

## Las colecciones biológicas “itinerantes” como instrumentos de educación ambiental

*"Itinerant" biological collections as tools of environmental education*

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### Resumen

Las colecciones biológicas de las instituciones académicas son repositorios de la biodiversidad de una región en particular. Su utilidad va más allá del conocimiento científico. En este trabajo se presentan los resultados de llevar a las comunidades locales una pequeña muestra de los especímenes de flora y fauna de las colecciones biológicas del Centro Universitario de la Costa Sur en el estado de Jalisco. Los objetivos eran mostrar a los pobladores una parte de la riqueza biológica que los rodea, dar información sobre las especies que por considerarse dañinas son destruidas, resaltar aquellas que sí lo son, y promover un cambio de actitud en favor de la conservación de la biodiversidad regional. El interés para que la exposición itinerante sea mostrada en diferentes eventos locales e

instituciones educativas en el estado ha crecido, resaltando el potencial que esta actividad tiene como instrumento de educación ambiental y de conservación.

**Palabras clave:** colecciones biológicas, itinerante, educación ambiental, conservación de biodiversidad, Jalisco.

### Abstract

The Biological Collections of academic institutions are repositories of biodiversity in a region in particular. Its usefulness goes beyond the scientific knowledge. This paper presents the results of local communities take a small sample of specimens of flora and fauna of the Biological Collections of the South Coast University Centre of Jalisco State. The objectives were to show people a part of the biological richness that surrounds them, provide information on species considered harmful are destroyed, highlight those that are, and to promote a change of attitude in favour of the conservation of regional biodiversity. The interest that the exhibition be shown at various local events and educational institutions in the State has grown, highlighting the potential that this activity has as an instrument of environmental education and conservation.

**Key words:** Biological Collections, itinerant, travelling, environmental education, conservation of biodiversity, Jalisco.

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### Introduction

Biological Collections are databases, as well as museums and libraries, provide basic information on the biological diversity of a place and time in particular (Simmons and Muñoz-Saba, 2005), and the scientific foundation for studies in taxonomy and biogeography (García-Deras et al., 2001), palaeontological heritage (Cristin & Cavedigital,

2011), genetic diversity (Ossa et al., 2012), and agricultural heritage (Daly & Clark 2010), among others. Today, these historical files take on a special importance by serving in the monitoring of global environmental change, and the changes in the distribution of animal and plant species as a result of the loss and modification of habitat, biological invasions, mainly (Suarez & Tsutsui, 2004). This information, in addition to being helpful for scientific knowledge, serves as an input for conservation and sustainable development projects (García-Deras et al., 2001) and, depending on the particular objectives of the collections, are used for the study of vectors of diseases, contaminants, and biosecurity, becoming important tools for different sectors of national Governments (Suarez & Tsutsui, 2004; Daly & Clark, 2010).

Despite the biological importance that Mexico has in the world as a megadiverse country, and threats to their natural resources, there are few biological collections in the country which contribute in the efforts for the conservation and sustainable development (GarcíaDeras et al., 2001; Plascencia et al., 2011). On the other hand, biological museums and collections are primarily intended to support teaching activities and scientific research, academics and scientists are its main users (Suarez & Tsutsui, 2004). However, they also have the potential of becoming tools of environmental education and education for conservation when your users are people in local communities, in particular in places rich in biological and cultural diversity. The present work aims to report the results carry part of the biological collection of an academic institution to different local communities, with the aim of raising awareness among the population about the importance of the biodiversity of the region and Mexico, on the one hand, and of the relevance that have these biological collections for the society. The idea is that this is a way to human communities part of the acquis that scientists in the natural area obtained the zones of influence of these communities and that many times there is no retribution by academics.

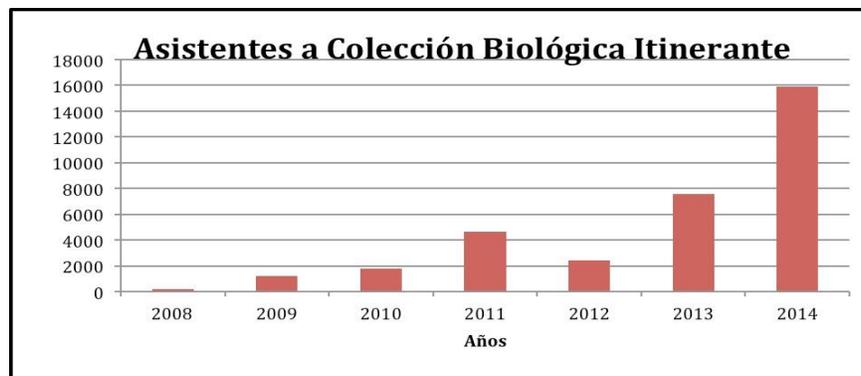
## **Background**

The University Center of the South Coast (CUCSUR) of the University of Guadalajara, located in the city of Autlan, Jalisco, in western Mexico, has a Herbarium, called ZEA and a menagerie, which have been operating for more than 28 years. These two biological collections are administered by the Department of Ecology and Natural Resources (DERN-IMECBIO), and have in their collections with biological material from the South Coast region of the state of Jalisco and Colima state. These biological collections emerged from the research started in the mid 1980s when they began biodiversity inventories of the current Biosphere Reserve Sierra de Manantlán. Having these two collections has allowed the identification of new species of plants and insects for science and many new records for the protected area and the state of Jalisco and the neighboring state of Colima. To date, in them they have more than 80 000 invertebrates (mostly insects and arachnids), 5000 vertebrates and 30 000 specimens of plants of the main mountain ranges of the south and the coast of Jalisco and Colima, such as saws Manantlán, Quila, Cacoma, Tapalpa and West.

In addition to the support given to research in ecology and taxonomy, the collections have served to promote the teaching work in management and conservation of natural resources carried out by the university in an undergraduate and two graduate programs, and is visited by researchers and students from different educational levels, and the general public of major cities in the region. From 2009 comes the project of "traveling Biological Collections", with the initial goal to encourage a greater number of people to know the regional natural wealth, people who hardly would visit the premises of the menagerie, the Herbarium in the CUCSUR, or similar installation in the region. The objectives are to 1) carry the general population sample of the vast biological diversity that counts Mexico, 2) convey, in simple language, about the importance of biodiversity, particularly one whose perception is wrong; 3) thereby promoting a change in attitude about the value and relevance of the conservation of national flora and fauna; and 4) information of the people in different places on different uses and myths about particular species.

With these goals in mind we chose to separate copies of vertebrates, invertebrates and herbarium that were representative of the region South Coast, and could be easily transferred to different populations, both in the area of influence of the university and from other regions Jalisco state. Later the importance of not only copies of the Zoological Collection and the Herbarium, but also with living specimens of the region he was, so he started with a collection of live spiders, owned by MC Luis Eugenio Rivera Cervantes, which was growing and now includes other arthropod species and native reptiles and amphibians; many of these have been donated by students or people rescued or trapped in their homes.

The presentations in different places called much attention, so invitations schools, civic organizations and municipalities grew exponentially for the collection was exposed as part of extracurricular activities of students in their schools, or to the knowledge of the general population as part of a local festival or environmental fair. To date, the itinerant collection has been visited by over 17 thousand people (Figure 1).



**Figure 1.** Number of people who attended the presentation of the traveling menagerie CUCSUR in different parts of the state since 2008 Jalisco

The "traveling" biological collections have been quite attractive, so have allowed a greater number of people of all ages know a part of the biological richness of the state of Jalisco, as well as their ecological and economic importance. It has become a tool of further education that helps highlight the importance of respect, care and conservation of fauna and flora. As a tool for environmental education has been used to dispel some myths that exist around

certain species (mostly animals), such as spiders "star" (*Amblipigyda*), known in the region as "cancles" the that being considered very poisonous and disgusting are indiscriminately killed by the villagers. There is also the case of bats, which they are generalized as vampires, or snakes, that you be mistaken for snakes are killed.

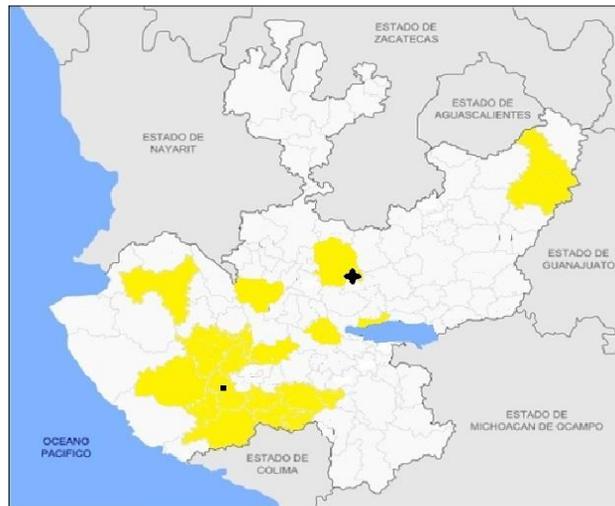
The presentations of live animals, the emphasis is on those who have both medical importance, such as scorpions, black widow spider violinist, snakes (rattlesnake, coral snake, zolcuate or Cantil), or bug transmitting disease Chagas, all present in the region or in the ecological importance and no danger to humans from some others such as tarantulas, some species of snakes (boas, pliers, chirrioneras, green traps, etc.) other reptiles, which are hunted indiscriminately by ignorance or, in some cases, captured for the pet trade. Stakeholders also mentioned the cares and problems in captivity have such animals. Sometimes some visitors to touch certain subjects, particularly those that are considered "dangerous" as amblypygids, tarantulas and snakes (Figure 2) is allowed. This helps to dispel fears and the idea that they are evil and dangerous; at the same time, they are invited to not kill these animals. Likewise and reciprocally, we were able to learn from visitors popular names, uses, ecological knowledge and myths that have various agencies. You could say that we have obtained ethnoecological ourselves retransmit information in other communities.



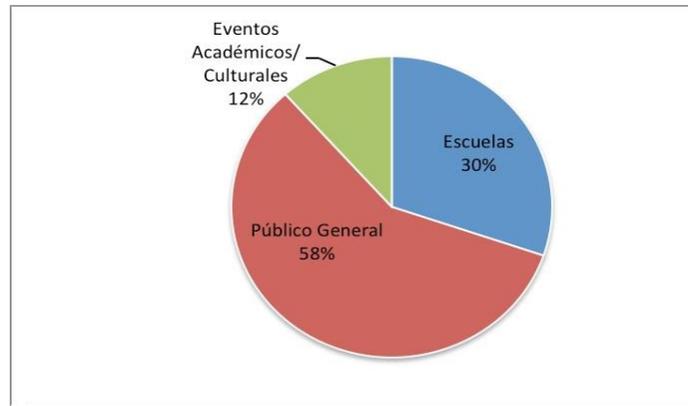
**Figure 2.** Student of Engineering in Agricultural and Natural Resources allowing a visiting primary handle a snake

Furthermore, the different presentations we have the support of university students, most of the Engineering of Natural Resources and Agricultural CUCSUR. Their participation allows them to learn more about the biology, natural history and threats facing different specimens in the collection but, above all, it helps them interact with people of different educational levels and ages, and transmit the information learned easily. Fortunately for us, many of the students who helped us continue to support the care and maintenance of the collection, and some are so interested in who decided to make their thesis work with a particular group or to continue their postgraduate studies related areas.

To date, the traveling collection was presented in 41 places in 17 municipalities in the state of Jalisco (Figure 3), which includes public schools from preschool to preparatory level. In addition, he has participated as a guest in activities organized by local councils, schools, government agencies and nongovernmental related to conservation of natural resources in the state, where nearly 60% of the visitors are general public (Figures 4 and 5). We believe that a high percentage of those attending our exhibitions hardly attend a museum of natural history, or the same biological collection of the University Center.



**Figure 3.** Municipalities of the State of Jalisco where it has been presented Biological Collection CUCSUR Traveling from 2008 to date (shaded yellow). The black box is the approximate location city autlán where CUCSUR is located, while the cross indicates the location of the metropolitan area of Guadalajara.



**Figure 4.** Origin of visitors to the traveling menagerie in the different places where he has performed.



**Figure 5.** People of different ages Copala community, Municipality of Toliman, Jalisco. on display as part of the campaign of collecting electronic waste

**Conclusions**

While the move samples of biological collections DERN is a job that requires considerable time and effort, and reduce the quality of the specimens on display, the actions so far have allowed to take part of the information obtained from the work of research and inventory the University of Guadalajara performed in its area of influence in the South Coast of Jalisco. This has allowed both teachers and students learn to communicate with people of different levels of education and knowledge. The response and the increasing number of invitations we have received to date are signs that the transmission of knowledge can be

achieved by different means, and that there is interest in what we plant and animal species, and how we can affect.

Also, the Bachelor of Natural Resources (Natural Resources Engineering and Agricultural) CUCSUR is benefiting from this activity, as it has received students whose interest in the conservation and management of natural resources was born in one of the exhibitions in their locations. Even, they have been part of the enthusiastic group of assistants at exhibitions. It allows, moreover, that students learn easily in an unconventional way. Such collections are information files that provide insight into the biological richness of a particular place. With the small sample that we use for this traveling collection, you can verify and confirm that the biological richness is accompanied by a major cultural wealth. Both wealth should be preserved and disseminated. That's part of our goals and the response is an encouragement to continue this activity and take it to a higher number of places in our state.

### **Acknowledgements**

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## Bibliography

- Cristin, A. & Perrilliat, M.C. (2011). Las colecciones científicas y la protección del patrimonio paleontológico. *Boletín de la Sociedad Geológica Mexicana*. 63(3): 421-427, 2011. De: [http://www.scielo.org.mx/scielo.php?pid=S1405-33222011000300004&script=sci\\_arttext](http://www.scielo.org.mx/scielo.php?pid=S1405-33222011000300004&script=sci_arttext), 15 ene 2015.
- Daly, J. & Clark, M. (2010). The importance of biological collections for biosecurity and biodiversity. *Biodiversity and World Food Security: Nourishing the Planet and Its People*, 30 August-1 September 2010. De: <http://ageconsearch.umn.edu/handle/125257>, 15 enero 2015.
- García-Deras, G.M., López de Aquino, S., Honey-Escandón, M., Cortés, N. & Hernández, B.E. (2001). “La importancia actual de las colecciones de tejidos”. *Biodiversitas*, 39, pp. 11-14.
- Ossa L., P.A., Giraldo M., J.M., López G., G.A., Díaz, L.G. & Riora P., F.A. Colecciones biológicas: una alternativa para los estudios de diversidad genética. *Boletín Científico de Museos de Historia Natural* 16(1): pp. 143-155, 2012. De: [http://200.21.104.25/boletincientifico/downloads/Boletin\(16\)1\\_12.pdf](http://200.21.104.25/boletincientifico/downloads/Boletin(16)1_12.pdf), 15 enero 2015.
- Plascencia, R.L., Castañón B., A. & Raz-Guzmán, A. (2011). “La biodiversidad en México, su conservación y las colecciones biológicas”. *Ciencias* 101, pp. 36-43.
- Simmons, J.E., & Muñoz-Saba, Y. (eds.). (2005). *Cuidado, manejo y conservación de las colecciones biológicas*. Universidad Nacional de Colombia. Conservation International.
- Suárez, A.V. & Tsutsui, N.D. (2004) “The value of museums collections for research and society”. *Bioscience* 54(1), pp. 66-74.