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Editorial

December is a time of reflection on the challenges of the past year as well as on our hopes for the coming one. The experiences from the June Symposium in Brazil are still vibrating in our minds, and this issue is again devoted mainly to them. With pleasure, we are awaiting the forthcoming meeting in Palermo next year, and the welcome call is also included in this issue.

The year 2016 is almost over and we are happy that it has been active and fruitful thanks to many of you who contributed to the events and activities organized by the IAVS and its working groups. We would also like to thank those of you who helped to make our Bulletin interesting by providing news, information and/or pictures. We wish all of you a peaceful holiday time and good luck for the coming year 2017.

Monika Janišová (editor of the IAVS Bulletin) and IAVS Officers



We are grateful to all organizers of the IAVS events in 2016. Photos: M. Chytrý and J. Dengler

Plant species loss and communication

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One of my favorite courses at the University is a series of lectures on conservation biology and its applications in practical nature conservation. A considerable time of this course is devoted to conveying the manifold values of biodiversity and to providing evidence for the disastrous loss of biodiversity around the globe, across different habitat types and organism groups. When I stress that northern Germany – where my university is located – is no exception here and suffers from an unprecedented decline in plant species richness, many students remain skeptical: Hasn't nature conservation counteracted a further loss of species by creating lots of new reserves and by making large restoration efforts? Aren't there positive population trends of many large bird species (crane, geese, sea eagle) and mammals (wolves have established themselves again in Germany) in the country that contradict the statement of a declining biodiversity? Isn't climate change still of minor importance in temperate ecosystems compared to many other parts of the world? If there is a biodiversity crisis, why isn't it perceived as a crisis even by educated biology students? I believe that there are several reasons for this, and that we as vegetation scientists can and should contribute to change this perception in order to engage people in biodiversity issues and to prompt them to take action.

One basic problem of the weak public perception of the biodiversity crisis is that humans are confronted with a large number of problems other than environmental, including political and social issues that often rank higher than biodiversity (Novacek 2008). In addition, over the last years, public attention has markedly shifted away from habitat and biodiversity loss to climate change and global warming. People simply question that biodiversity affects their health and well-being, ignoring or not realizing that plants and animals provide enormous benefits, for example in the form of food and pharmaceutical products. To reverse this trend and to raise the public awareness of the biodiversity crisis, we need to become better in communicating the findings of our ecological research to a wider audience, and in showing the critical role of plant species in providing different ecosystem services (Bickford *et al.* 2012).

Another problem is that population declines and species extinctions often proceed unnoticed. In my home region, threatened plant species mainly consist of small-statured, inconspicuous forbs tolerant of nutrient-poor soils that have a low competitive ability in landscapes with an intensified agriculture and high levels on nitrogen deposition. Many species of acidic grasslands (*Polygala serpyllifolia*, *P. vulgaris*, *Viola canina*) or low-productive fields (*Arnoseris minima*) have largely disappeared, but this information does not reach out to the public. Oligotrophic lakes, having been rare already in the pre-human landscape, have vanished, and with them some of the by now rarest plant species in the country like *Lobelia dortmanna* and *Isoetes lacustris*. These lakes have often been replaced by mesotrophic lakes with reed and sedge vegetation, still representing valuable habitats and to most people looking probably nicer than before. Even if habitat destruction and habitat change are recognized as threats to biodiversity, the large extent of this change is rarely supported by numbers. I believe that vegetation scientists have an important task here: the huge amount of old vegetation records forms a treasure that can be used in re-survey studies to demonstrate the dramatic changes in plant species



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Large animal species like the Sea eagle (*Haliaeetus albicilla*) are well known to people, and their rapid decline in the 1950ies and 1960ies in Central Europe received large public attention. Their increase over the past decades is by many perceived as an evidence against the biodiversity crisis. Young bird, Elbe near Hitzacker, Germany.

composition and the species loss associated with this change. Fortunately, re-surveys of e.g. forests and grasslands have recently received increasing attention - but unfortunately, many of these studies have confirmed the ongoing negative trends. One example: in 2015, a Master student in our institute re-visited a wet grassland area in the “Stedinger land” close to Bremen from where plot data dating back to 1948 was available. In altogether 52 plots, the cumulative number of species had decreased from 116 to 58 (a reduction by 50%), while mean plot species richness had declined by 62.7%. Drainage, artificial fertilizers and modern land use had altered the vegetation to such an extent that old and new plots in some cases did not have a single species in common! Such numbers and re-survey studies in general are urgently needed to underpin that the biodiversity crisis is not a fiction.



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Few people would recognize small plant species like *Polygala* (*P. vulgaris* at the left, *P. serpyllifolia* at the right) and even fewer will have noticed that many of these have largely disappeared from most areas of North-western Germany. Badenstedt E of Bremen, Germany.

Finally, a lacking perception of plant species loss among the general public is also due to a phenomenon called “plant blindness” (Wandersee & Schussler 2001). This term describes the observation that humans tend to more readily appreciate animals compared to plants, perceive the disappearance of animals faster than that of plants, and therefore also support animal conservation more than plant conservation. Whatever the reasons are for plant blindness (see the excellent essay by Baldung & Williams 2016), a consequence is that changes in populations sizes and threats of (especially large) animals receive much more attention than those of plants. People engage in guarding the eyries of rare raptors, support re-introduction programs of wild cats or lynx, and are prepared for paying money to watch whales or the courtship dance of cranes. In contrast, they rarely engage with the same passion (and financial contribution) in plants, except perhaps

for a few flagship species. Plant blindness is thus an obstacle for conveying the loss of plant diversity, and it calls for a new collaboration between botanists and vegetation scientists, conservation practitioners and social scientists to increase the knowledge about and empathy with plants. Botanical gardens are invaluable here, but vegetation scientists also have an important task in providing relevant information about ongoing vegetation changes, the locations of remnants of rare plant communities and their threatened species, and possible countermeasures to stop the loss of biodiversity.

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Welcome to Sicily

60th Annual Symposium of the International Association for Vegetation Science
20–24 June 2017 Palermo, Italy



“Italien ohne Sizilien macht gar kein Bild in der Seele: hier ist erst der Schlüssel zu allem” (J. W. Goethe)

“Vegetation patterns in natural and cultural landscapes”

It is my great honour and pleasure to invite you to the 60th Annual Symposium of the International Association for Vegetation Science (IAVS). It will take place in Sicily, the largest and most central Mediterranean island. Over the centuries, Sicily has attracted many human cultures and civilizations, leaving behind a unique blend of natural and cultural heritages all over the island. Sicily has been Phoenician, Carthaginian, Greek, Roman, Byzantine, Arab, Norman, Swabian, French and Spanish, just to name the origin of some of the most influential settlers of the island.

While Europe was shrouded in the darkness of the Middle Ages, Sicily was the shining land celebrated in

The Book of Roger, published in 1154 by the Muslim geographer *Idrīsī* (*Abū ‘Abd Allāh Muhammad ibn Muhammad ibn ‘Abd Allah ibn Idrīs al-Siqillī*), at the court of king Roger II d’Hauteville, in Palermo.

Sicily is a land of peoples and mountains, volcanoes, badlands, fields, salt works and mines. All around, the sea tells the history and poetry of this unique human heritage, created by countryless people. *«Il mare non ha paese nemmeno lui, ed è di tutti quelli che lo stanno ad ascoltare, e, di qua e di là dove nasce e muore il sole»* (“the sea has no country, either, and belongs to whoever will pause to listen to it, here or there, wherever the sun dies or is born” quote from G. Verga, *I Malavoglia*).

Most of the Sicilian landscapes (see the photos on the next page) are protected landscapes. The first Italian law that placed landscapes and historical buildings under public control was implemented in 1922. At the time this was a significant achievement, but “landscape” emphasized essentially historical and aesthetic features, with no explicit reference to the natural components of landscapes and their ecological value.

Today, all over the world, many protection policies and initiatives for landscape conservation are still biased by a “sectorial specialization” and lack of clarity of the respective roles of ecologists, planners and managers of landscapes. The priority granted to historical and aesthetic values often de-emphasizes the complex relationship between natural vegetation, ecosystem dynamics and agricultural and urban assets.

Vegetation science can inform the sustainable management of landscapes that preserve natural ecosystems and their associated services. Moving towards a shared and integrated strategy for sustainability requires a substantial revision of the general objectives of growth and development: conservation, innovation and new ideas on human habitats should jointly proceed, recognizing the natural vegetation as a readily available monitoring target. At the same time, some reflection would be necessary also for the role of vegetation science and vegetation scientists in promoting ideas of sustainability.

For all these reasons, any study linking biological and cultural diversity, or contributing to the multi-faceted theme of insular biodiversity, will be highly welcome at the 60th IAVS annual symposium. During the IAVS symposium 2017, we will explore and discuss the applications of vegetation science to a wide array of landscapes and land-use patterns, with specific thematic sessions on:

- Land-use patterns and vegetation in cultural landscapes
- Green infrastructures and vegetation science
- Functional diversity along environmental gradients
- Vegetation, traits and ecosystem services valuation
- Vegetation dynamics and human-induced successions
- Grasslands, land uses and environmental changes
- Invasive species: past, present and future trends
- Habitat monitoring and conservation assessment
- Vegetation for conservation planning
- Vegetation classification, vegetation management and restoration ecology

- Plant diversity patterns across biomes, habitats and communities
- Vegetation diversity on islands
- Ecological informatics and facilitating vegetation syntheses
- Macroecological analysis and modelling of vegetation patterns

After Rome (Frascati) in 1988 (theme: Spontaneous vegetation in settlements) and Naples in 2003 (theme: Water resources and vegetation), the annual symposium of the IAVS is returning to Italy for the third time, and I am pleased to organize it at the Botanical Garden of the University of Palermo (and nearby facilities). The University of Palermo was founded in 1806 by Ferdinand III of Bourbon, by refurbishing, transforming and upgrading the local Jesuit Academy of Studies, established 1550. Today, the university consists of 20 departments, five schools, 1,600 tenure-track professors and researchers and nearly 50,000 students.

Palermo, the regional capital of Sicily, is a lively Mediterranean city, counting ca. 700,000 inhabitants. The result of its quilted history is evident today in the vast range of architectural styles, the intriguing fusion of ingredients in many local meals and in many place names. There is an incredible number of interesting monuments in Palermo and in its environs, including churches, museums, palaces, theatres, and gardens. Italy is the country with the highest number of UNESCO World Heritage Sites. Since July 2015, a new Italian jewel has been placed on the list: the breath-taking complex of Arabic and Norman architectures of Palermo, along with the Cathedrals of Monreale and Cefalù.

Palermo is also in the list of the “top ten cities for street food”. The uniqueness of street food from Palermo lies not only in its variety and goodness, but also in the ability that every dish has to tell a historical chapter of the Sicilian capital. In June, summer comes into the Palermo area in full force, with rapidly rising temperatures and long, sunny days. This month sees about 9.9 hours of sunshine each day, lots of time to be outside, exploring the area and skipping the IAVS symposium duties.

For registration or further information on the thematic sessions, pre- and post-symposium excursions, please refer to the symposium website:

<http://iavs.org/2017-Annual-Symposium/Home.aspx>

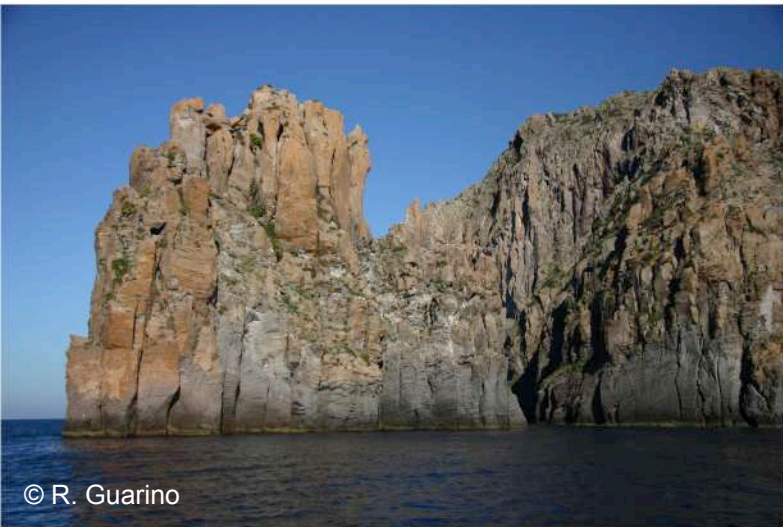
Riccardo Guarino
Organizer of the 60th IAVS Symposium



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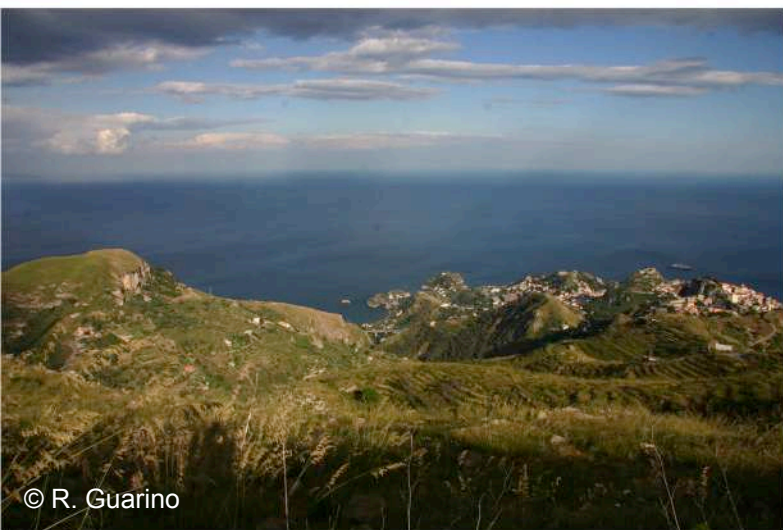
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Cerrado, Caatinga, Gran Chaco and Mata Atlântica: South American flagships of biodiversity

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Once you visit the extraordinary and unique ecosystems of Latin America, you would like to learn more about them. We learned a lot from our guides and lecturers during the IAVS excursions and plenary presentations and we are very grateful for this shared knowledge and experience. For many of us, these recent trips were the first time we visited these types of ecosystems. They were so breath-taking that some of us fell in love with them immediately, while others did after only a few days of absorbing their complexity and uniqueness. However, we also learned that these ecosystems will not necessarily persist into the future and that some systems are becoming degraded, whereas others may be completely destroyed.

The **Cerrado**, **Caatinga**, **Gran Chaco**, **Mata Atlântica** are just some of the unique ecosystems of Latin America. How could we, as scientists, help to prevent further destruction of these valuable habitats? Scientists are usually not very powerful, but if we will talk about the incredible values of these natural ecosystems and about the imminent threats, we can perhaps at least make other people aware of them. This was the primary motivation that leads us to publish this synthesis with the intent of introducing these threatened ecosystems more broadly to the scientific community. To provide a firm foundation we invited several colleagues from Latin America to contribute their opinions on the conservation status of these systems. Along with this information, we introduce briefly each of the ecosystems and describe our impressions and experience from visiting these ecosystems during the IAVS excursions.

Cerrado

The 'Cerrado' is the most extensive savanna region in Latin America, extending across the plateaus of east-central Brazil and spanning altitudes of 300–1000 m above sea level (Fig. 1). The region itself is composed of a mosaic of habitats that have been classified in various ways. For convenience, in our article we follow the classification by Ribeiro & Walter (2008). The Cerrado region is home to the most species-rich of all tropical savanna grasslands and woodlands, which became known generally as 'cerrado'. This region also has a high level of endemism and has been recognised as one of the global biodiversity hot spots (Mittermeier *et al.* 2011). Mendonça *et al.* (2008) listed 12,356 vascular species as occurring in Cerrado.



Fig. 1. The location of the cerrado biome in South America. Source: <https://en.wikipedia.org/wiki/Cerrado>

“Cerrado” means (in Portuguese) ‘closed’ or ‘semi-closed’ – a place where horseback riding is difficult. The name Cerrado is used in several ways: Firstly, it is the region supporting extensive Brazilian savanna formations, with other vegetation types embedded; secondly, it is being applied for a biome characterised by grasslands dominated by C4 grasses, with scattered trees and shrubs. Originally this biome occupied nearly 23% of the territory of Brazil. This concept includes a range of vegetation formations from open grasslands to closed woodlands. Within these, pockets of dry, wet and riparian (gallery) forests and non-wooded wetlands (veredas) are found, and although these are vital elements of the cerrado landscapes, in biome schemes they represent either azonal vegetation (riparian forests and woodlands, veredas) or extrazonal occurrence of vegetation typical of neighbouring biomes such as Amazonian rainforest, Mata Atlântica and Seasonal Dry Tropical forests. Campos rupestres (‘rocky fields’), also found in some part of the cerrado region, are yet another special vegetation type associated with cerrado.

The core cerrado is grassland, with shrubs and trees covering 5%–70%. This woody cover basically reflects, under mesic nutritional conditions, water availability (or amount of precipitation), with high cover being characteristic of high-precipitation regions.

Faces of the cerrado savanna

As with many savanna systems on other continents, the South American cerrado has many physiognomic faces, ranging from grassland appearance to semi-closed forests.

Brazilian botanists and ecologists recognise *campos limpos* (grasslands), *campos sujos* (shrubby grasslands), *campos cerrado* (semi-closed woodlands) and *cerradão* (closed-canopy, dense savanna woodlands, sometimes called also ‘forests’). Across several campos categories, so called *campos com murundus* (mounds) are recognised. *Campos rupestres* are part of the Cerrado region, though they deviate ecologically and floristically from the core cerrado savannas. Their biogeographic position has been intensively studied but remains controversial.

Campo cerrado (Figs. 2c and 2d, next page) represents the core physiognomic face of the cerrado biome; it is savanna woodland where tree cover varies from 5% to 70%. Characteristically no closed (interlocking) canopy is formed. Trees are small and tortuous, often with thick and corky bark, and leathery and hairy leaves. In this vegetation type, sunlight reaches the soil surface, supporting a dense herbaceous (and in places also shrubby) understorey.

Campos com murundus (mounds) is considered a peculiar face of either campo sujo or campo limpo

and is characterised by regularly spaced mounds. The mounds promote soil aeration and increase water infiltration and as such favour colonization of typical cerrado woody elements shrubs and small trees. This type of campo has tree cover of 50%–70% and occurs on drier, more aerated soils with regularly spaced mounds. Trees are virtually absent in nearby depressions. The origin of the hummocks used to be controversial and was often ascribed to activity of termites, however a recent study by Silva *et al.* (2015) revealed that their origin, at least those studied by the authors, is a consequence of topographic erosion.

Campos limpos (singl. *campo limpo* and freely translated as ‘clean field’; Fig. 2a, next page) is herb-dominated vegetation, characterised by mixture of grasses, sedges, herbs with no trees or shrubs. They are commonly found on hill slopes, plateau bases and neighbouring water springs.

Campos sujos (also known as ‘dirty fields’; Fig. 2b, next page) represents a grassland with very sparse cover of scattered shrubs and small trees. In general, it colonises shallow soils. It also includes dry, wet and hummock communities.

Cerradão (cerrado forest; Fig. 2g, next page), when compared to cerrado s.str. (=campo cerrado), contains trees that are taller (up to 12–15 m) and denser (up to 90% cover). Most importantly, unlike the extrazonal forest types found in the Cerrado region, cerradão is floristically composed of typical cerrado woody elements. Few shrubs, herbs and grasses are found in the understory as a result of the reduced incidence of sunlight at the soil surface. Soil fertility defines the dystrophic and mesotrophic subtypes.

Campos rupestres (‘rocky fields’) constitute a complex vegetation system, in places having variously grassland or shrubland appearance. Common to both facies is the shallow, nutrient-poor sandy soil and abundant rocky outcrops. In places, campos rupestres can be temporarily water-rich, especially during rainy season. Often they are exposed to winds and wide variation in daily temperatures. These habitats, supporting very species-rich vegetation, are usually limited to higher elevations where sandstone geology dominates the ancient landscapes of the Brazilian shield.

Cerrado wetlands

Veredas are small-sized marshes (Fig. 2e, next page) occurring in depressions collecting fine-size soil material (loam and clay) and producing water-saturated habitats, which continue to appear green (hence the name ‘vereda’) during the dry season. In places, these depressions support **Palmeirals** (palm-dominated groves) with buriti palm (*Mauritia flexuosa*)(Buritizal) on poorly-drained soils and

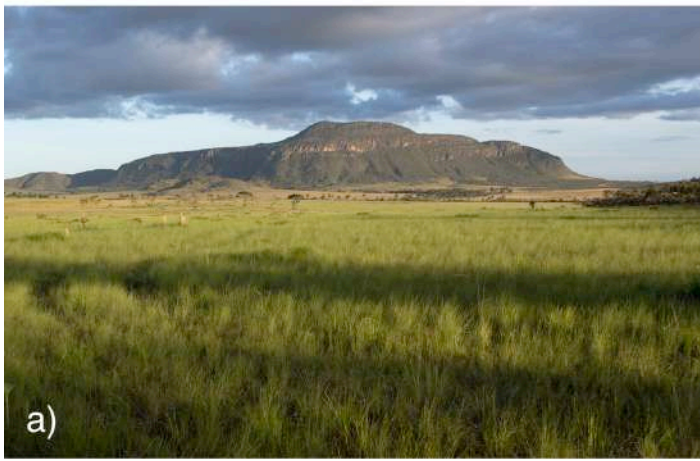


Fig. 2 The diversity of vegetation physiognomies of the Cerrado region: a) Campo limpo; b) Campo sujo (campo rupestre); c) sparse and d) typical Campo cerrado; e) Vereda; f) Palmeiral; g) Cerradão and h) Mata seca. Photos: Manoel Cláudio Da Silva Júnior

Attalea speciosa (Babaçual), *Syagrus oleracea* (Guerobal) and *Acrocomia aculeata* (Macaubal) occur on well-drained soils.

Forests of the Cerrado Region

Besides the cerradão, there are other forest formations embedded within the Cerrado region. These are either azonal (riparian and gallery forests) or extrazonal (tropical wet forests and seasonal tropical dry forests).

The azonal alluvial forests fall within two categories (not always recognised as separate classification entities) – gallery and riparian forests.

Gallery forest (Mata de galeria) is an evergreen riparian forest associated with smaller watercourses. The high tree density results in 70% to 95% cover. Waterlogged and drier subtypes, depending on length of influence of the groundwater, are recognised. Its highly variable floristic composition accounts for more than 30% of the vascular flora in the cerrado region, despite occupying only 5% of its extent.

Riparian forest (Mata ciliar) is deciduous or semi-deciduous riparian vegetation with 50% (dry season) to 90% (rainy season) cover. The floristic composition differs from that of gallery forests and its width is often greater than 100 m.

Dry forest (Mata seca; Fig. 2h previous page) is a deciduous, semi-deciduous or evergreen forest located away from watercourses on the most fertile soils with or without limestone outcrops. The canopy, up to 15–25 m tall, has seasonally variable tree cover of 0% (dry season) to 95% (rainy season). These forests are part of the global SDTF (Seasonal Tropical Dry Forest) biome, with its flagship – caatinga – bordering the cerrado savannas to the East.

What local specialists said about Cerrado



Giselda Durigan
São Paulo, Brazil

Every time I take a botanist or ecologist from other country to visit the Cerrado, the first impression is “what a huge biodiversity!!!”

What do you consider the main threat to the Cerrado?

The rapid and overwhelming land conversion for agriculture, forestry and pastures. At present, only about half the original area of the biome still has native vegetation, and the remnants are often threatened by biological invasions and fire suppression.

Could you estimate how many species of plants live in the Cerrado, and how many of these species do not live anywhere else?

More than 12,000 plant species are already recorded in the cerrado biome, of which about half are endemic.

Is it more difficult to persuade people to conserve non-forest ecosystems than forested ones?

Yes. I cannot clearly understand why, but the bigger the organism, the higher its value under human’s perspective. Therefore, a typical human’s reaction is much stronger when a tree is eliminated, compared to the destruction of grasses or forbs. People, in general, do not see the value of non-forest ecosystems.

We are scientists focussing on vegetation from all around the world. We understand the importance of maintaining all ecosystems, their component biodiversity and the ecosystem services they provide. Which arguments do you think should be used to persuade the governments and the public to protect these ecosystems?

I do believe the protection of the headwaters of most large rivers in Brazil is an incontestable argument to persuade governments and society as a whole that replacing native cerrado vegetation by other land uses can severely threaten people’s health and the economic stability of Brazil. Land-use planning should prioritize this ecosystem service, in addition to hotspots of biodiversity within the cerrado biome.

What kind of publicity could help to preserve the cerrado? How can the scientific community, including the IAVS for example, contribute to this aim?

Giving publicity to the huge importance of cerrado vegetation for water protection and production is crucial. The huge biodiversity of small plants is also a surprise for people in general, and even for scientists. In 1 m² we can find up to 40 plant species. In 1,000 m² we can find more than 200 species. It is much higher than the diversity of African or Australian savannas, and even higher than that of many tropical forests.

In addition, cerrado has astonishing landscapes, charismatic animals, wonderful flowers and delicious fruits. We have to give these elements broad visibility. We have to disseminate the concept of “old-growth grasslands”, to demonstrate that small plants can be long-lived, fragile, and very difficult to cultivate. That means once lost, recovering them will be almost impossible.

Human beings are more eager to love and protect what they are more familiar with. What interesting fact about the cerrado would you teach people who are not scientists? What plant or animal representing the cerrado would you introduce to them?

I would like to show people a short movie with scenes from the cerrado before fire, during fire and two months after fire, when it turns into a huge garden of rare and peculiar plants vigorously sprouting and blooming. Even for botanists, it is unforgettable. For me, the blue flowers of the dwarf shrub *Jacaranda decurrens*, the perfectly symmetric pink-flowers of *Gomphrena macrocephala* or the different species of *Eriocaulaceae* are good examples among hundreds of attractive plants in the cerrado that can get people's attention.

What botanists said about their visit of the Cerrado

Robert Peet (United States):

This is an amazingly diverse and unique set of ecosystems. I kept trying to place them in the context

of other ancient grassland ecosystems seen on IAVS excursions: southwestern Australia, South Africa, southeastern US. The woody diversity at the genus and family level seemed the greatest I had seen in savanna-like vegetation. The floristic connections with the southeastern US were striking, yet the shift in diversity from almost exclusively the herb-layer in the southeastern US to include the woody layer in the cerrado was equally striking and unexpected.

Riccardo Guarino (Italy):

I think that the first threat is urban sprawl. We should not forget that Brasilia was built right in the middle of the cerrado. When I landed, I took a nice tour of the architectural creations of Oscar Niemeyer, the gardens of Roberto Burle Marx, and the Marianne Peretti art works. Everything inspired in me rhetoric and desolation. The EUR, in Rome, seems much, much better (...need I say more?). Spaces are so large that the buildings, while large, seem small and disproportionate. The theatre seems abandoned, as well as the garden surrounding it. The Museu Nacional is pretty empty (with the exception of rather insignificant temporary exhibitions). The frame of



Fig. 3 Flowers of the Cerrado: a) *Paepalanthus* sp. (*Eriocaulaceae*); b) *Kilmeyera rosea* (*Calophyllaceae*); c) *Heteropterys byrsonimifolia* (*Malphigiaceae*); d) *Vellozia* sp. (*Velloziaceae*); e) *Evolvulus* (*Convolvulaceae*); f) *Eriosema glaziovii* (*Fabaceae*). Photos: Monika Janišová (a) and Radim Hédl (b–f)

cars whizzing (on six lane roads) contributes to making these places hostile and unsuitable for man: void zones, fear scapes. My final impression of the monumental axis of Brasilia is that it is a huge waste of space. Rhetoric of a power that celebrates itself constructing buildings, of which it does not grasp the meaning.

Monika Janišová (Slovakia):

The diversity of patterns, shapes, and strategies in the Cerrado is incredible. One can feel the creativity and phantasy of living systems in these primeval ecosystems, which have developed for many millions of years. One also can guess how difficult it is to survive here, in such harsh conditions. The tortuous trunks and traces of fire act as witnesses of this struggle. I was astonished and I could not stop taking more and more photographs.

The cerrado is not only beautiful, but it fulfils also important life-supporting functions on our planet. This is a pragmatic argument to protect it. Another, less pragmatic argument is that the Cerrado is an endless source of inspiration and surprise. There is nothing to get bored about here.

Laco Mucina (Australia):

Seeing, experiencing, smelling, enjoying cerrado has always been my dream. It was one of the last large pieces of savanna I had not seen – and now I have! What a feast!! In some places I felt I was somewhere in the Central Bushveld of South Africa, the country of my heart, yet that unexpected species diversity in cerrado made me eat humble pie. And, of course, it really does “work” like any other proper savanna: C4 grasses dominate, form biomass to be burned and carry regenerating fire, trees and shrubs adding a bit more structure and colour, offering food and shelter for many animals. What I miss are those herds of antelopes that the African savanna would support, but you cannot have it all and there is probably a good reason why the large herbivores are not so abundant. Yet, I was most in awe when I set my foot into a campo rupestre. Poor soils support the highest diversity... is it not strange? Not to somebody who has studied South African fynbos or Australian kwongan or maybe just a humble garrigue on siliceous substrates in the Mediterranean. Campos rupestres are the real biodiversity gems!

Caatinga

Caatinga is a dryland biome endemic to the north-eastern corner of South America (Fig. 5). It can be broadly characterized as ranging from shrubland to relatively open woodland with many thorny species. The more-or-less scattered trees usually do not exceed 15 m of height. The name “caatinga” is derived from the local Tupi language, where *caa* means forest and *tinga* means white, probably referring to whitish appearance of trunks of some woody species. The

vegetation of the caatinga is relatively variable and hosts thousands of species endemic to this biome. Taxonomically and ecologically, the three most significant plant families are *Fabaceae*, *Cactaceae* and *Euphorbiaceae*. Interestingly, caatinga is one of the world's three biodiversity centres for cacti. *Bromeliaceae*, *Acanthaceae* and *Bignoniaceae* are other examples of fairly common and diverse groups. Caatinga experiences strongly seasonal climate. For most of the year (about six to nine months) the region is rainless, which causes woody plants to lose their leaves and most of the ground vegetation to retreat into a dormant stage. With the onset of the rainy season, vegetation changes abruptly. Human populations have for thousands of years inhabited the Caatinga region. It contains numerous important archaeological sites with characteristic outdoor rock paintings. The region was also among the first settled by the first Europeans arriving in the early 1500s. The current human pressure, including deforestation and overgrazing by sheep and cattle, poses serious threats to persistence of the extant caatinga ecosystems.

What botanists said about their first visit of the Caatinga

Radim Hédli (the Czech Republic):

What is your impression from the Caatinga?

The caatinga, at least what we could see in a three-day visit to the Catimbau National Park (near Buique, Pernambuco State), is a truly fascinating dry tropical ecosystem. Soils are extremely poor, sandy, shallow, and still they support considerable biomass of plants, and are able to feed the local human population and



Fig. 5 Position of the caatinga biome in north-eastern Brazil. Source: <https://en.wikipedia.org/wiki/Caatinga>



Fig. 4 The huge biodiversity of the Cerrado region is reflected also in the diversity of tree barks, as seen during just a short walk in the Chapada dos Veadeiros near Alto Paraiso de Goias. Photos: Monika Janišová.

livestock. Perhaps the most stunning recognition for me was that it has been like this for quite a long time. We visited rock paintings over three thousand years old, and the region is famous for such prehistoric sites. Historically, the caatinga biome has been closely linked to the human presence, which did not start with the arrival of white settlers but which has much deeper roots. We still need to understand it properly to fully appreciate this unique biome.

Why is the Caatinga important for ordinary people and why should it be protected?

Who are ordinary people? I am an ordinary person, so I can answer this question in an ordinary way: if the caatinga thickets would vanish, it would be sad news. The existence of any ecosystem has a value that can be hardly evaluated in terms of “services”. Why it should be protected? Because many people depend on it, grew up and live their lives in the Caatinga region. It is a general reason for protecting any part of functioning environment.

For me, it was particularly interesting to compare the caatinga with the cerrado, which we visited during the post-conference excursion. Both are seasonal tropical biomes, and at the first glance the difference seems to be only a matter of subjective judgement. Neither climate nor soils would clearly differentiate the caatinga from the cerrado. It is mostly vegetation and its composition, which is highly specific, but there is such a great variability in ecosystem types within each of these biomes that it is difficult for me to tell, for example, how similarly looking ecosystems in tropical Asia differ from them (apart from species composition). It motivates me to read more and try to understand them better.



Fig. 6 Multiple views at the Caatinga. Photos Radim HédI



Fig. 7 Beautiful flowers of the Caatinga: a) *Jatropha mutabilis*; b) *Clusia nemorosa*; c) *Commelina* sp.; d) *Justicia aequilabris*. Photos: Radim HédI

Mata Atlântica

Historically speaking, Brazil started its development in the Mata Atlântica. The fleet of the Portuguese navigator Pedro Álvares Cabral anchored in the region where the present-day State of Bahia is located. The Atlantic Forest is also the domain of Brazilwood, whose name was given to the country (*Paubrasilia echinata* (Lam.) E. Gagnon, H.C. Lima & G. P. Lewis, *Fabaceae*).

The Mata Atlântica covers a large extent of the Brazilian coastline along the Serra do Mar hillsides. Its original area of 1,200,000 km² of large-sized forest has been deforested and only 11%–16% exists currently (Ribeiro *et al.* 2009). The original distribution spanned a continuous band from Rio Grande do Norte and Ceará (northeastern Brazil) to Rio Grande do Sul (southern Brazil).

Due to the fact that it spans a broad range of altitudes and latitudes (Fig. 8), the Mata Atlântica exhibits diverse vegetation physiognomies and landscapes. The most remarkable of them is the Dense



Fig. 8 Position of the Mata Atlântica ecoregion in south-eastern Brazil Source: https://en.wikipedia.org/wiki/Atlantic_Forest

“There I saw, for the first time, a tropical forest in all its sublime grandeur – nothing but the reality can give an idea of how wonderful and magnificent this landscape is.”

Charles Darwin

Ombrophilous Forest (we consider this physiognomy as the *sensu stricto* Atlantic Rainforest; Fig. 9a), a lush and biodiverse floristic formation located close to the ocean. Further inland, the forest exhibits formations where the plants lose partially their leaves and the vegetation can be described as Seasonal Semideciduous Forest (Fig. 9b). Furthermore, in the southern Brazilian States of Paraná, Santa Catarina and Rio Grande do Sul, a portion of the Atlantic Forest is dominated by Araucária (*Araucaria angustifolia* Bertol. Kuntze, *Araucariaceae*) in Moist Forest and or Mixed Ombrophilous Forest (Fig. 9c).

It plays a key role in the stabilization of the steep and complex coastal terrain and preventing landslides. It has rugged topography where shallow soil and rocky outcrops are often visible. Such an exuberant forest is supported by high humidity levels, which come from the ocean and stay at the Serra do Mar owing to the high mountains immediately to the west.

About 70% of the Brazilian population lives in cities at a maximum distance of 200 km from the coastline and shares space with this biome, and whose historical occupation led to an intense loss of the Mata Atlântica forests.

What local specialists said about the Mata Atlântica



Gabriel Pavan Sabino
Rio Claro, Brazil

What do you consider the main threat to the Mata Atlântica?

The destruction of the Brazilian Mata Atlântica has been ongoing since European colonization in the 1500s, beginning with the exploration of Brazilwood (*Paubrasilia echinata*). We can also mention the economic cycles, such as gold mining and cultivation of sugarcane and coffee, which resulted in a lot of forest loss. Currently, the main cause of destruction of the Mata Atlântica is the disordered human occupation. Forests are being converted into large areas of livestock, sugarcane, eucalyptus and pine

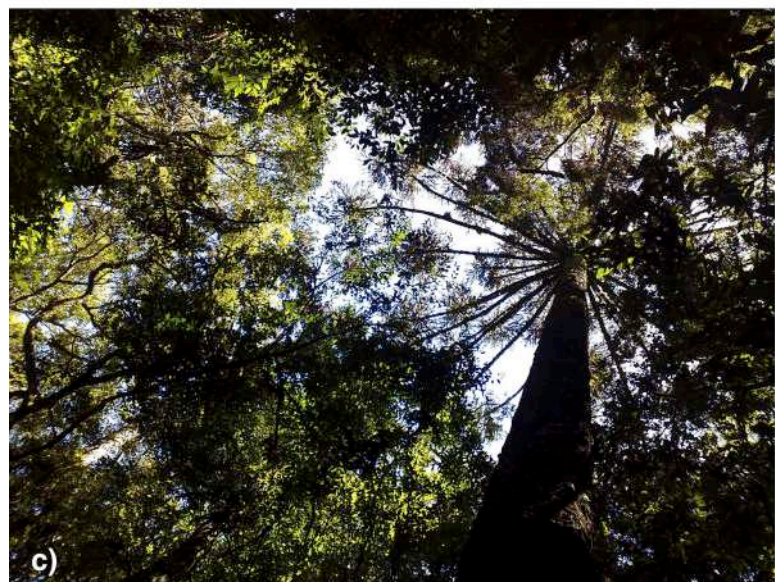
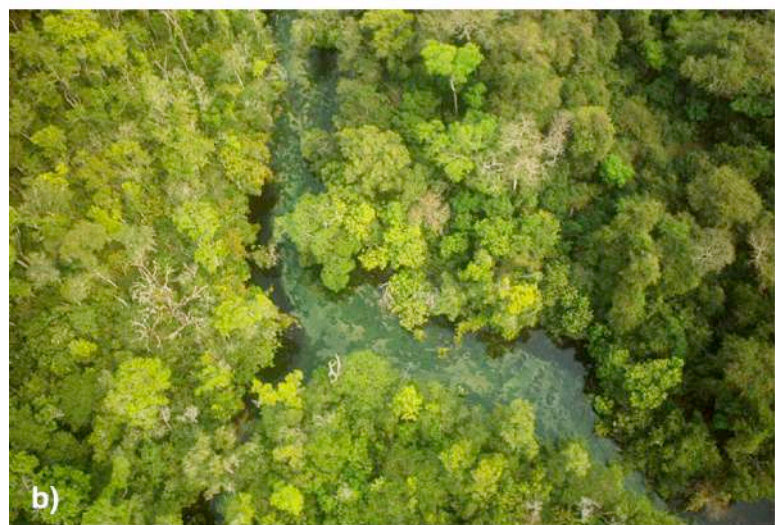


Fig. 9 Various physiognomies of the Brazilian Mata Atlântica: a) Dense Ombrophilous Forest, Stadal Park os Serra do Mar, Cunha, São Paulo; b) Seasonal Semideciduous Forests, Bonito, Mato Grosso do Sul State; c) Mixed Ombrophilous Forest, São José dos Pinhais-PR. Photos: Gabriel Pavan Sabino and José Sabino

plantation. The spreading of invasive plants is also a huge problem in the conservation of forest remnants.

Could you estimate how many species of plants live in the Mata Atlântica? How many of these species do not live anywhere else?

In a recent paper, the Brazil Flora Group (2015) updated the inventory of the Brazilian seed plants. For the Mata Atlântica, they found 15,001 species of angiosperm, 7,432 of which are endemic (49.5%).

Consulting the flora, I've just checked the numbers: Angiosperms (15,504 species), Bryophytes (1,335 species), Gymnosperms (10 species), Ferns and Lycophytes (898 species) and Fungi *sensu lato* (3,012). Total: 20,759 species of plant and fungi known from the Brazilian Mata Atlântica. (Available at: <http://floradobrasil.jbrj.gov.br/reflora/listaBrasil/ConsultaPublicaUC/ConsultaPublicaUC.do>, accessed on: X/2016).

Is it more difficult to persuade people to conserve non-forest ecosystems than forested ones?

This is a good question. Definitely non-forested ecosystems are more targeted (and even more expansive), commercially-speaking, than the forested ones. I think that there are another two good reasons that make humans save more non-forested formations:

i) Economic use of forests: in the case of Brazil, Mata Atlântica, the use in different historical stages from Brazilwood to sugarcane to coffee and, more recently,

the expansion of cities along the Brazilian coast. ii) It seems to me that - as we are primates that evolved in savannahs (open formations) – we have an evolutionary tendency to avoid closed formations such as forests.

Which arguments should be used to persuade the governments and the public to protect the Mata Atlântica?

The ecosystem services seem to be the most current approach to convince politicians and decision makers, as they address the most utilitarian view of nature, so much so that the UN set up recently (2012) the IPBES (www.ipbes.net) that takes this approach. It is more obvious to us experts as we more widely understand the importance of their roles and functions in the natural world.

What kind of publicity could help to preserve the Mata Atlântica? How can the scientific community, including the IAVS for example, contribute to this aim?

Public comprehension of science has been a challenge in Brazil. On one side, the dissemination channels have improved in recent years, while on the other hand the anthropogenic pressures have also increased and the remaining few pieces are increasingly restricted to fragmented areas.

Thus, it is increasingly necessary to produce and disseminate authoritative content on this topic. Fortunately, it has advanced here. There are NGOs, such as SOS Mata Atlântica, with 30 years of



Fig. 10 *Brachycephalus* sp., Cunha, São Paulo, Brazil



© G. P. Sabino

Fig. 11 A big and old Jequitibá-Rosa *Cariniana legalis* (Lecythidaceae), Santa Rita do Passa Quatro, São Paulo, Brazil

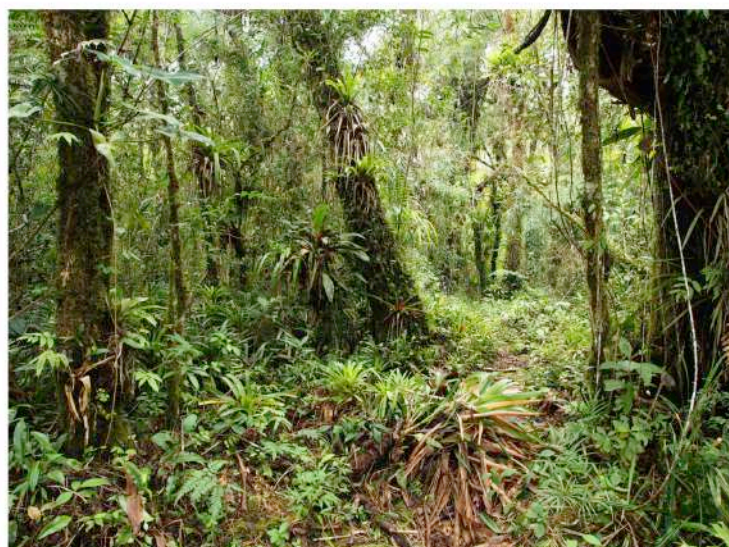
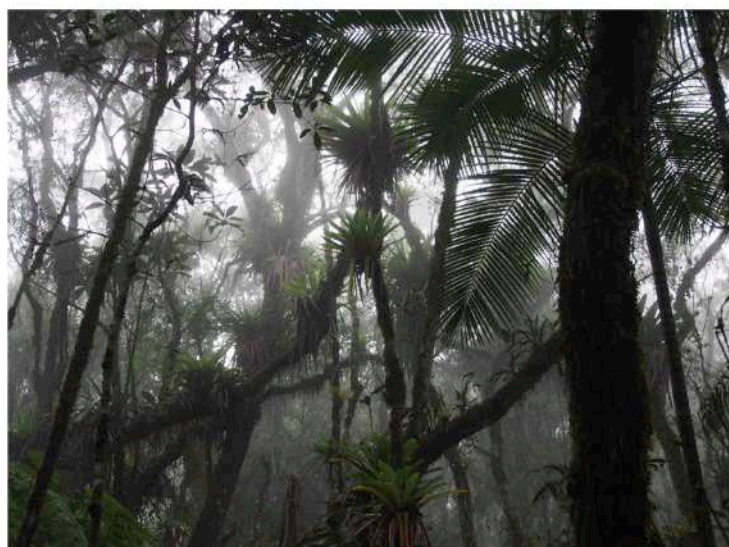
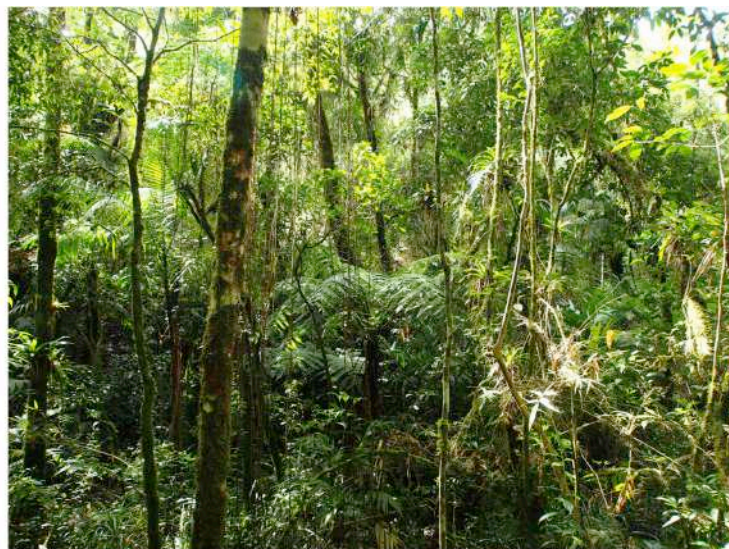


Fig. 12 Multiple views at Mata Atlântica in the Serra do Mar State Park near Cunha, São Paulo, Brazil.
Photos: Monika Janišová

participation in numerous conservation actions, as well as specific projects with flagship species, like the Golden Lion Tamarin (*Leontopithecus rosalia*). Strengthening these actions and defending them in many different venues (internet, cable TV, channels that broadcast nature such as Nat Geo, Animal Planet, Discovery, BBC etc.) seem to me a solid way to reach a large public audience. Increasing the production of media in videos and scientific blogs is bringing people closer to the riches of the Mata Atlântica.

Human beings are more eager to love and protect what they are more familiar with. What interesting fact about the Mata Atlântica would you teach people who are not scientists? What plant or animal representing the Mata Atlântica would you introduce to them?

There is a fabulous richness in the Mata Atlântica. When Darwin visited it in 1832 he marvelled with first contact at the vastness of species of tropical environments. This is well reported in several of his travelogues. Using these examples, both the vegetation that amazed him, as well as many other

groups such as the insects, can be a way to help connect people. The Mata Atlântica is, at the same time, so close to the great urban centres of Brazil (São Paulo, Rio de Janeiro, Salvador, Curitiba, among other cities) and so distant because most Brazilians have no idea of the richness of this heritage. Another approach could be with endemic groups as frogs of the *Brachycephalidae* family where the whole family is endemic to this biome (Fig. 10, page 18).

A plant that could very well represent the Mata Atlântica (at least the physiognomy of Seasonal Semideciduous Forests) is the *Cariniana legalis* (*Lecythidaceae* family), known as “Jequitibá-rosa” (Fig. 11, previous page). The Jequitibá-rosa is a beautiful tree, reaching 50 meters in height and many centuries in age.

What botanists said about their first visit of the Mata Atlântica

Robert Peet (United States):

I was aware that there was great human pressure on these systems, but both the extent and the long-history greatly exceeded my expectations.

Monika Janišová (Slovakia):

The way in which space is occupied by plants in Mata Atlântica is amazing. The various mixtures of trees, palms, woody ferns, lianas and bromelias are so decorative that I was feeling like I was in the best gallery of the world. I was also impressed by the extent and quality of the research. It is so difficult to approach the plots, to collect the material, to grasp all the biodiversity, to avoid everything dangerous, ... I think all scientists working in the rainforests are heroes.

Gran Chaco

The Gran Chaco is a hot dry plain in interior south-central Latin America (Fig. 13). The name is of Quechua origin, meaning "Hunting Land". The climate varies from tropical in the north to warm-temperate in the south, but in most of the region it is subtropical with average temperatures between 19°C and 29°C and total annual precipitation between 450 and 1200 mm. Chaco soils range from sandy to heavy clay and are determined mainly by the drainage. The vegetation is associated with the soil patterns, reflecting also the east-west division. To the east, it is a parklike landscape of clustered trees and shrubs interspersed with tall, herbaceous savannas. Thorn shrubs, low trees and cacti are characteristic of the western Chaco. The area is only sparsely populated. In recent years, cattle ranching and soy cultivation have led to significant deforestation and increased threat for the Chaco extraordinary biodiversity.

What local specialists said about the Gran Chaco



Jose Paruelo
Buenos Aires, Argentina



Alicia Acosta
Rome, Italy

What do you consider the main threat to the Gran Chaco?

We can affirm that deforestation is the main threat to the chaco ecosystems, which are seriously exposed to agricultural clearing and timber extraction, both authorized and illegal. The deforestation rate in this biome is the highest in the world, even higher than for tropical forests (Hansen *et al.* 2013, Vallejos *et al.* 2014). Land cover transformation is driven by agribusiness and associated with the land grabbing phenomena (Rulli *et al.* 2013).

Could you estimate how many species of plants live in the Gran Chaco? How many of these species do not live anywhere else?

The Gran Chaco, which is among the largest regions of seasonally dry subtropical forests in the world, (ca. 1,200,000 km²), occurs in Argentina, Paraguay, Bolivia and Brazil (Cabido *et al.* 2008). It comprises one of the few areas worldwide where the transition between the tropics and the temperate belt does not occur in the form of a desert, but rather as semi-arid forests and woodlands (Morello & Adamoli 1974). Although most authors agree that these subtropical, seasonally-dry forests are characterized by a specific vegetation composition and unique flora, there are still no comprehensive floras, checklists or vegetation databases that allow us to answer to this question.

Which arguments should be used to persuade the governments and the public to protect the chaco?

In Argentina the law aimed to preserve native ecosystems focuses only on forest; there is no regulation on the transformation of grasslands, shrublands, wetlands and savannas of the Chaco region. In Paraguay the situation is even worst in terms of level of protection. So, we think that to preserve visible, non-forested ecosystems is an urgent need.

Land transformation is generating benefits that have (mainly) private appropriation (particularly



Fig. 13 The location and borders of the Gran Chaco region. The natural border to the west is the Andes and, to the east, the Paraguay River; its northern and southern borders are less well-defined.

Source: https://en.wikipedia.org/wiki/Gran_Chaco

agricultural commodities). The scientific community should warn the government and the public as to the type and magnitude of public services provided by the chaco ecosystems that are being lost due to land cover transformation. Such services include biotic, cultural and ethnic biodiversity. Some emblematic cases include animal (e.g. the yaguareté, *Panthera onca*, a major feline), and plant species (e.g. different species of the genus *Schinopsis* such as *S. lorentzii* and *S. balansae*, Anacardiaceae), both are listed as threatened by the IUCN. Additionally, the xerophytic forests are critical to regulated water fluxes and groundwater recharge. The rise to groundwater level due to deforestation is a major concern in the area due to the risk of soil salinization.

What kind of publicity could help to preserve the chaco? How can the scientific community, including IAVS for example, contribute to this aim?

The scientific community must place stress on the known and documented consequences of land-cover

transformation in the Chaco from habitat losses to the reduction in ecosystem services. Moreover, as vegetation scientists we must also point out the unknowns (e.g. the lack of a comprehensive vegetation inventory, or an updated list of endemic and endangered species).

Human beings are more eager to love and protect what they are more familiar with. What interesting fact about the chaco would you teach people who are not scientists? What plant or animal representing the chaco would you introduce to them?

What has happened with the quebrachos (*Schinopsis balansae* and *S. lorentzii*), the “history of the quebrachos”, tells us also the history of the colonization and degradation of the chaco. The hard wood of the quebrachos made them a very valuable resource in railroad construction and its high content of tannins turned this species into a key resource in leather tanning. Foreign companies exploited both the quebrachos and local workers to send overseas

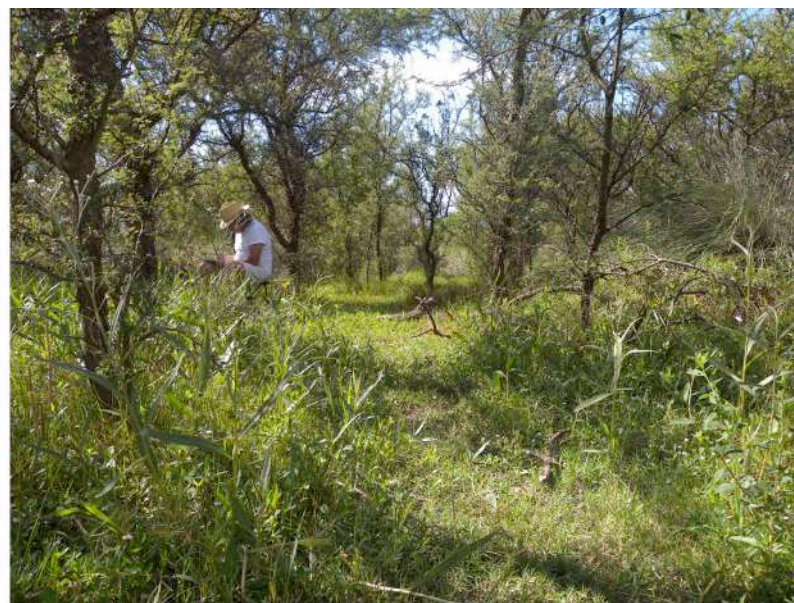
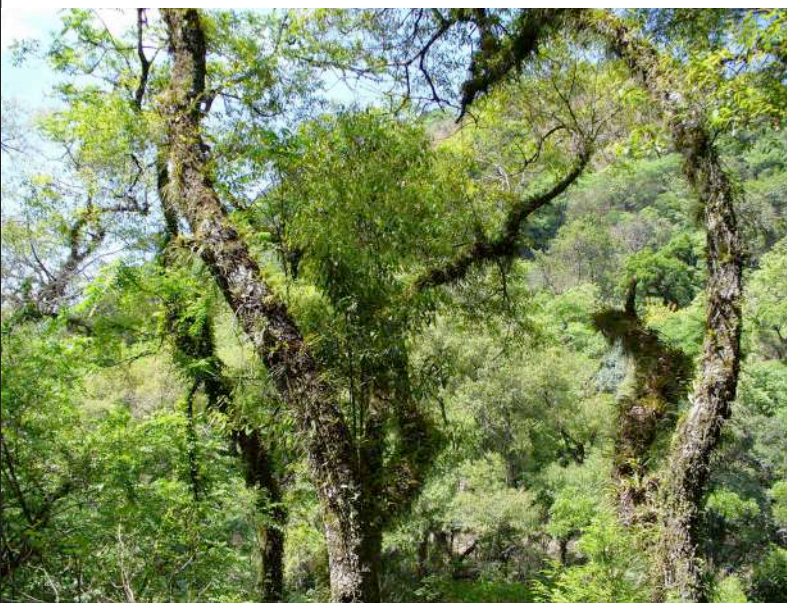


Fig. 14. Multiple views at the chaco ecosystem. Photos: José Paruelo and Melisa Giorgis

the material for tanneries and built railroads to ship agricultural commodities to Europe. Both the forests and the local aboriginal communities paid a high price in terms of ecological and social degradation after the industrial exploitation collapsed. A movie from the 1970's captures the essence of the process; its name is precisely "Quebracho" (<https://www.youtube.com/watch?v=CNje5ieYdKU>).

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Y Young Scientists Awards

During the 59th Annual IAVS Symposium in Pirenópolis, Brazil, several young scientists received awards for the best oral and poster presentations. We decided again to introduce the winners of Young Scientist Awards 2015 to readers of the IAVS Bulletin and asked them to answer several simple questions for this purpose. We are happy that our respondents fully used the opportunity to present their work and ideas. Verify yourself.

1. Describe the research you presented during the Annual IAVS Symposium in Pirenópolis.
2. What was your first motivation to study and work in Vegetation Science?
3. What is your favorite ecosystem/plant community (a photo is welcome)?
4. What was your deepest impression from the Annual IAVS Symposium in Pirenópolis (apart from being awarded)?
5. Do you plan to attend the 60th Annual IAVS Symposium in Palermo, Sicily?

Nathalia Bonani

Young scientist Poster Presentation Award, First Prize

How is fire affecting the germination of legume species? The study of Cerrado and forest species?

Supervisors: Alessandra Fidelis and Luís Felipe Daibes, Rio Claro, São Paulo, Brazil

Lab link: <http://www.rc.unesp.br/ib/leveg/LEVeg/People.html>

My Research

At IAVS 2016 in Pirenópolis I presented a study developed in my undergraduate course, where we try to understand the effect of heat shocks, simulating fire temperatures, on the seed germination of Neotropical tree legumes. We evaluated seeds from Cerrado and forest and we expected those from Cerrado (fire-prone) to be fire-resistant, having their physical dormancy broken, whereas forest seeds would have their viability reduced by the heat shocks. The exposure to high temperatures did not enhance germination in Cerrado nor in forest seeds. Meanwhile, most legume trees from Cerrado had a high percentage of non-dormant seeds, whilst the forest species were more easily classified as 'dormant' or 'non-dormant'. The Cerrado species also had mostly a high percentage of fire-resistant seeds, which is an important trait in fire-prone ecosystems. However, although some forest species with permeable seed coats were found to be more sensitive, most of them also resisted the heat shocks. Those results show that germination patterns are not dichotomous between Neotropical fire and non-fire prone systems: both can have fire-resistant propagules. Moreover, having a proportion of non-dormant seeds might be important to spread germination in the Cerrado system.

First Motivation

I already had a general interest in ecology and conservation of nature since I was a teenager. Natural cycles, structures and adaptation of plants are fascinating for me, and I think that observing and trying to understand them is very motivating. During my undergrad course I started studying botany by researching on phenology and now I am studying fire



ecology from the perspective of seed germination in a gradient of environments, which has been an exciting work.

Favourite Ecosystem/Plant Community
(pictured on the top of the next page)



© N. Bonani

Cerrado ecosystem in Brazil

Impression on the IAVS Symposium in Pirenópolis

That was my first participation in an international event and for me the Symposium was great. To meet very experienced scientists, and people in general who work in vegetation throughout the world, and which have a number of interesting ideas, provided an enriching academic and cultural experience. The organization of the event was dynamic and its

structure, including the lectures, excursions and social events, provided a pleasant environment where people interested in vegetation science could talk, interact and exchange knowledge.

Next IAVS Symposium

Yes! I am willing to attend the next IAVS Symposium in Italy and I am looking forward to this meeting.

Anaclara Guido

Young scientist Poster Presentation Award, Honorable Mention

Invasive species removal: assessing community impact and recovery from invasion

Supervisors: Valério D. Pillar, Department of Ecology, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

My Research

We examined the invasion of grasslands in southern Brazil by *Eragrostis plana*, the currently most problematic invasive species in the region. By means of an experiment on invaded communities complemented by observation of non-invaded communities, we assessed the impact of *E. plana* on vegetation, evaluated community response to its removal and discussed the effectiveness of removal methods. Removal was done annually over three years and consisted of four treatments (clipping aboveground biomass, clipping aboveground biomass periodically, herbicide application and hand-pulling) plus a control treatment with no-removal.

Additionally, plots located in an adjacent non-invaded area were monitored. All treatments reduced *E. plana* cover across years, but were not sufficient to eradicate it. We revealed not only differences between invaded and non-invaded communities, but also an effect of *E. plana* removal on resident species richness and total cover. We demonstrated that *E. plana* invasion reduces resident species richness and total cover. This study revealed the impact on vegetation of the most important invasive species in the natural grasslands of southern Brazil. We highlighted the advantages of combining observations of non-invaded communities and experimental studies on invaded communities, with

and without invasive removal, to help infer causal relationships in ecological invasion research.

First Motivation

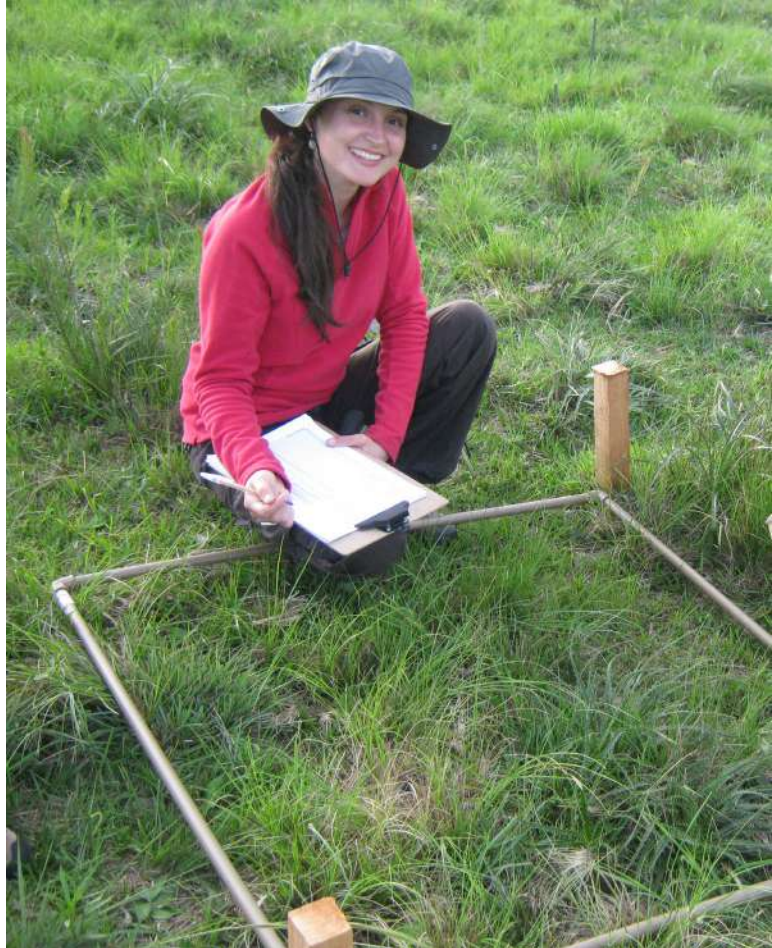
I not sure but I think my first motivation to study and work in Vegetation Science was in my childhood, when I used to help my mother do gardening. I used to observe, reproduce and collect some plants as a kind of game. Then in the Ecology course I took at University in my undergraduate studies, I realized I could turn that game into a profession. It was one of the best choices I have ever made.

Favourite Ecosystem/Plant Community

As I am from Uruguay, a country that had 70% cover of natural grasslands (unfortunately, nowadays this value is much lower), grassland ecosystems were always part of my daily landscape. Thus, I can say grasslands are my favorite ecosystem, since they hold many of my good memories and great fieldwork. This feeling has been spread in southern Brazil, where I am working now.

Impression on the IAVS Symposium in Pirenópolis

The Annual IAVS Symposium in Pirenópolis was really nice. I have attended the last four symposia and I realized this year that I had more opportunity to discuss my work with other colleagues around the world. I think it might be because research groups of South America were better represented this year, which allowed more exchange of ideas, as we often share the same reality. In addition, the field trips were wonderful. The opportunity to go to the *Cerrado* vegetation, one of the world's unique and most threatened ecosystems, was really amazing.



Next IAVS Symposium

I would like to attend the 60th Annual IAVS Symposium in Palermo but I am not sure if this will be possible. At this time, we are going through a critical political moment in Brazil, where the resources for science have drastically decreased, which makes it difficult to make future plans.



© A. Guido

Native grasslands in Rocha, Uruguay

Joosep Sarapoo

Young scientist Poster Presentation Award, Honorable Mention

Cut evolution in cut forests? Changes in phylogenetic structure of tropical rain forests due to ecological release of leaf-cutting ants

Supervisors: Pille Gerhold, Tartu University, Estonia

My Research

My work was about leaf-cutting ants (LCA) and about their diet species. We looked at which plants they are collecting and what are the patterns there. We found that LCA harvest some clades more than others. They have phylogenetic signal and leaf texture is partly responsible for that. If the leaves are easier to cut then LCA are cutting these species more. Also we analysed edge and interior colonies and the difference between them. It turned out that in interior colonies they have to search more actively for the right plants to cut, whereas in edge colonies they do not have to search for the right plant because there are "softer" plants anyway and that is the reason why in the edge LCA have more colonies.

First Motivation

My first motivation to study vegetation science was tropical ecosystems and the richness of the species there. Considering my work I think that I am not only a vegetation scientist but also an ecologist. I really want to discover how different species work together and what are the underlying mechanisms.

Favourite Ecosystem/Plant Community

My favourite ecosystem is rainforest, because it has the highest diversity of species and there is always something to discover.



My picture on a zoology field course

Impression on the IAVS Symposium in Pirenópolis

As I am Bachelor's student right now and had never been to this kind of symposium before, everything was new for me. I met a lot of new scientists and heard interesting work and plans, which broadened my view. Also Brazil itself was really awesome.

Next IAVS Symposium

Unfortunately I cannot participate in Palermo, because I will be in French Guiana then.

Michele Dechoum

Young scientist Oral Presentation Award, First Prize

Factors controlling grassland occupancy by shrubs in montane systems in Southern Brazil

Supervisors: Nivaldo Peroni, Department of Ecology and Zoology, Federal University of Santa Catarina, Brazil

My Research

Montane grasslands have been subjected to shrub encroachment due to fire and grazing suppression, and more recently to climate change (increase in temperature and precipitation). The main objective of our research was to assess the effects of temperature increase and neighbour removal on growth of juveniles of the shrub *Baccharis uncinella* (Asteraceae) in a montane grassland in southern Brazil. We hypothesized that removal of neighbour grasses and increased air temperature would enhance the growth of *B. uncinella*. Since *B. uncinella* is a widespread and abundant species in these systems, we considered that its responses to changes in abiotic and biotic conditions may provide valuable information to forecast how these systems

will be affected by climate change. We established an experiment in a grassland on a forest-grassland boundary. We tested the individual and combined effects of temperature increase (using open-top chambers) and neighboring plant removal by clipping all shoots of neighboring grasses in a 30 cm radius around each *B. uncinella* plant at the ground level. Our data suggest that an increase in temperature would enhance *B. uncinella* encroachment in the study area. Counterintuitively, grass removal had a negative effect on shrub growth, suggesting that factors other than competition may explain the persistence of montane grasslands in Southern Brazil.

First Motivation

Growing up in a small town in Rio de Janeiro State (Brazil), I lived in close interaction with montane ecosystems and beautiful landscapes since I was very young. Biology was my favorite subject at school, and it was not difficult to decide which career I would choose. Studying plants and how they respond to abiotic factors and biotic interactions is not something that I planned. It came naturally very early in my professional life. However, I am not interested just in theoretical Vegetation Science, but especially in conservation issues and topics related to applied Ecology, such as invasive alien species, restoration, and protected area management.

Favourite Ecosystem/Plant Community

It is almost impossible to answer this question, especially when as a Biologist you have the opportunity to have a detailed view of natural ecosystem functioning. As I really like open landscapes, I could say that grasslands are my favorite ecosystem.

Impression on the IAVS Symposium in Pirenópolis

It was great to have the opportunity to interact with people from so many different countries and cultures, including some of the most acknowledged researchers of different fields in Vegetation Science. I really enjoyed learning more about ecosystems and vegetation types from different parts of the world,



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Grasslands at the Sierra de la Ventana Provincial Park, Argentina

and about new methods, which have been used to study them. In my personal view, the most interesting activities at the symposium were the section about invasive alien species and the meeting of young researchers with the Editorial Board of Journal of Vegetation Science.

Next IAVS Symposium

As I am planning to go to another international meeting in Portugal in 2017, I believe will not be able to go to the 60th Annual IAVS Symposium in Palermo. But I will definitely go to Bozeman (Montana, USA) to participate in the 61th Annual IAVS Symposium.



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Montane grasslands at the São Joaquim National Park, Brazil

Anina Coetzee

Young scientist Oral Presentation Award, First Prize

The importance of Proteaceae species richness in providing nectar resources

Main supervisor: Anton Pauw, Stellenbosch University, South Africa

Co-supervisor: Phoebe Barnard, South African National Biodiversity Institute, South Africa

Collaborator: Anthony G. Rebelo, South African National Biodiversity Institute, South Africa

My Research

Our study investigated the spatio-temporal floral patterns of bird-visited species of Proteaceae in the Cape Floristic Region, South Africa. We determined where and when nectar resources are available to nectar-feeding birds in order to understand which aspects of these fluctuating resources are most important. Using biome-wide data sets of the occurrence of bird-visited Proteaceae plants and nectar-feeding birds, we established where the temporal and spatial resource limitations are. The results suggest that bird populations cannot be sustained by tracking resources across mountain ranges, since floral abundances are low in all subregions at the same time of year. However, the three genera of bird-visited Proteaceae have complementary flowering times and possibly

sustain resident bird populations throughout the year. Bird abundances were also most strongly related to Proteaceae species richness and not to floral abundances. This highlights the importance of protecting Proteaceae diversity across the whole biome and not just specific species or locations.

First Motivation

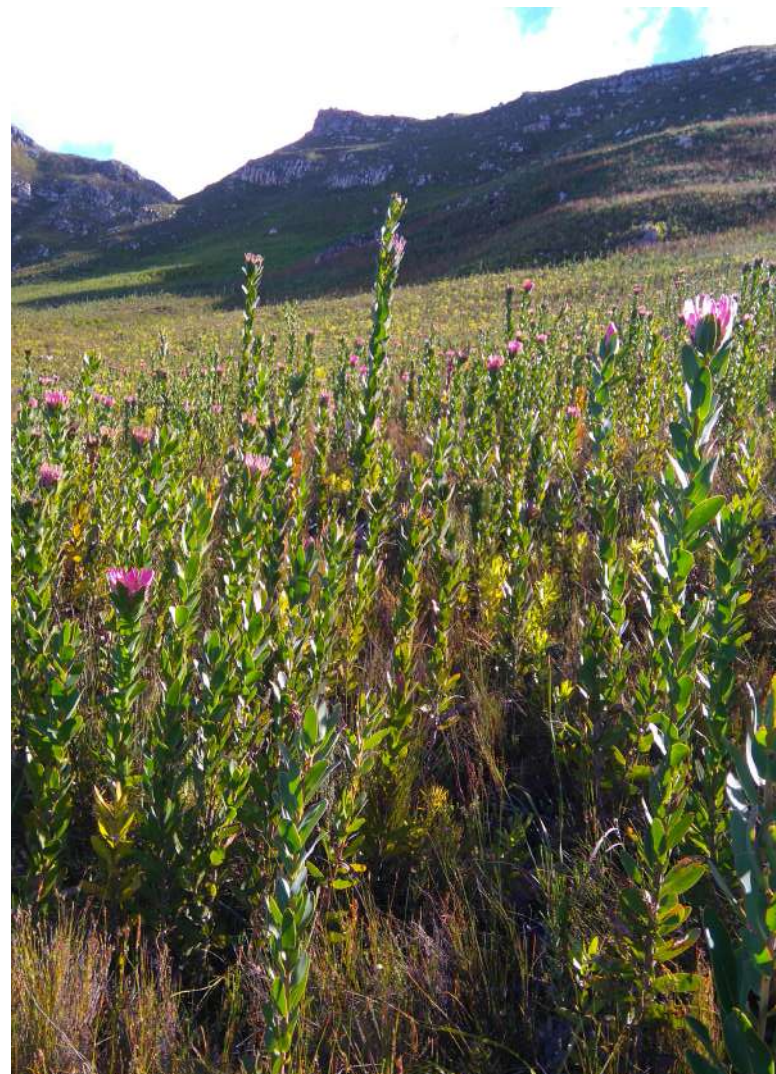
I have always wondered why certain plants occur in certain places and others do not. The great botanical diversity of the fynbos biome in the Cape Floristic Region fuels these questions and keeps me wondering how all these species manage to coexist with the limited resources available.

Favourite Ecosystem/Plant Community

Fynbos plant communities. The diversity is spectacular and provides endless questions. My



Me next to a protea in the Cederberg



A community of bird-pollinated proteas at Kogelberg

particular favorites are the *Erica* communities, because there are nearly 700 species of this genus in this biome.

Impression on the IAVS Symposium in Pirenópolis

I was fascinated by the similarities and contrasts of the ecosystems that are related to my country's, both

during the presentations and excursions. I enjoyed the stimulating conversations during the symposium and learnt a lot.

Next IAVS Symposium

I hope to attend IAVS in 2017.

Elisabeth Gorgone-Barbosa

Young scientist Oral Presentation Award, Honorable Mention

Can fire be used as a management tool to control invasive grasses in Cerrado?

Supervisor: Alessandra Fidelis, Universidade Estadual Paulista, Rio Claro, São Paulo, Brazil

Co-supervisor: Vânia Pivello, Universidade de São Paulo, Brazil

My Research

I presented part of my PhD research at the IAVS Symposium in Pirenópolis. In the Cerrado, fire is an important ecological factor. Therefore, we used prescribed burns, applying different fire regimes to understand how fire affects the African invasive, *Urochla brizantha*, and the native community, in

order to evaluate if fire could be used to manage this species. From 2012 to 2014 we applied fire treatments: Annual, Biennial and Control (no fire), in two seasons Mid-Dry and Late-Dry. Independently of the frequency and season, fire led to the decrease of dead biomass of *U. brizantha*. Moreover, the major difference between burned and Control communities



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Me in one of the prescribed burn experiments at Reserva Natural Serra do Tombador, Goiás, Brazil



© E. Gorgone

An area in Cerrado invaded by *Urochloa brizantha*: Campo Sujo at Reserva Natural Serra do Tombador, Goiás, Brazil

were the amount of dead biomass. Biennial Late-Dry fires tended to reduce the cover of live *U. brizantha*, but not the biomass, whilst Biennial Mid-Dry fires showed a positive feedback with *U. brizantha*. The non-invaded communities were not affected by any treatment. Fire alone will not control the invasive species, however, Late-Dry fires could help in reducing dead biomass, thus reducing the chance of wildfires and enhancing some native groups. Our study helps to understand and predict the assembly of vegetation communities (invaded and non-invaded) and their post-fire regeneration, in order to guide management strategies for conservation in Cerrado.

First Motivation

I really don't know what was my first motivation to study and work in Vegetation Science. I guess that it occurred when I was a kid because I loved plants and flowers and wanted to be a scientist. Then, when I started an undergrad course in Biology I was interesting in Ecology, especially in Plant Ecology, and a little bit later but still during my undergrad course I fell in love with plant invasion ecology and I started to study it.

Favourite Ecosystem/Plant Community

My favorite ecosystem is open Cerrado such as Campo Sujo, which is a type of Cerrado dominated by a grassland layer with scattered shrubs and trees. See the picture.

Impression on the IAVS Symposium in Pirenópolis

I really enjoyed Dr Hanna Tuomisto's talk. I don't know if it was because it was about a subject that is not familiar (since I study Cerrado), but it was very interesting and I was amazed.

Next IAVS Symposium

I'd love to attend, but I am still looking for ways to do it.

Scientists in Brazil and Argentina are Struggling with Government Budget Cuts After Years of Improvement

José Paruelo¹, Alicia Acosta² and Valério D. Pillar³

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Recent articles in *Nature* and *Science* (Rodríguez Mega 2016, Román 2016, Angelo 2016) reported the concerns of Brazil and Argentina's scientists on cuts in the national funding for research and development. The neoliberal administrations that are now ruling both countries changed a long-lasting policy of supporting Science. The new Brazilian government, which took power after a controversial process in the congress, is pushing a constitutional amendment to freeze the federal budget for the next 20 years (Angelo 2016). If approved, this restriction may greatly reduce expenditures on science and development relative to the GDP, which in 2012 has reached 1.15%, the highest level among the countries in South America. Van Noorden (2014) showed the substantial increase in the resources invested in Science from the beginning of the XXI century in Brazil and Argentina (but also in Uruguay and Chile). As a consequence of the increase in economic resources, South America (mainly Brazil and Argentina) have doubled their share of world publications from 2% in 2000 to 4% in 2014 (Van Noorden 2014).

In the last decades, improvement was also evident in Ecology and Conservation, and Vegetation Science. From 1996 to 2015, the number of published articles indexed by the Web of Science in Ecology and Conservation increased at an average growth rate of 15.9 % per year in Brazil and 11% per year in Argentina. The h-index for papers in these topics, relative to the average h-index of some countries in Europe (Germany, France, Italy, Spain, England), increased from a ratio of about 0.56 in 1996–1999 to 0.64 in 2012–2015 in Brazil, while the ratio remained around 0.50 in Argentina in both periods. The proportion of articles with Brazilian or Argentine authors in *JVS* and *AVS* went from 3.7% for the period 1996–1999 to 8.2% for 2012–2015. By 2016, the average number of citations received by all *JVS* and *AVS* articles authored by Brazilian or Argentine scientists was 28.3, higher than the journals' average (24.9) in the same period. Thus, the increase in

scientific production in our field in both countries was of high quality papers.

A reduction in the research and development budget will not only impact the number of published papers but also human resources, which may generate an exodus of young scientists. Argentina has already experienced "brain drains" due to political reasons (1966, 1976) or economic crises (mainly the 1980s debt crisis and the terminal financial crisis of 2001; Pellegrino 2002). To a much lesser extent, this process also took place in Brazil during the 1990's (Guimarães 2002). Vegetation studies rely on local expertise that is formed in a long and continuous process, and would be greatly affected if an exodus of young scientists were to take place.

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Photo Memories



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Pre-symposium Excursion to Chapada Imperial (above) and Abade Waterfall Excursion 4 (below)



© G. Bohari



Atlantic Rainforest Excursion within the São Paulo and Rio de Janeiro states (above)
Pre-symposium Excursion to Restinga de Itaunas, Espírito Santo (below)





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Participants of the Post-symposium Excursion in the Chapada dos Veadeiros, Brazil

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