



**Andrea Mariana Giordano**

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## Andrea Mariana Giordano

Surname(s): **Giordano**  
Name: **Andrea Mariana**

### Current professional situation

**Employing entity:** Universitat Autònoma de Barcelona **Type of entity:** University

**Department:** Facultat de Ciències

**Professional category:** Professor Asociado

**Start date:** 01/03/2021

**Type of contract:** Temporary

**Dedication regime:** Part time

**Employing entity:** CONSORCI CSIC-IRTA-UAB CENTRE DE RECERCA EN AGRIGENOMICA (CRAG)

**Department:** Plant and animal genomics, Plant and animal genomics

**Professional category:** Matie Curie Postdoctoral researcher

**Start date:** 14/05/2018

**Type of contract:** Grant-assisted student (pre or post-doctoral, others) **Dedication regime:** Full time

**Identify key words:** Genetics; Genomics; Biotechnology

### Previous positions and activities

	Employing entity	Professional category	Start date
1	Semillas Fito, S.A.	Project Management Internship	01/07/2017
2	Universidade Federal Viçosa	Postdoctoral fellow	23/04/2013
3	La Trobe University/ AgriBio Centre	PhD fellow	24/08/2009
4	Universidad de Buenos Aires/Facultad Agronomía	Pre-doctoral student	01/03/2008
5	Universidad de Buenos Aires/Facultad Cs Exactas y Naturales	Honours thesis student	01/03/2006
6	GIVAUDAN ROURE, S.A.	Quality Control/Microbiology training	01/07/2004
7	Universidad de Buenos Aires/Facultad Bioquímica	student training	01/03/2003

- 1** **Employing entity:** Semillas Fito, S.A. **Type of entity:** Business  
**Department:** Research and Development-Biotech  
**Professional category:** Project Management Internship  
**Start-End date:** 01/07/2017 - 31/12/2017 **Duration:** 6 months  
**Performed tasks:** Development and establishment of a software for R&D projects



- 2** **Employing entity:** Universidade Federal Viçosa  
**Department:** Department of Plant Biology, Universidade Federal Viçosa  
**City employing entity:** Viçosa, Brazil  
**Professional category:** Postdoctoral fellow **Educational Management (Yes/No):** No  
**Start-End date:** 23/04/2013 - 01/05/2015 **Duration:** 2 years  
**Type of contract:** Grant-assisted student (pre or post-doctoral, others)  
**Dedication regime:** Full time  
**Primary (UNESCO code):** 240000 - Life Science  
**Secondary (UNESCO code):** 241500 - Molecular biology  
**Tertiary (UNESCO code):** 241502 - Molecular biology of plants  
**Performed tasks:** Project: 'Variability in cell wall composition along culm development in sugarcane and characterisation of recalcitrance factors that affects the production of second generation ethanol.'  
 Activities: -Development of a new research area at the laboratory: RNA sequencing. Establishment and optimisation of RNA sequencing protocols. Generation of sugarcane RNA sequencing datasets. -Molecular characterisation of cell wall recalcitrance factors in monocots. -Training and supervision of students (Honors, Msc. and PhD students) - International peer reviewed publications and communication of results in conferences  
**Applicability in teaching and/or research:** Co-supervision of students: MSc. Thesis: Thiago Alves Napoleão: 'Effects of Metyl jasmoate and salicilic acid in cell wall composition, secondary metabolism and cell wall recalcitrance in Brachypodium distachyon.' Supervisor: Marcelo Ehlers Loureiro. Co-supervisor: Andrea Giordano. Universidade Federal Viçosa (July 2015) Honors thesis: Robson Soares de Castro: 'Saccharification of sugarcane genotypes under different pretreatment conditions' Supervisor: Marcelo Ehlers Loureiro. Co-supervisor: Andrea Giordano. Universidade Federal of Viçosa (August 2015) PhD thesis: Giuliana Mourão Soares: 'Functional analysis of MED5a and its importance in cell wall recalcitrance in Brachypodium distachyon.' Supervisor: Marcelo Ehlers Loureiro. Co-supervisor: Andrea Giordano. Universidade Federal Viçosa (June 2016)
- 3** **Employing entity:** La Trobe University/ AgriBio **Type of entity:** University Research Institute Centre  
**Department:** AgriBio Centre for AgriBioscience, Faculty of science, technology and engineering  
**City employing entity:** Melbourne, Australia  
**Professional category:** PhD fellow **Educational Management (Yes/No):** Yes  
**Start-End date:** 24/08/2009 - 22/12/2012 **Duration:** 3 years - 3 months  
**Type of contract:** Grant-assisted student (pre or post-doctoral, others)  
**Dedication regime:** Full time  
**Primary (UNESCO code):** 240000 - Life Science  
**Secondary (UNESCO code):** 241500 - Molecular biology  
**Tertiary (UNESCO code):** 241502 - Molecular biology of plants  
**Performed tasks:** Project: 'Functional genetics of lignin pathway in warm-season grasses' PhD thesis title ' Functional genomic of lignin biosynthesis in Paspalum dilatatum' Activities: -RNA sequencing of monocots -Establishment of tissue culture and plants transformation of Paspalum dilatatum -Characterisation of genes related to lignin biosynthesis pathway -Genetic transformation of P. dilatatum using RNAi silencing strategy to improve digestibility -Transgenic lines evaluation and selection of best lines -Commnication of results in international congresses, and international peer-review journals  
**Identify key words:** Molecular, cellular and genetic biology  
**Field of management activity:** University  
**Applicability in teaching and/or research:** Teacher and coordinator of the science hands on secondary school program 'Get into genes', Melbourne University, Australia (<http://www.getintogenes.com/>)
- 4** **Employing entity:** Universidad de Buenos Aires/Facultad Agronomia **Type of entity:** University  
**Department:** Departamento Genetica, Facultad agronomia



**City employing entity:** Buenos Aires, Argentina  
**Professional category:** Pre-doctoral student      **Educational Management (Yes/No):** Yes  
**Start-End date:** 01/03/2008 - 01/07/2009      **Duration:** 1 year - 4 months  
**Type of contract:** Grant-assisted student (pre or post-doctoral, others)  
**Primary (UNESCO code):** 240000 - Life Science  
**Secondary (UNESCO code):** 241502 - Molecular biology of plants  
**Performed tasks:** Project: 'Discover of genes involved in abiotic stress tolerance' Activities: -Tissue culture and plant transformation -Cloning of genes related with abiotic stress  
**Field of management activity:** University  
**Applicability in teaching and/or research:** Teacher at Facultad Agronomia, Universidad de Buenos Aires. Subject: Genetics

**5** **Employing entity:** Universidad de Buenos Aires/Facultad Cs Exactas y Naturales      **Type of entity:** University  
**Department:** Quimica Biologica, Facultad Cs. Exactas y Naturales, Universidad de Buenos Aires  
**City employing entity:** Buenos Aires, Argentina  
**Professional category:** Honours thesis student      **Educational Management (Yes/No):** Yes  
**Start-End date:** 01/03/2006 - 01/03/2008      **Duration:** 2 years  
**Type of contract:** Grant-assisted student (pre or post-doctoral, others)  
**Performed tasks:** Project: 'Production of biodegradable plastic in bacteria using low-cost substrates' Honours thesis title: " Poly-(3-hydroxybutyrate) (PHB) production in Escherichia coli recombinant strains." Activities: -Genetic engineering of E. coli for production of bioplastics poly(3-hydroxybutyrate) (PHB) -Scale up of PHB production using bioreactors -Participation in conferences and publications in international peer-reviewed journals  
**Field of management activity:** University  
**Applicability in teaching and/or research:** Teacher assistant of practical classes at Microbiology and immunology, Biochemistry., Universidad de Buenos Aires

**6** **Employing entity:** GIVAUDAN ROURE, S.A.  
**City employing entity:** Buenos Aires, Argentina  
**Professional category:** Quality Control/Microbiology training  
**Start-End date:** 01/07/2004 - 01/03/2006      **Duration:** 1 year - 6 months  
**Type of contract:** student training  
**Dedication regime:** Part time  
**Performed tasks:** Quality control tasks and microbiology control of raw material and final products (fragrances and flavors)

**7** **Employing entity:** Universidad de Buenos Aires/Facultad Bioquimica      **Type of entity:** University  
**Department:** Fisiopatologia, Catedra Fisiopatologia/Facultad Bioquimica  
**City employing entity:** Buenos Aires, Argentina  
**Professional category:** student training  
**Start-End date:** 01/03/2003 - 01/02/2004      **Duration:** 1 year  
**Type of contract:** training student  
**Dedication regime:** Part time  
**Performed tasks:** Student training in laboratory techniques



## Education

### University education

#### 1st and 2nd cycle studies and pre-Bologna degrees

**1** **University degree:** Higher degree

**Name of qualification:** Master in Project Management

**Degree awarding entity:** INESEM Business School

**Date of qualification:** 31/03/2017

**2** **University degree:** Higher degree

**Name of qualification:** Bachelor Biological Sciences (Honours thesis)

**City degree awarding entity:** Buenos Aires, Argentina

**Degree awarding entity:** Universidad de Buenos Aires      **Type of entity:** University

**Date of qualification:** 03/12/2007

#### Doctorates

**Doctorate programme:** PhD

**Degree awarding entity:** La Trobe University      **Type of entity:** University

**City degree awarding entity:** Melbourne, Australia

**Date of degree:** 21/02/2013

**Thesis title:** Functional Genomics of lignin biosynthesis in *P. dilatatum*.

**Thesis director:** German Spangenberg

**Thesis co-director:** Aidyn Mouradov

### Language skills

Language	Listening skills	Reading skills	Spoken interaction	Speaking skills	Writing skills
French	A2	A2	A1	A1	A2
Catalan	B1	B1	B1	B1	B1
Italian	B2	B2	B1	B1	B1
English	C2	C2	C2	C2	C2
Portuguese	C2	C2	C2	C2	C2



## Teaching experience

### General teaching experience

- 1 University degree:** Graduado o Graduada en Bioquímica y Biología Molecular  
**Start date:** 01/03/2021 **End date:** 31/12/2022  
**Entity:** Universitat Autònoma de Barcelona **Type of entity:** University  
**Faculty, institute or centre:** Biosciencias
- 2 Type of teaching:** International teaching  
**Name of the course:** ' Get into Genes'  
**Type of programme:** Secondary schools 'hands on' program **Type of teaching:** hands on  
**University degree:** Science secondary school program  
**Start date:** 01/03/2010 **End date:** 01/12/2012  
**Entity:** Dairy Futures CRC, Australia **Type of entity:** Business  
**Faculty, institute or centre:** La Trobe University, Australia  
**Department:** Botany Department  
**City of entity:** Melbourne, Australia  
**Subject language:** English
- 3 Type of teaching:** Official teaching  
**Name of the course:** Genetica  
**Type of programme:** Bachelor's degree **Type of teaching:** Practical work (classroom-problems)  
**Type of subject:** Obligatory  
**University degree:** Agronomy  
**Geographical area:** National  
**Course given:** Genetica  
**Start date:** 01/05/2008 **End date:** 01/07/2009  
**Entity:** Universidad de Buenos Aires **Type of entity:** University  
**Faculty, institute or centre:** Facultad de Agronomia  
**Department:** Genetica  
**City of entity:** Buenos Aires, Argentina  
**Subject language:** Spanish
- 4 Type of teaching:** Official teaching  
**Name of the course:** Microbiologia e Inmunologia  
**Type of programme:** Bachelor's degree **Type of teaching:** Laboratory work  
**Type of subject:** Obligatory  
**University degree:** Bachelor biology  
**Start date:** 01/03/2007 **End date:** 01/03/2008  
**Entity:** Universidad de Buenos Aires **Type of entity:** University  
**Faculty, institute or centre:** Facultad Cs. Exactas y Naturales  
**Department:** Departamento Quimica Biologica  
**City of entity:** Buenos Aires, Argentina  
**Subject language:** Spanish





**5** **Type of teaching:** Official teaching  
**Name of the course:** Química biológica  
**Type of programme:** Bachelor's degree **Type of teaching:** Laboratory work  
**Type of subject:** Obligatory  
**University degree:** Bachelor biology  
**Start date:** 01/03/2007 **End date:** 01/03/2008  
**Entity:** Universidad de Buenos Aires **Type of entity:** University  
**Faculty, institute or centre:** Facultad Cs Exactas y Naturales  
**Department:** Departamento Química biológica  
**City of entity:** Buenos Aires, Argentina  
**Subject language:** Spanish

**6** **University degree:** Profesor Asociado  
**Start date:** 01/03/2021  
**Entity:** Universitat Autònoma de Barcelona **Type of entity:** University  
**Faculty, institute or centre:** Departamento Bloquímica y Biología Molecular

### Experience supervising doctoral thesis and/or final year projects

- 1** **Project title:** Study of CMV resistance in melon  
**Entity:** CONSORCI CSIC-IRTA-UAB CENTRE DE RECERCA EN AGRIGENOMICA (CRAG)  
**Student:** Loïs van Dijk  
**Date of reading:** 23/11/2020
- 2** **Project title:** Co-supervision: 'Functional analysis of MED5a and its importance in cell wall recalcitrance in Brachypodium distachyon.'  
**Type of project:** Doctoral thesis  
**Entity:** Universidad Federal Viçosa  
**City of entity:** Viçosa, Brazil  
**Student:** Giuliana Mourao Soares  
**Date of reading:** 01/06/2016
- 3** **Project title:** Co-supervision : 'Saccharification of sugarcane genotypes under different pretreatment conditions'  
**Type of project:** End of course project  
**Entity:** Universidad Federal Viçosa  
**City of entity:** Viçosa, Brazil  
**Student:** Robson Soares Castro  
**Obtained qualification:** A  
**Date of reading:** 01/08/2015
- 4** **Project title:** Co-supervision: 'Effects of Metyl jasmoate and salicilic acid in cell wall composition, secondary metabolism and cell wall recalcitrance in Brachypodium distachyon'  
**Type of project:** Master thesis  
**Co-director of thesis:** Marcelo Elhers Loureiro  
**Entity:** Universidad Federal Viçosa  
**City of entity:** Viçosa, Brazil  
**Student:** Thiago Alves Napoleao  
**Obtained qualification:** A  
**Date of reading:** 17/07/2015



## Scientific and technological experience

### Scientific or technological activities

#### R&D projects funded through competitive calls of public or private entities

- 1** **Name of the project:** Implementation of CRISPR/Cas9 technology in melon to edit fruit ripening and CMV resistant genes  
**Entity where project took place:** CONSORCI CSIC-IRTA-UAB CENTRE DE RECERCA EN AGRIGENOMICA (CRAG)  
**Start-End date:** 14/05/2018 - 14/05/2020
- 2** **Name of the project:** Proyecto PICT-PAE- "Descubrimiento de genes que otorguen resistencia a estreses abióticos"  
**Type of project:** Research and development, including transfer  
**Degree of contribution:** Current university student  
**Entity where project took place:** Catedra Genetica-Facultad Agronomia-Universidad de Buenos Aires  
**Type of entity:** University  
**City of entity:** Buenos Aires, Argentina  
**Name principal investigator (PI, Co-PI....):** Gustavo Schrauf  
**Type of participation:** Team member  
**Start-End date:** 01/01/2009 - 01/01/2012  
**Dedication regime:** Full time
- 3** **Name of the project:** Construcción y análisis de cepas recombinantes de E.coli para la obtención de PHB a partir de glicerol  
**Type of project:** Research and development, including transfer  
**Degree of contribution:** Current university student  
**Entity where project took place:** Depto de Química Biológica, Fac. de Cs. Exactas y Naturales, Universidad de Buenos Aires.  
**Type of entity:** University  
**City of entity:** Buenos Aires, Argentina  
**Name principal investigator (PI, Co-PI....):** Julia Pettinari; Beatriz Mendez; Nancy Lopez; Pablo Nickel; Alejandra de Almeida; Manuel Godoy; Andrea Giordano  
**Nº of researchers:** 7  
**Type of participation:** Team member  
**Start-End date:** 01/05/2008 - 30/04/2011  
**Dedication regime:** Part time
- 4** **Name of the project:** Proyecto UBACyT: Aplicación de herramientas moleculares en Programas de Mejoramiento Genético  
**Degree of contribution:** Current university student  
**Entity where project took place:** Catedra Genetica-Facultad Agronomia- Universidad de Buenos Aires  
**Type of entity:** University  
**City of entity:** Buenos Aires, Argentina  
**Name principal investigator (PI, Co-PI....):** Gustavo Schrauf





**Type of participation:** Team member

**Start-End date:** 01/01/2008 - 01/01/2011

**Dedication regime:** Full time

**5 Name of the project:** Identificación y manipulación de la expresión de genes relacionados con la formación de pared celular para la producción de etanol de segunda generación

**Type of project:** Research and development, including transfer

**Degree of contribution:** Researcher

**Entity where project took place:** Universidad Federal Rio de Janeiro/Universidad Federal Vicosa

**Type of entity:** University Centres and Structures and Associated Bodies

**City of entity:** Brazil

**Name principal investigator (PI, Co-PI....):** Gilberto Sacheto Martins; Marcelo Elhers Loureiro

**Funding entity or bodies:**

PETROBRAS

**City funding entity:** Brazil

**Type of participation:** Team member

**Start date:** 2013

**Dedication regime:** Full time

## Scientific and technological activities

### Scientific production

#### Publications, scientific and technical documents

**1** Thiago Alves Napoleao; Giuliana Soares; Camilo Elber Vital; Carla Bastos; Robson Castro; Marcelo Elhers Loureiro; Andrea Giordano. Methyl jasmonate and salicylic acid are able to modify cell wall but only salicylic acid alters biomass digestibility in the model grass *Brachypodium distachyon*. *Plant Science*. 263, pp. 46 - 54. Elsevier, 01/10/2017. Available on-line at: <<https://www.sciencedirect.com/science/article/pii/S0168945217301863>>.

**DOI:** /doi.org/10.1016/j.plantsci.2017.06.014

**Type of production:** Scientific paper

**Format:** Journal

**Position of signature:** 7

**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee

**Total no. authors:** 7

**Corresponding author:** Yes

**Impact source:** ISI

**Category:** agricultural and biological sciences

**Impact index in year of publication:** 3.4

**Journal in the top 25%:** Yes

**Relevant results:** In addition to playing a key role in the response to environmental changes, cell walls are also considered as a valuable feedstock for cellulosic ethanol. Here we explored the effects of the stress-response hormones, salicylic acid and methyl jasmonate, on cell wall biosynthesis and biomass digestibility in *Brachypodium distachyon*, a species recently considered as a suitable model for biomass conversion. We found that in response to salicylic acid or methyl jasmonate treatment, plant growth was reduced coupled with significant changes in cell wall composition. Cellulose content increased in response to methyl jasmonate whereas a reduction in lignin content was found after salicylic acid application. Moreover, hemicellulose composition was altered and increases in caffeic acid, ferulic acid and p-coumaric acid content were detected in response to both treatments. The hormonal profile and the expression pattern of genes involved in cell wall biosynthesis were also modified. Biomass digestibility was reduced in leaf tissue after salicylic acid treatment and was negatively correlated with ferulic acid and p-coumaric acid content. The results obtained here aid in our understanding of cell wall dynamics in response to stress and will enable the development of new strategies to improve cell wall digestibility in bioenergy feedstock.

- 2** Camilo Elber Vital; Andrea Giordano; Eduardo Almeida de Soares; Thomas Williams; Rosilene Mesquita; Pedro Vidigal; Pedro Vidigal; Amnada Lopez; Tulio Gomes; Marcelo Rogalski; Humberto Oliveira Ramos; Marcelo Elhers Loureiro. An integrative overview of the molecular and physiological responses of sugarcane under drought conditions. *Plant molecular biology*. 94, pp. 577 - 594. Springer, 13/04/2017. Available on-line at: <<https://link.springer.com/article/10.1007/s11103-017-0611-y>>. ISSN 0167-4412

**DOI:** 10.1007/s11103-017-0611-y

**Type of production:** Scientific paper

**Position of signature:** 1

**Total no. authors:** 11

**Impact source:** ISI

**Impact index in year of publication:** 3.35

**Format:** Journal

**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee

**Corresponding author:** No

**Category:** Agricultural and Biological sciences

**Journal in the top 25%:** Yes

**Relevant results:** Drought is the main abiotic stress constraining sugarcane production. However, our limited understanding of the molecular mechanisms involved in the drought stress responses of sugarcane impairs the development of new technologies to increase sugarcane drought tolerance. Here, an integrated approach was performed to reveal the molecular and physiological changes in two closely related sugarcane cultivars, including the most extensively planted cultivar in Brazil (cv. RB867515), in response to moderate (?0.5 MPa) and severe (?1 MPa) drought stress at the transcriptional, translational, and posttranslational levels. The results show common and cultivar exclusive changes in specific genes related to photosynthesis, carbohydrate, amino acid, and phytohormone metabolism. The novel phosphoproteomics and redox proteomic analysis revealed the importance of posttranslational regulation mechanisms during sugarcane drought stress. The shift to soluble sugar, secondary metabolite production, and activation of ROS eliminating processes in response to drought tolerance were mechanisms exclusive to cv. RB867515, helping to explain the better performance and higher production of this cultivar under these stress conditions.

- 3** Andrea Giordano; Viviane Guzzo de Carli Poelking; Maria Esther Ricci-Silva; Thomas Rhys William; Diego Alves Pecanha; Marilia Contin Ventrella; Jorge Rencoret; John Ralph; Marcio Pereira Barbosa; Marcelo Elhers Loureiro. Analysis of a modern hybrid and an ancient sugarcane implicates a complex interplay of factors in affecting recalcitrance to cellulosic ethanol production. *PLoS one*. 10 - 8, pp. e0134964. (United States of America): 06/08/2015. Available on-line at: <[10.1371/journal.pone.0134964](https://doi.org/10.1371/journal.pone.0134964)>. ISSN 1932-6203

**Type of production:** Scientific paper

**Position of signature:** 1

**Total no. authors:** 10

**Impact source:** ISI

**Impact index in year of publication:** 3.234

**Format:** Journal

**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee

**Corresponding author:** No

**Category:** Agricultural and Biological Sciences (miscellaneous)

**Journal in the top 25%:** Yes

**Relevant results:** Abundant evidence exists to support a role for lignin as an important element in biomass recalcitrance. However, several independent studies have also shown that factors apart from lignin are also relevant and overall, the relative importance of different recalcitrance traits remains in dispute. In this study we used two genetically distant sugarcane genotypes, and performed a correlational study with the variation in anatomical parameters, cell wall composition, and recalcitrance factors between these genotypes. In addition we also tracked alterations in these characteristics in internodes at different stages of development. Significant differences in the development of the culm between the genotypes were associated with clear differential distributions of lignin content and composition that were not correlated with saccharification and fermentation yield. Given the strong influence of the environment on lignin content and composition, we hypothesized that sampling within a single plant could allow us to more easily interpret recalcitrance and changes in lignin biosynthesis than analysing variations between different genotypes with extensive changes in plant morphology and culm anatomy. The syringyl/guaiacyl (S/G) ratio was higher in the oldest internode of the modern genotype, but S/G ratio was not correlated with enzymatic hydrolysis yield nor fermentation efficiency. Curiously we observed a strong positive correlation between ferulate ester level and cellulose conversion efficiency. Together, these data support the hypothesis that biomass enzymatic hydrolysis recalcitrance is governed by a quantitative heritage rather than a single trait.

- 4** Andrea Giordano; Noel O I Cogan; Sukhjiwan Kaur; Michelle Drayton; Aidyn Mouradov; Stephen Panter; Gustavo E Schrauf; John G Mason; German C Spangenberg. Gene discovery and molecular marker development, based on high-throughput transcript sequencing of *Paspalum dilatatum* Poir. *PLoS one*. 9 - 2, pp. e85050. 10/02/2014. Available on-line at: <10.1371/journal.pone.0085050>. ISSN 1932-6203

**Type of production:** Scientific paper

**Format:** Journal

**Position of signature:** 1

**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee

**Total no. authors:** 9

**Corresponding author:** No

**Impact source:** ISI

**Category:** Agricultural and Biological Sciences (miscellaneous)

**Impact index in year of publication:** 3.234

**Journal in the top 25%:** Yes

**Relevant results:** *Paspalum dilatatum* Poir. (common name dallisgrass) is a native grass species of South America, with special relevance to dairy and red meat production. *P. dilatatum* exhibits higher forage quality than other C4 forage grasses and is tolerant to frost and water stress. This species is predominantly cultivated in an apomictic monoculture, with an inherent high risk that biotic and abiotic stresses could potentially devastate productivity. Therefore, advanced breeding strategies that characterise and use available genetic diversity, or assess germplasm collections effectively are required to deliver advanced cultivars for production systems. However, there are limited genomic resources available for this forage grass species. Transcriptome sequencing using second-generation sequencing platforms has been employed using pooled RNA from different tissues (stems, roots, leaves and inflorescences) at the final reproductive stage of *P. dilatatum* cultivar Primo. A total of 324,695 sequence reads were obtained, corresponding to c. 102 Mbp. The sequences were assembled, generating 20,169 contigs of a combined length of 9,336,138 nucleotides. The contigs were BLAST analysed against the fully sequenced grass species of *Oryza sativa* subsp. japonica, *Brachypodium distachyon*, the closely related *Sorghum bicolor* and foxtail millet (*Setaria italica*) genomes as well as against the UniRef 90 protein database allowing a comprehensive gene ontology analysis to be performed. The contigs generated from the transcript sequencing were also analysed for the presence of simple sequence repeats (SSRs). A total of 2,339 SSR motifs were identified within 1,989 contigs and corresponding primer pairs were designed. Empirical validation of a cohort of 96 SSRs was performed, with 34% being polymorphic between sexual and apomictic biotypes. The development of genetic and genomic resources for *P. dilatatum* will contribute to gene discovery and expression studies. Association of gene function with agronomic traits will significantly enable molecular breeding and advance germplasm enhancement.

- 5** Andrea Giordano; Zhiqian Liu; Stephen N Panter; Adam M Dimech; Yongjin Shang; Hewage Wijesinghe; Karen Fulgueras; Yidong Ran; Aidyn Mouradov; Simone Rochfort; Nicola J Patron; German C Spangenberg. Reduced lignin content and altered lignin composition in the warm season forage grass *Paspalum dilatatum* by down-regulation of a Cinnamoyl CoA reductase gene. *Transgenic research*. 23 - 3, pp. 503 - 520. (Holland): Springer International Publishing, 07/02/2014. Available on-line at: <10.1007/s11248-014-9784-1>. ISSN 1573-9368

**Type of production:** Scientific paper

**Format:** Journal

**Position of signature:** 1

**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee

**Total no. authors:** 12

**Corresponding author:** No

**Impact source:** ISI

**Category:** Agronomy and Crop Science

**Impact index in year of publication:** 2.32

**Journal in the top 25%:** Yes

**Relevant results:** C4 grasses are favoured as forage crops in warm, humid climates. The use of C4 grasses in pastures is expected to increase because the tropical belt is widening due to global climate change. While the forage quality of *Paspalum dilatatum* (dallisgrass) is higher than that of other C4 forage grass species, digestibility of warm-season grasses is, in general, poor compared with most temperate grasses. The presence of thick-walled parenchyma bundle-sheath cells around the vascular bundles found in the C4 forage grasses are associated with the deposition of lignin polymers in cell walls. High lignin content correlates negatively with digestibility, which is further reduced by a high ratio of syringyl (S) to guaiacyl (G) lignin subunits. Cinnamoyl-CoA reductase (CCR) catalyses the conversion of cinnamoyl CoA to cinnamaldehyde in the monolignol biosynthetic pathway and is considered to be the first step in the lignin-specific branch of the phenylpropanoid pathway. We have isolated three

putative CCR1 cDNAs from *P. dilatatum* and demonstrated that their spatio-temporal expression pattern correlates with the developmental profile of lignin deposition. Further, transgenic *P. dilatatum* plants were produced in which a sense-suppression gene cassette, delivered free of vector backbone and integrated separately to the selectable marker, reduced CCR1 transcript levels. This resulted in the reduction of lignin, largely attributable to a decrease in G lignin.

- 6** Andrea Giordano; A. T. Smith; Aidyn Mouradov. Metabolic reprogramming of lignin biosynthesis in *Crops*. 1, pp. 93 - 117. Signpost Open Access Journal of NanoPhotoBioSces, 2013. ISSN 2347-7342

**Type of production:** Scientific paper

**Format:** Journal

**Position of signature:** 1

**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee

**Total no. authors:** 3

**Relevant results:** Emergence and evolution of sophisticated chemical scaffolds of lignin polymers providing mechanical support for plant tissues, protecting the plant from pathogen invasion and damaging UV, and enhancing the hydrophobicity of the plant vasculature was of paramount importance to land plant evolution and their adaptation to the local ecosystems. Recruitment of enzymes from primary metabolism and their evolutionary modification led to biosynthesis of H and G lignin in early terrestrial plants. Evolutional advantage of S lignin in adaptation to environment was a result of the selective structural alterations of the ring modification enzymes such as ferulate 5-hydroxylase and caffeic acid/5-hydroxyferulic acid O-methyltransferase at later stages of evolution. Lignification consequently transformed phenylpropanoid metabolism into a major sink for carbon in plants estimated to represent as much as 30% of the total biomass produced in the biosphere. Significant progress in plant genomics and in sequencing of the plant species that occupy important positions within the evolutionary history of plants along with functional studies of the families of lignin-specific genes in these plants allowed us in-depth understand how lignin biosynthesis was originated and evolved. Accumulated knowledge also triggered new strategies for targeted re-programming lignin biosynthesis to improve agricultural and economic values of the crops as the great sugar sources for animal feed and biofuels production. Here we review the current knowledge about different aspects of lignin biosynthesis including its evolution, regulation and targeted modification to improve plant cell wall composition for animal health and for biofuel production

- 7** Pablo I Nikel; Andrea M Giordano; Alejandra de Almeida; Manuel S Godoy; M Julia Pettinari. Elimination of D-lactate synthesis increases poly(3-hydroxybutyrate) and ethanol synthesis from glycerol and affects cofactor distribution in recombinant *Escherichia coli*. *Applied and environmental microbiology*. 76 - 22, pp. 7400 - 7406. American Society for Microbiology, 11/2010. Available on-line at: <10.1128/AEM.02067-10>. ISSN 1098-5336

**Type of production:** Scientific paper

**Format:** Journal

**Position of signature:** 2

**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee

**Total no. authors:** 5

**Impact source:** ISI

**Category:** Applied Microbiology and Biotechnology

**Impact index in year of publication:** 3.778

**Journal in the top 25%:** Yes

**Relevant results:** The effect of eliminating D-lactate synthesis in poly(3-hydroxybutyrate) (PHB)-accumulating recombinant *Escherichia coli* (K24K) was analyzed using glycerol as a substrate. K24KL, an *ldhA* derivative, produced more biomass and had altered carbon partitioning among the metabolic products, probably due to the increased availability of carbon precursors and reducing power. This resulted in a significant increase of PHB and ethanol synthesis and a decrease in acetate production. Cofactor measurements revealed that cultures of K24K and K24KL had a high intracellular NADPH content and that the NADPH/NADP(+) ratio was higher than the NADH/NAD(+) ratio. The *ldhA* mutation affected cofactor distribution, resulting in a more reduced intracellular state, mainly due to a further increase in NADPH/NADP(+). In 60-h fed-batch cultures, K24KL reached 41.9 g·liter<sup>-1</sup> biomass and accumulated PHB up to 63% ± 1% (wt/wt), with a PHB yield on glycerol of 0.41 ± 0.03 g·g<sup>-1</sup>, the highest reported using this substrate.

- 8** Pablo I Nikel; Alejandra de Almeida; Andrea M Giordano; M Julia Pettinari. Redox driven metabolic tuning: carbon source and aeration affect synthesis of poly(3-hydroxybutyrate) in *Escherichia coli*. *Bioengineered bugs*. 1 - 4, pp. 291 - 296. (United States of America): Landes Bioscience, 15/04/2010. Available on-line at: <10.4161/bbug.1.4.12103>. ISSN 1949-1026

**Type of production:** Scientific paper

**Format:** Journal



**Position of signature:** 3**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee**Total no. authors:** 4

**Relevant results:** Growth and polymer synthesis were studied in a recombinant *E. coli* strain carrying phaBAC and phaP of *Azotobacter* sp. strain FA8 using different carbon sources and oxygen availability conditions. The results obtained with glucose or glycerol were completely different, demonstrating that the metabolic routes leading to the synthesis of the polymer when using glycerol do not respond to environmental conditions such as oxygen availability in the same way as they do when other substrates, such as glucose, are used. When cells were grown in a bioreactor using glucose the amount of polymer accumulated at low aeration was reduced by half when compared to high aeration, while glycerol cultures produced at low aeration almost twice the amount of polymer synthesized at the higher aeration condition. The synthesis of other metabolic products, such as ethanol, lactate, formate and acetate, were also affected by both the carbon source used and aeration conditions. In glucose cultures, lactate and formate production increased in low agitation compared to high agitation, while poly(3-hydroxybutyrate) synthesis decreased. In glycerol cultures, the amount of acids produced also increased when agitation was lowered, but carbon flow was mostly redirected towards ethanol and poly(3-hydroxybutyrate). These results indicated that carbon partitioning differed depending on both carbon source and oxygen availability, and that aeration conditions had different effects on the synthesis of the polymer and other metabolic products when glucose or glycerol were used.

- 9** Alejandra de Almeida; Andrea M Giordano; Pablo I Nikel; M Julia Pettinari. Effects of aeration on the synthesis of poly(3-hydroxybutyrate) from glycerol and glucose in recombinant *Escherichia coli*. *Applied and environmental microbiology*. 76 - 6, pp. 2036 - 2076. 03/2010. Available on-line at: <10.1128/AEM.02706-09>. ISSN 1098-5336

**Type of production:** Scientific paper**Position of signature:** 2**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee**Total no. authors:** 4**Impact source:** ISI**Category:** Applied Microbiology and Biotechnology**Impact index in year of publication:** 3.778**Journal in the top 25%:** Yes

**Relevant results:** Bioreactor cultures of *Escherichia coli* recombinants carrying phaBAC and phaP of *Azotobacter* sp. FA8 grown on glycerol under low-agitation conditions accumulated more poly(3-hydroxybutyrate) (PHB) and ethanol than at high agitation, while in glucose cultures, low agitation led to a decrease in PHB formation. Cells produced smaller amounts of acids from glycerol than from glucose. Glycerol batch cultures stirred at 125 rpm accumulated, in 24 h, 30.1% (wt/wt) PHB with a relative molecular mass of 1.9 MDa, close to that of PHB obtained using glucose.

- 10** Alejandra de Almeida; Pablo I Nikel; Andrea M Giordano; M Julia Pettinari. Effects of granule-associated protein PhaP on glycerol-dependent growth and polymer production in poly(3-hydroxybutyrate)-producing *Escherichia coli*. *Applied and environmental microbiology*. 73 - 24, pp. 7912 - 7918. 12/2007. Available on-line at: <10.1128/AEM.01900-07>. ISSN 1098-5336

**Type of production:** Scientific paper**Format:** Journal**Position of signature:** 3**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee**Total no. authors:** 4**Impact source:** ISI**Category:** Applied Microbiology and Biotechnology**Impact index in year of publication:** 4.004**Journal in the top 25%:** Yes

**Relevant results:** Polyhydroxyalkanoates (PHAs) are accumulated as intracellular granules by many bacteria under unfavorable conditions, enhancing their fitness and stress resistance. Poly(3-hydroxybutyrate) (PHB) is the most widespread and best-known PHA. Apart from the genes that catalyze polymer biosynthesis, natural PHA producers have several genes for proteins involved in granule formation and/or with regulatory functions, such as phasins, that have been shown to affect polymer synthesis. This study evaluates the effect of PhaP, a phasin, on bacterial growth and PHB accumulation from glycerol in bioreactor cultures of recombinant *Escherichia coli* carrying phaBAC from *Azotobacter* sp. strain FA8. Cells expressing phaP grew more, and accumulated more PHB, both using glucose and using glycerol as carbon sources. When cultures were grown in a bioreactor using glycerol, PhaP-bearing cells produced more polymer (2.6 times) and more biomass (1.9 times) than did those without



the phasin. The effect of this protein on growth promotion and polymer accumulation is expected to be even greater in high-density cultures, such as those used in the industrial production of the polymer. The recombinant strain presented in this work has been successfully used for the production of PHB from glycerol in bioreactor studies, allowing the production of 7.9 g/liter of the polymer in a semisynthetic medium in 48-h batch cultures. The development of bacterial strains that can efficiently use this substrate can help to make the industrial production of PHAs economically feasible.

- 11** Gustavo Schrauf; Flavia Nogara; Pablo Rush; Pablo Peralta Roa; Eduardo Musacchio; Sergio Ghio; Luciana Couso; Elena Ramos; Matias Schrauf; Lisandro Voda; Andrea Giordano; Julio Giavedoni; José F. Pensiero; Pablo Tomas; Juan M. Zabala; Germán Spangenberg. Genetic Improvement of Perennial Forage Plants for Salt Tolerance. Saline and Alkaline Soils in Latin America. pp. 399 - 414. Springer, 27/09/2020.

**Type of production:** Book chapter

**Format:** Book

**Corresponding author:** No

### Other dissemination activities

- 1** **Title of the work:** BIYSC (Barcelona International Youth Science Challenge)  
**Date of event:** 10/07/2019  
**Organising entity:** Fundacion La Pedrera
- 2** **Title of the work:** Taller plantas mutantes  
**Date of event:** 01/03/2019  
**Organising entity:** CONSORCI CSIC-IRTA-UAB CENTRE DE RECERCA EN AGRIGENOMICA (CRAG)
- 3** **Title of the work:** Els gens que ens mengem  
**Name of the event:** Escolab  
**Date of event:** 24/10/2018  
**Organising entity:** CONSORCI CSIC-IRTA-UAB CENTRE DE RECERCA EN AGRIGENOMICA (CRAG)
- 4** **Title of the work:** Radio interview : 'Logran secuenciar el genoma de una pastura nativa de Argentina' -  
**Name of the event:** radio program : Sobre la tierra  
**Type of event:** Media interviews  
**City of event:** Buenos Aires, Argentina  
**Date of event:** 13/02/2014  
**Organising entity:** Universidad de Buenos Aires      **Type of entity:** University
- 5** **Title of the work:** science divulgation at the biology week  
**Name of the event:** Semana de la biologia  
**Type of event:** Fairs and exhibitions  
**City of event:** Buenos Aires, Argentina  
**Date of event:** 05/10/2007  
**Organising entity:** Universidad de Buenos Aires      **Type of entity:** University
- 6** **Title of the work:** outreach science work: Taller de aguas-Facultad Cs. Exactas y Naturales Universidad de Buenos Aires  
**Type of event:** educational activity  
**City of event:** Argentina  
**Date of event:** 2006  
**Organising entity:** Universidad Buenos Aires