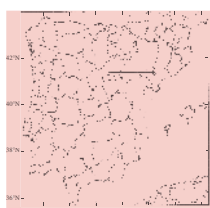


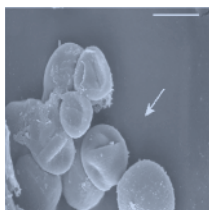
Autumn leaves on hybrid trees

What happens when a deciduous tree is crossed with an evergreen? Do half the leaves fall off, do all the leaves half-fall off, or does the habit of one parent predominate? A hybridization between two species with contrasting leaf behaviours has been described by **Steconni *et al.* (Bariloche and Buenos Aires, Argentina, pp. 775–786)** in the genus *Nothofagus*. Indeed, the way by which the hybrids were discovered helps to answer our opening questions. The authors describe two species that occur in the Nahuel Huapi National Park. In the habitat under study, the deciduous *N. antarctica* is a dominant species but there are some individuals of the evergreen *N. dombeyi*. The authors' attention was caught by the occurrence during autumn of some individual trees showing a complete range of leaf behaviour: from complete abscission through partial senescence (indicated by autumn colouration without abscission), to leaves that remained green and attached. The authors thus suspected that the trees were hybrids. They have investigated this further by examining a range of features from leaf and floral morphology to isoenzyme patterns and by subjecting the data to rigorous statistical analysis. In some of the characters investigated, the hybrids exhibit a complete range between the two parents. These include leaf behaviour (as already mentioned), certain aspects of leaf morphology and the number of flowers in staminate inflorescences. In other morphological traits, the hybrids resemble one or other parent, whilst for the informative isozymes, the putative hybrids are clearly heterozygous. The authors conclude that these individuals are indeed hybrids, probably F_1 . The distribution of the hybrids in relation to individual *N. dombeyi* trees suggests that the latter is the male parent. The authors discuss their results in relation to the evolution of *Nothofagus*. For my part, I would love to know the mechanisms that enable different leaves on the same tree to respond differently to the same environmental cues.



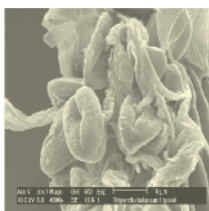
Spanish snapdragons in a shallow gene pool

I recently had a discussion with a colleague about the role of research in practical conservation. We agreed that it is important to know as much as possible about the biology, for example of threatened species, so that informed decisions may be made about appropriate measures in conservation. Thus, data on the genetic structure of populations can inform us about the origins of that population, the degree of variation within the population and the relatedness to other populations of the same species. This approach has been taken by **Isabel Mateu-Andrés (Valencia, Spain, pp. 797–804)** in a study of genetic variability (assessed by allozyme patterns for 10 different enzymes) in two rare and threatened *Antirrhinum* species: *A. subbaeticum* and *A. peretgasii*. A related but non-threatened species, *A. pulverulentum*, was included for comparison. For the two rare species, the author shows that genetic variabilities are '... the lowest known for the genus', whereas in *A. pulverulentum* the variability is much greater. Further, for *A. subbaeticum* there is clear evidence for genetic isolation of different populations, with 85 % of the genetic diversity distributed among the different populations. Overall, these data conform to the widely acknowledged correlation between population size and the extent of genetic variability. But what has all this to do with practical conservation? Firstly, it shows that these threatened species, especially if individual populations become genetically isolated from each other, have higher incidences of inbreeding and genetic drift, leading to a lowered evolutionary potential. Secondly, the data indicate the need for a good germplasm bank for these species. Thirdly, the author suggests that for *A. subbaeticum*, with its high degree of diversity between populations, it is not a good idea to try to repopulate one region with plants or seeds from another. And, perhaps obviously, steps should be taken to protect the plants from those factors that pose the greatest threats.



UV or not UV? — that is the question

Global climate change is, quite rightly, a matter of major concern but our focus on it means that other environmental problems may not be receiving appropriate attention. An example of this is ozone depletion and the concomitant increase in UV-B irradiation. This concern seems to have dropped out of public and scientific headlines in recent years. Nevertheless, as pointed out by **Koti *et al.*** (**Mississippi State University and USDA/ARS, Beltsville, pp. 855–864**), the problem is still very much with us. Indeed, although measures have been taken to reduce ozone loss, it is unlikely that we will see an improvement for several years to come. It therefore continues to be important to study the effects of increased UV-B irradiation on plant performance. The authors exposed soybean plants to a range of UV-B radiation intensities for 8 h per day from seedling emergence onwards. They then measured aspects of reproductive performance, including the size of flowers and floral organs, pollen production, pollen viability and pollen tube growth. The results show clearly that exposure to UV-B reduced the size of flowers and of floral organs, decreased pollen production, lowered pollen viability and slowed pollen tube growth. Indeed, at the highest exposures, pollen grains were shrivelled and lacked the apertures that may aid pollen germination. The authors comment that developing pollen grains had previously been thought to be protected from UV-B by the perianth. But their results show clearly that UV-B affects pollen quality, perhaps by indirect means. The authors used all their results to construct a UV-B sensitivity index or combined response index for each variety. Although all the varieties of soybean they used showed some vulnerability to UV-B, some were obviously much less affected than others, enabling them to designate some varieties as UV-B tolerant. These varieties will be important in breeding programmes aimed at improving crop performance under conditions of increased UV-B irradiance.



Trigonella breeding biology — playing home or away

How does one establish breeding programmes for crop species that have, so far, received relatively little attention? That question lies behind the work of **Nair *et al.*** (**Adelaide, Australia, pp. 883–888**). They have worked on *Trigonella balansae*, a Eurasian legume that is capable of productive growth in alkaline soils in areas that receive less than 400 mm annual rainfall. The authors point out that this makes *T. balansae* potentially useful in temperate zones of Australia. Further, it is readily nodulated by local strains of *Rhizobium meliloti* and thus could complement or even replace *Medicago* species in some farming systems. However, before any breeding to improve performance is undertaken, the characteristics of the plant's breeding system must be established. This was the aim of the work presented in this paper. The study included an investigation of floral morphology, a comparison of non-self with self-pollination, the role of vectors in pollination and the extent of inbreeding depression. The species is completely self-fertile, with a relatively low level of inbreeding depression, but selfing cannot occur in the absence of vectors because of the spatial arrangement of anthers and stigma at the time of anthesis. However, vectors such as bees are able to effect the transfer of both self and non-self pollen to receptive stigmatic surfaces. The breeding system is thus described as mixed but the authors suggest that it is likely, because of the structure of the florets at the time of anthesis, for there to be a greater tendency to outbreeding. This suggestion is supported by their measurement of the actual selfing rate. This paper thus represents clear progress in understanding the breeding system in a potential new crop. However, the authors' cautious final statement is that this study of one population cannot be used to generalize about the whole species. There is more work still to be done.

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