



IAVS

BULLETIN 2017 / 3

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Acer pseudoplatanus (Sapindaceae) on Monte Soro in the Nebrodi Mountains is an old giant with its trunk covered by a thick layer of bryophytes and lichens

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A Message from the Editor

The IAVS Annual Symposium in Palermo is over and we are full of various experiences and beautiful memories of all the sunny days, encounters, smileys, debates, lectures, flowers, mountains, landscapes, monuments, foods, drinks, songs, ... Some of them are reflected in this Bulletin issue, some others will be shared in the next issues. Many thanks to Riccardo Guarino and the local team of organizers for their perfect job and extraordinary comfort and hospitality during the Symposium!

Monika Janišová
Editor of the IAVS Bulletin



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Sicilian Jewels

or

What do vegetation scientists appreciate on plants?

Monika Janišová, Institute of Botany, Plant Science and Biodiversity Center, Slovak Academy of Sciences, Banská Bystrica, Slovakia

with contributions from Milan Chytrý (Czech Republic), Hazel Gordon (United States), Riccardo Guarino (Italy), Atsuko Harada (Japan), Carsten Hobohm (Germany), Pavel Krestov (Russia), Irina Krestova (Russia), Javier Loidi (Spain), Ladislav Mucina (Australia), Robert K. Peet (United States) and Valério Pillar (Brazil)

During the five-day post-symposium excursion to Sicilian Mountains (June 25–29, 2017) we visited three main mountain ranges of Sicily: **Etna Massif**, the largest active volcano in the Mediterranean Basin; **Nebrodi Mts**, the smoothest and most forested part of the so-called Sicilian Apennines; and **Madonie Mts**, the highest and most heterogeneous mountain system of the Sicilian Apennines. After an intensive introduction to the Sicilian flora by Riccardo Guarino and his colleagues and friends Giuseppe Baiamonte, Giuseppe Bazan, Salvatore Brullo, Orazio Caldarella, Chiara Catalano, Leopoldo de Simone, Emanuele Genduso, Lorenzo Gianguzzi, Gianpietro Giusso del Galdo, Alessandro Gristina, Vincenzo Ilardi, Alfonso La Rosa, Corrado Marcenò, Pietro Minissale, Teresa Napolitano, Pippo di Noto, Salvatore Pasta, Rosario Schicchi, and Angelo

Troia, each of us, vegetation scientists from abroad, became familiar with plenty of Sicilian plant species. Moreover, many of us visited other Sicilian sites during the pre- and mid-symposium excursions or on private trips. We used this opportunity to make a short survey among the participants and the local guides and asked a simple question: **Which is your favourite plant in Sicily and why?** Based on the responses, this summary on jewels of the Sicilian flora was compiled, and here – the winning plants are introduced.

In total, 45 respondents took part in the survey, 24 males and 21 females. Each respondent voted for one or two plants (respondents from outside Europe or those who insisted or had persuasive supporting arguments had usually two votes), resulting in 56



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Vegetation scientists and survey respondents during the excursion on Mt Etna on 25 Juni 2017.
(Above and on the two next pages)

votes altogether. Finally, we gathered 28 male and 28 female votes and 28 votes from European and 28 votes from non-European respondents. The respondents were intentionally surprised by the question and were expected to respond immediately. Interestingly, some respondents were immediately ready to take decision, while others pondered longer and in one case the respondent even changed his decision after a careful consideration.

31 plants species (from 19 families) were nominated (Table 1). Among the families, grasses (*Poaceae*) family were represented the best (4 species), followed by *Asteraceae* (3 species), *Apiaceae* (3 species), *Caryophyllaceae* (2 species), *Pinaceae* (2 species), *Fabaceae* (2 species), *Fagaceae* (2 species), *Crassulaceae* (2 species), and *Dipsacaceae* (2 species), with all the remaining families on the list represented by only a single species.

Sicily is an island with high rate of endemism. Following a most recent source (Guarino & Pasta 2017), 338 out of around 3000 of vascular plant species occurring on the island are endemic. This was reflected also in the results of our survey where 15 out of 31 appreciated plants were either narrow endemic or subendemic taxa, with distribution restricted to Sicily (Sic in column 3, Table 1) or only to small part of the Mediterranean Basin. And it is also reflected in frequent “geographic” species *epitheta* of the appreciated taxa, such as *siculus/sicula* (3 times), *aetnensis* (3 times), *nebrodensis* (once), and *calabrica* (once).

The most popular Sicilian plant appreciated by our group was ***Saponaria sicula*** (*Caryophyllaceae*, 7 votes). This mountain plant is one of the pioneers inhabiting volcanic scoria and limestone gravel screes, where it gradually develops circular cushions providing safe sites for other vascular plant species. The expressive pink flowers are usually distributed around the cushion periphery thus forming a wreath. This contrast of green cushions with a pink edge on the black lava background makes the plants remarkable and attractive. In later successional stages, *Saponaria* retreats as it is not a strong competitor. The distribution area of *S. sicula* subsp. *sicula* is very narrow and island-like; besides the scoria slopes of Mt Etna, it also occurs on limestones of the Madonie and even in a small area in Algeria, at elevation range spanning 700–2000 m. Two very similar subspecies occur in the Balkan Peninsula.

Betula aetnensis (some would say a local variant of common *Betula pendula*; *Betulaceae*, 5 votes) also attracted attention by its contrasting appearance and background - the white trunks shining on the black pyroclastic scoriae. In pure or mixed stands, it grows on Mt Etna from 1450 m up to the tree line at 2100 m a.s.l. while the best developed stands are found on the east-facing flank of the volcano.

Zelkova sicula (*Ulmaceae*, 5 votes) is a deciduous shrub of the family *Ulmaceae* growing 2–3 m tall. Yet its natural mature size is unknown as all existing specimens have been heavily browsed by goats. Its natural habitats are supramediterranean forests and scrub. The species is critically endangered by habitat



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loss with only two remnant populations still surviving, both found in south-eastern Sicily near Sortino and Melilli, having about 200–250 individual stems only. These populations are thought to have originated from possibly one clone, or at most only a very few distinct individuals. During recent years, only a few flowering individuals have been observed and the fruits produced have been sterile. It is unclear why reproduction in this taxon is in peril (Garfi 2006, Hobohm 2014).

Lomelosia crenata (*Dipsacaceae*, 4 votes) grows on predominantly calcareous rocks and rocky grasslands at elevations up to 1900 m, forming large tussocks full of gently pink flowers with finely cut petals. Its distribution range includes Mediterranean regions of Italy, Greece, Albania, Montenegro and Algeria.

While male respondents voted more frequently for trees and appreciated plants characteristics related to their ability to survive or compete, female respondents often voted for subtle and tender plants, apparently appreciating their beauty and grace. The list of compliments in Table 1 documents well that the extraordinary plant features are not only perceived by our senses; we often also use our knowledge and ecological experience to build a relationship with a plant species. We are fascinated by the ability of many species to survive in harsh habitat conditions, and their adaptation for this survival. We are excited by extremes, contrasts, striking and dramatic effects, something unusual or unexpected, and look for stories. But on the other hand, commonness and familiar features reminding us of our home country can also be important in choosing our most favourite plant. A special case are plants studied by the respondents – their real “babies”.

Apart from standard answers, we recorded several specific answers, which were not included in our analysis as they considered non-native species or even animals. Two trees in the Palermo Botanical Garden drew attention to such an extent that they were mentioned by our respondents: a giant *Ficus macrophylla* var. *columnaris* (*Moraceae*) and the bottle-like thorny trunked *Ceiba speciosa* (*Malvaceae*). Another tree admired as an individual rather than as a species was the primeval giant *Acer pseudoplatanus* (*Sapindaceae*) on Monte Soro (1847 m, Nebrodi Mts), said to be 1000 years old (photo on the cover page of the issue). The survey reliably revealed a zoologist among us, who voted for the beetle *Polyphylla ragusae*. But other animals gained a vote, too – specifically the black pigs in the Nebrodi Mts – because they are lovely (although quite noisy early in the morning) and some of us are sure they would also taste good.

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Figure above: *Saponaria sicula* (Caryophyllaceae). Figure below: *Lomelosia crenata* (Dipsacaceae).



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Figure above: *Betula pendula* (Betulaceae). Figure below: *Zelkova sicula* (Ulmaceae).



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Table 1 Favourite plants of vegetation scientists ordered by their popularity (number of votes) and the characteristics responsible for their popularity (compliments). Nomenclature, taxonomy, and distribution follow Raimondo et al. (2010).

Species	Family	Distribution	Number of votes	Respondent's country		Respondent's gender	
				Europe	Outside Europe	Male	Female
<i>Saponaria sicula</i>	<i>Caryophyllaceae</i>	S-Stenomedit	7	5	2	2	5
Compliments: It is beautiful. It is like heaven in hell (lava). It is pioneer, forming amazing patches of all ontogenetic stages from seedlings to adults. It grows on lava as well as on calcareous rocks, but is happier on lava. It is a wonderful combination of strength and grace.							
<i>Betula aetnensis</i>	<i>Betulaceae</i>	Sic	5	2	3	3	2
Compliments: It has a white trunk. Forms nice contrast of black lava and white bark of trunks. It is lovely. It is unusual. It is unexpected.							
<i>Zelkova sicula</i>	<i>Ulmaceae</i>	Sic	5	5	0	4	1
Compliments: It is a monster, living in a desperate atmosphere, among unfriendly plants. It is a hero. It is unpredictable. Nice endemic plant with an interesting distribution, genetics, physiology and ecology.							
<i>Lomelosia crenata</i>	<i>Dipsacaceae</i>	Stenomedit	4	1	3	0	4
Compliments: It is lovely. It is beautiful. It has nice flowers and fine petals.							
<i>Fagus sylvatica</i>	<i>Fagaceae</i>	C-Europ	3	2	1	3	0
Compliments: It is the most beautiful tree in the world. It is unexpected in Sicily. It grows on extreme sites, where it would not be expected from Ellenberg indicator values.							
<i>Abies nebrodensis</i>	<i>Pinaceae</i>	Sic	2	0	2	2	0
Compliments: It is unusual.							
<i>Astragalus siculus</i>	<i>Fabaceae</i>	Sic	2	2	0	1	1
Compliments: It is pioneer, which governs the dynamic processes of the whole community. It belongs to an interesting genus adaptively radiated in the Mediterranean region.							
<i>Ferula communis</i>	<i>Apiaceae</i>	Medit	2	0	2	0	2
Compliments: It is striking and dramatic.							
<i>Genista aetnensis</i>	<i>Fabaceae</i>	endem	2	0	2	0	2
Compliments: It is pretty. It smells and has a dramatic colour.							
<i>Limonium hyblaicum</i>	<i>Plumbaginaceae</i>	Sic	2	1	1	1	1
Compliments: It was described by my uncle. The <i>Limonium</i> genus has nice colour and fine shape.							
<i>Pinus nigra subsp. calabrica</i>	<i>Pinaceae</i>	endem	2	1	1	1	1
Compliments: It looks nice on the lava. It competes with birch and beech.							
<i>Bellardiochloa variegata subsp. aetnensis</i>	<i>Poaceae</i>	Sic	1	1	0	1	0
Compliments: Everybody neglects it.							
<i>Cachrys ferulacea</i>	<i>Apiaceae</i>	NE-Medit Mont	1	0	1	1	0
Compliments: It resembles Iran.							
<i>Capparis spinosa</i>	<i>Capparidaceae</i>	Medit	1	1	0	1	0
Compliments: I studied this species since 2008.							
<i>Centaurea solstitialis subsp. schouwii</i>	<i>Asteraceae</i>	subendem	1	0	1	0	1
Compliments: It is very common and spiny.							

Species	Family	Distribution	Number of votes	Respondent's country		Respondent's gender	
				Europe	Outside Europe	Male	Female
<i>Cerastium tomentosum</i>	Caryophyllaceae	endem	1	0	1	0	1
Compliments: It forms nice cushions.							
<i>Chamaerops humilis</i>	Arecaceae	W-Steno-medit	1	0	1	1	0
Compliments: It is a very smart plant.							
<i>Cistus creticus</i>	Cistaceae	Medit	1	0	1	0	1
Compliments: It smells and has a dramatic colour.							
<i>Desmazeria pignattii</i>	Poaceae	Sic	1	1	0	0	1
Compliments: It has a narrow niche, specific ecology. It is annual occurring in desiccated salty hollows along the coast.							
<i>Eryngium triquetrum</i>	Apiaceae	SW-Steno-medit	1	0	1	0	1
Compliments: It belongs to my favourite genus.							
<i>Evacidium discolor</i>	Asteraceae	subendem	1	1	0	0	1
Compliments: It is small and pretty. It looks like a small <i>Leontopodium</i> (very rare plant in the respondent's home country).							
<i>Geranium versicolor</i>	Geraniaceae	NW-Medit Mont	1	1	0	0	1
Compliments: Love without specific reasons.							
<i>Lygeum spartum</i>	Poaceae	Medit	1	0	1	1	0
Compliments: It is most beautiful.							
<i>Nerium oleander</i>	Apocynaceae	Medit	1	0	1	0	1
Compliments: It is beautiful.							
<i>Onopordum illyricum</i>	Asteraceae	Stenomedit	1	1	0	1	0
Compliments: It is most beautiful.							
<i>Pseudoscabiosa limonifolia</i>	Dipsacaceae	Sic	1	1	0	1	0
Compliments: I studied this species for PhD thesis.							
<i>Quercus ilex</i>	Fagaceae	Medit	1	0	1	1	0
Compliments: It comes from the monsoon climate.							
<i>Scrophularia canina</i>	Scrophulariaceae	Medit	1	0	1	1	0
Compliments: It looks like a barking dog.							
<i>Sedum hispanicum</i>	Crassulaceae	S Europ	1	0	1	1	0
Compliments: It is small and effective.							
<i>Sedum sediforme</i>	Crassulaceae	Stenomedit	1	0	1	0	1
Compliments: It is succulent.							
<i>Stipa austroitalica subsp. appendiculata</i>	Poaceae	subendem	1	1	0	1	0
Compliments: It moves nicely in the wind.							



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Figure above: *Ficus macrophylla* var. *columnaris* (*Moraceae*) is a tropical tree with smooth light-gray bark and entire oblanceolate leaves, which in Mediterranean climate grows to about fifteen meters tall but in favourable conditions it grows much larger, producing great numbers of prop roots. This extraordinary individual is cultivated in the Palermo Botanical Garden.

Figure below: An alley of *Ceiba speciosa* (*Malvaceae*) with the thorny trunks in the Palermo Botanical Garden. Its native range is Argentina, southern Brazil, Uruguay, Paraguay, and eastern Bolivia.



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Figure above: *Abies nebrodensis* (*Pinaceae*) is an extremely rare tree, currently limited to a small valley (1440–1600 m a.s.l.) subject to periodical fogs, where it colonizes young sandy soils. The Madonian fir is one of the last representatives of a Tertiary vegetation that has been largely displaced by the arrival of beech in Sicily during the wet phases of the Quaternary (Guarino & Pasta 2017). Degraded natural habitat, the poor health of specimens propagated in tree nurseries, the limited population size (including only 30 individuals), and fire represent the biggest threats to the survival of the species (Hobohm 2014).

Figure below: *Fagus sylvatica* (*Fagaceae*) at the extreme southern limit of its distribution range looks much different from its typical central- or western-European appearance. Not only is its occurrence in the centre of the Mediterranean Basin unexpected, this species was admired also due to its special growth form. Thanks to traditional management of the wooded pastures, the bark at the bottom part of trunks has been damaged and resprouting has been supported. The young branches have been repeatedly browsed, leading to formation of such a specific growth form.



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Figure above: *Pinus nigra* subsp. *calabrica* (syn. *Pinus nigra* subsp. *laricio*, *Pinaceae*) forms a beautiful Calabrian pine forest, which represents the zonal vegetation in the N-NW flank of Mt Etna, but most often it forms just a seral stage of oak or beech woods (depending on elevation). The Calabrian pine forests have been exploited since ancient times for timber and resin (pitch) production. Resin extraction was a local economic activity until the recent past. Many old pines with the typical “fishbone” carving, adopted for this ancient practice, are still alive (Guarino & Pasta 2017).

Figure below: *Genista aetnensis* (*Fabaceae*), endemic to very restricted areas of Sardinia, Corsica and Sicily is a very important biomass producer on recent lava flows, where it can grow relatively fast, thanks to the symbiosis with nitrogen-fixing bacteria (Guarino & Pasta 2017), and thereby increases the rate of primary succession.



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Figure above: *Thapsia garganica* (Apiaceae), is an impressive plant especially during its flowering and fruiting time between March and July. It grows in dry grasslands (in the picture the dry grasslands of Nebrodi Mts are shown with a view to the cliffs named “Rocche del Crasto”), shrubland fringes and nearby roads and settlements. It is distributed throughout the Mediterranean; in some regions it is used as a medicinal plant. A similar plant, *Ferula communis*, in the Roman times had an infamous function – used as a stick to beat (punish – hence the name!) ‘unruly’ slaves.

Figure below: *Cachrys ferulacea* (syn. *Prangos ferulacea*, Apiaceae) is a perennial herb that dominates the mountain pastures subject to overgrazing. In the Madonie Mts in the picture we admired beautifully coloured stands of the *Cachryetum ferulaceae* (*Cerastio-Astragalion nebrodensis*) developed on the overgrazed slopes of local karstic dolines.



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Figure above: *Astragalus siculus* (*Fabaceae*) is endemic of Sicily, occurring in shrubby communities of the *Astragaletum siculi* (*Rumici-Astragalion siculi*) differentiated by the presence of many other endemics, such as *Senecio aetnensis*, *Galium aetnicum*, *Tanacetum siculum* and *Viola aetnensis*. The thorny cushions of *Astragalus siculus* shelter many plant species defined as “Polstergäste” (literally: the guests of the cushion; Guarino & Pasta 2017).

Figure below: *Cerastium tomentosum* (*Caryophyllaceae*) is a beautiful plant naturally distributed in the southern Italy (and interestingly also in Slovakia!), including northern Sicily, where it grows in sunny grasslands and rocky habitats between 600 and 2200 m a.s.l. In many other parts of Europe it is planted as a decorative plant and frequently escapes cultivation.



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Figure above: *Onopordum illyricum* (Asteraceae) is a spectacular thistle occurring on old field and in overgrazed pastures in many parts of the Mediterranean Basin. A real treat for lovers of prickly plant life!

Figure below: *Evacidium discolor* (Asteraceae) is like a small Edelweiß, *Leontopodium alpinum*. It is limited to few mountain ranges of Sicily, Malta, Algeria, and Morocco, where it inhabits open soils and rocky places.



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Figure above: *Limonium hyblaicum* (*Plumbaginaceae*) is a cushion-forming plant of coastal cliffs exposed to salt spray and merciless relentless sunshine. Its decorative leaves found appreciation by some florist who might be responsible to introducing the plant to Australia where it is becoming a coastal pest.

Figure below: *Nerium oleander* (*Apocinaceae*) occurs naturally in gravelly riverbeds of Sicilian fumaras, but is widespread in cultivations as well.



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Figure above left: *Chamaerops humilis* (*Arecaceae*), the Mediterranean dwarf palm, is one of only two palm species native to southern Europe. It is widely distributed in uncultivated land and is adapted to regimes of frequent burning, which it survives largely by re-sprouting from underground rhizomes and fire-damaged stems.

Figure above right: *Geranium versicolor* (*Geraniaceae*) is native of Italy, Sicily and the southern Balkans.

Figure below: In the Nebrodi Mts, traces of traditional land uses are still very evident and the main income for local communities is provided by pastoral activities (pigs left to wild pasture in the woodlands, goats and sheep in open degraded cork and downy oak woods and grasslands) and tourism (Guarino & Pasta 2017). As pigs are rarely grazed in the other parts of the world, we were amazed by these lovely animals and watched them like a popular TV show.



© C. Hobohm



Figure above: a) *Eryngium triquetrum* (Apiaceae) by C. Hobohm, b) *Sedum sediforme* (Crassulaceae) by R. Guarino, c) *Lygeum spartum* (Poaceae) by P. Krestov d) *Centaurea solstitialis* subsp. *schouwii* (Asteraceae) by H. Gordon, e) *Sedum hispanicum* (Crassulaceae) by A. Harada, f) *Cistus creticus* (Cistaceae) by J. Loidi, g) *Desmazeria pignattii* (Poaceae) by R. Guarino, h) *Capparis spinosa* (Capparidaceae) by M. Janišová, i) *Scrophularia canina* (Scrophulariaceae) by P. Krestov, j) *Pseudoscabiosa limonifolia* (Dipsacaceae) by R. Guarino, k) *Quercus ilex* (Fagaceae) by H. Gordon, and l) *Stipa austroitalica* subsp. *appendiculata* (Poaceae) by R. Guarino.

Alexander von Humboldt Medal

Awarded to F. Stuart Chapin III, 2017

By Robert K. Peet

The Alexander von Humboldt Medal for Excellence in Vegetation Science is the highest award that IAVS can bestow on a scientist. Established in 2011, it is awarded at approximately two-year intervals in recognition of an outstanding body of work that has strongly impacted vegetation science. It is my honor and privilege to introduce the 2017 recipient of the IAVS Alexander von Humboldt Medal, F. Stuart Chapin III.

Terry, as we all know him, is Professor Emeritus of Ecology in the Institute for Arctic Biology at the University of Alaska. He has received far more awards and honors than I have time to report. As examples, he received the 1996 Kempe Award for Distinguished Ecologists, the 2000 Usibelli Award for top researcher in all fields at the University of Alaska, he was elected a fellow of the American Association for the Advancement of Science in 2000, a member of the Royal Swedish Academy in 2000, a fellow of American Academy of Arts and Science and in 2004 he became the first resident of Alaska to be elected a Member of the US National Academy of Sciences.

Terry began his undergraduate studies as an economics major at Swarthmore College. However, an inspiring introductory biology course, and many hours spent outdoors while growing up, resulted in him switching to a major in Biology. After graduating in 1966, and following by a 2-year stint in the Peace Corps in Bogota Colombia, he entered graduate school at Stanford University to work with Hal Mooney, with whom he obtained his PhD in 1973.



Toolik Lake, Alaska.

Terry has had a profound impact on ecology. Consider his citation statistics as reported by Google Scholar. He is one of only a very few ecologists I know to have an H-Index of greater than 120, and he has fifteen publications with over 1000 citations. An even more amazing thing is that he has had a profound impact on many different areas of inquiry. I have met superstars from time to time, but I don't think I have ever met anyone else who is a superstar in so many fields.

The first area of ecology where Terry's work has been transformative is plant physiological ecology. For his dissertation, he focused on plant nutritional adaptations to low temperature. He found that plants cope with environmental variation by changing their physiological activity, and that plants from more variable environments are better able to adjust. I remember early in my career reading his 1980 *Annual Review* on the mineral nutrition of wild plants and thinking how this provided a compelling explanation of the mechanisms behind the types of plant strategies Phil Grime had recently proposed. Of course, Terry has continued to provide critical insights in many aspects of plant physiological ecology and is, along with Hans Lambers and Thijs Pons, author of the leading textbook in plant physiological ecology.

A second area where Terry has led transformative research is in the dynamics and function of ecosystems, especially those of boreal and arctic regions. There have been many facets to this research program. Particularly important was the



Marking seedlings in experimental disturbances in arctic Alaska.



© G. Shaver

Fiddling at Toolik Lake, ~ 1977



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NSF-sponsored Long-Term Ecological Research program he developed, and the projects of the many productive scientists associated with that initiative. Among the many aspects of this project and his other work on these northern ecosystems were studies of biogeography, the importance of microbial processes, primary succession (including rethinking the classic Glacier Bay case study), secondary succession, and the changing role of fire in the Alaskan landscape. One of my favorite topics in his work is how the loss of large herbivores at the end of the Pleistocene dramatically altered the northern lands from what was a grass-dominated steppe biome to a moss-dominated tundra biome. I am sure our IAVS members will appreciate that Terry's work was not limited by national boundaries; international collaboration was frequent, especially with workers in Siberia. Terry would be the first to point out that this international collaboration was made possible by the collaboration of Terry's wife Mimi, who served as a translator. All this has, of course, led to significant discussion of the past and future changes in the boreal forest and arctic. In short, Terry has transformed boreal and arctic ecology by providing a much deeper integration and understanding of ecosystem processes with the changes taking place on these landscapes. Terry capped his work on ecosystem function by writing with Pam Matson and Peter Vitousek what is now the lead textbook in terrestrial ecosystem ecology.

A third area where Terry's work has been transformative is in applying ecological principles to earth stewardship, both in Alaska and globally. Perhaps this reflects something of his lineage and the values passed on to him. He is the third of a series of very important academics with the name F. Stuart Chapin. He grew up in Chapel Hill, NC, where his father, F. Stuart Chapin Jr., was one of the first and certainly the most central faculty member in the University of North Carolina's Department of City and Regional Planning. His grandfather, F. Stuart Chapin Sr., was a famous quantitative sociologist who taught at the University of Minnesota. Terry has contributed to many international commissions focused on the environment and climate, including the Millennium Ecosystem Assessment and Intergovernmental Panel on Climate Change. When serving as

President of the Ecological Society of America during 2011 and 2012, he made Earth Stewardship a central theme of the Society and its annual meeting. As with his other transformative areas, he proceeded to create the definitive books on the topic, *Principles of Ecosystem Stewardship* and *Earth Stewardship*.

Clearly, Terry has accomplished an enormous amount during his career. But still, you might wonder, what is he really like? I asked a few colleagues who know him well. Colleagues were unanimous in reporting Terry's ability to synthesize, to sit in a room and capture what everyone says, yet at the same time maintain his ability to be constantly positive and to be the nicest guy you could imagine working with. I will pass on excerpts from what three close colleagues wrote me.

Peter Vitousek: "To me, the most remarkable thing about Terry as a scientist is his absolute fearlessness. He is understated, and it would be easy to miss his ferocious drive to understand and to systematize understanding - but he will take on any question, and will put forward his understanding of that question publicly, in an iterative way until he is comfortable with it. All of us are informed by the process; for me, Terry, more than anyone I know, provides the moments of understanding in which I



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Developing village collaborations in Nikolai, Alaska



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Camping on top of Finger Mountain, ~1977.

say to myself – ‘that’s so simple that it has to be true’.”

Gus Shaver. “Terry and I spent a lot of time working together in the 1970s and early 1980s, and of course there are lots of anecdotes... What I happen to be thinking about lately are the times he entertained us by playing his fiddle---often this meant him sitting in the back seat of our van, playing wildly as we bounced our way up and down the Dalton Highway in search of *Eriophorum* tussocks to pluck. For a while I remember his favorite song was called “Whiskey Before Breakfast”. All this as we drove through an ecologist’s dream transect, in all kinds of weather, in the stunning landscape of the Brooks Range and North Slope. ... Those were glorious times.”

Marilyn Walker. “...Terry has spent his life focusing his powerful presence in 3 main areas – his family, his fiddle, and his work. I do not think any of this was ever “hard” for him, in that he truly just followed what he wanted to do, and in being true to that created a beautiful life. The home that he and Mimi created welcomes everyone. ... It is the same understanding of “connection” that he brings to his professional work. He understands the connections in nature, and has spent his lifetime describing them, and encouraging others to do the same.

“[Here] are [two] powerful images that I have of Terry. The first was from a meeting in Iceland, in 1986. ... My friend and I went hiking on the steep and beautiful slopes above the sea. And at one point we came around a corner, and there was Terry, with his fiddle, just playing and being there in a spectacularly beautiful spot. It was almost dreamlike, with his slightly wild hair and his innocence and his fiddle, in a spot of brilliant green slopes, Icelandic sheep, and blue ocean. And he just smiled...”



© G. Shaver

Sampling vegetation from functional-type removal plots in Argentina (with Sandra Diaz).



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Extracting sediment cores in a Siberian lake with Katey Walter at Northeast Science Station, Cherskii, Russia (above). Plucking *Eriophorum* tussocks at Sagwon, ~ 1977 (below).

The second image was a time I was visiting and staying in Terry and Mimi's home. ... I am a very early riser, and I was up doing something, and Terry came down the stairs. I think he was probably surprised to see someone up even before him! But with only a nod and brief greeting, he grabbed his computer and began to work. It was his writing hour. ... Terry wrote like someone devouring the most delicious meal they have ever had.... Wherever he was and whatever he was doing, he gave it his full focus. And

in doing so, he has made the world a better place and produced new understanding of how the natural world works."



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A Look Back

59th IAVS Annual Symposium, Pirenópolis, Brazil, 2016

By John Hay



General Information

The 59th Annual Symposium of the International Association for Vegetation Science was held in Pirenópolis, Brazil, from 12–17 June 2016. The venue was Pousada dos Pirinéus located in central Brazil, Goiás. Pirenópolis (Latitude S 15° 51' 00" and Longitude W 48° 57' 00") is a small historical city, approximately 150 km west of Brasília, and was founded in 1757 as a village by colonialists ("bandeirantes"), slaves and indians looking for gold. The initial motivation to hold this Symposium again in Brazil was provided by Valério Pillar in mid-2010 and the symposium was organized by vegetation

scientists from Universidade de Brasília (UnB), with huge support by colleagues from the Universidade Estadual Paulista – Rio Claro (UNESP-Rio Claro), the Universidade de São Paulo (USP) and the Universidade Federal do Rio Grande do Sul (UFRGS).

The choice of the Cerrado region was influenced by its high species richness, with almost 12,000 plant species identified and up to 400 species per hectare between woody and herbaceous species. Another factor in the proposal for holding this Symposium in the region of Central Brazil was due to this region's uniqueness in regard to previous symposia of the IAVS since there never had been a symposium with

a venue within the tropics.

The specific theme of IAVS was “*Conservation of Plant Communities: From Environmental Drivers to Ecosystem Services*”, an important theme and especially important in Brazil, but talks on all aspects of research related to the study of vegetation science were welcomed.

The venue of the Symposium, the Pousada dos Pirenéus, is a local resort with a tradition of hosting meetings of scientific societies, both national and international. The facilities for this meeting were spacious and adequate. Many of the participants especially liked some of the decorations in the hotel restaurant that were sculptures made from vegetables.

Participants

The symposium was attended by 174 participants from 30 countries with the following distribution by country:

Brazil	73	France	5
Germany	9	Hungary	5
Spain	9	Australia	4
Czech Republic	8	Argentina	3
Japan	8	Austria	3
Italy	7	Finland	3
Estonia	6	New Zealand	3
USA	6	Uruguay	3
Chechen Republic	2	China	1
United Kingdom	2	Namibia	1
Russia	2	Poland	1
Sweden	2	Portugual	1
South Africa	1	Slovakia	1
Bolivia	1	Chile	1

Although the total number of participants was lower than the mean attendance in the past few years, as Javier Lodi said “It’s the people who are attending the Symposium that make it a success”.

Travel grants were solicited by 77 people from 24 countries and IAVS was able to provide support for 46 participants from 15 countries through the IAVS Global Sponsorship Committee.

Scientific Program and Presentations

The scientific program of the symposium included plenary talks, contributed talks in three parallel sessions and poster sessions. As an innovation from previous Symposia, the mobile app Whova was used to inform all users of updates in the daily schedule and symposium program. This app also permitted interaction with other participants, exchange of information, creating and reinforcing old and new friendships.

The invited plenary speakers brought different perspectives to the overall theme of the Symposium and were:

- Giselda Durigan (Brazil) “Cerrado ecology, ecosystem services and management decisions”;
- Marcelo Tabarelli (Brazil) “Chronic antropogenic disturbances in tropical forests: negative impacts from population to ecosystem level”;
- William Bond (South Africa) “Conservation challenges in savanna/forest mosaics”;
- José Paruelo (Argentina) “From vegetation science to ecosystem services assessment”;
- Daniel Simberloff (USA) “Invasion of tropical plant communities: fewer than those of elsewhere? Does it matter?”;
- Hanna Tuomisto (Finland) “Diversity in Amazonian rain forests: scaling up from local communities to conservation planning”;
- Pille Gerhold (Estonia) “Don’t put all your eggs in one basket: measuring phylogenetic diversity in ecosystems” and
- Fabio Scarano (Brazil) “Ecosystem-based adaptation to climate change: an opportunity for Brazil”.

The final session of the Symposium was a Tribute to Robert Peet (USA) in recognition of his contribution and dedication to IAVS.

A total of 151 contributed talks and posters were presented in 15 sessions. The open sessions covered a range of topics within the general theme of the Symposium and the scope of IAVS. The open sessions and their respective number of presentations were:

- “Functional and phylogenetic patterns in plant communities” (25);
- “Structure and dynamics of plant communities (14);
- Conservation of plant communities: from science to policy” (11);
- “Climate change and plant communities” (10);
- “Fire and grazing in non-forest vegetation” (7);
- “Multivariate methods in vegetation science” (6);
- “Classification of plant communities” (5);
- “Community assembly and species diversity”(5);
- “Underground processes in plant communities” (3) and
- “Linking vegetation to ecosystem services” (1).

All sessions were ably coordinated by the chairs of each session.

Six special sessions were proposed and convened to map the current state of research on selected topics or in selected sub-disciplines of vegetation science. These were:

- “Applied mapping for conservation and management” convened by Franco Pedrotti with 14 oral and poster presentations;
- “Concepts in ecological stability” convened by



© J. Hay

In the Vagafogo Wildlife Sanctuary.

- Valério Pillar with 4 oral presentations;
- “Historical human legacy in vegetation” convened by Radim Hédl with 5 oral presentations;
- “Plant community invasion” convened by Vânia Pivello with 12 oral and poster presentations);
- “Plant strategies and disturbance” convened by Alessandra Fidelis and Jitka Klimešová with 12 oral and poster presentations;
- “Restoration of subtropical and tropical grasslands and savannas” convened by Gerhard Overbeck with 15 oral and poster presentations.

Along with the normal and special sessions, there were also two sessions on Communication in Science, the first organized by Peter Minchin on “How to use social media in science and the second by Michael Palmer on “How to write an effective manuscript review in Vegetation Science” and both were well attended.

As in past annual symposia, the IAVS recognized the young scientists who made the best oral and poster presentations. This year there was a tie for first place for the best oral presentation between Anina Coetzee “The importance of Proteaceae species richness in providing nectar resources” and Michele Dechoum “Factors controlling grassland occupancy by shrubs in montane systems in Southern Brazil” and Elisabeth Gorgone Barbosa received an Honorable Mention for her oral talk. In the category of best poster Nathalia Bonani “How is fire affecting the germination of legume species? The study of Cerrado and forest species” was awarded first place and Honorable Mention was given to Anaclara Guido and Joosep Sarapuu

Excursions

There were 10 excursions prior, during and after the Symposium with a total of 243 participants; some attendees participated in more than one excursion. Four pre-Symposium excursions were held in three different Brazilian biomes, one in the Caatinga (thorn shrub forest in northeastern Brazil), two in the Atlantic Forest (one in the state of São Paulo and the other in the state of Espírito Santo) and one to the Cerrado near Brasília. The first three excursions were between 4 to 6 days long and the last was a short excursion. The mid-symposium excursions were a great opportunity to introduce different physiognomies of the Cerrado (our savanna) to the participants. The post-Symposium Excursion was devoted to the Cerrado. In all of the excursions, the participants experienced the variety and richness of the flora in the plant communities and in some cases, even the excursion leaders and the participants in the excursion were at a loss to give a name to some of the encountered species (see below for an example). On a positive note, in some of the excursions the participants encountered plant families that were new to them.

Pre-Symposium Excursions

Pre-Symposium Excursion 1 (June 7–11) – Caatinga (group leaders: Marcelo Tabarelli, Inara Leal) to the Catimbau National Park in the state of Pernambuco, northeastern Brazil. During five days the 4 participants, saw one of the last preserved areas of caatinga (thorn shrub forest) in Brazil. This Park cover over 600 km², ranges in altitude from 700 to 900 m, located 293 km west from Recife (Pernambuco) and is the core region of the Caatinga Biosphere Reserve. The excursion was based at a central point and on each day a different area of the Park or region was visited. The local vegetation is a thorn shrub forest with high number of species and different structure, typical caatinga species are dominant (bromeliads and cactus) but some species from cerrado, mountain (rocky fields), Atlantic Forest and coastal forest are also present. Aside from biological diversity, the Park is Brazil’s second largest archaeological site, with more than 30 archeological sites, rupestrian paintings and artefacts dated to at least 6000 years bp. Aside from its floristic richness, the park area has at least 150 birds species, some are endemic.

Pre-Symposium Excursion 2 (June 6–11) – Atlantic Rainforest (group leaders: Alessandra Fidelis, Julio Lombardi, Reinaldo Monteiro) – the 19 participants made an elevational transect in the Atlantic forest from the coast (dune, mangrove, restinga vegetation), to up the Montane Atlantic Rainforest (Pedra da Macela – 1840 m). The initial part of the excursion was in the coastal zone, and the participants walked through dunes, coastal vegetation (restinga), Lowland Atlantic Rainforest and mangrove communities. On the fourth day the excursion left the coastal zone and travelled to Cunha (Estrada Real or King’s Highway) and trekking to the Pedra da Macela at 1840 m above sea level. And the last day before travelling back to São Paulo, included walking in the montane Atlantic Rainforest to see local plant diversity, highest trees, epiphytes and forests with different structures and regeneration stages.

Pre-Symposium Excursion 3 (June 7–10) – Coastal forests and dunes (group leaders: Luis Fernando Tavares de Menezes, Dorothy S. Araujo and Gloria Matallana) – the 12 participants started the excursion in the Itaúnas State Park (3481 ha), the vegetation local called Restingas (coastal forests) and dunes on sandy coastal plains that have their origin in marine deposits of the Quaternary period. After the visit to the restinga the excursion went to the Vale Natural Reserve (23000 ha) to explore the “Floresta de Tabuleiros” that is considered to have a highest floristic diversity. Parts of this Reserve were originally planted with *Eucalyptus* to supply sleepers for Brazilian railways, but these areas have been abandoned. The final stage of the excursion was in the area near the city of Santa Teresa, a city



Participants of the Pre-Symposium Excursion to Caatinga (above) and to Atlantic Rainforest (below).



that combines the beauty of the Atlantic Forest with the style and influence of Italian culture in Brazil. A visit was made to the Biological Station of St. Lucia, with remnants of the Atlantic forest and with one of the highest tree species richness (430 species per hectare) in the world. The station also hosts the highest richness index for birds and butterflies in the Brazilian Atlantic Forest and has been qualified as the second most diverse Neotropical forest for non-flying mammals. The participants visited the Museu de Biologia Mello Leitão (MBML) in Santa Teresa. This museum was founded in 1949 by Brazilian naturalist Augusto Ruschi, has the objectives to collect species of plants and animals for scientific purposes, biological research, especially the flora and fauna of the Atlantic Rainforest, environmental education and the preservation of Augusto Ruschi's memory.

Short one-day Pre-Symposium Excursion (June 12) - Chapada Imperial (group leaders: Vicente Arcela and Dulce Rocha) – the 30 participants in this excursion trekked along one of the three trails at Chapada Imperial, a private preservation of 4800 ha area about 50 km from Brasília. The trail passed through several different Cerrado physiognomies, including gallery forest, cerrado, wet and dry fields. On route to this venue a short stop was made to visit another community found in some areas of the cerrado, the murundus or small earth mounds which have a species composition completely different from the surrounding matrix of wet or moist grassland.

Mid-Symposium Excursions

Mid-Symposium Excursion 1 to the Serra dos Pirineus State Park (group leaders: Vicente Arcela and Camilla Casella) – the 42 participants trekked in the Serra dos Pirineus. The excursion included several different Cerrado physiognomies, ranging from gallery forest, cerrado to wet and dry fields and at the end of the day the participants had a chance to refresh at a waterfall.

Mid-Symposium Excursion 2 to another part of the Serra dos Pirineus State Park (group leaders: Washington Oliveira and Alexandre Sampaio) – the 50 participants started with a scenic overview of the whole Park from the top of Três Picos, the second highest peak in the state of Goiás (1385 m). After this the participants in this excursion visited areas of cerrado and “campo rupestre” (high altitude rocky field).

Mid-Symposium Excursion 3 to the Vagafogo Wildlife Sanctuary (group leaders: Bruno Walter and Fabio Venturoli) – the 29 participants visited a private property maintained by the owners to protect areas of native semideciduous forest. During the excursion it was possible to visit the semideciduous forest that is characteristic of the region and also some areas of Cerrado vegetation. Some members of this

excursion were surprised by the height of the trees in the forest (>20 m). The owners of the reserve have a small collection of bromeliads and orchids that were appreciated by participants as well as the colonial brunch provided during the visit. The participants in this excursion also accompanied the release of a group of birds that had been rescued by the National Agency for Environmental Protection.

Mid-Symposium Excursion 4 to Abade Waterfall (group leader: Marcelo Simon) – the 31 participants trekked along trails to the Abade and Canyon waterfalls through different Cerrado physiognomies. Unfortunately a side trail with a few individuals of an endemic species (*Tibouchina papyrus*) was closed, but there is a photo of it below. At the end of the trek and before lunch some participants enjoyed one of the typical recreational events of this region of Brazil and swam in the pool under the waterfall. One of the “highlights” of this excursion was a close encounter with a “jararaca” (*Bothrops* sp.), one of the poisonous snakes found in the region, which presented itself for a photo-op.

Mid-Symposium Excursion 6 to Babilônia Farm (group leader: John Hay) – the 6 participants had a guided tour of the Babilônia Farm and were told about the history of the region. The Babilônia Farm was established in 18th century and during several years was one of the largest sugar cane processing sites in central Brazil and is the oldest in Goiás state. After a lunch of local products, the participants made a short excursion to a Cerrado.

Post-Symposium Excursion

Post-Symposium Excursion 1 (June 18–23) - National Park of Chapada dos Veadeiros (group leaders: Cássia B. Munhoz, José Roberto R. Pinto, Manuel Claudio Silva, Carolyn B. Proença and Dulce Rocha) – the 30 participants visited several different physiognomies during this excursion. On route to the Chapada dos Veadeiros, a short stop was made at a site with serpentine soil. The first full day of the excursion was dedicated to visiting areas of semideciduous forest including an area with *Cavanillesia arborea* (Brazilian baobab). The second day was in the National Park of the Chapada dos Veadeiros with a trek through Cerrado and grass physiognomies. On the third day the excursion went to the highest peak in the Cerrado region, Pouso Alto (1676 m), although there was not enough time to get to the summit and also to an area with gallery forests. The final day of the excursion included a visit to a “vereda” (palm swamp) and a rocky cerrado. There was also time to visit a mushroom farm where the participants could watch the sunset over the local mountains.

Social Events and Miscellanea

Along with the scientific program, various meetings were realized during the symposium. These included the meeting of the Editorial Board, the IAVS Council, the Travel Grants Awardee Lunch, a meeting of the Young Scientists Group and the Vegetation Classification Working Group. The Symposium also had the presence of a representative from Wiley publishing.

The Welcome reception on June 12, that also is Valentines's Day in Brazil, was a "festa junina" (June festival) that is typical for this time of year in Brazil and typical food, made from corn, and drinks for this time of year was served. After the food and drinks, all participants were invited to participate to dance in the quadrilha (a folk dance with origins in the Azores, England and France) that was animated by a local musical group.

The Symposium dinner, this year included in the Registration fee, was a typical Brazilian barbecue, with different cuts of beef roasted over charcoal and also included a vegetarian option, that was also appreciated by all participants. A local musician played Brazilian popular music and all participants were invited to dance.

There were also two novel aspects in this year's Symposium: 1) the use of Whova, a mobile app that permitted real time updates of the program and 2) a silent auction.



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Tibouchina papyrus in the Abade Reserve.



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Participants of the Mid-Symposium Excursion to Serra dos Pirenéus State Park.

The Whova app had a mixed acceptance by the participants in the Symposium, but overall it was well rated by those who used it. It was especially useful for communicating changes in the program, both of changes of rooms and alteration of speakers and for interactions among those who registered for the APP.

The Silent Auction received 26 donations from 11 countries, Brazil, Czech Republic, Estonia, France, Hungary, Italy, Japan, New Zealand, Scotland, Spain and the US and included books, different chocolates, local products from Pirenópolis, liquors, whiskey, t-shirts, different wines and spirits and field notebooks. The funds raised from this auction were used to help defray expenses of the student volunteers.

Acknowledgements

We are especially grateful for IAVS for choosing Brazil again to hold this Symposium and for the

possibility to integrate several administrative aspects, set-up of the web site and possibility of receiving registration information into the planning of the Symposium with a special thanks to Stefan Bradham for his assistance in interfacing between the Local Organizing Committee and IAVS. The realization of this Symposium in Brazil was an excellent opportunity for many students, especially Brazilian, to participate, contribute and interact with others students and vegetation scientists from around the world, not virtually but personally. The success of this Symposium was also due to the effort and hard work of Valério Pillar, Alessandra Fidelis, Vania Pivello and also to all students and excursions guides without whom it would not have been possible to realize these events. A special thanks should also be given to three people who tirelessly worked in the Secretary's Office, Diana Hay, Luis Carlos Silva and Naomi Sato, for their dedication and good humor during the event. And, last but not least, to all of the participants of the Symposium.



Serenade at waterfall in Chapada dos Veadeiros during the Post-Symposium excursion.



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Young Scientist Working Group meeting (above).

Participants of the Pre-Symposium Excursion 2 to Atlantic-Rainforest (below).



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A Look Forward

61st IAVS Annual Symposium, Bozeman, Montana, USA, 2018

By Dave Roberts and Peter Minchin

The 2018 IAVS 61st Annual Symposium will be held July 22–27, 2018 at Montana State University in Bozeman, Montana, USA. Bozeman is located in the Greater Yellowstone Area close to the Crown of the Continent of the northern Rocky Mountains. The timing of the symposium is optimal to see the subalpine and alpine flora in flower and will also allow participants to attend the 103rd Annual Conference of the Ecological Society of America, which is August 5–10 in New Orleans, Louisiana if they wish.

Given the magnificent natural setting, we chose the primary theme of the meeting as “Natural Ecosystems as Benchmarks for Vegetation Science”. Anticipated sub-themes include:

- Theory and Methods in Vegetation Science
- Species Pools Across Scales: An Integrative Perspective
- Vegetation Science in Natural Resource Management
- The US National Vegetation Classification Effort

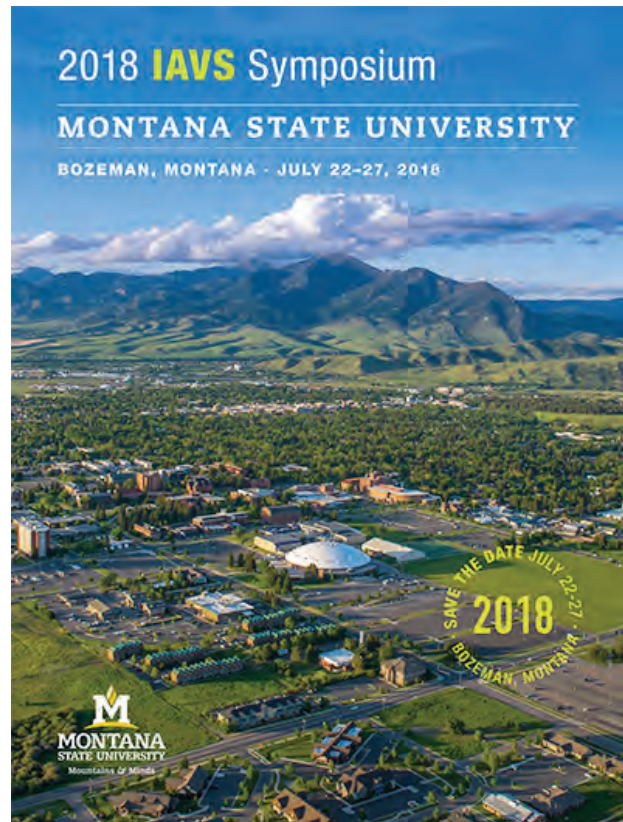
Proposals for special sessions are welcome.

Excursions

Pre- and post-symposium excursions will visit regional grassland, steppe, forest, and alpine vegetation. The primary pre-symposium excursion will leave Bozeman on Tuesday July 17 for five days (four nights), traveling through the beautiful Swan River Valley to Whitefish, Montana, followed by visits to the extraordinary Glacier National Park, and National Forests in the northern Rocky Mountains. The excursion will return to Bozeman on Sunday July 22 in time for the opening social.

The primary post-symposium excursion will leave Bozeman on Saturday July 28 for five days (four nights), visiting Beartooth Plateau, Yellowstone National Park, and Grand Teton National Park. The excursion will return to Bozeman on Wednesday August 1. The capacity of each of these excursions will be around 40. Costs have not yet been accurately determined.

A selection of one-day mid-symposium excursions will be provided to local grasslands, forests, and cultural/historic sites on Wednesday July 25, with costs included in registration.



Workshops

Based on feedback from the 60th IAVS Symposium in Palermo, we plan to schedule a full day for workshops and working group meetings. Facilities will be provided on campus for groups to meet Sunday July 22 for half- or full-day sessions. Please let us know if you would like to hold a workshop or meeting.

Venue and Accommodation

The symposium will be held at the conference center in the Montana State University Student Union Building, with capacity for 500+ people. There will be plenty of hotel rooms (cost about \$130/night) as well as student dormitories for budget accommodation (\$23/night for shared rooms, \$28/night for single rooms). A shuttle bus service will be provided between the three or four official conference hotels and the conference venue. We will post registration fees and accurate accommodation costs as soon as they can be determined.

The weather in Bozeman in July is usually warm, with an average daily maximum of 28 °C, an average overnight minimum of 10 °C, and a mean rainfall of 36 mm.

Travel to Bozeman

Bozeman can be readily reached by connections to Bozeman-Yellowstone International Airport (BZN). Direct flights from the east arrive from Minneapolis and Denver, with connections to New York, Newark, Philadelphia, Washington, and Atlanta. Direct flights from the west arrive from Seattle, Portland, Los Angeles, and San Francisco. The selected conference hotels will provide airport shuttle services and a shuttle bus will be provided for people staying in student dormitories.

Local Organizing Committee

- David W. Roberts, Montana State University (co -chair), droberts@montana.edu
- Peter R. Minchin, Southern Illinois University Edwardsville (co-chair), pminchi@siue.edu
- Mr. Kent Houston, US Forest Service (retired)
- Dr. Stephen V. Cooper IV, Montana Natural Heritage (retired)

A scientific committee is currently being formed.

Important Deadlines

- Special session and work shop proposals 15 January 2018
- IAVS travel grant applications and abstracts 19 February 2018
- Travel grant decisions announced 26 March 2018
- Regular abstract submission 5 March 2018
- Decision letters on abstracts 26 March 2018
- Final date for early registration with reduced fees April 30 2018
- Final date for late registration 25 June 2018

Link to survey

In order to help us estimate the number attending, the type of accommodation required, and participation in the pre- and post-symposium excursions, we have setup a short on-line survey. Please take the survey as soon as possible and no later than 30 September, 2017.

To access the survey please click on the following link:

<https://www.surveymonkey.com/r/2018iavsbozeman>



© P. Minchin

Dodecatheon pulchellum (pretty shooting star) in Yellowstone National Park.

Forum

Multivariate Analysis of Ecological Data using Canoco 5



Course tutors: Jan Lepš & Petr Šmilauer

Applications are now being accepted for this course, to be held at the Faculty of Science in České Budějovice, Czech Republic, **from 23 January to 3 February 2018**. This popular course, offered regularly since 1997, focuses on major modern approaches to the analysis of multivariate data, and is specially designed for researchers and students in all fields of ecology and conservation.

In-depth lectures and practical sessions cover the following topics:

- Traditional ordination methods (PCA, DCA, PCO, NMDS)
- Constrained ordination methods (CCA, RDA), including partial analyses, variation partitioning, principal response curves, and permutation tests of multivariate hypotheses
- Tuition on the efficient use of Canoco software and correct interpretation of ordination diagrams; all practicals are run with Canoco 5

- Course participants are expected to bring data from their own projects and will be given time to apply methods mastered during the course to their own datasets. The course lecturers will provide required guidance.

The course follows the structure of our book Šmilauer & Lepš (2014): *Multivariate Analysis of Ecological Data using Canoco 5*, 2nd edition, Cambridge University Press.

Further information about the course can be found at <http://regent.jcu.cz> and you are much welcome to address any enquiries to course manager, Petr Šmilauer, at his e-mail address: petrsm@jcu.cz.

Jan Lepš
*Department of Botany, University of South Bohemia
České Budějovice, Czech Republic*



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Participants of the Post-Symposium Excursion in the Madonie Mountains, Sicily (29 June 2017)

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IAVS Bulletin Article Submission

Have an idea for an IAVS Bulletin article? Or, would like your picture featured in the next issue? Please email the Editor at: monika.janisova@gmail.com.

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