



Plant Posters

P-2000

Comparative Assessment of Antioxidant Activity of Prenylated Stilbenoid-rich Extracts from Elicited Hairy Root Cultures of Three Different Cultivar of Peanut. G. GAJUREL^{1,2}, R. Hasan^{1,2}, and F. Medina-Bolivar^{1,3}. ¹Arkansas Biosciences Institute, ²Department of Molecular Biosciences, and ³Department of Biological Sciences, Arkansas State University, Jonesboro, AR 72401. Email: gaurav.gajurel@smail.astate.edu, fmedinabolivar@astate.edu

Over-production of reactive oxygen species (ROS) induces oxidative stress by damaging lipids, membranes, proteins, and DNA at the cellular level. This phenomenon results in several pathogenesis like cardiovascular diseases, cancer, neurodegenerative disease, and aging. Stilbenoids and their derivatives possess antioxidant activity and act to counteract these ROS, thereby alleviating oxidative stress. However, the antioxidant capacity of these stilbenoids is yet to be explored in depth. This project aimed to assess the antioxidant capacity of stilbenoid-rich extracts from hairy root cultures of peanut cultivars Hull, Tifrunner, and Georgia Green *in vitro* using the DPPH (2,2-diphenyl-1-picrylhydrazyl) assay. To produce the stilbenoid-rich extracts, hairy root cultures of the three cultivars of peanut were co-treated with methyl jasmonate, methyl- β -cyclodextrin, hydrogen peroxide, and magnesium chloride for 168 h. Different levels of resveratrol and prenylated stilbenoids were detected in the ethyl acetate extract of the culture medium. The stilbenoid-rich extracts from the Tifrunner hairy root culture showed a higher amount of arachidin-1 and arachidin-6. Upon reaction with DPPH, the Tifrunner stilbenoid-rich extracts had significantly higher antioxidant activity at the lower concentration of 6.25 $\mu\text{g/mL}$ and 3.125 $\mu\text{g/mL}$ when compared to extracts from cultivars Hull and Georgia Green. The stilbenoid-rich extracts from peanut hairy root cultures may provide a formulation for nutraceuticals to promote human health.

P-2001

In Vitro Selection for Fusaric Acid Resistant Egyptian Cumin Plants (*Cuminum cyminum* L.). HOSSAM

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Cumin is a winter annual herb and one of important medicinal, aromatic and spice plants in Egypt. Production of cumin is limited due to several biotic and abiotic stresses; among them wilt disease (caused by *Fusarium* spp.) is one the most serious problem. Fusaric acid "FA is a metabolite product from many strains of *Fusarium* spp.; could be applied as selecting agent for *in vitro* selection and production resistant plants. Many published papers indicated that FA it might play a role in pathogenesis and inhibits growth and regeneration of *in vitro* cell culture. In our work, hypocotyl was excised from seedling of Egyptian cumin 2-3 days after emergence, surface sterilized, cut into 5 mm long segments, cultured on B5_{DK} for callus induction (Gamborg B5) containing 0.88 mg/l 2,4-D, 0.86 mg/l kin, 30g/l sucrose, 8g/l agar, pH 5.8). Cultures were incubated at 25 \pm 2 $^{\circ}\text{C}$ under darkness or fluorescent light (16h/day) for 5 weeks. Five-week-old calli were used to study the phytotoxic concentrations of FA. A series of FA concentration was tested with B5_{DK} medium (0, 120, 140, 160, 180, 200 and 220 $\mu\text{M/l}$) at 25-27 $^{\circ}\text{C}$ under fluorescent light (16h/day). Fresh weight of calli after 5 weeks was calculated. Calli were turned to pale green smooth and friable on medium with 120 μM FA. With higher FA concentration (140, 160 and 180 μM), calli were rather nodular, compact and chlorophyllous, and few resistant calli ramming survivors. Calli unable to grow on 200 and 220 μM FA concentration hence lost their pigmentation and died, therefore, we proposed 150 μM FA concentration suitable for *in vitro* selection. Three hundred twenty calli were grown through two selection cycles (each for 4 weeks) on B5_{DK} with 150 μM FA. In the first selection cycle, 78.75 % of the calli were killed, after the second cycle, 16.1 % resistant calli were obtained and passed for plant regeneration. Resistant calli maintained on non-toxic B5 hormone-free medium for two weeks. After that calli were transferred on non-toxic B5_K regenerated medium (B5 with

0.215 mg Kin/l). After two subcultures on this medium, seven putative-resistant regenerated plants were obtained.

P-2002

RNAi Mediated Suppression of Flowering in Energycane to Enhance Biocontainment. BASKARAN KANNAN, Thaibinhduong Nguyen, Niki Koukoulidis, Qasim Ali, Frico Situmeang, and Fredy Altpeter. Agronomy Department, University of Florida, Gainesville, FL 32611. Email: kbaskaran@ufl.edu, altpeter@ufl.edu

Energycane is like sugarcane an interspecific hybrid in the genus *Saccharum*. In contrast to sugarcane, energycane has a high proportion of *S. spontaneum* in its genome which contributes to early season flowering, higher tiller number, biomass yield and persistence in addition to a reduced stem diameter and sugar content. Metabolic engineering of energycane has great potential to improve its value as biofuel feedstock. Since energycane is vegetatively propagated for commercial production, suppression of flowering will not require an altered agronomic practice while elevating the biosafety of transgenic energycane by preventing the formation of wind dispersed seeds. Therefore, we generated transgenic energycane plants harboring a construct for RNAi mediated co-suppression of multiple flowering genes. Transgenic plants were planted at the University of Florida Plant Science Research and Education Center near Citra, FL in randomized and replicated plots, following a statement from the inquiry based “Am I regulated” process that these transgenic plants are not-regulated by USDA-APHIS. Data will be presented comparing expression of the RNAi construct during photo inductive period with flowering response.

P-2003

A Bibliometric Review on *Citrus* Cryopreservation. MELEKSEN AKIN¹, Sadiye Peral Eydurana², and Barbara M. Reed³. ¹Department of Horticulture, Iğdir University, Iğdir, TURKEY; ²Department of Horticulture, Muğla Sıtkı Koçman University, Fethiye 48 300, TURKEY; and ³Department of Horticulture, Oregon State University, Corvallis, OR 97331. Email: akinmeleksen@gmail.com

This study documents a bibliometric assessment of scientific literature on *Citrus* cryopreservation. Bibliometrics is a literature review method analyzing systematic collections of statistics on a research discipline, demonstrating patterns and relationships among concepts in the field. The literature published on *Citrus* cryopreservation up to or before 2021 were extracted from the Web of Science database which resulted in 80 documents. The bibliographic data were analyzed in R studio utilizing the Bibliometrix package. The

scientific literature published on *Citrus* cryopreservation over time showed a decreasing trend (around -2.73%) with many fluctuations. The first document published in the area was in 1990 and there was no publication in some of the years including 2021. Most of the scientific literature on *Citrus* cryopreservation was published in Cryoletters followed by Plant Cell Tissue Organ Culture and In Vitro Cellular and Developmental Biology-Plant journals. Author keywords were projected with a word cloud to show hierarchical representation of the frequency of a word's use. The most frequent keywords, after cryopreservation and *Citrus*, were vitrification, embryonic axes, desiccation and encapsulation. India showed the highest number of publications on *Citrus* cryopreservation followed by Malaysia, China, Italy, USA, Australia and Japan. Collaboration network analysis of top countries doing research in the field was performed and three distinct network subgroups were detected. International collaboration graph was also generated showing single and multiple country publications based on corresponding author country. The objective of this research is to explore research patterns and the relationship between concepts in *Citrus* cryopreservation literature by performing descriptive and retrospective bibliometric assessments. We also intend to introduce text mining by utilizing R language, and encourage future application of this method on systematic review.

P-2004

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The Boyce Thompson Institute (BTI) Center for Plant Biotechnology Research (CPBR) was established to provide support to researchers at BTI as well as external customers that need plant transformation and plant tissue culture. CPBR personnel are experienced in *Agrobacterium tumefaciens*-mediated transformation of various species including tomato, potato, *Nicotiana tabacum*, *Nicotiana benthamiana*, alfalfa, *Medicago truncatula*, *Brachypodium distachyon*, *Setaria viridis*, switchgrass, sorghum, barley, and wheat. Instructions for how to submit requests and service fees can be found at our website <https://btiscience.org/our-research/research-facilities/biotechnology-center/>. Other potential services such as vector construction and transformation for species not listed may be discussed with the facility manager by email.

P-2005

Micropropagation and Transformation of *Cannabis sativa* L. GREGORY ROBINSON and Igor Kovalchuk. Department of Biological Sciences, University of Lethbridge,

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Cannabis sativa L. is a medicinal plant that has been used for thousands of years, however, due to decades of prohibition and stigmatization, little research has been performed on propagation and transformation techniques. Micropropagation is an alternative crop reproduction method where plants can be aseptically propagated for *Cannabis* plant multiplication and enables gene editing to be performed. Various tissue culture protocols for *Cannabis* have been reported, however, reports have low efficiency, are controversial, or are limited in tissue types, cultivars and plant growth regulators (PGR) tested. This study examines the regeneration and transformation potential of *Cannabis* leaves, petioles, internodes, nodes, and florets across *Cannabis* cultivars for the use in CRISPR-mediated gene editing. *Cannabis* explants were sterilized using 0.06% sodium hypochlorite & 3% hydrogen peroxide and initiated on Murashige and Skoog agar plates with different concentrations of PGRs to induce callogenesis, shoot induction, and rooting. Transformation of *Cannabis* was performed via EHA105 strain of *Agrobacterium tumefaciens* carrying the pCAMBIA1301 construct with *uidA* gene to test the transformation efficiency by visual inspection of blue staining via GUS assay. Statistical analysis was performed using a chi-squared test or one-way ANOVA followed by Dunnett's post hoc test. Callogenesis, shooting, and rooting of *Cannabis* explants was dependent upon tissue, cultivar, and PGRs. Transformation efficiency was dependent upon explant tissue type. With well-developed micropropagation and transformation techniques, *Cannabis* can be propagated with higher multiplication rates and CRISPR/Cas9 gene editing can be performed to produce new cultivars with optimized or novel traits.

P-2006

In Vitro Germination and Micropropagation of *Asclepias eriocarpa* After Cold Stratification. ANTHONY PEREZ^{1,2} and Raquel Folgado². ¹California Botanic Garden, 1500 N. College Avenue, Claremont, CA 91711 and ²Botanical Center, The Huntington Library, Art Museum, and Botanical Gardens, 1151 Oxford Rd, San Marino, CA 91108. Email: aperez@calbg.org

There is increasing demand by Southern Californian restoration practitioners for improving *Asclepias* propagation and outplanting protocols, yet seed availability, access, and reliability of propagation methods differs across species. Although seeds of numerous *Asclepias spp.* benefit from a cold stratification (CS) period, effective treatments and storage protocols for *Asclepias* seeds must be determined in addition to produce quality plantlets. 100 seeds of *A.*

eriocarpa were collected and stored at room temperature (RT) for either 2 or 3-months and were subjected to 0, 4, and 8 weeks CS before the germination tests. After sterilization of the seeds, germination tests were carried out in plastic containers with agar 0.6 %. In all CS treatments, 20 seeds per condition were used, with the exception of 0 week CS (10 seeds). Preliminary results for 0 week CS treatments showed higher germination rates for 2-month RT (50%) versus 3-month RT (10%). Similarly for 4 week CS treatments, 2-month RT produced a higher germination rate (85%) versus 3-month RT (55%). However, 8 week CS treatments showed a higher rate in 3-month RT (65.3%) compared to the 2-month RT conditions (10.5%). In-vitro shoots of *A. eriocarpa* produced from these trials were micropropagated on Murashige and Skoog medium, with 3% sucrose. The microshoots will be used to optimize the rooting and ex vitro acclimation conditions for this species. Our results suggest that seed germination rates of *A. eriocarpa* may be improved in seeds stored at 3-month RT with the maximum CS treatment of at least 8 weeks, while seeds stored at 2-months RT decrease germination rate when subjected to an 8 week CS treatment. *A. eriocarpa* seeds might require time to mature post-collection and prior to the CS treatment.

P-2007

Dehydration Stress Memory Genes in *Triticum turgidum* L. ssp. *durum* (Desf.). M. T. SADDER¹, A. Musallam², M. M. Allouzi², and M. A. Duwayri². ¹Department of Horticulture and Crop Science, School of Agriculture, University of Jordan, Amman 11942, JORDAN and ²Biotechnology Directorate, National Agricultural Research Center, P. O. Box: 639, Baq'a 19381, JORDAN. Email: sadderm@ju.edu.jo

Exposure of successive stress cycles can result in a variety of memory response patterns in several plant species. We have investigated a group of these patterns at both the transcriptional and physiological memory levels in durum wheat. The data revealed huge discrepancies between investigated durum wheat cultivars, which presumably are drought tolerant. It was possible to generate a consensus memory response pattern for each cultivar, where Hourani 27 was the most tolerant followed by Balikh 2 and then Omrabi 5. When durum wheat homologs from rice and maize were compared, only 18% gave similar memory response patterns. The data would indicate the presence of potentially divergent memory mechanisms in different plant species and genotypes. Ultimately, a thorough examination is required for each genotype before giving solid memory-based conclusions that can be applied in plant breeding and agricultural management practices.

P-2008

Overexpression of a *VvMYB* Transcription Factor Gene Enhances Tolerance to Cold Stress in Transgenic Citrus Plants. LAMIAA M. MAHMOUD^{1,2}, Jude W. Grosser¹, and Manjul Dutt¹. ¹Citrus Research and Education Center, University of Florida, Lake Alfred, FL and ²Pomology Department, Faculty of Agriculture, Mansoura University, EGYPT. Email: lamiaa.mahmoud@ufl.edu

Citrus is a cold-sensitive genus and most commercially important varieties of citrus are susceptible to freezes. Plants differ in their pattern of gene expression and protein products in response to environmental stressors. The MYB proteins play a central role in cold stress response in plants. In the present study, the grapevine derived *VvMYB* overexpressing transgenic ‘Hamlin’ trees were maintained at 4° C for 30 days. The changes in the chlorophyll fluorescence and gene expression of some important transcription factors in the cold stress regulation pathway were studied. We recorded a reduction on chlorophyll fluorescence parameters in the leaves under cold stress in the wild type. The values of Fv/Fm, Fv/Fo, TRo/RC, ETo/RC, TRo/ABS, ETo/CS and PI decreased considerably, while DIO/CS increased with cold stress in the wild type. *VvMYB* overexpressing transgenic showed modulation for chlorophyll fluorescence values under cold stress compared to the control. The expression patterns of the HSP, WRKY, CBF and antioxidant transcription factors were analyzed, and we found that *CsHSP59*, *CsHSP90* and *CsHSP99* exhibited higher transcript levels in the leaves under cold stress and expressed higher levels in the transgenic lines compared to control conditions. Additionally, under chilling conditions, we recorded overexpression of heat stress transcription factor 1 (*CsHSFA1*), *CSOD1*, *CsCAT*, *CsGST* genes in the transgenic lines. We also recorded overexpression of *CsWRKY12* and downregulation of *CsWRKY14*, *CsWRKY33* in the transgenic plants compared to the control. These findings revealed *VvMYB* can play a role following cold stress and may be important for better acclimatization of plants to environmental stressors.

P-2009

Characterization of Polar and Non-polar Lipids in Nanofer 25s Iron Nanoparticle-treated *Fremyella diplosiphon*, a Biofuel Producing Cyanobacterium. SAMSON GICHUKI¹, Huan Chen², LaDonna Wyatt¹, Yuan Lin², and Viji Sittther¹. ¹Department of Biology, Morgan State University, 1700 East Cold Spring Lane, Baltimore, MD and ²National High Magnetic Field Laboratory, Florida State University, 1800

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Increased global concerns on the energy crisis and pollution caused by fossil fuels have generated significant interest in cyanobacteria-derived fuels. In the present study, polar and non-polar lipids in Nanofer 25s zero-valent iron (nZVI) nanoparticle-treated *Fremyella diplosiphon*, an ideal biofuel producing species, were characterized. The B481-WT strain treated with 3.2mg/L nZVIs was grown under continuous growth light for 15 days at 170 rpm. Cultures not exposed to nZVIs served as control and three replicates were maintained. Total lipids were extracted and converted to fatty acid methyl esters (FAMES) via direct transesterification. Detailed characterization, quantitation of FAMES and other volatile organic matters such as alkanes and olefins were performed using comprehensive two-dimensional gas chromatography-time-of-flight mass spectrometry. Polar lipids from the strains were extracted and separated by an Acuity M-Class LC system and the eluent analyzed by Fourier transform ion cyclotron resonance mass spectrometry. Assigned elemental compositions from MS/MS were searched against lipid libraries to confirm lipid identities. Our results revealed significantly high lipid yield and FAME production in cultures treated with 3.2mg L⁻¹ nZVIs compared to the control. The highest concentration of polar lipid class identified was the saccharolipids accounting for 36% in the nano-treated cells compared to 25% in the control. Other identified polar lipids included diphosphatidylcholine, lysophosphatidylcholine, diacylglyceryltrimethylhomo-Ser, monogalactosyldiacylglycerol, digalactosyldiacylglycerol, and digalactosyldiacylglycerol. Our findings indicate that Nanofer 25s nZVIs significantly enhance *F. diplosiphon* lipid content and essential FAMES, thus offering a promising approach to augment its biofuel potential. *This work is funded by the National Science Foundation’s Nanoscale Interactions Program grant (1900966) and Division of Chemistry and Materials Research (16-44779), and the State of Florida.*

P-2010

Impact of Antibiotics on Growth and Pigment Accumulation in *Fremyella diplosiphon*, a Model Cyanobacterium. YAVUZ YALCIN, Busra Aydin, Mst Sayadujjhara, and Viji Sittther. Department of Biology, Morgan State University, Baltimore, MD. Email: viji.sittther@morgan.edu

In recent years, the extensive use of antibiotics has resulted in unintended consequences on diverse metabolic processes of various prokaryotic aquatic life forms. *Fremyella diplosiphon* is a widely studied fresh-water cyanobacterium with

great potential as a source of renewable biofuel. In the present study, the impact of ampicillin, tetracycline, kanamycin, and cefotaxime on growth and pigment accumulation in B481 (wildtype) and B481-SD (engineered to produce lipids) strains was determined. Cultures were grown in liquid BG-11/HEPES media amended with antibiotics ranging from 0.2 to 102.5 mg/L, under red light at 650 nm with continuous shaking at 170 rpm for 6 days. Three replicated treatments were maintained, and the experiment repeated. Phyco-cyanin and chlorophyll-a fluorescence was recorded at every 48h intervals. Cell structure alterations in antibiotic-treated cells were visualized using Cytation-5 microscopy on day 6 of treatment. Data was analyzed using repeated ANOVA and Tukey's honest significant difference test. Our results indicated that both strains exposed to kanamycin from 0.2 to 3.2 and tetracycline from 0.8 to 12.8 mg/L enhanced pigment accumulation. Additionally, B-481-SD treated with ampicillin from 0.2-51.2 mg/L exhibited a significant enhancement ($p < 0.005$) in pigment fluorescence. A detrimental effect on pigmentation was observed in both strains treated with kanamycin from 6.4 to 102.5 mg/L and cefotaxime from 0.8-102.5 mg/L. Microscopic observations revealed abundant vacuolation and pyrophosphate granules formation in cells as a response to antibiotic stress. Our findings on the hormetic effect indicated that exposure of *F. diplosiphon* to low-dose antibiotics promoted pigment accumulation while higher concentrations were detrimental. Future studies will be aimed to increase cellular lipid secretion in the strains by weakening the membrane using optimal antibiotic concentrations. *This work is funded by the National Science Foundation's Nanoscale Interactions Program grant (1900966) and co-supported by Excellence in Research.*

P-2011

Improved *Agrobacterium*-mediated Transformation and Genome Editing Efficiency in a Maize (*Zea mays* L.) Inbred Line. MYEONG-JE CHO¹, Jaelyn Tanaka¹, Eunyoung Seo¹, Lu Shi¹, George Austin¹, and Brian Staskawicz^{1,2}, ¹Innovative Genomics Institute and ²Department of Plant and Microbial Biology, University of California, Berkeley, CA 94704. Email: mjcho1223@berkeley.edu

B104 is a yellow dent maize inbred line, which was cooperatively developed by the Iowa Agriculture and Home Economics Experiment Station and USDA-ARS in 1996. It has been popular for transformation due to its high sequence similarity with the reference maize line B73. However, transformation frequency of B104 via *Agrobacterium* is still relatively low despite being commonly used in research labs. In this study we established an *Agrobacterium*-mediated transformation protocol that achieves significantly higher

transformation frequencies than previously published using simple, public vectors. Optimal modifications in the co-cultivation, resting, and selection media resulted in average transformation frequencies at the T₀ plant level of 7.4% (2.3 to 14.3%) and 21.2% (7.2 to 50.0%) using hygromycin and bialaphos selection, respectively. We also report our findings in efforts to increase gene mutation rates in the B104 maize inbred line in order to make CRISPR-Cas9 a more direct and stable gene editing system. We propose that these improvements can be applied to other maize inbreds.

P-2012

Micropropagation of *Randia echinocarpa*, an Endemic Medicinal Plant from Mexico. ABRAHAM CRUZ-MENDÍVIL¹, Dalia A. Valenzuela-Atondo², Carlos L. Calderón-Vázquez², Melina López-Meyer², Jesús L. Romero-Romero², and Martha L. Orozco-Cárdenas³. ¹CONACYT-Instituto Politécnico Nacional, CIIDIR Sinaloa, Guasave, MEXICO; ²Instituto Politécnico Nacional, CIIDIR Sinaloa, Guasave, MEXICO; and ³University of California, Riverside, CA. Email: acruz@conacyt.mx

Randia echinocarpa (Rubiaceae) is a plant native to Mexico that extends along the Pacific coast and is used in traditional Mexican medicine. Previous studies have shown that the fruit of *R. echinocarpa* presents high antioxidant, antimutagenic, and antidiabetic activities, and was innocuous in toxicity tests in mice. Unfortunately, wild populations of *R. echinocarpa* have severely declined in recent years, primarily due to deforestation associated with the expansion of land for agriculture. In this sense, *in vitro* culture has proven to be an effective strategy for the conservation of threatened species. Therefore, the objective of this work was to establish a micropropagation protocol for *R. echinocarpa* accessions from northwestern Mexico. For this, *R. echinocarpa* fruits were collected from 19 locations in the states of Sonora and Sinaloa, Mexico, and their seeds were sown in 0.5X Murashige and Skoog (MS) media. After eight weeks of culture, the seed germination rate ranged from 68 to 100%, the percentage of seedlings with cotyledons ranged from 4 to 72%, the percentage of seedlings with true leaves ranged from 0 to 28%, and the seedling height ranged from 0.44 to 2.76 cm. The higher values of seed germination and plantlet growth were observed in "Laguna Seca", "Ocoroni", "Trinidad", and "San José" accessions. Subsequently, the nodal explants from the four above mentioned accessions were cultured in 1X MS media with 1 mg/L of benzyl aminopurine (BAP), zeatin (ZT), or kinetin (Kin). After six weeks of culture, the "Laguna Seca" and "Trinidad" accessions in BAP and ZT supplemented media showed

higher number and length of shoots. Shoots longer than 2 cm were cultured in 0.5X MS media with 1 mg/L of indole-3-acetic acid (IAA), 1-naphthaleneacetic acid (NAA), or indole-3-butyric acid (IBA). After six weeks of culture, the "Laguna Seca" and "San José" accessions in NAA supplemented media showed higher number and length of roots. This protocol will be useful for *R. echinocarpa* conservation and propagation and highlights accessions with better performance for *in vitro* culture.

P-2013

Nutrient Media are Promising for Improving the Liquid Preparative Form of an Insecticide. ANASTASIIA KRYZHKO. Research Institute of Agriculture of Crimea, Simferopol, RUSSIA. Email: solanum@ukr.net

B. thuringiensis strains with high entomopathogenic and technological properties are used to develop a new generation of biological products. β -exotoxin, a thermostable exotoxin produced by *B. thuringiensis* during vegetative growth, is one of the main entomopathogenic factors described for this bacterium. For a quick qualitative determination of a strain ability to produce β -endotoxin, it is advisable to use PCR. *thuE* was used as the target gene in the cluster of the β -exotoxin synthesis cascade. Primers for the detection of the *thuE* gene were selected by analyzing the nucleotide sequences of the *B. thuringiensis* strains *thuE* genes from the NCBI GenBank database. To obtain a liquid formulation of the strain *B. thuringiensis* var. *thuringiensis* 0371, a culture medium based on cornmeal and yeast autolysate was optimized. The response function regression equation describing a crop growth, including only statistically significant effects, can be written as follows: $Y=8.31-1.56x_1+5.66x_2-2.41x_1x_2$. A set of experimental nutrient media (PS) was obtained with the following composition: PS1 - 17 g/l corn flour, 8.48 g/l yeast autolysate, PS2 - 16 g/l corn flour, 9.64 g/l yeast autolysate, PS3 - 15 g/l corn flour, 10.8 g/l yeast autolysate, PS4 - 14 g/l corn flour, 11.96 g/l yeast autolysate, PS5 - 13 g/l corn flour, 13.12 g/l yeast autolysate, PS6 - 12 g/l corn flour, 14.28 g/l yeast autolysate. The experimental results show that the best result was obtained on PS4 and PS5 media (with the spore titer 0.67-0.70 billion/ml). The study of the *thuE* gene expression responsible for the synthesis of *B. thuringiensis* exotoxin showed that this indicator was maximum at 24 hours of cultivation in PS3, PS4, and PS5 media. Thus, PS4 and PS5 media are promising for improving the liquid preparative form of an insecticide.

P-2014

Efficient Bay Sucker (*Trioza alacris*) Control with DNA Insecticides. I. A. NOVIKOV¹, E. V. Yatskova², R. Z. Useinov¹, N. V. Gal'chinsky¹, Y. V. Puzanova¹, and V. V. Oberemok^{1,2}. ¹V. I. Vernadsky Crimean Federal University, Simferopol, CRIMEA and ²Nikita Botanical Garden, National Scientific Centre Russian Academy of Sciences, Yalta, CRIMEA. Email: i.nowikow2012@mail.ru

Trioza alacris is an insect pest that preys on the laurel tree (*Laurus nobilis*). This sap-sucking insect from the suborder *Sternorrhyncha* causes significant damage to laurel plantings, destroying plant growth points by damaging young shoots. Using an innovative approach, unmodified antisense oligonucleotides, to create DNA insecticides, we have demonstrated the ability to control *Trioza alacris*. We have developed two antisense oligonucleotides aimed at suppressing the expression of the 5.8S ribosomal RNA gene. These fragments, each 11 nucleotides long, Alacris-11 (5'-CCACCGGGTAG-3') and Laura-11 (5'-GACACGCGCGC-3'), were applied to *Laurus nobilis* plants infested with *Trioza alacris* larvae. Preliminary data show the high efficacy of the oligonucleotides. The experiment was carried out in duplicate from June to September 2021 at the Nikita Botanical Garden (Yalta, Crimea). Plants were treated with a solution of oligonucleotides at a concentration of 100 mg/L using a hand-held sprayer. Control treatments were water and a random 5'-CTGACTGACTG-3' fragment. Larval mortality was determined on the 9th day after treatment. In larvae treated with the water control, mortality was $8.68 \pm 4.9\%$, while for those treated with the random oligonucleotide control, the mortality was $14.37 \pm 3.25\%$. However, after treatment with the Alacris-11 antisense fragment, mortality was $71.02 \pm 5.21\%$, and after treatment with the Laura-11 antisense fragment, it was $72.39 \pm 6.48\%$. The high mortality of the target insects shows the enormous potential for using the Alacris-11 and Laura-11 antisense fragments as DNA insecticides to control the *Trioza alacris* population. The research results are obtained within the framework of a state assignment at the V.I. Vernadsky Crimean Federal University for 2021 and the planning period of 2022–2023 (No. FZEG-2021-0009; 'Development of oligonucleotide constructs for making selective and highly effective preparations for medicine and agriculture', registration number 121102900145-0).