Arabidopsis* and tomato.

Poplar appears to have many of the qualities to make it a suitable model system for studying organogenesis. Poplar shows developmental plasticity for organ formation, undergoes phase change, can be genetically transformed and has available gene sequence information. It is the objective of this study is to develop an *in vitro* system for both root and shoot organogenesis and to precisely define the physiological and anatomical events associated with poplar organogenesis.

Materials and Methods

Plant material and culture conditions: In vitro cultures of a hybrid poplar (*P. canescens x P. gradidentata*) were maintained and subcultured on woody plant medium (WPM) containing charcoal. Plants were cultured under a 16/8 hour photoperiod provided by cool white fluorescent lamps (PAR 45 $\mu mol \cdot sec^{-1} \cdot m^{-2}$) at 25°C.

Organogenesis assays: Internode explants were prepared by cutting stem sections to 0.5 cm in length then placing them horizontally in 9-cm Petri dishes with 25 ml sterile one-half strength MS media supplemented with 30g/l sucrose, 7 g/l agar and 100 µM indole-3-butyric acid (IBA), 5 µM benzyladenine (BA) or 0.1 µM thidiazuron (TDZ). Explants were moved between media depending on the experiment and data was collected for root or shoot number and percentage.

Figure 1. Morphological observations of root and shoot formation in poplar stem internodes.

Results

A system was developed to study adventitious shoot and root organogenesis in poplar stem explants. *In vitro* internode explants formed either shoots or roots depending on the plant growth regulators (PGR) in the medium. The highest root formation (3.3 roots per explant) occurred after a one-day pulse treatment of 100 mM IBA prior to moving to basal PGR-free medium (Table 1). The highest shoot formation (13.8 shoots per explant) occurred for explants continually treated with TDZ (Table 2).

Morphological observations demonstrated that the origin of the adventitious organs differed. Shoots arose from peripheral cells near the epidermis along the two cut surfaces, while roots were derived from internal phloem parenchyma cells and formed all along the explants (Fig. 1). Competency and determination studies were conducted to determine key stages of organ initiation (Fig.2). Explants were competent to form roots after a single 24-hr IBA treatment and became determined for root formation after 5 days (Tables 1, 3). Explants appear to be competent for shoot formation by 10 days and were determined for shoot formation by day 15 (Table 3).

Table 1. Root formation in poplar stem internodes placed on a basal media prior to being moved to 100 µM IBA for one day. Internodes were then returned to a basal media.

Treatment duration on PGR medium				
(Basal)	(IBA)	(Basal)	Rooting percentage	Roots per explant
0 day	1 day	13 day	80a	1.6ab[z]
1 day	1 day	12 day	60a	1.2b
3 day	1 day	10 day	65a	2.0a
5 day	1 day	8 day	60a	1.0b

[z]means separated at the 5% level by Tukey's HSD test.

Table 2. Shoot formation in poplar stem internodes placed on a 0.1 µM TDZ before being moved to basal media containing no hormones.

Days before moving to Basal	Shoot percentage	Shoots per explant
5	37.5b[z]	0.6b
10	25.0b	1.6b
15	81.3a	11.8a
20	93.8a	13.8a

[z]means separated at the 5% level by Tukey's HSD test.

Table 3. Root formation in poplar stem internodes treated with 100 µM IBA for one day prior to being moved to a shoot induction medium (SIM) containing 5 µM BA.

Days before moving to SIM	Rooting percentage	Roots per explant
2	0d[z]	0c
3	6.0c	0.1c
5	56.2b	1.5b
7	43.8b	1.1b
9	68.8a	2.3a
Control	68.8a	3.5a

[z]means separated at the 5% level by Tukey's HSD test.

Discussion

There are two general phases of organogenesis – dedifferentiation and redifferentiation. During the dedifferentiation phase, the plant cell must reverse its cell state and become "competent" to express its organogenic potential. Competent cells are then able to respond to an induction treatment and progress toward the attainment of an organ specific fate.

Once this organ specific fate is acquired the cells are considered "determined" to move into the redifferentiation phase of organogenesis and produce the new organ. Experimental approaches have been established for species such as tobacco (Dhaliwal *et al.*, 2003) and *Arabidopsis* (Valvekens *et al.*, 1988) that support the dedifferentiation – redifferentiation model.

Here we report a system using *Populus* hybrids internode explants suitable for studying basic adventitious root and shoot organogenesis.

Literature Cited

Dhaliwal, H.S., Ramesar-Fortner, N.S., Yeung, E.C., and Thorpe, T.A., 2003. Competence, determination, and meristemoid plasticity in tobacco organogenesis in vitro. *Canadian Journal of Botany* 81:611-621.

Geneve, R.L. 2010. Propagation from non-meristematic tissues - Organogenesis. In: Plant Cell Culture, Development and Biotechnology. R.N. Trigiano and D. J. Gray (eds.). CRC Press, LLC, Boca Raton, Florida. pp. 243-256.

Valvekens, D., Vanmontagu, M., and Vanlijsebettens, M., 1988. *Agrobacterium tumefaciens* mediated transformation of *Arabidopsis thaliana* root explants by using kanamycin selection. *Proceedings of the National Academy of Sciences* 85:5536-5540.

Back Next

Poster Presentations

Font type and size

A block type font like Arial is a good font for a poster because it is easy for people to read.

Size matters in a poster. A small font size is difficult to read.

You need to balance the amount of information you want to present with its readability.

A poster is a visual medium and images and figures can be more informative that many lines of text.

Font size in Arial
The title should be greater than 72
Your name should be around 50-60
Titles preceding the text should be around 48
Text be at least 40
Images and figures should be large enough to see from several feet away (~5 inches high).

Poster Presentations

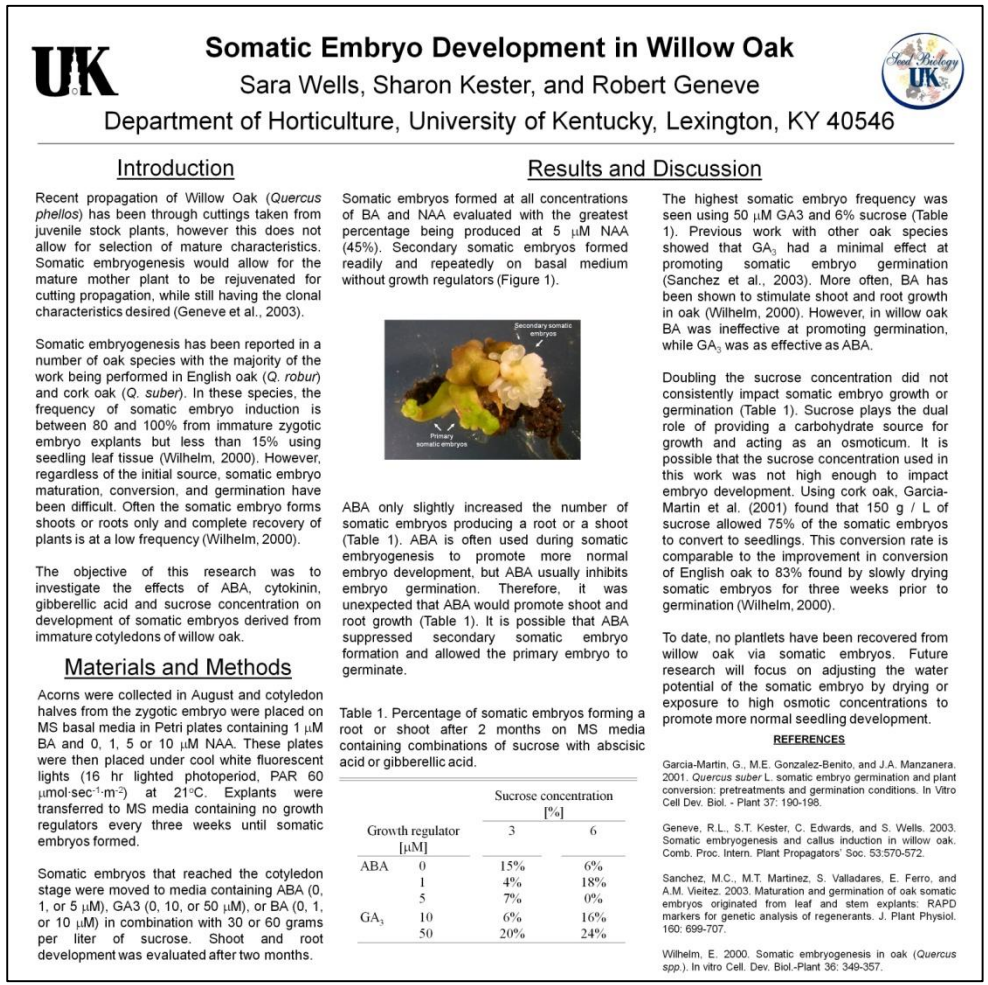
Preparing text, tables, and figures

Text can be prepared in PowerPoint or it can be imported from Word using Word's copy and paste function.

It is best to divide the poster into columns (usually three).

A column width of 10 to 10.5 inches works well and can be set from the "Format" tab in PowerPoint.

Leaving "white space" between columns and major sections will be more visually appealing.



Somatic Embryo Development in Willow Oak

Sara Wells, Sharon Kester, and Robert Geneve

Department of Horticulture, University of Kentucky, Lexington, KY 40546

Introduction

Recent propagation of Willow Oak (*Quercus phellos*) has been through cuttings taken from juvenile stock plants, however this does not allow for selection of mature characteristics. Somatic embryogenesis would allow for the mature mother plant to be rejuvenated for cutting propagation, while still having the clonal characteristics desired (Geneve et al., 2003).

Somatic embryogenesis has been reported in a number of oak species with the majority of the work being performed in English oak (*Q. robur*) and cork oak (*Q. suber*). In these species, the frequency of somatic embryo induction is between 80 and 100% from immature zygotic embryo explants but less than 15% using seedling leaf tissue (Wilhelm, 2000). However, regardless of the initial source, somatic embryo maturation, conversion, and germination have been difficult. Often the somatic embryo forms shoots or roots only and complete recovery of plants is at a low frequency (Wilhelm, 2000).

The objective of this research was to investigate the effects of ABA, cytokinin, gibberellic acid and sucrose concentration on development of somatic embryos derived from immature cotyledons of willow oak.

Materials and Methods

Acorns were collected in August and cotyledon halves from the zygotic embryo were placed on MS basal media in Petri plates containing 1 μM BA and 0, 1, 5 or 10 μM NAA. These plates were then placed under cool white fluorescent lights (16 hr lighted photoperiod, PAR 60 $\mu mol \cdot sec^{-1} \cdot m^{-2}$) at 21°C. Explants were transferred to MS media containing no growth regulators every three weeks until somatic embryos formed.

Somatic embryos that reached the cotyledon stage were moved to media containing ABA (0, 1, or 5 μM), GA3 (0, 10, or 50 μM), or BA (0, 1, or 10 μM) in combination with 30 or 60 grams per liter of sucrose. Shoot and root development was evaluated after two months.

Results and Discussion

Somatic embryos formed at all concentrations of BA and NAA evaluated with the greatest percentage being produced at 5 μM NAA (45%). Secondary somatic embryos formed readily and repeatedly on basal medium without growth regulators (Figure 1).

ABA only slightly increased the number of somatic embryos producing a root or a shoot (Table 1). ABA is often used during somatic embryogenesis to promote more normal embryo development, but ABA usually inhibits embryo germination. Therefore, it was unexpected that ABA would promote shoot and root growth (Table 1). It is possible that ABA suppressed secondary somatic embryo formation and allowed the primary embryo to germinate.

Table 1. Percentage of somatic embryos forming a root or shoot after 2 months on MS media containing combinations of sucrose with abscisic acid or gibberellic acid.

Growth regulator [μM]		Sucrose concentration [%] 3	6
ABA	0	15%	6%
	1	4%	18%
	5	7%	0%
GA_3	10	6%	16%
	50	20%	24%

The highest somatic embryo frequency was seen using 50 μM GA3 and 6% sucrose (Table 1). Previous work with other oak species showed that GA_3 had a minimal effect at promoting somatic embryo germination (Sanchez et al., 2003). More often, BA has been shown to stimulate shoot and root growth in oak (Wilhelm, 2000). However, in willow oak BA was ineffective at promoting germination, while GA_3 was as effective as ABA.

Doubling the sucrose concentration did not consistently impact somatic embryo growth or germination (Table 1). Sucrose plays the dual role of providing a carbohydrate source for growth and acting as an osmoticum. It is possible that the sucrose concentration used in this work was not high enough to impact embryo development. Using cork oak, Garcia-Martin et al. (2001) found that 150 g / L of sucrose allowed 75% of the somatic embryos to convert to seedlings. This conversion rate is comparable to the improvement in conversion of English oak to 83% found by slowly drying somatic embryos for three weeks prior to germination (Wilhelm, 2000).

To date, no plantlets have been recovered from willow oak via somatic embryos. Future research will focus on adjusting the water potential of the somatic embryo by drying or exposure to high osmotic concentrations to promote more normal seedling development.

REFERENCES

Garcia-Martin, G., M.E. Gonzalez-Benito, and J.A. Manzanera. 2001. *Quercus suber* L. somatic embryo germination and plant conversion: pretreatments and germination conditions. In Vitro Cell Dev. Biol. - Plant 37: 190-198.

Geneve, R.L., S.T. Kester, C. Edwards, and S. Wells. 2003. Somatic embryogenesis and callus induction in willow oak. Comb. Proc. Intern. Plant Propagators' Soc. 53:570-572.

Sanchez, M.C., M.T. Martinez, S. Valladares, E. Ferro, and A.M. Vieitez. 2003. Maturation and germination of oak somatic embryos originated from leaf and stem explants: RAPD markers for genetic analysis of regenerants. J. Plant Physiol. 160: 699-707.

Wilhelm, E. 2000. Somatic embryogenesis in oak (*Quercus spp.*). In vitro Cell. Dev. Biol.-Plant 36: 349-357.

Poster Presentations

Preparing text and figures

Tables can be generated in PowerPoint, but tables are often easier to make in Word and copied into PowerPoint using the copy and paste function.

Remember, you will have to re-size the font and usually amend the column and row spacing in the larger PowerPoint poster format if imported from a standard Word page setup.

Table 1. Root formation in poplar stem internodes placed on a basal media prior to being moved to 100 µM IBA for one day. Internodes were then returned to a basal media.

Treatment duration on PGR medium				
(Basal)	(IBA)	(Basal)	Rooting percentage	Roots per explant
0 day	1 day	13 day	80a	1.6ab[z]
1 day	1 day	12 day	60a	1.2b
3 day	1 day	10 day	65a	2.0a
5 day	1 day	8 day	60a	1.0b

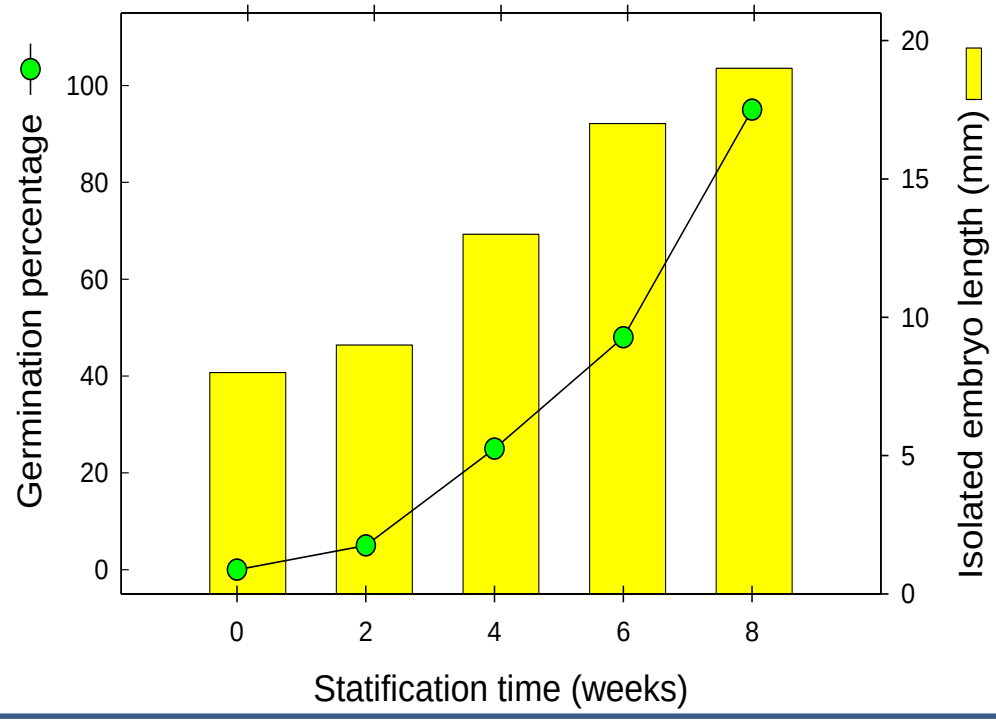
Poster Presentations

Preparing text and figures

Figures can be generated in PowerPoint, but figures are usually easier to make in Excel or some other program designed to make figures.

Figures can be imported into PowerPoint using the copy and paste function or you can save the figure as a JPEG image file.

Figure 1. The impact of stratification time on germination percentage and embryo growth after germination in Eastern redbud seeds.



Poster Presentations

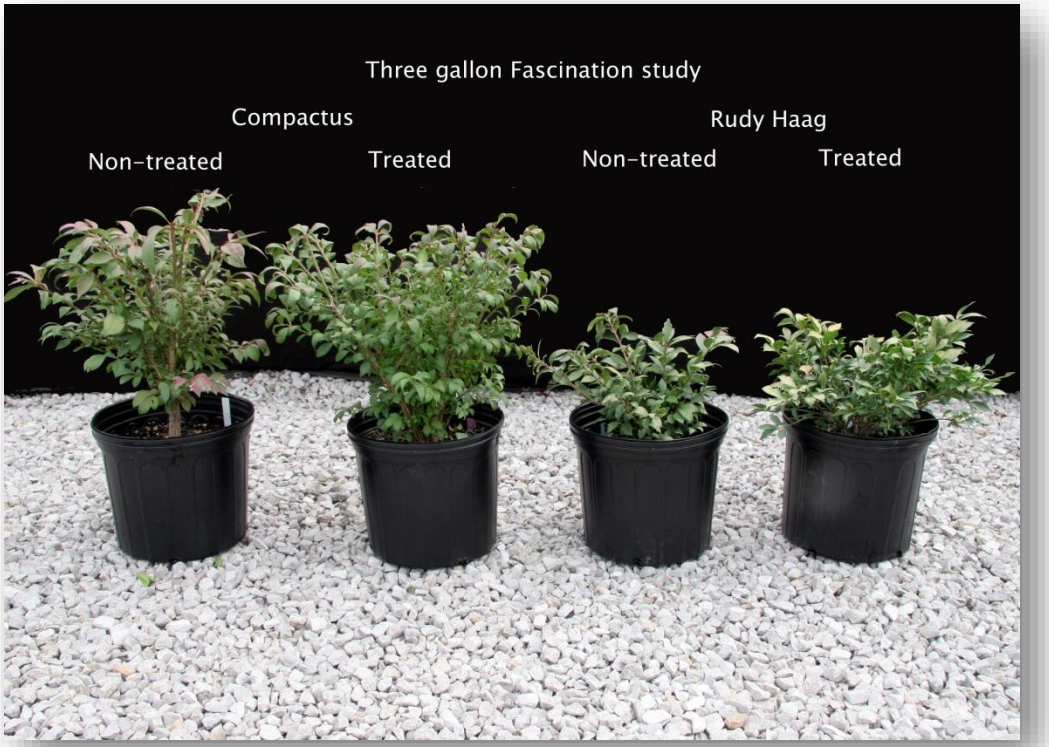
Image size and quality

Since the poster has large dimensions, it is important to have picture images with good focus and high resolution.

Use a good camera to ensure high resolution. Try to reduce interfering backgrounds and try to get uniform lighting on the subject.

Plan ahead and stage your pictures to tell a story for your poster.

Labeling the images in your picture will provide more interest and enhance comprehension.



Poster Presentations

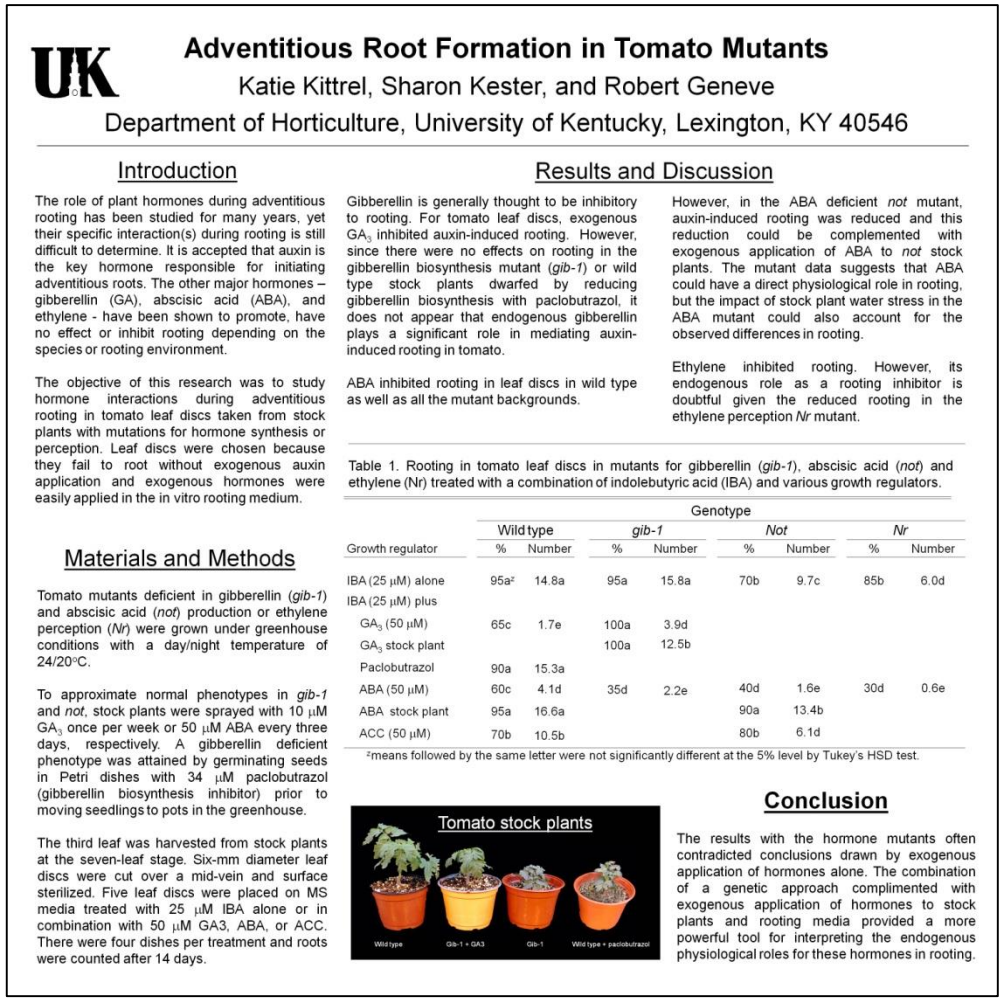
Poster printing

Posters need to be custom printed.

National firms like Kinko and Office Max do custom printing, but local companies may also be available.

Check with the company for the format they require for printing.

They may be able to print directly from your PowerPoint, or they may require you to provide a PDF version of your poster.



Adventitious Root Formation in Tomato Mutants

Katie Kittrel, Sharon Kester, and Robert Geneve

Department of Horticulture, University of Kentucky, Lexington, KY 40546

Introduction

The role of plant hormones during adventitious rooting has been studied for many years, yet their specific interaction(s) during rooting is still difficult to determine. It is accepted that auxin is the key hormone responsible for initiating adventitious roots. The other major hormones – gibberellin (GA), abscisic acid (ABA), and ethylene - have been shown to promote, have no effect or inhibit rooting depending on the species or rooting environment.

The objective of this research was to study hormone interactions during adventitious rooting in tomato leaf discs taken from stock plants with mutations for hormone synthesis or perception. Leaf discs were chosen because they fail to root without exogenous auxin application and exogenous hormones were easily applied in the in vitro rooting medium.

Materials and Methods

Tomato mutants deficient in gibberellin (*gib-1*) and abscisic acid (*not*) production or ethylene perception (*Nr*) were grown under greenhouse conditions with a day/night temperature of 24/20°C.

To approximate normal phenotypes in *gib-1* and *not*, stock plants were sprayed with 10 µM GA_3 once per week or 50 µM ABA every three days, respectively. A gibberellin deficient phenotype was attained by germinating seeds in Petri dishes with 34 µM paclobutrazol (gibberellin biosynthesis inhibitor) prior to moving seedlings to pots in the greenhouse.

The third leaf was harvested from stock plants at the seven-leaf stage. Six-mm diameter leaf discs were cut over a mid-vein and surface sterilized. Five leaf discs were placed on MS media treated with 25 µM IBA alone or in combination with 50 µM GA3, ABA, or ACC. There were four dishes per treatment and roots were counted after 14 days.

Results and Discussion

Gibberellin is generally thought to be inhibitory to rooting. For tomato leaf discs, exogenous GA_3 inhibited auxin-induced rooting. However, since there were no effects on rooting in the gibberellin biosynthesis mutant (*gib-1*) or wild type stock plants dwarfed by reducing gibberellin biosynthesis with paclobutrazol, it does not appear that endogenous gibberellin plays a significant role in mediating auxin-induced rooting in tomato.

ABA inhibited rooting in leaf discs in wild type as well as all the mutant backgrounds.

However, in the ABA deficient *not* mutant, auxin-induced rooting was reduced and this reduction could be complemented with exogenous application of ABA to *not* stock plants. The mutant data suggests that ABA could have a direct physiological role in rooting, but the impact of stock plant water stress in the ABA mutant could also account for the observed differences in rooting.

Ethylene inhibited rooting. However, its endogenous role as a rooting inhibitor is doubtful given the reduced rooting in the ethylene perception *Nr* mutant.

Table 1. Rooting in tomato leaf discs in mutants for gibberellin (*gib-1*), abscisic acid (*not*) and ethylene (Nr) treated with a combination of indolebutyric acid (IBA) and various growth regulators.

	Genotype							
	Wild type		*gib-1*		*Not*		*Nr*	
Growth regulator	%	Number	%	Number	%	Number	%	Number
IBA (25 µM) alone	95a[z]	14.8a	95a	15.8a	70b	9.7c	85b	6.0d
IBA (25 µM) plus								
GA_3 (50 µM)	65c	1.7e	100a	3.9d				
GA_3 stock plant			100a	12.5b				
Paclobutrazol	90a	15.3a						
ABA (50 µM)	60c	4.1d	35d	2.2e	40d	1.6e	30d	0.6e
ABA stock plant	95a	16.6a			90a	13.4b		
ACC (50 µM)	70b	10.5b			80b	6.1d		

[z]means followed by the same letter were not significantly different at the 5% level by Tukey's HSD test.

Conclusion

The results with the hormone mutants often contradicted conclusions drawn by exogenous application of hormones alone. The combination of a genetic approach complimented with exogenous application of hormones to stock plants and rooting media provided a more powerful tool for interpreting the endogenous physiological roles for these hormones in rooting.

Back Next

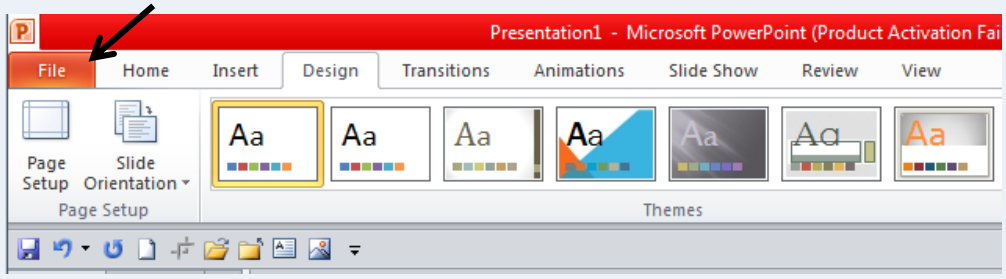
Poster Presentations

Poster printing

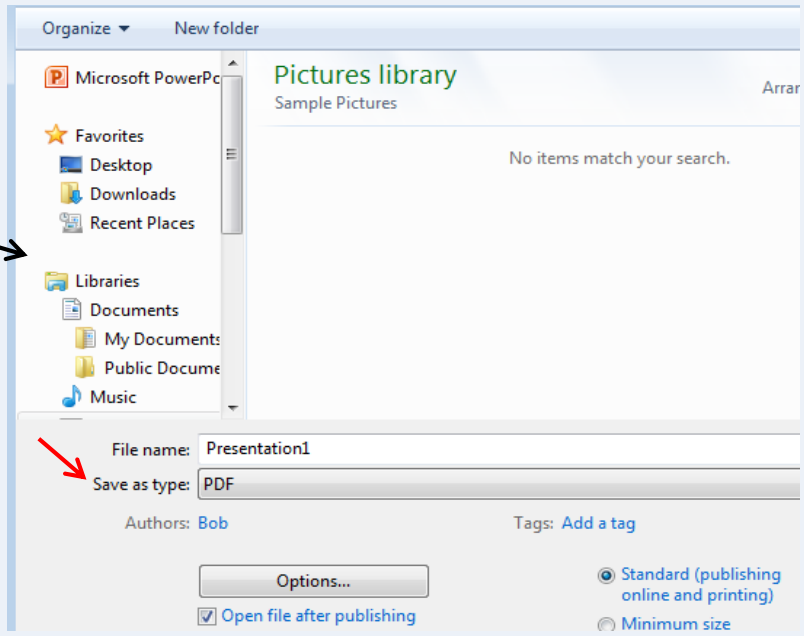
If you are required to have your poster in a PDF file format, you can create a PDF file for printing by going to the "File" menu tab at the top left of the PowerPoint page.

Select the "Save as" option and under the "Save as type" pull down menu - select the PDF format and save your file.

File menu tab



Save as menu



Back Next

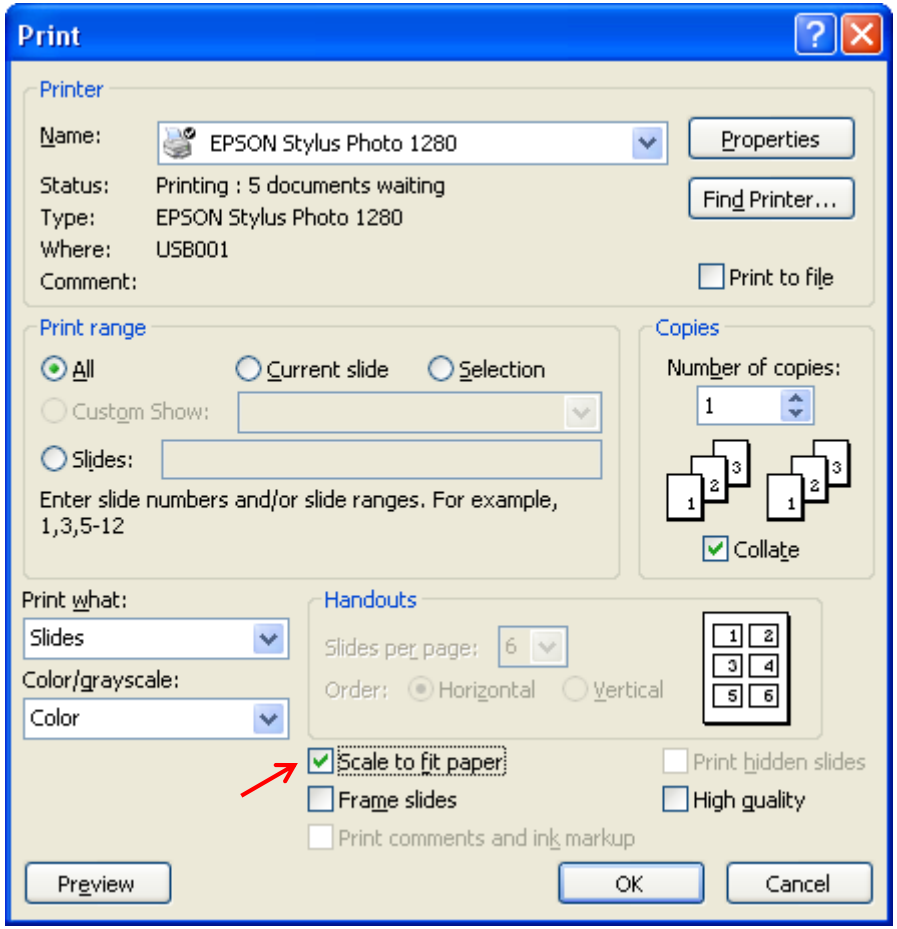
Poster Presentations

Poster printing

Before you go to the printer, check your poster out first in PowerPoint.

To do this, select the file menu and view the print file.

If you want a printed version on 8.5 by 11 inch paper, you can select the "scale to fit paper" option to see your poster in a small version.



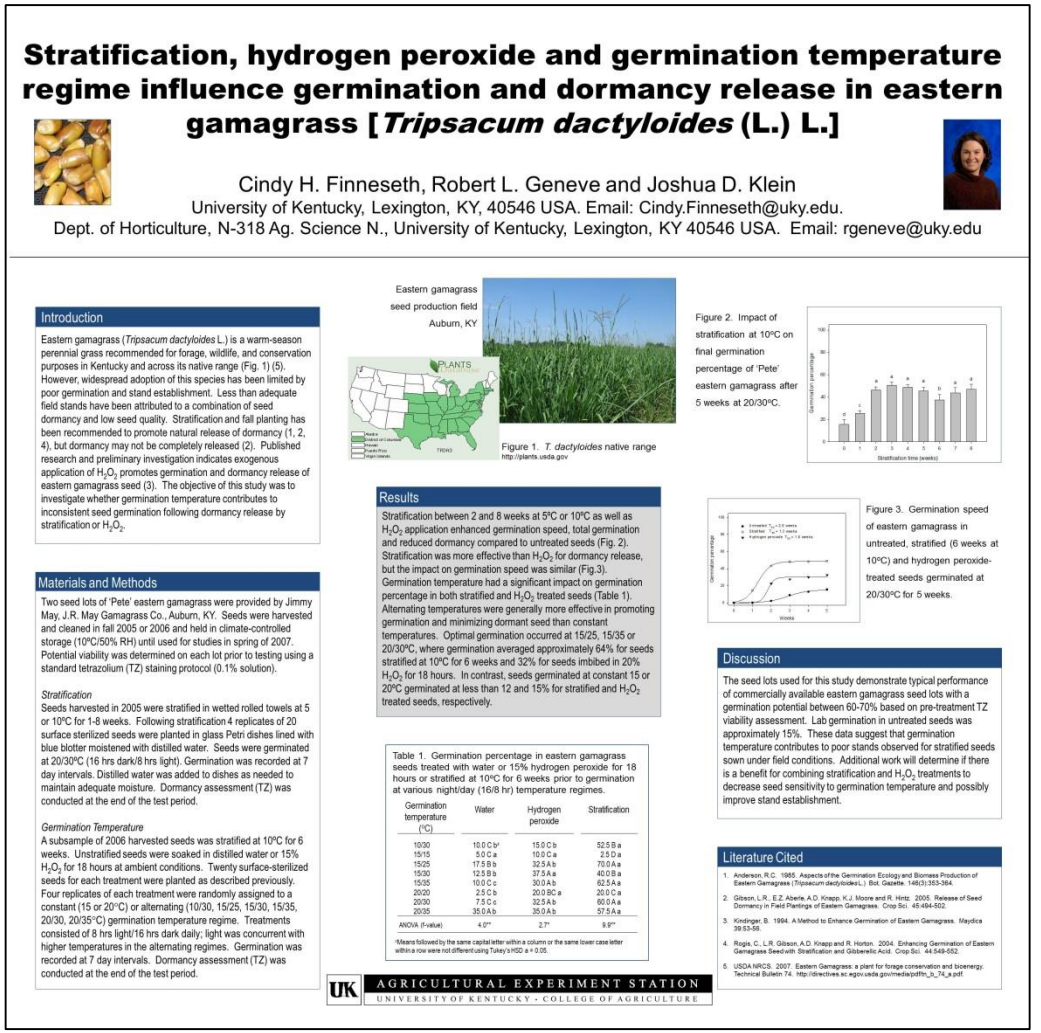
Poster Presentations

Research poster

A research-based poster is a way to report the results from a production or propagation research project.

Its basic organization includes sections for:

- Introduction
- Materials and methods
- Results
- Discussion
- Literature cited



Stratification, hydrogen peroxide and germination temperature regime influence germination and dormancy release in eastern gamagrass [*Tripsacum dactyloides* (L.) L.]

Cindy H. Finneseth, Robert L. Geneve and Joshua D. Klein
University of Kentucky, Lexington, KY, 40546 USA. Email: Cindy.Finneseth@uky.edu.
Dept. of Horticulture, N-318 Ag. Science N., University of Kentucky, Lexington, KY 40546 USA. Email: rgeneve@uky.edu

Introduction

Eastern gamagrass (*Tripsacum dactyloides* L.) is a warm-season perennial grass recommended for forage, wildlife, and conservation purposes in Kentucky and across its native range (Fig. 1) (5). However, widespread adoption of this species has been limited by poor germination and stand establishment. Less than adequate field stands have been attributed to a combination of seed dormancy and low seed quality. Stratification and fall planting has been recommended to promote natural release of dormancy (1, 2, 4), but dormancy may not be completely released (2). Published research and preliminary investigation indicates exogenous application of H_2O_2 promotes germination and dormancy release of eastern gamagrass seed (3). The objective of this study was to investigate whether germination temperature contributes to inconsistent seed germination following dormancy release by stratification or H_2O_2.

Eastern gamagrass seed production field Auburn, KY

Figure 1. *T. dactyloides* native range http://plants.usda.gov

Figure 2. Impact of stratification at 10ºC on final germination percentage of 'Pete' eastern gamagrass after 5 weeks at 20/30ºC.

Materials and Methods

Two seed lots of 'Pete' eastern gamagrass were provided by Jimmy May, J.R. May Gamagrass Co., Auburn, KY. Seeds were harvested and cleaned in fall 2005 or 2006 and held in climate-controlled storage (10ºC/50% RH) until used for studies in spring of 2007. Potential viability was determined on each lot prior to testing using a standard tetrazolium (TZ) staining protocol (0.1% solution).

Stratification
Seeds harvested in 2005 were stratified in wetted rolled towels at 5 or 10ºC for 1-8 weeks. Following stratification 4 replicates of 20 surface sterilized seeds were planted in glass Petri dishes lined with blue blotter moistened with distilled water. Seeds were germinated at 20/30ºC (16 hrs dark/8 hrs light). Germination was recorded at 7 day intervals. Distilled water was added to dishes as needed to maintain adequate moisture. Dormancy assessment (TZ) was conducted at the end of the test period.

Germination Temperature
A subsample of 2006 harvested seeds was stratified at 10ºC for 6 weeks. Unstratified seeds were soaked in distilled water or 15% H_2O_2 for 18 hours at ambient conditions. Twenty surface-sterilized seeds for each treatment were planted as described previously. Four replicates of each treatment were randomly assigned to a constant (15 or 20°C) or alternating (10/30, 15/25, 15/30, 15/35, 20/30, 20/35°C) germination temperature regime. Treatments consisted of 8 hrs light/16 hrs dark daily; light was concurrent with higher temperatures in the alternating regimes. Germination was recorded at 7 day intervals. Dormancy assessment (TZ) was conducted at the end of the test period.

Results

Stratification between 2 and 8 weeks at 5ºC or 10ºC as well as H_2O_2 application enhanced germination speed, total germination and reduced dormancy compared to untreated seeds (Fig. 2). Stratification was more effective than H_2O_2 for dormancy release, but the impact on germination speed was similar (Fig.3). Germination temperature had a significant impact on germination percentage in both stratified and H_2O_2 treated seeds (Table 1). Alternating temperatures were generally more effective in promoting germination and minimizing dormant seed than constant temperatures. Optimal germination occurred at 15/25, 15/35 or 20/30ºC, where germination averaged approximately 64% for seeds stratified at 10ºC for 6 weeks and 32% for seeds imbibed in 20% H_2O_2 for 18 hours. In contrast, seeds germinated at constant 15 or 20ºC germinated at less than 12 and 15% for stratified and H_2O_2 treated seeds, respectively.

Figure 3. Germination speed of eastern gamagrass in untreated, stratified (6 weeks at 10ºC) and hydrogen peroxide-treated seeds germinated at 20/30ºC for 5 weeks.

Table 1. Germination percentage in eastern gamagrass seeds treated with water or 15% hydrogen peroxide for 18 hours or stratified at 10ºC for 6 weeks prior to germination at various night/day (16/8 hr) temperature regimes.

Germination temperature (°C)	Water	Hydrogen peroxide	Stratification
10/30	10.0 C b[z]	15.0 C b	52.5 B a
15/15	5.0 C a	10.0 C a	2.5 D a
15/25	17.5 B b	32.5 A b	70.0 A a
15/30	12.5 B b	37.5 A a	40.0 B a
15/35	10.0 C c	30.0 A b	62.5 A a
20/20	2.5 C b	20.0 BC a	20.0 C a
20/30	7.5 C a	32.5 A b	60.0 A a
20/35	35.0 A b	35.0 A b	57.5 A a
ANOVA (F-value)	4.0**	2.7*	9.9**

[z]Means followed by the same capital letter within a column or the same lower case letter within a row were not different using Tukey's HSD α = 0.05.

Discussion

The seed lots used for this study demonstrate typical performance of commercially available eastern gamagrass seed lots with a germination potential between 60-70% based on pre-treatment TZ viability assessment. Lab germination in untreated seeds was approximately 15%. These data suggest that germination temperature contributes to poor stands observed for stratified seeds sown under field conditions. Additional work will determine if there is a benefit for combining stratification and H_2O_2 treatments to decrease seed sensitivity to germination temperature and possibly improve stand establishment.

Literature Cited

1. Anderson, R.C. 1985. Aspects of the Germination Ecology and Biomass Production of Eastern Gamagrass (*Tripsacum dactyloides* L.). Bot. Gazette. 146(3):383-364.
2. Gibson, L.R., E.Z. Aberle, A.D. Knapp, K.J. Moore and R. Hintz. 2005. Release of Seed Dormancy in Field Plantings of Eastern Gamagrass. Crop Sci. 45:494-502.
3. Kindinger, B. 1994. A Method to Enhance Germination of Eastern Gamagrass. Maydica 39:83-86.
4. Regis, C., L.R. Gibson, A.D. Knapp and R. Horton. 2004. Enhancing Germination of Eastern Gamagrass Seed with Stratification and Gibberellic Acid. Crop Sci. 44:549-552.
5. USDA NRCS. 2007. Eastern Gamagrass: a plant for forage conservation and bioenergy. Technical Bulletin 74. http://directives.sc.egov.usda.gov/media/pdf/tn_b_74_a.pdf

UK AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF KENTUCKY - COLLEGE OF AGRICULTURE

Back Next

Poster Presentations

Practices poster

A practices-based poster describes a technique or process used in production or propagation.

It could be the propagation of a specific plant, an irrigation procedure, a sustainable technique, or your beneficial insect control strategy. The subject can be anything you want to share with the membership.

The example to the right is a technique poster for seed removal in gamagrass. It contains an introduction and then the different steps involved in seed removal. It is very image oriented.

Seed caryopsis removal from gamagrass cupules

Cindy H. Finneseth and Robert L. Geneve
University of Kentucky, Lexington, KY, 40546 USA. Email: Cindy.Finneseth@uky.edu.
Dept. of Horticulture, N-318 Ag. Science N., University of Kentucky, Lexington, KY 40546 Email: rgeneve@uky.edu

Introduction

Eastern gamagrass (*Tripsacum dactyloides* L.) is a warm-season perennial grass recommended for forage, wildlife, and conservation purposes in Kentucky and across its native range (Fig. 1) (5). However, widespread adoption of this species has been limited by poor germination and stand establishment. Less than adequate field stands have been attributed to a combination of seed dormancy and low seed quality.

Stratification and fall planting has been recommended to promote natural release of dormancy (1, 2, 4), but dormancy may not be completely released (2). Seeds will readily germinate when removed from the fruit coverings. However, the seed (caryopsis) is enclosed in a hard fruit covering called a cupule. The objective of this poster is to demonstrate a relatively quick method for removing seeds from the cupule in order to measure total viability and to evaluate growth regulator effects on the seed.

Gamagrass as a crop

Gamagrass can be used as an ornamental grass, a forage grass as well as a biomass crop.

Seed removal – Step 3

Clip where the rachis and glume (red arrow) meet on both sides and the cupule will 'hinge' open.

Glume
Rachis

Tip: You may have to tug at the tip a bit to fully open the cupule.

Methods

Seeds were removed from the dry and moistened cupule using a typical manicure/ pedicure nail clipper. Following seed removal, they were germinated in Petri dishes germinated at 20/30ºC (16 hrs dark/8 hrs light). Viability using a TZ test was also conducted.

Seed removal – Step 1

Seed removal was most efficient when the cupule was soaked in water for 8 hours.

Seed removal – Step 4

Crack off the glume to expose the caryopsis. The caryopsis can also be removed to excise the true seed.

Caryopsis
True seed

Gamagrass fruit and seed morphology

Gamagrass (*Tripsacum*) produces a seed unit that is a little different from other grasses. It produces a cupule that consists of hardened rachis and glume tissue surrounding a papery lemma and palea directly covering the caryopsis.

Developing fruits
Intact seed unit
Glume partially removed
Glume
Rachis
Lemma and palea

Seed removal – Step 2

Nail clippers was the most useful tool to separate the seed from the cupule.

Literature Cited

1. Anderson, R.C. 1985. Aspects of the Germination Ecology and Biomass Production of Eastern Gamagrass (*Tripsacum dactyloides* L.) Bot. Gazette. 146(3):353-364.
2. Gibson, L.R., E.Z. Aberle, A.D. Knapp, K.J. Moore and R. Hintz. 2005. Release of Seed Dormancy in Field Plantings of Eastern Gamagrass. Crop Sci. 45:494-502.
3. Kindinger, B. 1994. A Method to Enhance Germination of Eastern Gamagrass. Maydica 39:53-56.
4. Rogis, C., L.R. Gibson, A.D. Knapp and R. Horton. 2004. Enhancing Germination of Eastern Gamagrass Seed with Stratification and Gibberellic Acid. Crop Sci. 44:549-552.
5. USDA NRCS. 2007. Eastern Gamagrass: a plant for forage conservation and bioenergy. Technical Bulletin 74. http://directives.sc.egov.usda.gov/media/pdf/tn_b_74_a.pdf.

Back