



Joining Forces across Continents: The 1st SOLATINA–COLOSS Conference

Melanie Parejo, Fabrice Requier, Ciro Invernizzi, Patricia Aldea-Sánchez, Marina Basualdo, Robert Brodschneider, Adriana Correa-Benítez, Ernesto Guzman-Novoa, Christian W. W Pirk, Nathalie Steinhauer, Rodrigo Velarde, Peter Neumann & Karina Antunez

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Joining Forces across Continents: The 1st SOLATINA–COLOSS Conference

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Introduction

The first SOLATINA-COLOSS meeting took place virtually on September 22, 2021. The event was set up with the aim of promoting collaboration between the two societies. SoLatInA (SOCiedad LATinoamericana de INvestigación en Abejas; www.solatina.org) is the Latin American Society for Bee Research based in Montevideo, Uruguay, founded in 2017 with the objectives of contributing to the knowledge, health and conservation of bees in Latin America while strengthening research capacities, and coordinating international research activities (Antúnez et al., 2018). COLOSS (prevention of honey bee COLony LOSSes; www.coloss.org) is an international bee research association headquartered in Bern, Switzerland, whose mission is to improve the health and well-being of bees at a global level by advocating for bees, and their well-being, especially towards government legislators and administrators; coordinating international research, including the development of standard research methods; disseminating knowledge and training related to improving the well-being of bees; promoting youth development and gender balance among those studying, or actively involved, in promoting the well-being of bees (Carreck, 2021). The aims of both societies are much in line with each other, and cooperation and open dialogue are key to better understand the reasons why bee populations are threatened in today's world. The collaboration between both societies started since the creation of SOLATINA, when Dr. Karl Crailsheim participated in the foundational meeting

and has continued throughout the years with the participation of SOLATINAs researchers in meetings organized by COLOSS and *vice versa*.

In this first official joint meeting with the motto “joining forces across continents”, members of both societies exchanged and discussed topics of common interest that will ultimately lead to the development of joint research projects and activities to safeguard bees.

The meeting was organized around two round table discussions (Figure 1). Prominent researchers of both SOLATINA and COLOSS discussed two topics of global interest for honey bees: 1) Monitoring honey bee colony losses and 2) honey bee colonies surviving *Varroa destructor* infestations. This was an excellent opportunity to present and discuss contrasting views on these issues and to encourage the interaction between researchers from different regions. Moreover, the event was virtual and free, in order to attract a large number of participants without the need for traveling. In fact, in total there were 85 participants from 17 countries - a great success!

Roundtable on Monitoring of Honey Bee Colony Losses

The main objective of this roundtable was to exchange current knowledge and ideas regarding the effectiveness and challenges around citizen science programs aimed at monitoring honey bee colony losses,

specifically by discussing the following points: (1) how to get more respondents (i.e. the methods used to disseminate the surveys to beekeepers; which methods are most efficient, how to achieve spatial representativity, etc.); (2) how to keep respondent volunteer beekeepers engaged (feedback information, sending back result briefings or summaries, perform conferences or meetings, etc.); and (3) whether the Covid pandemic impacted data collection. The speakers invited to this round table were: 1) Nathalie Steinhauer from the University of Maryland and research coordinator for the Bee Informed Partnership, presenting her experience from the USA, 2) Robert Brodschneider from the University of Graz and co-leader of the COLOSS monitoring group, 3) Fabrice Requier from the French National Research Institute for Sustainable Development (IRD) and co-leader of the SOLATINA monitoring group.

Overall, one aspect that was central to the discussion was the difficulty of achieving significant levels of volunteer participation in Latin America (Table 1). This could be explained by some peculiarities of the region. A very important contrasting observation is that most Latin American beekeepers prefer, or are only able to answer the surveys through face to face interviews (as opposed to the USA and Europe where online participation is dominant). Therefore, it is not surprising that the Covid pandemic disturbed considerably the possibility of getting high participation rates during the last two years in this region.

Virtual

SOLATINA
—
COLOSS

Joining forces across continents

URUGUAY TIME UTC/GMT -3 hrs.

PROGRAM

SEPTEMBER 22, 2021
I ENCOUNTER SOLATINA- COLOSS,
JOINING FORCES ACROSS CONTINENTS

Welcome: Directive board of SOLATINA and COLOSS

Roundtable: Monitoring of colony losses

Coordinators: Fabrice Requier and Melanie Parejo.

Participants: Nathalie Steinhauer (North America);
Robert Brodschneider (Europe);
Fabrice Requier (Latin America).

Break

Roundtable: Varroa-resistant honey bees

Coordinators: Ciro Invernizzi and Melanie Parejo.

Participants: Ernesto Guzmán Novoa (Latin America);
Peter Neumann (Europe);
Christian Pirk (Africa).

Closing remarks

zoom

Figure 1. Schedule and speakers of the 1st SOLATINA-COLOSS meeting.

Table 1. Summary of the main points highlighted during the three comparative talks on honey bee colony loss monitoring.

	How to get volunteer respondents?	Strategies for continued engagement by respondents	Impact of the Covid19 pandemic on response rates?
Europe	Mainly online using websites, journals, meetings, emails; also by regular mail, phone calls. "snowballs", The European survey extends southwards into North Africa, where responses are better obtained by phone.	Workshops with beekeepers (ask them what they want to know). In Austria, survey results are openly available through a platform that allows respondents to make analysis and regional comparisons on their own. Translations of scientific papers and publications in national/regional beekeeping journals are important.	Regional response rates had increased since 2013. The impact of the pandemic appears not to be uniform. For example, no effect was registered in some countries, while there was reports from other countries. A reduction in in-person beekeeper meetings has impacted response rates in some locations.
USA	Mostly online (by email, advertisements, notices to partners, meetings of professional beekeepers associations, journals, through inspectors, suppliers; "snowballs") and in beekeeping journals and magazines; promotion of reports/ dissemination. The previous practice of sending paper surveys through mail was stopped due to low return rates; phone call interviews with commercial beekeepers to fill out surveys while on the phone remain in place.	Rapid publication of preliminary results, publication in scientific journals (although beekeepers dislike the time delay caused by the editorial process associated with scientific publishing), non-scientific communication in blogs and emails. Survey results are also publicly available at the Bee Informed Partnership website (www.beeinformed.org).	Participation numbers originally increased between 2007 and 2014 but a reduction in data collection occurred since then, and more so in the last 2 years, which cannot be conclusively linked to the pandemic; Representativity of the survey is checked by comparing to an independent source (% of participants from different operation size).
Latin America	Mainly by face to face or phone interviews. The minority is online self-reported. Survey is distributed by email, journals, social networks, websites and beekeeper conferences and societies.	Acknowledgments by email and dissemination of results online. A new video will be launched in October (SOLATINA Youtube channel, facebook and webpage); Flyer and short power-point for coordinators to be used during meetings.	Data collection decreased due to the lack of opportunities to conduct face-to-face interviews (most in-person beekeeping meetings were cancelled due to lockdown measures); The Covid pandemic has had and may continue to have a direct negative regional impact on monitoring efforts.

What we have learned from the lively discussions in this first round table is that it is important to work in maintaining the interest of beekeepers in participating in the surveys and to convince them about

the importance of the collection and analysis of survey data for their activity. It was discussed that one way to keep beekeepers motivated could be to offer them "rewards". For example, direct or

immediate feedback of results relevant to their associations or regions or providing them the capacity to compare local results with the results of other regions. Other potential rewards would be to offer

them beekeeping courses, and economic incentives; albeit this latter point was disputed because of its potential to generate unwanted biases.

Another discussed point was the importance of comparing the results of colony losses between continents, as a potential way to address global issues affecting honey bees. However, there are some methodological challenges linked to the structure of the surveys. For example, it is difficult to define a discrete winter season for every region, and in some regions, winter losses are similar to summer losses. This problem was already encountered during the discussions to include data from South Africa in the COLOSS monitoring group over a decade ago. An option that was discussed was to compare annual losses leaving aside seasonal (latitudinal) variation. Moreover, one must also consider the variation in colony loss rates due to the prevalence of certain honey bee subspecies in given regions, in particular, subspecies in Africa and Africanized bees in Latin America (the neotropics), which display higher rates of absconding or seasonal migrations. This is a true cornerstone for our understanding of honey bee colony losses outside temperate regions, and an important issue that needs further investigation. Finally, it was pointed out that comparing managed stingless bees with managed honey bees would be a major step forward to broadly understand the common causes of social bee losses, due to joint exposure to stressors (e.g. pesticides, bad forage, etc.).

Roundtable on Honey Bee Populations Surviving *Varroa destructor*

V. destructor has been the main biotic threat to Western honey bees, *Apis mellifera* L., worldwide for more than four decades, causing enormous economic damage to the beekeeping industry. The study of varroa resistant bee populations has been of increasing interest in recent years. In this round table we had the opportunity to hear about populations of honey bees resistant to *Varroa* in Europe, Africa and the Americas, and to learn about specific traits or mechanisms that enable them to resist mite parasitism. The invited panelists were Peter Neumann from the Institute of Bee Health, University of Bern, Christian Pirk from the Department of Zoology & Entomology, University of Pretoria, and Ernesto Guzmán-Novoa from the School of Environmental Sciences, University of

Guelph. After their presentations we had a subsequent joint discussion with lively inputs from other participants. It was noted that although Africanization of honey bees may provide some level of resistance to *Varroa*, the effects of mite infestation on honey productivity in Africanized honey bees colonies should not be ignored. Moreover, to better understand the complex interaction between honey bees and mites, it is necessary to consider bee genetics, mite genetics, viral presence and load, and environmental factors. The potential of mite adaptation was also discussed as an aspect that needs further investigation. Finally, it was concluded that international collaboration, and joint research efforts between scientists will be the only way forward to shed light into the mechanisms that confer some bee populations the capacity to withstand mite infestations; how to conserve, maintain or breed such populations; and how to select and breed bees that display favorable traits while maintaining productivity. In particular, the mosaic of Africanized and European honey bee populations in Latin America is a golden key to our understanding of these systems. By joining forces across continents, we will have the potential to generate breakthroughs in these area of research and ultimately find sustainable solutions for the beekeeping industry.

Concluding Remarks and Perspectives

Collaborative research efforts are needed to tackle global threats and challenges to honey bee populations. A fruitful collaboration between SOLATINA and COLOSS will make use of novel approaches to better train a new generation of bee scientists, foster bee conservation and bridge the gap between bee research and beekeepers.

For both of the topics discussed in the round tables, common global key issues for honey bees were clearly identified. To tackle them, we have started further discussions and are planning follow-up actions in line with our common aims for the wellbeing of bees. Moreover, given the success of this first meeting, we have decided to hold a joint event annually. In addition, we expect to develop further exchanges that will include issues relevant for non-*Apis* bee communities, such as stingless bees.

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