

HAUSTORIUM

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STATUS OF HAUSTORIUM

Haustorium is the official organ of the International Parasitic Plant Society (IPPS) and is published twice yearly.

We are pleased to acknowledge that Old Dominion University continues to support the printing and mailing of Haustorium.

Many readers are already receiving Haustorium by Email. If any more of you wish to do so, please let Chris Parker know (Email address on the last page). Bear in mind that having an electronic version of the newsletter enables you to 'search' for selected key words.

The web-site version of this issue and past issues of Haustorium are available on <http://web.odu.edu/haustorium>, and on the IPPS site – <http://www.ppws.vt.edu/IPPS/>

IPPS EDITORIAL BOARD ESTABLISHED

I am pleased to announce the formation of an Editorial Board for IPPS. This represents a new mechanism for IPPS to generate and review information of interest to parasitic plant researchers. The objective of having an Editorial Board is to assist in producing the publications of our Society. Specifically, the job of the Editorial Board members is to 1) participate in discussions on the form and function of Haustorium, and 2) contribute occasional content or editing to the newsletter. At some point in the future, IPPS may also produce other publications and the Editorial Board will assist in shaping the form and content of these as well.

The Editorial Board was selected to represent a diversity of expertise and perspectives, and each member represents a specific discipline. In addition, the Board reflects much of the geographical diversity of our society. Editorial Board members are:

Agronomy	Charlie Riches
Anatomy	Brian Fineran
Biochemistry	Philippe Simier
Biotech	Jonny Gressel
Breeding	Rositza Batchvarova
Chemistry	Koichi Yoneyama
Ecophysiology	Kushan Tennakoon
Taxonomy	Dan Nickrent

An important feature of the Editorial Board is this wide range of perspectives it will bring to Haustorium. We hope that this will encourage an increase in the number and diversity of articles in Haustorium and also ease the work load needed to publish each issue. One of the keys to the success of any society is involvement of its membership, and this Board represents a positive step in that direction. We are grateful to these individuals for sharing their time and talents with IPPS.

Jim Westwood

CIMMYT UNVEILS HERBICIDE- COATED MAIZE SEED TECHNOLOGY FOR *STRIGA* CONTROL

New, locally adapted, herbicide-resistant, open pollinated and hybrid maize varieties along with the seed-coating technology for *Striga* control were described to seed and chemical companies as well as pesticide

and seed variety regulators in Eastern and Southern Africa in a two and a half day meeting in early July, 2002, at Kisumu, Kenya. *Striga* infests an estimated 20 to 40 million hectares of farmland cultivated by poor farmers throughout sub-Saharan Africa. In Kenya, an estimated 150,000 ha of land are infested (76 % of farmland in Western Kenya) causing an estimated crop loss valued at about US\$38 million. In sub-Saharan Africa, the value of yield lost annually to *Striga* is estimated at US\$1 billion, affecting the welfare and livelihood of over 100 million people. Heretofore alternative *Striga* control methods have not gained wide acceptance by farmers because they were not cost effective or did not fit well into the existing cropping systems, including intercropping with sensitive legumes as often practiced by small-scale African farmers.

On the first day of the meeting, scientists described years of research by CIMMYT in collaboration with the Weizmann Institute of Science (Israel) (with funding from the Rockefeller Foundation) to develop the varieties and the control package for *Striga* control in maize. It combines low doses (as little as 30 grams per hectare) of a systemic acetolactate synthase-inhibiting herbicide such as imazapyr or pyrithiobac as a seed coating with imidazolinone-resistant (IR) maize seed. Field researchers from four east African countries described how the treatment leaves a field virtually clear of emerging *Striga* stalks up to harvest, and allows intercropping with legumes as long as the legume is interplanted between the maize rows at least 12 cm from the treated maize seed. Since the maize seed is treated, there is no need or added cost for spraying equipment and no possibility of off-target application. The herbicide is compatible with commonly-used fungicide/insecticide seed dressings, and is applied with them. With effective *Striga* control, the potential for returns on inputs such as fertilizers and other pest control products is greatly improved. The CIMMYT breeders described the laborious process of transferring the mutant IR gene from a Pioneer hybrid into a locally adapted background that has superior streak virus and fungal disease resistance. The regulators described the hurdles that must

be overcome to register the herbicide and its new form of application, and the new varieties. Representatives of the chemical companies described perceived problems in marketing – initially the material should be available only to seed companies to prevent farmers from losing their crops by treating non-IR maize. An economist and representatives of the seed companies described their perceptions of the market. However, no one was overly excited at the end of the first day.

The second day was devoted to visiting two experiment stations, and a large number of farmers' fields in heavily infested areas of western Kenya, up to the Uganda border. Huge differences between the treated and non-treated plots were seen at the Kibos experiment station, the first stop of the tour; *Striga* had clearly bewitched the untreated maize but the infested maize was still standing. This was not the case in farmers' fields where almost totally devastated plots of farmers' maize in full *Striga* bloom stood in stark contrast beside clean normal stands of herbicide-treated IR-maize. The herbicide treatments more than tripled yields (on average) when there were more than ten *Striga* plants emerging per square meter in the farmers fields (Fig. 1). Even with low infestations, most farmers reported significantly improved yields.

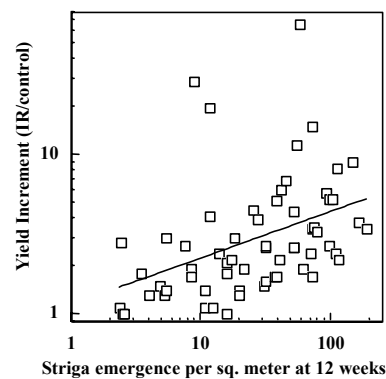


Figure 1. Increased yields of herbicide treated IR-maize as a function of *Striga* infestation. Yields of two imazapyr-treated locally-adapted CIMMYT IR-maize (averaged) were compared with (divided by) those of the untreated local landrace (Nyamulla) and commercial hybrid H513 (averaged).

Interviews with the farmers clearly affected the participants, especially when the farmers volunteered that they would pay much more for the technology than the seed producers estimated to charge. Seed companies have already developed a market for quality hybrid maize among subsistence farmers in nearby non-infested areas, and there is a realization for the large market potential where *Striga* is prevalent. The excitement from seeing the field trials was apparent on the third day when seed companies expressed strong interest in acquiring the technology. The plight of the farmers was not ignored by the regulators who discussed methods of fast-tracking chemical and varietal registrations for the *Striga* hot spots. It is anticipated that IR-maize lines adapted to the *Striga* infested agro-ecology of western Kenya will be released by CIMMYT to seed companies before the coming season, who will begin the process of certification and bulking up. Meanwhile CIMMYT breeders are developing additional varieties appropriate for other areas in sub-Saharan Africa where *Striga* is endemic.

Fred Kanampiu and Dennis Friesen, CIMMYT, Kenya
Jonathan Gressel, Weizmann Institute of Science, Israel

SORGHUM CULTIVARS RELEASED IN TANZANIA

Following extensive laboratory testing and participatory evaluation by farmers on *Striga* infested land in the Lake and Central zones of Tanzania, two white grained, early maturing sorghum cultivars have been approved for release by the national seed registration authority. Both lines were developed at Purdue University, USA. Line P9405 has been registered with the Swahili name HAKIKA (meaning 'be sure' i.e. that the farmer is sure to harvest something even from *Striga* infested fields) while P9406 has been named WAHI (meaning 'early' to indicate the early maturity of this material). Both lines have been evaluated on-farm over the past six years and have been found by farmer groups to support lower numbers of *S. hermonthica* or *S. asiatica* and to produce higher yields on infested fields compared to previously available local land races and cultivars. The early maturity, drought tolerance, grain quality and taste of these lines have also impressed farmers. Laboratory studies

undertaken at the University of Sheffield, UK, partners in this project funded by the Crop Protection Programme of the UK Department for International Development, have confirmed the *Striga* tolerance of both lines in terms of maintenance of stem biomass. HAKIKA shows a high degree of tolerance to *S. hermonthica* even at low nitrogen availability, equivalent to conditions in many continuously cultivated fields that farmers identify to have low and declining soil fertility.

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MISTLETOE SYMPOSIUM IN CAIRNS, AUSTRALIA

The Third International Canopy Conference was held in Cairns, Queensland, Australia from June 23-28, 2002. One of the symposia presented during that week was entitled 'Conservation, biodiversity, and management of mistletoes' and was co-organized by Dave Shaw (Wind River Canopy Crane Research Facility, Carson, Washington, USA) and Daniel Nickrent (Southern Illinois University, Carbondale, Illinois, USA). The symposium had a plenary session entitled 'Parasites in the Canopy: Mistletoe Evolution and Ecology' that included the following talks: Dan Nickrent 'Origin and phylogeny of the mistletoes,' Gerhard Glatzel 'Physiological ecology of mistletoes,' Nick Reid, Mark Stafford Smith, and Jake Overton 'Birds and mistletoes,' Robert Mathiasen 'Ecology of dwarf mistletoes,' and Bryan Barlow and Del Wiens 'Epi-parasitism in mistletoes, a neglected phenomenon in forest canopy biology.' In addition, there were the following contributed papers: Peter Bannister, Graham L. Strong and Inge Andrew 'Is differential accumulation of elements in leaves of mistletoes and their hosts related to greater water loss in mistletoes?' David C. Shaw 'Ecology of *Arceuthobium tsugense* (Viscaceae), Cascade Mts. USA,' and David M. Watson 'Mistletoe as a keystone resource: a progress report.' Because of cancellations (Jose Kallarackal et al. and Mohan P. Devkota), we had time slots open that were filled by David Norton (University of Canterbury, New Zealand) who spoke on his research on the ecology and conservation of New Zealand mistletoes, such as *Peraxilla tetrapetala*.

In addition to presented papers, there were four posters dealing with mistletoes: Jon Cabrera and Dan Nickrent 'Historical biogeography of Loranthaceae inferred from chloroplast matK sequences,' Mohan Devkota and Gerhard Glatzel 'Mistletoes of the Annapurna Conservation Area, Central Nepal,' Ainsley Calladine 'Evolution of the mistletoe family Loranthaceae in Australia,' and Wilfried Morawetz 'Investigations on the ecology of the Loranthaceae and Viscaceae in the upper Orinoco (Venezuela).' To view the abstracts from the plenary and contributed papers, see:

<http://www.science.siu.edu/parasitic-plants/MistletoeAbstracts.html>

On June 26, a group of enthusiastic 'mistletoers' were treated to a marvellous field trip lead by Bryan Barlow. We began by visiting the mangrove swamp near the Cairns airport where we saw *Lysiana maritima* and *Amyema mackayense*. The next stops were Trinity beach and Pebble beach where we saw *Amyema queenslandica*, *Dendrophthoe vitellina*, *Lysiana subfalcata*, and *Cansjera leptostachya* (Opiliaceae). Although not a mistletoe, our stop at Kingfisher Park to see *Balanophora fungosa* was a treat for some of us! A parasite of *Melaleuca viridiflora*, *Diplatia tomentosa*, was next seen at Abattoir Swamp. In Atherton we got to see the flowers and fruits of *Amylotheca dictyophleba* thanks to the tree climbing ability of Nick Reid! North of Tolga, where we had a wonderful lunch by the way, we saw the beautiful *Decaisnina brittenii* parasitic on *Lophostemon suaveolens*. Finally, the 'pièce de résistance' or possibly the 'coup de grâce' for those who had had quite enough, was the tree on Hastie road near Atherton that contained, all in one clump (and including some epiparasites): *Dendrophthoe curvata*, *D. vitellina*, *Amyema queenslandica*, *A. glabra*, *Notothixos subaureus*, and *Viscum articulatum*! So, an even dozen mistletoe species in seven genera in one day; where else besides Australia can one do that?

Dan Nickrent, Southern Illinois University, Carbondale, USA

SANDALWOOD RESEARCH NEWSLETTER

Further to the item in Haustorium 41, please note that the editor is now Jon Brand, Dept. of Conservation and Land Management, Bag 104,

Bentley, WA 6983, Australia; email jonb@calm.wa.gov.au; fax 61-8-93340327. Issue 16 was published in July 2002 and includes 3 articles noted in the Literature section below under Vernes and Robson, 2002, TueMan Luong, 2002, and Angadi *et al.*, 2002.

CALLING ALL PARASITICULTURALISTS

Greetings fellow Haustorium readers. I am a recent initiate to your group but am very keen to expand our knowledge regarding the horticulture of the more spectacular plant parasites. I have been growing a wide range of unusual plants for most of my life and would like to add parasites to the list, provided material can be made more widely available. I am interested in hearing expressions of interest in setting up a seed-bank for members to access, featuring seed of plant parasites which might be of horticultural interest (but probably excluding those known to parasitise any crops of economic importance). Plants such as *Hydnora*, *Cynomoria*, *Cytinus*, *Tristerix aphyllus* and *Viscum minimum* spring to mind. I should be able to personally contribute seeds of a few Australian mistletoes. If you might be able to supply material or are keen to obtain particular species, please contact me.

Shane Simonsen, 6 Edgar Street, West End 4101, Queensland, Australia.

Email: void_genesis@hotmail.com

MISTLETOES OF NORTH AMERICAN CONIFERS

At the request of the North American Forestry Commission, the Rocky Mountain Research Station in partnership with the Canadian Forest Service and Mexican Sanidad Forestal has published a general guide and literature review, *Mistletoes of North American Conifers*. The guide provides resource managers, foresters, arborists, and land owners with a recent, practical, and user-appropriate summary of literature and current research on the leafy and dwarf mistletoes in North America (includes over 600 references, most published since 1990). Information is presented for the three major genera of mistletoes on their hosts, distribution, life cycle, damage, ecological effects, and economic importance. Current and emerging methods for the survey and management of infested trees and stands with biological,

chemical, genetic, and cultural approaches are described. These approaches especially consider situations where resources are managed for timber or non-timber objectives such as wildlife or wildfire hazard reduction. A Spanish translation is being prepared.

Copies of Geils, Cibrián, and Moody (2002) [*Mistletoes of North American Conifers*. Gen. Tech. Rep. RMRS-GTR-98. Ogden UT:U.S. Dept. Agric. Forest Service, Rocky Mountain Research Station. 123 p.] are freely available through several means. The publication is on-line at http://www.fs.fed.us/rm/pubs/rmrs_gtr098.pdf. Individual or several printed copies can be requested from the Rocky Mountain Research Station by phone (970-498-1392), mail (Richard Schneider, USDA Forest Service, Rocky Mountain Research Station, 240 W Prospect Road, Fort Collins, CO 80526), or Internet (<http://www.fs.fed.us/rm/main/pubs/order.html>). The publication is intended for a general audience; therefore, instructors, arboreta, and others who would like to have multiple copies for their distribution are encouraged to request copies in box lots (50 per box) by contacting Brian Geils at the Rocky Mountain Research Station (bgeils@fs.fed.us or 928-556-2076).

The *Mistletoes of North American Conifers* updates, expands upon, and complements the previous technical monograph by Hawksworth and Wiens (1996) [*Dwarf Mistletoes: Biology, Pathology, and Systematics*. Agric. Handb. 709. Washington, DC: U.S. Dept. Agric. Forest Service. 410 p.]. This publication intended for botanists and pathologists can be viewed at http://www.rmrs.nau.edu/publications/ah_709/index.html. A limited supply of printed copies is also still available (contact Richard Schneider by phone, mail or Internet as listed above).

Internet links to both of these publications (and other information) are also located at the Mistletoe Center (<http://www.rmrs.nau.edu/mistletoe>). The server on which the Mistletoe Center resides is presently without a webmaster and may occasionally be unavailable. We are, however, working to obtain needed technical support for the site and intend to continue providing access to the Mistletoe Literature Database.

Brian Geils, USDA Forest Service, Rocky Mountain Research Station, 240 W Prospect

Road, Fort Collins, CO 80526. Email: bgeils@fs.fed.us

WEBSITES

For past and current issues of Haustorium see: <http://web.odu.edu/haustorium>

For information on the International Parasitic Plant Society see: <http://www.ppws.vt.edu/IPPS/>

For Lytton Musselman's Plant site see: <http://web.odu.edu/plant>

For Dan Nickrent's 'The Parasitic Plant Connection' see: <http://www.science.siu.edu/parasitic-plants/index.html>

For The Mistletoe Center (including a comprehensive Annotated Bibliography on mistletoes) see: <http://www.rmrs.nau.edu/mistletoe/welcome.html>

For on-line access to USDA Forest Service Agriculture Handbook 709 'Dwarf Mistletoes: Biology, Pathology and Systematics' see: http://www.rmrs.nau.edu/publications/ah_709/ (Brian Geils asks us to point out that, contrary to the note in Haustorium 40, some hard copies are still available – via bgeils@fs.fed.us)

For information on the Parasitic Plants mailing list 'PP listserve' see: http://www2.labs.agilent.com/botany/pp/html/pp_listserv.html

For the Parasitic Plants Database, including '4000 entries giving an exhaustive nomenclatural synopsis of all parasitic plants' see: http://www2.labs.agilent.com/bot/pp_home

For 'Hosts and geographic distribution of *Arceuthobium oxycedri*.' (version 1.0) by Ciesla, W.M., Geils, B.W. and Adams, R.P. 2001. USDA Forest Service, Fort Collins, RMRS-RN-11WWW see: http://www.fs.fed.us/rm/pubs/rmrs_rn11/

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