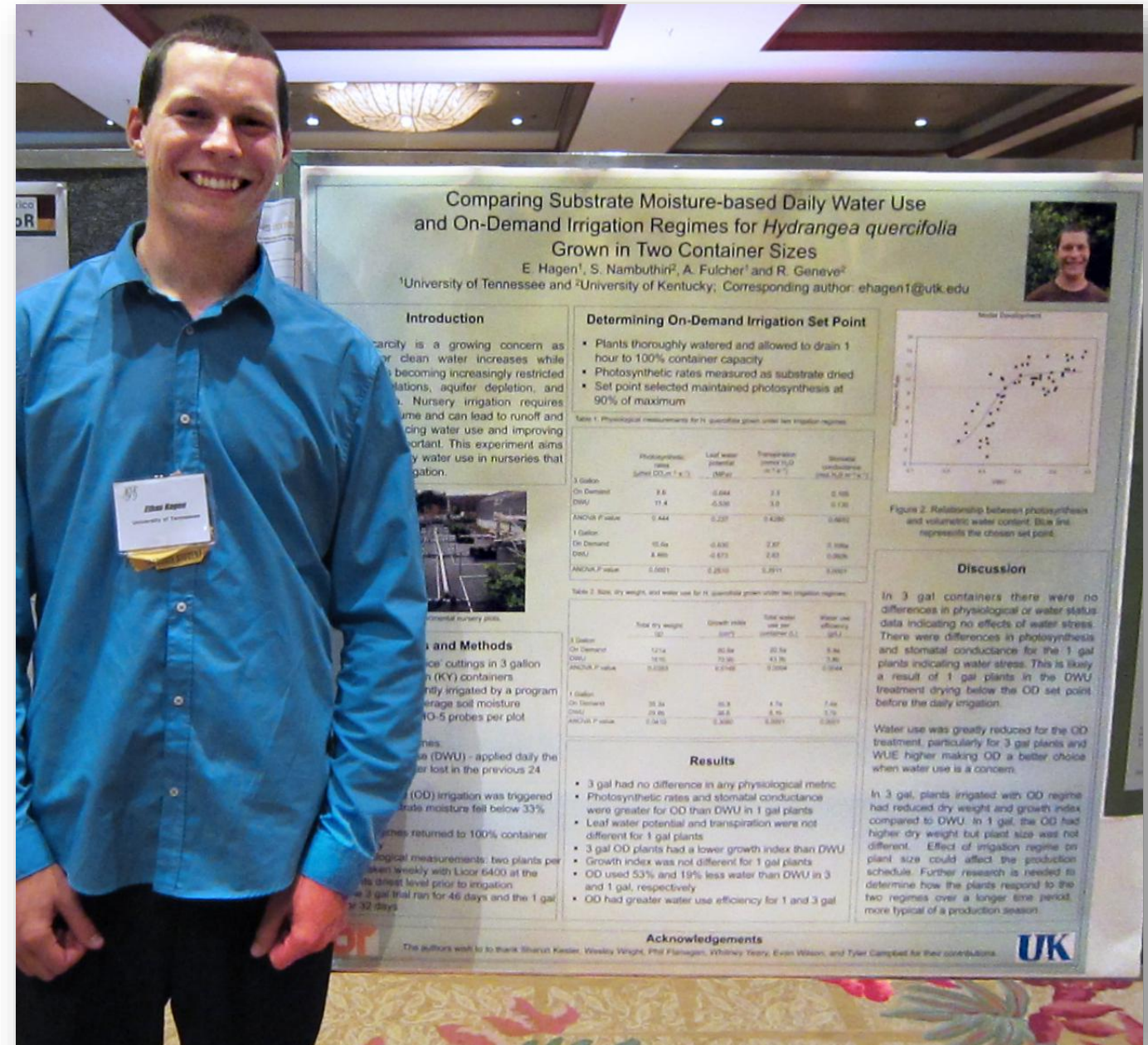


Poster Presentations

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 or production-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.

Clipping and Gibberellin Treatment Promote Germination in Fresh Grape Seeds Sown in Vitro

Bridget Bolt, Roberta Magnani, Carlos Rodriguez López and Robert Geneve
Department of Horticulture, University of Kentucky, Lexington, KY 40546

Introduction

Grape is commercially important both as a table fruit, a processed fruit for raisins, juice, and jams, as well as for wine production. Selected cultivars are commercially propagated by hardwood cuttings or grafted on resistant rootstocks (Davies et al. 2018). However, weather patterns around the world are changing and there is an urgent need to breed and propagate new adapted selections of a variety of traditional crops including grape. For grape, there are dire predictions for dramatic reductions (50% or more by 2040) of suitable wine grape acreage in the U.S. Seed germination is an important step in traditional breeding programs as well as those "accelerated crop breeding" programs utilizing novel genetic approaches.

Grape seed has physiological dormancy and requires three to four months of chilling stratification. Having a system that could by-pass this stratification time to expedite seedling production could reduce breeding cycles and facilitate novel "accelerated breeding" programs. Therefore, the objective of this project was to investigate the impact of partial seed coat removal and gibberellin treatment on germination of freshly harvested grape seeds.

Materials and Methods

Seeds were extracted from ripened grape (*Vitis* 'Cabernet Sauvignon') fruits from greenhouse grown plants (Fig.1). Fruits were physically crushed by hand and the pulp removed from seeds by rubbing with paper towels. Seeds were surface disinfested for 10 minutes in a 10% commercial bleach solution followed by three rinses in sterile distilled water. Half the seeds were left intact, and half the seeds were cut through the seed coat at the distal rounded portion of the seed (Fig. 2). Intact and cut seeds received a 24-hour soak in sterile distilled water or a filtered sterilized gibberellic acid (GA) solution at 2,000 ppm. Seeds were then placed in Petri dishes on an in vitro agar based Murishige and Skoog salts medium without sucrose (Fig. 3). Germination was at 25°C in the light.

Figure 1. Seeds were extracted from ripened grape fruits, while seeds were about 35% moisture.



Results

Untreated seeds failed to germinate (Fig. 3 and 4). All seeds that were cut and treated with GA germinated after about 14 days. Intact seeds treated with GA or cut without GA germinated at 40% or 20% respectively, but germination was slow taking between 20 and 40 days to initiate germination.

Seeds germinated in vitro transitioned to produce seedlings, but further observation in necessary to ascertain the vigor of these seedlings (Fig. 5).

Figure 2. Seeds were sown on MS in vitro medium without sucrose.

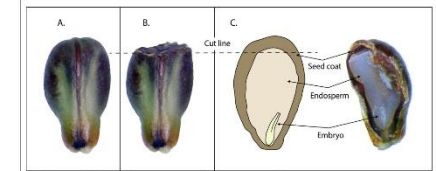


Figure 3. Seeds were sown on MS in vitro medium without sucrose.

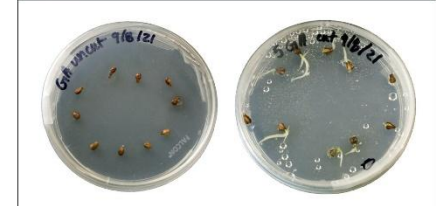
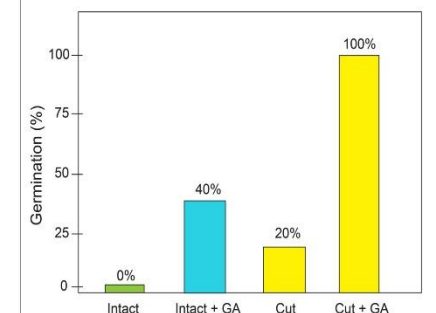


Figure 4. Germination in fresh grape seeds after being cut and treated with 2,000 ppm gibberellic acid.



Discussion

There are several surgical methods to by-pass seed physiological dormancy including embryo removal from the seed or disrupting seed coat integrity (Geneve 1991). Hormones, primarily GA, can also substitute for chilling stratification to satisfy dormancy (Baskin and Baskin, 2014). There is also significant anecdotal evidence that utilizing fresh seed that has not gone through the desiccation process can show less dormancy compared to dried seeds (Schopmeyer, 1974).

The present preliminary study with grape, demonstrates that seeds that have been cut and treated with GA can germinate and transition to seedlings thus reducing the time to produce a seedling compared to traditional stratification treatments. This study was done with fresh seed and additional studies are underway to see if the combination of cutting and GA treatment is only efficacious in fresh seeds or can also be applied to dried and stored seeds.

Figure 5. Seedling from seed that was cut and treated with 2,000 ppm gibberellic acid.



Literature Cited

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Poster Presentations

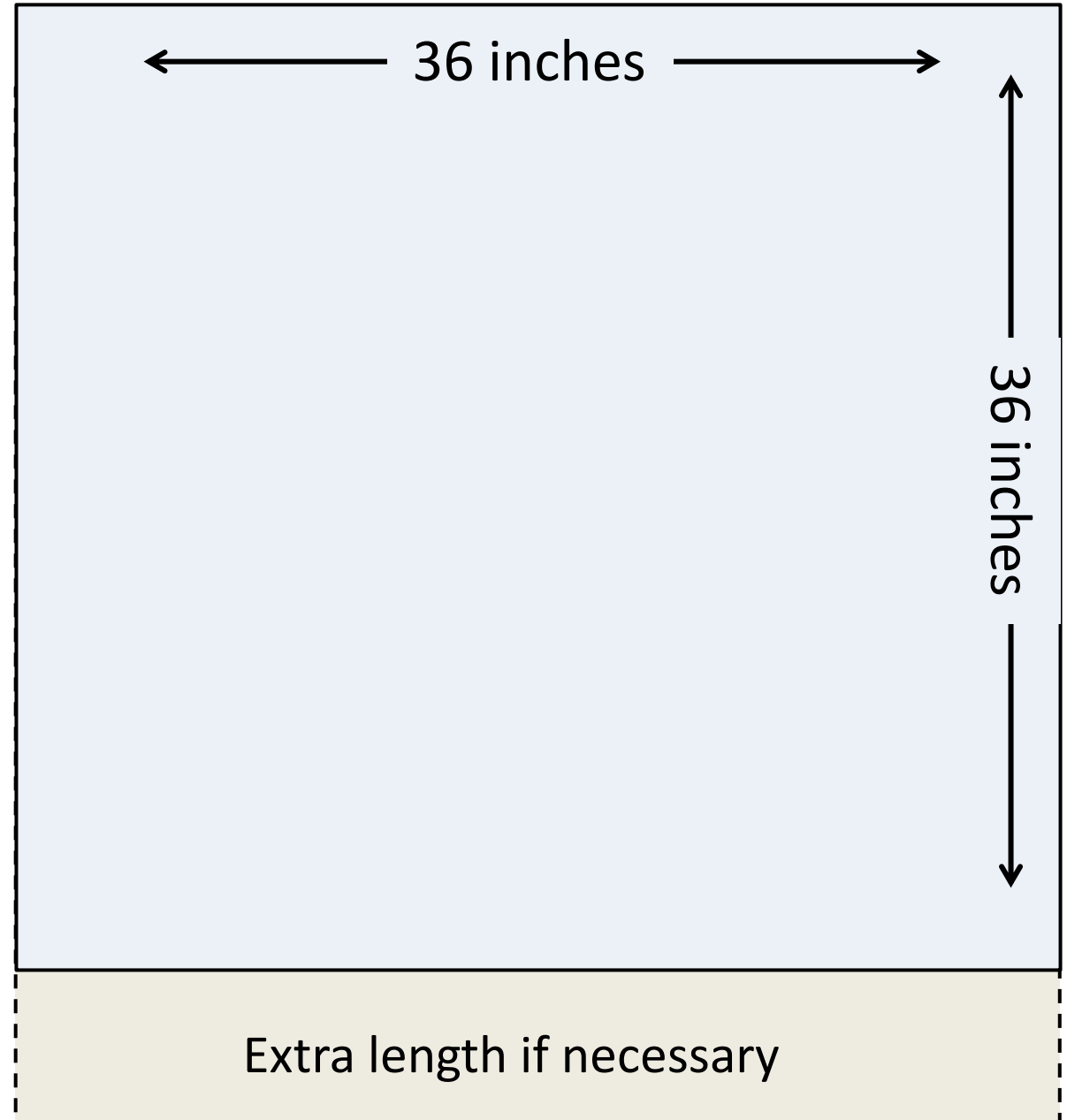
Poster size

The basic poster dimensions is 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 an issue.



Poster Presentations

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

- 1 “Design” tab at the top left of the PowerPoint program page.

- 2 Next select “Slide Size”.
- 3 In the dropdown box select “Custom Slide Size”.

- 4 Then select the width and height for 36 inches.

Poster size

1 Design tab

2 Slide size

3 Custom Slide Size

4 Select Slide Size
36in : 36 in

Slide Size

Slides sized for:
Custom

Width:
36 in

Height:
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Number slides from:
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Orientation

Slides

☐ Portrait
☒ Landscape

Notes, Handouts & Outline

☒ Portrait
☐ Landscape

OK Cancel

Standard (4:3)
Widescreen (16:9)
Custom Slide Size

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



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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. canadensis* x *P. grandidentata*) 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 $\mu\text{mol}\cdot\text{sec}^{-1}\cdot\text{m}^{-2}$) 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 ²
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

²means 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 ²	0.6b
10	25.0b	1.6b
15	81.3a	11.8a
20	93.8a	13.8a

²means 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 ²	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

²means 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.

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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.

Font 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 than 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 μ M BA and 0, 1, 5 or 10 μ M NAA. These plates were then placed under cool white fluorescent lights (16 hr lighted photoperiod, PAR 60 μ mol \cdot sec $^{-1}$ ·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 μ M), GA₃ (0, 10, or 50 μ M), or BA (0, 1, or 10 μ M) in combination with 30 or 60 grams per liter of sucrose. Shoot and root development was evaluated after two months.

Somatic embryos formed at all concentrations of BA and NAA evaluated with the greatest percentage being produced at 5 μ M 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 [μ M]		Sucrose concentration [%]	
		3	6
ABA	0	15%	6%
	1	4%	18%
	5	7%	0%
	10	6%	16%
GA ₃	10	6%	16%
	50	20%	24%

Results and Discussion

The highest somatic embryo frequency was seen using 50 μ M GA₃ and 6% sucrose (Table 1). Previous work with other oak species showed that GA₃ 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 GA₃ 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.

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

Poster Presentations

Tables

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 μ M IBA for one day. Internodes were then returned to a basal media.

Treatment duration on PGR medium			Rooting percentage	Roots per explant
(Basal)	(IBA)	(Basal)		
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

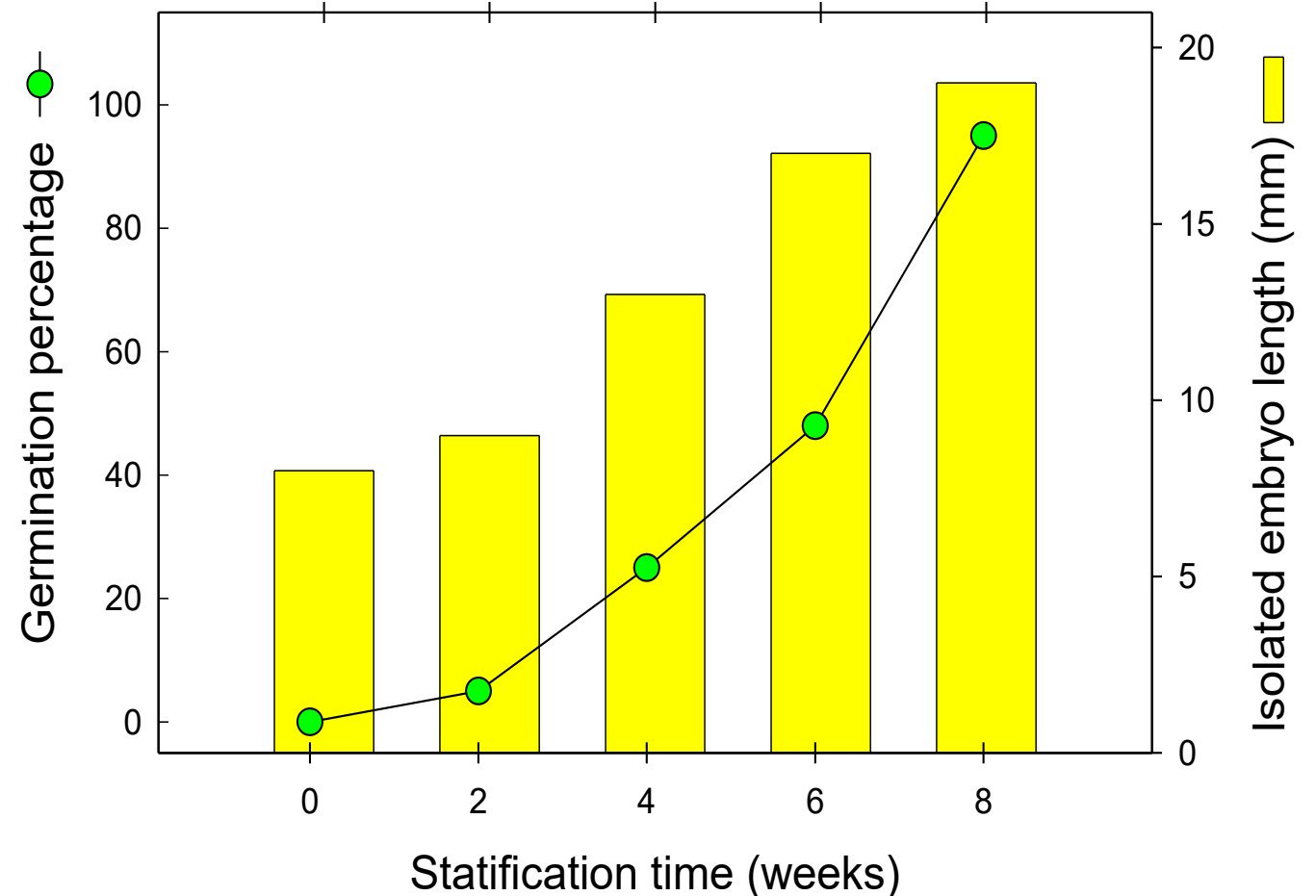
Poster Presentations

Figures

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

Figures can be easier to resize and move around if converted to a JPEG image file before importing into PowerPoint.

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 page 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 in 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

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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 μ M GA₃ once per week or 50 μ M ABA every three days, respectively. A gibberellin deficient phenotype was attained by germinating seeds in Petri dishes with 34 μ M 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 μ M IBA alone or in combination with 50 μ M 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 GA₃ 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.

Growth regulator	Genotype							
	Wild type		<i>gib-1</i>		<i>Not</i>		<i>Nr</i>	
	%	Number	%	Number	%	Number	%	Number
IBA (25 μ M) alone	95a [*]	14.8a	95a	15.8a	70b	9.7c	85b	6.0d
IBA (25 μ M) plus								
GA ₃ (50 μ M)	65c	1.7e	100a	3.9d				
GA ₃ stock plant			100a	12.5b				
Paclobutrazol	90a	15.3a						
ABA (50 μ M)	60c	4.1d	35d	2.2e	40d	1.6e	30d	0.6e
ABA stock plant	95a	16.6a			90a	13.4b		
ACC (50 μ M)	70b	10.5b			80b	6.1d		

^{*}means followed by the same letter were not significantly different at the 5% level by Tukey's HSD test.

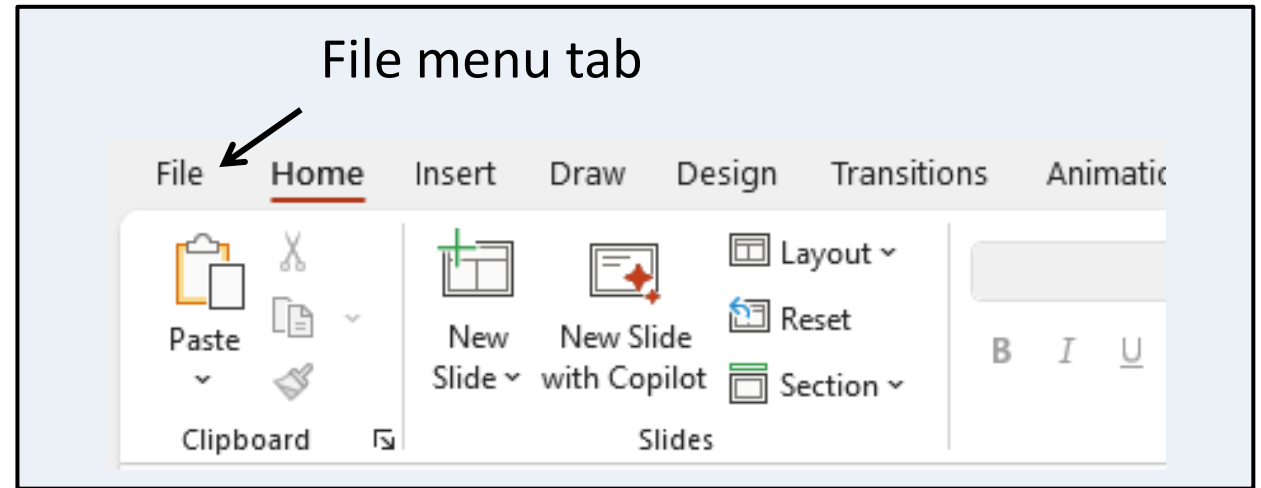


Conclusion

The results with the hormone mutants often contradicted conclusions drawn by exogenous application of hormones alone. The combination of a genetic approach complemented 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.

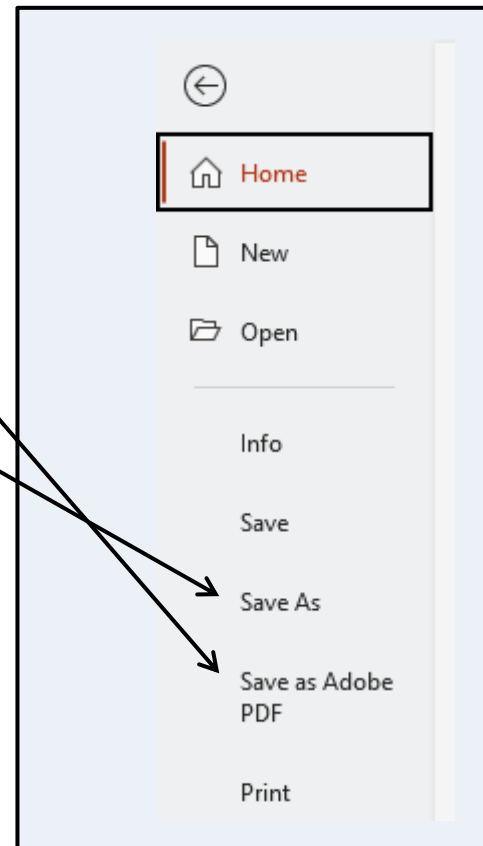
Poster Presentations

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Select Save as Adobe PDF.

You can also select the “Save as” option and under the “Save as type” pull down menu - select the PDF format and save your file.



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

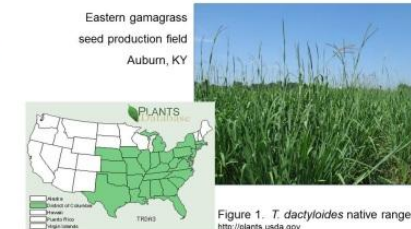
Stratification, hydrogen peroxide and germination temperature regime influence germination and dormancy release in eastern gamagrass [*Tripsacum dactyloides* (L.) L.]



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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 .



Results

Stratification between 2 and 8 weeks at 5°C or 10°C 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 20/30°C, where germination averaged approximately 64% for seeds stratified at 10°C for 6 weeks and 32% for seeds imbibed in 20% H_2O_2 for 18 hours. In contrast, seeds germinated at constant 15 or 20°C germinated at less than 12 and 15% for stratified and H_2O_2 treated seeds, respectively.

Table 1. Germination percentage in eastern gamagrass seeds treated with water or 15% hydrogen peroxide for 18 hours or stratified at 10°C 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 ^a	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 B c	20.0 C a
20/30	7.5 C c	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*	8.9**

^aMeans 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 $\alpha = 0.05$.

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

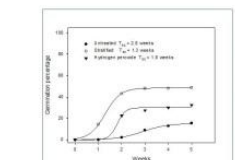
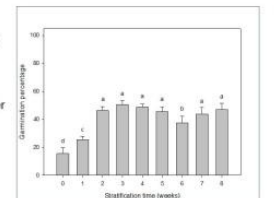


Figure 3. Germination speed of eastern gamagrass in untreated, stratified (6 weeks at 10°C) and hydrogen peroxide-treated seeds germinated at 20/30°C for 5 weeks.

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

- Anderson, R.C. 1985. Aspects of the Germination Ecology and Biomass Production of Eastern Gamagrass (*Tripsacum dactyloides* L.). Bot. Gazette. 146(3):353-364.
- 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. 45:484-502.
- Kindinger, B. 1994. A Method to Enhance Germination of Eastern Gamagrass. Maydica 39:53-56.
- 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.
- USDA NRCS. 2007. Eastern Gamagrass: a plant for forage conservation and bioenergy. Technical Bulletin 74. http://directives.sc.egov.usda.gov/index.jsp?nav=74_a.pdf



Poster Presentations

Practices or production poster

A practices or production-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

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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.



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 20/30°C (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.



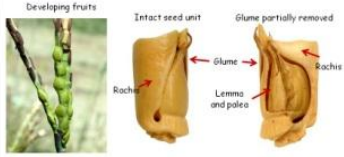
Seed removal – Step 2

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



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.



Seed removal – Step 4

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



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.
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4. Rogie, 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/ttn_b_74_a.pdf

Poster Presentations

The research and practices are basic poster formats.

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You also can provide a Proceedings paper as an additional way to “Seek and Share” your information.



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