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SOLATINA: A Latin-American Society for Bee Research to Foster the Interactions Between Scientists and Coordinate Large-Scale Research Programs

Karina Antúnez, Fabrice Requier , Patricia Aldea Sánchez, Marina Basualdo, Belén Branchiccela , Rafael Calderón, Adriana Correa-Benítez, Andres Delgado-Cañedo, Sandra Fuselli, Carolina Morales, Eleazar Pérez-Castro, Santiago Plischuk, Martin Pablo Porrini, Lionel Segui Goncalves, José María Tapia González, Alexandra Torres, Rodrigo Velarde & Ciro Invernizzi

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Introduction

Bees (members of the super family *Apoidea*) are the main pollinators in modern agro-ecosystems, where they have a critical positive effect on yield improvement for about 75% of world's crops (Klein et al., 2007; Potts et al., 2016). However, there is evidence of a worldwide decline in the populations of wild bees, and numerous reports of high colony losses of managed bees, which may disrupt crop pollination, honey production and the reproduction of bee-pollinated wild plants (Potts et al., 2010), leading to negative social, economic and ecological effects (Potts et al., 2016). Latin America (hereafter, LA) is home to about 8 million managed honey bee colonies (*Apis mellifera* L.) which produce more than 200000 tons of honey annually (FAOSTAT, 2018). Several Latin American countries are among the global top 20 in terms of honey production and beehives stock, such as Argentina, Brazil and Mexico (García, 2018; Requier et al., 2018). Moreover, LA hosts a unique fauna of native bees, with about 5,000 identified species, including 391 species of the native stingless bees in the tribu *Meliponini* (Camargo & Pedro, 2008; Freitas et al., 2009). Some of those native stingless bees are managed since ancient times to produce honey through the practice of "Meliponiculture" (Jaffé et al., 2015). Latin American bee research has contributed to improve our understanding of problems relevant for apiculture, bee diversity and the causes of bee population decline in the region among other topics (see e.g., Maggi et al., 2016; Morales, Arbetman, Cameron, & Aizen, 2013; Vandame & Palacio, 2010). These scientific achievements are mostly the result of research efforts led by groups working independently rather than the product of cooperative research efforts between different countries. We argue that the strength, impact, and relevance of these research efforts, for apiculture and bees in the region, can be improved by promoting interactions between Latin American bee scientists and coordinating large-scale research programs.

SOLATINA's establishment: "a new colony arises"

Taking bee colonies as an example, we can easily pinpoint that inter-individual cooperation is a critical trait of a social community for improving learning, adaptation and survival capabilities. Thus, the growing number of Latin American researchers interested in bee-related topics implied the need for cooperation and overall organization. This cooperation is needed to complement the strengths and built-in research capabilities among researchers from different countries, for example in countries where apiculture, meliponiculture and bee research is incipient, and much is unknown, like Bolivia. The motivation is to recruit researchers that can look more into the built-in capabilities of neighboring countries which have a more developed bee research community and infrastructure. This can be of crucial importance, due to the proximity, in working together to solve issues of bee health, bee conservation, emerging pests, and the understanding of how to better manage bees to maintain and promote their health.

To accomplish the main objective of starting up a coalition across bee scientists from Latin American countries, and inspired by the efforts of COLOSS network, in 2016, a group of researchers from different Uruguayan institutions organized and hosted the workshop "Towards the creation of a Latin American network on bee research" (Figure 1). Fifty bee researchers from Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica,

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Figure 1. Founding partners (more than 50 Latin-American bee researchers) under a large native emblematic tree (*Erythrina crista-galli*, ceibo) at the end of the meeting "Towards the creation of a Latin American network of bee research" at INIA La Estanzuela (Colonia, Uruguay), in November 2016, which lead to the establishment of SOLATINA in 2017.

Mexico, Peru, Uruguay and invited speakers from the United States and Austria attended this meeting. All participants identified the need for the establishment of a Latin American organization to support interactions between bee researchers in the region as crucial and pledged their support and commitment for the establishment of such an organization. As a result of this "young colony" effort, the Latin-American Society for Bee Research, called SOLATINA – (the Spanish acronym of "Sociedad Latinoamericana de Investigación en Abejas") (Figure 2), was officially founded a few months later on the 22nd of July, 2017.

SOLATINA is structured as a non-profit civil association enrolling bee scientists from several Latin American countries. The 2017–2018 Directive Board is integrated by a titular group headed by Karina Antúnez (President, Uruguay), Martín Porrini (Vice-President, Argentina), Belén Branchiccela (Uruguay), Ciro Invernizzi (Uruguay), Rodrigo Velarde (Bolivia), Andres Delgado Cañedo (Brazil), Patricia Aldea (Chile), Marina Basualdo (Argentina) and Eleazar Pérez (Perú). This representative group is supported by Carolina Morales (Argentina), Adriana Correa-Benítez, (Mexico) and Rafael Calderón (Costa Rica) as substitutes. The 2017–2018 Fiscal Committee is formed by a titular group including Carmen Rossini (Uruguay), Estela Santos (Uruguay), and Daniela Arredondo (Uruguay), supported by a group of substitutes including Enrique Nogueira (Uruguay) and Pablo Zunino (Uruguay).

Figure 2. Logo of SOLATINA (Latin-American Society for Bee Research). Further information about SOLATINA is available online (SOLATINA, 2018).

Beyond this organizational structure within LA, SOLATINA also promotes inter-continental connections through a close collaboration with COLOSS. We are also open to develop new collaborative research projects with colleagues from other countries.

Enhancement of interactions among Latin American bee scientists

The main objectives of the Society are: (1) to contribute to the knowledge, health, and conservation of both wild and managed bees in LA; (2) to strengthen the scientific capabilities of the researchers and the institutions they represent; and (3) to coordinate intra-continental research efforts within LA and collaborative research efforts with researchers outside LA. In this context, SOLATINA has become the first large-scale platform of its type in America. Nowadays, SOLATINA includes a coalition of more than 100 bee researchers (complete list available on the SOLATINA's website; SOLATINA, 2018), from 11 Latin American countries (Figure 3), representing 90% of the Latin American territory, 91% of the beehives stock and 90% of the honey production as estimated based on data for 2016, last year of FAO available data (FAOSTAT, 2018).

While the diversity of research areas covered by SOLATINA's members is large, five priority areas were identified, and working groups created to stimulate interest-based interactions within members of the Society. Below is the list of priority research areas covered by the working groups and their current coordinators:

- *Diversity and Biology,* headed by Carolina L. Morales (Argentina), Walter M. Farina (Argentina) and Estela Santos (Uruguay).
- *Pests and pathogens,* headed by Belén Branchiccela (Uruguay) and Natalia V. Bulacio Cagnolo (Argentina).
- *Impact of agrochemicals and other agricultural practices,* headed by Ramón Rebolledo (Chile) and Horacio Heinzen (Uruguay).
- *Products, services and added value,* headed by Andrés Delgado Cañedo (Brazil), Marina Basualdo (Argentina) and Patricia Aldea Sánchez (Chile).
- *Monitoring of colony losses,* headed by Fabrice Requier (Argentina) and Karina Antúnez (Uruguay).

Coordination of large-scale bee research programs in LA

Current global changes affect biological processes and ecosystem functioning, for which large-scale monitoring of the population dynamics of managed species and changes in biodiversity are needed in order to understand the causes and consequences of disturbances, aiding in the prediction or anticipation of future trends. Specifically, large-scale bee monitoring programs allowed researchers, for instance, to document the ongoing decline of European wild bee populations (e.g., Biesmeijer et al., 2006) and managed honeybee populations in the United States (e.g., Kulhanek et al., 2017) as well as across Europe (e.g., Brodschneider et al., 2016; Jacques et al., 2017). The common trait of these successful large-scale monitoring programs implies a centralization and standardization of monitoring methods.

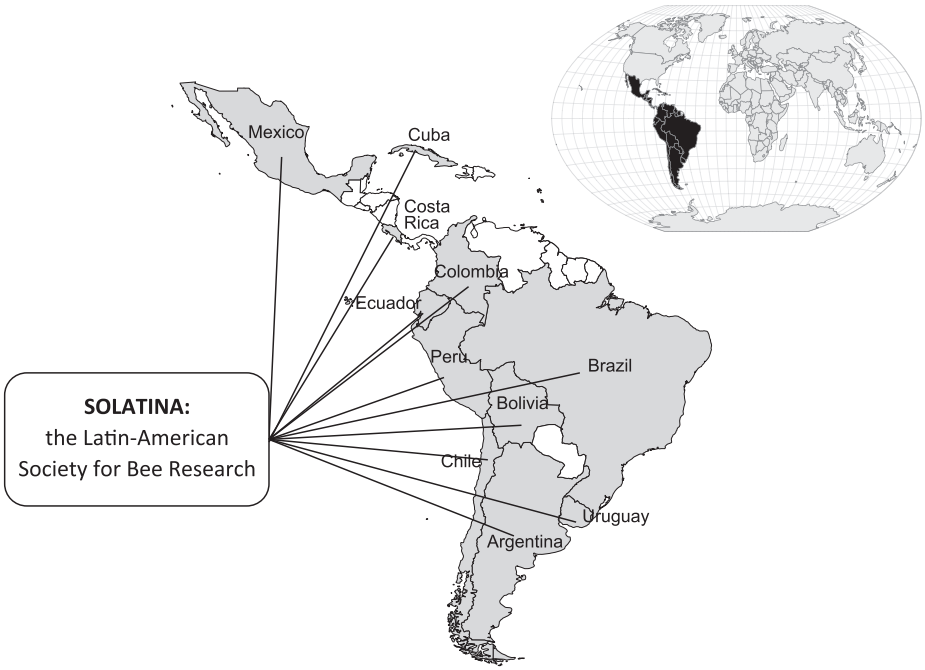

Figure 3. The map shows the spatial distribution of SOLATINA's bee research network, which currently includes 100 researchers from eleven Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Mexico, Peru, and Uruguay). The world map (top right) shows the location of Latin America.

SOLATINA proposes to develop a large-scale research platform through collaboration between scientists. Experimental protocols, monitoring strategies and other methods will be shared, standardized and spread across SOLATINA's bee research network to answer key questions of regional importance (Figure 3).

A successful example of the potential of SOLATINA is the recent development of a unified questionnaire to determine the degree and potential causes of colony losses within LA. The questionnaire was carried out by SOLATINA's '*Monitoring of colony losses*' working group, (see above), and launched in October 2017. This questionnaire was based on surveys that had been proven to be effective in other regions, and was adapted to Latin American climatic conditions; for example, by considering determinants of the season of lower honey bee activity other than thermic winter; more representative of tropical and subtropical regions (*e.g.* dry or rainy season). Moreover, we surveyed for the first time the status of meliponiculture (Requier et al., 2018).

Perspectives: "enlarging the colony"

SOLATINA will undoubtedly expand rapidly by facilitating horizontal cooperation between Latin American research groups and by promoting and consolidating the exchange of knowledge, experiences and technologies. The website, designed by SOLATINA's members, is currently available to obtain further information about the Society´s structure, aims, results of current research and future events. All researchers, technicians and students, whose research topics and interests involve bees, are invited to visit our website (SOLATINA, 2018), and join the consortium.

Authors' contributions

Karina Antúnez and Fabrice Requier wrote the manuscript with equal contributions; the other authors are listed in alphabetic order. All authors reviewed, edited the text, and gave their approval of the final version prior to publication.

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ORCID

Marina Basualdo https://orcid.org/0000-0001-6445-4624
Sandra Fuselli https://orcid.org/0000-0003-4372-6939
Carolina Morales: https://orcid.org/0000-0002-9989-5347
Santiago Plischuk. https://orcid.org/0000-0001-8135-3462
Eleazar Pérez-Castro https://orcid.org/0000-0002-5811-4014
Karina Antúnez http://orcid.org/0000-0002-3664-9835
Fabrice Requier http://orcid.org/0000-0003-1638-3141
Patricia Aldea Sánchez http://orcid.org/0000-0003-2055-7765
Belén Branchiccela http://orcid.org/0000-0003-1624-7916
Andres Delgado-Cañedo http://orcid.org/0000-0002-8377-6204
Martin Pablo Porrini http://orcid.org/0000-0002-6070-1664
Ciro Invernizzi http://orcid.org/0000-0003-3626-4879

References

Biesmeijer, J.C., Roberts, S.P.M., Reemer, M., Ohlemüller, R., Edwards, M., Peeters, T., … Kunin, W.E. (2006). Parallel declines in pollinators and insect-pollinated plants in Britain and the Netherlands. *Science*, *313*, 351–354. doi:10.1126/science.1127863

Brodschneider, R., Gray, A., van der Zee, R., Adjlane, N., Brusbardis, V., Charrière, J.D., … Woehl, S. (2016). Preliminary analysis of loss rates of honey bee colonies during winter 2015/16 from the COLOSS survey. *Journal of Apicultural Research*, *55*, 375–378. doi:10.1080/00218839.2016.1260240

Camargo, J.M.F. & Pedro S.R.M. (2008). Revisãodasespécies de Melipona do grupofuliginosa (Hymenoptera, Apoidea, Apidae, Meliponini). *Revista Brasileira de Entomologia*, *52*, 411–427.

FAOSTAT. (2018). Production database from the Food and Agriculture Organization of the United Nations. Data available at http://www.fao.org/faostat/. Last accessed in March 2018.

Freitas, B.M., Imperatriz-Fonseca, V.L., Medina, L.M., de Matos PeixotoKleinert, A. Galetto, L., … Quezada-Eúan, J.J.G. (2009). Diversity, threats and conservation of native bees in the Neotropics. *Apidologie*, *40*, 332–346. doi:10.1051/apido/2009012

García, N.L. (2018). The current situation on the international honey market. *Bee World 95*. doi:10.1080/0005772X.2018.1483814

Jacques, A., Laurent, M., EPILOBEE Consortium, Ribière-Chabert, M., Saussac, M., Bougeard, S., & Chauzat, M.P. (2017). A pan-European epidemiological study reveals honey bee colony survival depends on beekeeper education and disease control. *PLoS One 12*:e0172591. doi:10.1371/journal.pone.0172591

Jaffé, R., Pope, N., Carvalho, A.T., Maia, U.M., Blochtein, B., de Carvalho, C.A.L., … Imperatriz-Fonseca, V.L. (2015) Bees for development: Brazilian survey reveals how to optimize stingless beekeeping. *PLoS One*, *10*, e0121157. doi:10.1371/journal.pone.0121157

Klein, A.M., Vaissière, B.E., Cane, J.H., Steffan-Dewenter, I., Cunningham, S.A., Kremen, C., & Tscharntke, T. (2007). Importance of pollinators in changing landscapes for world crops. *Proceedings of the Royal Society B: Biological Science*, *274*, 303–313. doi:10.1098/rspb.2006.3721

Kulhanek, K., Steinhauer, N., Rennich, K., Caron, D.M., Sagili, R.R., Pettis, J.S., … vanEngelsdorp, D. (2017). A national survey of managed honey bee 2015–2016 annual colony losses in the USA. *Journal of Apicultural Research*, *56*, 328–340. doi:10.1080/00218839.2017.1344496

Maggi, M., Antúnez, K., Invernizzi, C., Aldea, P., Vargas, M., Negri, P., … Eguaras, M. (2016). Honey bee health in South America. *Apidologie*, *47*, 835–854. doi:10.1007/s13592-016-0445-7

Morales, C.L., Arbetman, M.P., Cameron, S.A., & Aizen, M.A. (2013). Rapid ecological replacement of a native bumble bee by invasive species. *Frontiers in Ecology and the Environment*, *11*, 529–534. doi:10.1890/120321

Potts, S.G., Biesmeijer, J.C., Kremen, C., Neumann, P., Schweiger, O., & Kunin, W.E. (2010). Global pollinator declines: trends, impacts and drivers. *Trends in Ecology and Evolution*, *25*, 345–53. doi:10.1016/j.tree.2010.01.007

Potts, S.G., Imperatriz-Fonseca, V., Ngo, H.T., Aizen, M.A., Biesmeijer, J.C., Breeze, … Vanbergen A.J. (2016). Safeguarding pollinators and their values to human well-being. *Nature*, *540*, 220–229. doi:10.1038/nature20588

Requier, F., Antúnez, K., Morales, C.L., Aldea Sánchez, P., Castilhos, D., Garrido, P.M.M., Garibaldi, L.A. (2018) Trends in beekeeping and honey bee colony losses in Latin America. *Journal of Apicultural Research*. doi:10.1080/00218839.2018.1494919

SOLATINA. (2018). Online information about the structure, aims and events of the Latin-American Society for Bee Research, SOLATINA. Data available (in Spanish only) at http://solatina.org/. Last accessed in March 2018.

Vandame, R., Palacio, M.A. (2010). Preserved honey bee health in Latin America: a fragile equilibrium due to low-intensity agriculture and beekeeping? *Apidologie*, *41*, 243–255. doi:10.1051/apido/2010025

Karina Antúnez
Departamento de Microbiología,
Instituto de Investigaciones Biológicas
Clemente Estable (IIBCE). Avda. Italia
3318 Montevideo,
Uruguay

Fabrice Requier
Instituto de Investigaciones en Recursos Naturales,
Agroecología y Desarrollo Rural (IRNAD)
Sede Andina,
Universidad Nacional de Río Negro (UNRN) y Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET),
Mitre 630,
CP 8400,
San Carlos de Bariloche,
Río Negro,
Argentina

Patricia Aldea Sánchez
Centro para el Emprendimiento Apícola de la Universidad Mayor (CEAPI MAYOR),
Facultad de Ciencias,
Universidad Mayor,
Camino La Pirámide 5750,
Huechuraba,
CP8580745
Santiago,
Chile

Marina Basualdo
Facultad de Ciencias Veterinarias,
Universidad Nacional del Centro de la Provincia de Buenos Aires UNCPBA,
Tandil
Buenos Aires
Argentina

Belén Branchiccela
Departamento de Microbiología,
Instituto de Investigaciones Biológicas Clemente Estable (IIBCE). Avda. Italia
3318 Montevideo,
Uruguay

Rafael Calderón
Programa Integrado de Patología Apícola,
Centro de Investigaciones Apícolas Tropicales,
Universidad Nacional,
Heredia,
Costa Rica

Adriana Correa-Benítez
Departamento de Medicina y Zootecnia de Abejas,
Conejos y Organismos Acuáticos,
Facultad de Medicina Veterinaria y Zootecnia de la Universidad Nacional Autónoma de México,
Ciudad Universitaria,
Delegación Coyoacán,
Ciudad de México,
CP 04510
México

Andres Delgado-Cañedo
Centro Integrado de Pesquisas Biotecnológicas,
Campus São Gabriel,
Universidade Federal do Pampa (UNIPAMPA),
Rua Aluízio Barros Macedo,
Br 290, km 423 Bairro Piraí,
São Gabriel,
Rio Grande do Sul,
CP 97300-000
Brazil

Sandra Fuselli
Centro de Investigación en Abejas Sociales (CIAS), Instituto de Investigaciones en Producción, Sanidad y Ambiente (IIPROSAM), Dto. de Biología, CIC - UNMDP, Funes 3350 (7600) Mar del Plata,
Argentina

Carolina Morales
Grupo Ecología de la Polinización,
INIBIOMA (CONICET - Universidad Nacional del Comahue),
Quintral 1250,
Bariloche,
Río Negro,
Argentina

Eleazar Pérez-Castro
Facultad de Zootecnia,
Universidad Nacional del Centro del Perú,
Av. Mariscal Castilla N° 3909,
El Tambo,
Huancayo,
Perú

Santiago Plischuk
Centro de Estudios Parasitológicos y de Vectores (CEPAVE) (CONICET-UNLP)
Boulevard 120 s/n (1900) La Plata
Buenos Aires
Argentina

Martin Pablo Porrini
Centro de Investigación en Abejas Sociales (CIAS),
Instituto de Investigaciones en Producción,
Sanidad y Ambiente (IIPROSAM),
Dto. de Biología,
CONICET,
UNMDP,
Funes 3350 (7600),
Mar del Plata,
Argentina

Lionel Segui Goncalves
Universidad Federal Rural do Semiarido (UFERSA),
Mossoró,
Brazil

José María Tapia González
Centro de Investigaciones en Abejas.
Licenciatura en Medicina Veterinaria y Zootecnia.
Departamento de Ciencias Económicas Administrativas,
Centro Universitario del Sur,
Universidad de Guadalajara,
Guadalajara,
México

Alexandra Torres
Grupo de Investigación Biocalorimetría
Universidad de Pamplona,
Pamplona,
Colombia

Rodrigo Velarde
Instituto Apícola Boliviano (IAB),
parte de la Empresa Pública Productiva Apícola (PROMIEL),
Av. Jaimes Freyre No 2344,
Sopocachi,
La Paz,
Bolivia

Ciro Invernizzi
Sección Etología,
Facultad de Ciencias,
Montevideo, Universidad de la República
Uruguay