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MESSAGE FROM THE IPPS PRESIDENT

Dear IPPS Members,

Greetings and best wishes for 2008!

A new year brings new opportunities, challenges, and changes. Indeed, IPPS has already experienced one significant change in leadership this year. Danny Joel stepped down as President of IPPS in January and I am moving into this position from my previous role as Vice President. This is actually part of a planned change in how we manage the organization of the Executive Committee, and I will say more on this in a moment.

But let me begin by expressing my appreciation to Danny for his hard work on behalf of the society. Danny was instrumental in formalizing IPPS as an official society in 2001. He provided a large share of the leadership prior to and during the formative years, and then went on to be elected President of IPPS in 2005. Under his leadership we have had successful meetings in Durban (South Africa), Charlottesville (USA), and are already planning the next meeting in Turkey. Of course we still expect to find Danny actively participating in conferences and publishing his research, but he has earned a rest after providing seven years of outstanding leadership to IPPS.

IPPS is a young society and we are still tuning its engine to make it run smoothly. Among our challenges is how to replace officers of the society while maintaining continuity of leadership. Our initial model was to hold reelections for the entire Executive Committee (President, Vice President, Treasurer, Secretary and Members at Large) every four years, which corresponded to the cycle of major conferences. However, wholesale turnover of leadership is not healthy for a society, so we propose to modify this to begin electing half the positions in

the Executive Committee every two years such that overlap is maintained. Under this plan the Vice President will ascend to the Presidency to ensure continuity in that key position. This is consistent with the way leadership roles transition in other academic societies. We will soon be holding elections to fill the offices of Vice President, Secretary, and one Member at Large, but more information on this will be sent in a separate mailing. I encourage you to nominate, vote, and be active in your society.

Another change (that was actually initiated last year) is the schedule for the next major Congress on Parasitic Plants. The majority sentiment expressed at the last congress was that we would be better served by decreasing the span of time between major conferences. To this end we have selected Kusadasi, Turkey as a destination for 2009 (see separate announcement in this issue). The local organizing team, led by Yildiz Nemli and Ahmet Uludag, has already been busy planning and the venue looks to be exceptional. This should be a convenient destination for members from Europe, the Middle East, and Africa, so plan now to attend.

Of course, not everything changes. IPPS remains committed to fostering research and education on all aspects of parasitic plant science. We continue to draw our membership from a wide range of disciplines to address the many wonders and problems posed by parasitic plants. IPPS will continue to work to meet the needs of this diverse group, and to create mechanisms to facilitate the exchange of ideas and technologies. I look forward to the challenges and rewards of working with you and invite all members to feel free to contact me with input on all matters related to IPPS.

Jim Westwood
IPPS President

10TH WORLD CONGRESS ON PARASITIC PLANTS

8-12 June 2009, Kusadasi Turkey
 Website: <http://www.ippsturkey.com/>

Dear Colleagues,

It is with great pleasure that I invite you to the 10th World Congress on Parasitic Plants, to be held from 8 to 12 June, 2009 in Kusadasi, Turkey. Preparations are already well underway for a fantastic meeting that will embrace all aspects of parasitic plant research.

You may notice that this conference is occurring sooner than the 3-5 year interval that has traditionally separated major parasitic plant symposia, but there is good reason for this change. The rate of progress in parasitic plant research has been accelerating in recent years, and new approaches and resources have led to breakthroughs in parasite evolution, biology, ecology, host-parasite communication, and host response to parasitism. The future holds even more promise. However, despite these advances in knowledge, parasitic weeds continue to devastate crops in much of the world and farmers have few new tools at their disposal. For these reasons, participants at the 9th World Congress on Parasitic Plants agreed that a two year cycle for major meetings would provide a better timeframe for advancing our work.

Thus, in 2009 we will again assemble the world's foremost experts on parasitic plants with the objective of furthering the state of our science. Please mark your calendars now and plan to join colleagues old and new for the 10th World Congress on Parasitic Plants. This will be an outstanding event, and on behalf of the Organizing Committee and Society, we are looking forward to seeing you in Turkey.

Jim Westwood
 IPPS President

EWRS RESEARCH GROUP

Dear Colleague,

Last year the Working Group "Parasitic Weeds" was established within the European Weed Research Society, and I am the Contact Point for this working group. All the information on that can be found at the Official EWRS website at <http://www.ewrs.org>.

As a further step to keep the community connected, as promised I have created a moderated mailing list. The aim of that is to facilitate the exchange of information and news related to the parasitic weed research. Subscribers could be able to send messages to the list (or to receive them from it) regarding, for example, requests of general information, requests or announcement of publications or conferences, news about new students, projects, activities, etc. If you are interested in joining the list, please click on the following link: <http://muffin.area.ba.cnr.it/mailman/listinfo/parasiticweeds> and follow the easy instructions to register. It will take only a couple of minutes. In order to avoid any spam message, the list will be a moderated one, so that only people belonging to it will be able to send and receive messages, which will be further filtered by the moderator.

Please consider that being part of the EWRS WG "Parasitic weeds" and/or subscribing the list does not mean that you have to become a member of the EWR Society. Of course, that will be very welcomed. Moreover, the list is not restricted to European scientists.

Should you have any further questions, please do not hesitate to contact me.

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NOTES ON THE AFRICAN *STRIGA ASIATICA* SPECIES COMPLEX

The main objective of this brief note is to shed light on the differences among the species in the *Striga asiatica* cluster in Africa namely *S. asiatica*, *S. hirsuta*, *S. lutea*. The fourth species in this cluster is morphologically unique and will be discussed at the end of this message. It is important to emphasize that the south and Southeast Asian forms of *S. asiatica* are not included in this analysis since its relationship to the African species complex is not known.

The name *S. asiatica* is used to describe the obnoxious red-flowered *Striga* species which overwhelms sorghum, maize, and other cereal crops in Africa. Unlike *S. hirsuta* and *S. lutea*, *S. asiatica* plants are profusely branched with their leaves measuring up to 5 cm long and usually exceeding the length of the plant internodes. The number of the calyx teeth is usually

five but in *S. asiatica* it can be up to 8 in which case the teeth are unequal in length.

The number of rows of hairs on the lower surface of the leaves and bracts is a unique and most dependable feature that distinguishes *S. hirsuta* from *S. lutea*. *Striga hirsuta* has a single row of stiff hairs running along the margins and mid rib of its leaves and bracts. *Striga lutea* has 2 rows of hispid hairs along the margin and mid rib of its leaves and bracts. *Striga lutea* plants are characteristically tall (up to 40 cm) and lack branches but when branched there are typically just two branches. *Striga hirsuta* on the other hand is most often branched and the plants are the shortest (10 cm) in this cluster. Flower color can be of various shades of red and yellow and cannot be used alone in identification. *Striga asiatica* flowers are typically red with yellow throat. Flowers of *Striga lutea* are usually yellow and *S. hirsuta* are typically red but any of these species may occasionally have flowers of various shades of red, sometimes on the same plant. This is not unusual as the corolla color is controlled by few genes

There are also distinct differences in the geographical range of these species. Until the late eighties and early nineties *S. asiatica* was very largely confined to south and central Africa, normally south of the equator (it was also responsible for the exotic occurrence in southeastern USA). In these areas *S. asiatica* is commonly restricted to its agronomic hosts in the agro-ecosystems. Then it was reported from Kenya in the late 80's and Togo in West Africa in the early 90's. Our *Striga* surveys in West Africa and Sudan in the 80's and Ethiopia as recent as 2007 revealed that *S. asiatica* is not established as a widespread problem north of the equator, though it does occur sporadically on crops in several countries in West and East Africa. In November of 2007 we traveled for 15 days (October 27 – November 10) surveying *Striga* in Ethiopia. We reached as far south as Caves Omar and Megalo southeast of the Bale Region, North to Mekele just south of the Eritrean boarder, and east to Dire Dawa Region close to the Somali borders. We encountered *Striga asiatica* once (and only two plants) in a demonstration farm. However, in 1985/86 Chris Parker found *S. asiatica* with various corolla colors ranging from brown, red and orange sporadically attacking sorghum and maize, often quite seriously, in Hararghe and Gamo Gofa Regions of Ethiopia. *S. asiatica* had not previously been reported as a problem in Ethiopia (Parker 1988). Forms with little branching and bright scarlet flowers (*S. lutea*?) were also occasionally encountered attacking wild grasses without harming crops (Sherif, Fessehaie, and Parker 1987). *Striga*

asiatica is also known from a few collections in the Nile Delta in Egypt. These observations clearly suggest that the presence of *S. asiatica* north of the equator is relatively recent compared to its establishment in southern Africa. As suggested by Berner and his team (1994), contaminated crop grains are the main source of *Striga* spread in Africa.

S. hirsuta and *S. lutea* are present all over Africa but commonest in west and central parts of the continent, especially the savannah grassland from Senegal to Ethiopia. While *S. asiatica* is predominantly confined to crop fields *S. hirsuta* and *S. lutea* are rarely problems on crops and are confined to natural grasslands.

Striga elegans is the fourth species in this cluster however it is rarely confused with any of the other species in this cluster. It has brilliant scarlet flowers with yellow throats and dense compact inflorescence. Its distribution is limited to south and east Africa reaching its northern range in Kenya. *Striga elegans* has not been reported as a threat to crops. Our research showed that it is more closely related to *S. asiatica* than to the other two species in the cluster. No molecular study has yet been done to determine their phylogenetic relationships but it is more likely that *S. elegans* is the wild relative of *S. asiatica*. The two were sympatric in South Africa and definitely native to the region. A group of researchers from Old Dominion University, University of Georgia, and State University of New York-Oswego are studying the systematics of the genus *Striga* and its various cluster groups.

For a fuller account of *Striga* species in Africa refer to Mohamed *et al.* below.

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References:

- Berner, D.K., Cardwell, K.F., Faturoti, B.O., Ikee, F.O. and Williams, O. 1994. Relative roles of wind, crop seeds, and cattle in dispersal of *Striga* species. *Plant Disease* 78: 402-406.
- Mohamed, K.I., Musselman, L.J. and Riches, C.R. 2001. The genus *Striga* (Scrophulariaceae) in Africa. *Annals of the Missouri Botanical Garden* 88: 60-103.
- Parker, C. (1988). Parasitic plants in Ethiopia. *Walia* 11: 21-27.
- Sherif, A.M., Rezene Fessehaie and Parker, C. (1987). Parasitic weeds in Ethiopia. In: Michieka, R.W. (Ed.) *Proceedings, 11th East African Weed Science Society Conference, Nairobi, 1987*. pp. 66-72.

THREE NEW *STRIGA*- RESISTANT COWPEA VARIETIES FROM IITA

A three-year study by the International Institute of Tropical Agriculture (IITA) has resulted in the development of three new cowpea varieties with genetic resistance to *Striga gesnerioides*. These new cowpea varieties should enable Africa-based partners and farm institutions (NARS) to bring technical assistance directly to hard-hit farmers concentrated in Senegal, Mali, Burkina Faso, Niger, Benin and Cameroon. Cowpea production across sub-Saharan Africa (SSA) accounts for over 65 percent of world output, impacting on poverty and nutrition levels among more than 10 million in drought-prone areas.

The latest research was supported by \$900,000 in funding provided jointly by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the Generation Challenge Program (GCP) of The Consultative Group on International Agricultural Research (CGIAR). IITA's longstanding effort to alleviate infestations of *S. gesnerioides* has been further augmented through a new GCP initiative aimed at doubling cowpea and other legume production in drought-prone areas in SSA and South Asia, with additional funding provided by the Bill and Melinda Gates Foundation of U.S.A.

In dry areas of Nigeria, *Striga* losses have reduced cowpea productivity from 2-3 tons per hectare to 0.37 tons of annual output. 'There is a huge potential for cowpea crops to contribute to nutrition and income growth in Africa's dry and semi-arid regions,' said Dr. Satoru Muranaka, project leader based at IITA in Kano, Nigeria. 'Because of crop damage still inflicted by cowpea *Striga*, we hope our findings will contribute to greater food security in the dry and arid regions of SSA.'

Comprising over 25 % protein, cowpea provides food, sales income and residual bi-products for use as livestock feed. As a drought-tolerant crop, cowpea is adapted to dry or arid environments where rainfall is low and erratic, soils less fertile and other crops habitually fail. Cowpea also contributes to soil fertility through its ability to fix nitrogen, vital to rotational cropping systems in marginal areas.

From IITA press release 17 January 2008.

NEW UK-FUNDED RESEARCH ON *STRIGA*

The UK Biotechnology and Biological Sciences Research Council (BBSRC) and the UK Department

for International Development (DFID) have joined forces to announce £7M of new research to harness the UK's world-class bioscience research base to address the challenges facing agriculture and food security in developing countries. Under this flagship initiative - Sustainable Agriculture Research for International Development (SARID). Twelve grants have been awarded to projects which will utilize cutting edge technologies to develop sustainable agriculture solutions for farmers and communities in the developing world. The newly funded projects are collaborations between UK scientists and scientists from institutions and Universities across Africa, Asia and South America. Two of these 12 projects relate to *Striga*:

Saving staple foods from witchweed attack

Maize is the staple food for half of the population of sub-Saharan Africa, but unfortunately it is also susceptible to damage from pests and parasitic weeds, which can result in total yield loss. Parasitic witchweed is a major culprit. Researchers from the UK and Kenya are looking at new ways of tackling witchweed. Research has shown that when desmodium, a nitrogen-rich legume, is grown amongst maize, it can increase the yield from less than one tonne per hectare to over five tonnes by preventing witchweed from growing. A chemical in desmodium has been identified which interferes with the development of witchweed, the big question is 'how?' In this new study, the international team of researchers will look to identify the enzyme responsible for creating the chemical that disrupts growth of witchweed. With this information they will then be able to breed edible crop legumes, which when intercropped with maize, not only prevents witchweed from attacking the valuable maize but also provide another human food source.

Collaborators: Rothamsted Research, UK; and International Centre of Insect Physiology and Ecology, Kenya

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Defeating the witchweed famine threat

Many important subsistence crops, relied on by billions of people, are at risk of attack from a noxious parasitic plant - witchweed. Over 40% of the cereal-producing areas of sub-Saharan Africa are infested with the parasite and the livelihoods of some of the world's poorest farmers are threatened. Researchers from the UK, India and Senegal are using SARID funding to find ways to produce crops resistant to witchweed. Currently, the most commonly used strategies to reduce the impact of witchweed are hand weeding, improving soil fertility and growing some crops which are not

attacked by the parasite, but these methods are costly and largely ineffective. Producing crops resistant to witchweed would improve the stability of food supply for people who rely on crops such as sorghum, maize, millet and rice. Researchers from the University of Sheffield have already identified some rice varieties that are resistant to attack by witchweed. The next step for the international team of researchers is to identify what makes these varieties resistant and which genes play a role. Once this is known, they will look for similar genes in other cereals and explore the possibility of breeding cereals with increased resistance to witchweed.

Collaborators: University of Sheffield, National Institute of Agricultural Botany, UK; International Crops Research Institute for the Semi Arid Tropics, India; and African Rice Centre, Senegal.

Contact: Professor Julie Scholes
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NATIONAL SCIENCE FOUNDATION FUNDS PARASITIC PLANT GENOME PROJECT

Gene sequence information for some important parasitic plants will become available within the next few years thanks to a recently funded project by the US National Science Foundation's Plant Genome program (<http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0701748>). The project was funded to explore the sequences of genes associated with parasitism in the Orobanchaceae family. This "Parasitic Plant Genome Project" (PPGP) will compare three related species that differ distinctly in level of parasitism in order to elucidate the genes responsible for – or resulting from – the evolutionary transition from autotrophism to heterotrophism. The three focal species will include the facultative parasite (*Triphysaria versicolor*), the photosynthetically competent obligate parasite (*Striga hermonthica*), and the obligate holoparasite (*Orobanche ramosa*). The availability of a sequenced genome for the closely related non-parasite *Mimulus guttatus* provides a fully autotrophic out-group to further enhance this approach. We plan to concentrate efforts on sequencing genes that are expressed at key stages of parasite development, centering on haustorium development and establishment in the host. Although the project does not allow full genome sequencing, it should provide sufficient information to propel parasitic plant science into the genomics era.

A major impact of this project will be the public release (project website to be announced shortly) of an extensive set of gene sequences from a group of related plants that encompass an enormous breadth of

morphological and physiological diversity. This will relieve a major constraint to research on the molecular biology of parasitic weeds, for which few gene sequences have heretofore been available. Thus, a major goal for the project is to facilitate work on *Striga* and *Orobanche* that will contribute to the development of effective control strategies for these weeds. We intend that the information and bioinformatics tools produced by this project will be accessible to all researchers and we welcome input from the entire parasitic plant research community on how to make the data useful and user-friendly. To this end, we are planning an outreach component of this project that will involve collaboration and international scientific exchange between US and developing country researchers. We specifically invite research groups that have needs for training in genomics and bioinformatics to contact us to discuss potential partnerships.

The PPGP team:

James Westwood, Virginia Tech
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Claude dePamphilis, Penn State University
Michael Timko, University of Virginia
John Yoder, UC Davis

CONGRATULATIONS

Congratulations to Gebisa Ejeta on his recent appointment as **Distinguished Professor of Agronomy** at Purdue University.

THESIS

Mónica Fernández-Aparicio (PhD, University of Córdoba, 18 January 2008) **Perspectives for *Orobanche crenata* control in legumes by genetic resistance and alternative control practises** (supervised by D. Rubiales & A. Pérez-de-Luque)

The weedy root parasite *Orobanche crenata* constitutes a serious threat to grain and forage legumes in the Mediterranean and Western Asia. Control strategies have centred around agronomic practices and the use of herbicides. Resistance breeding is hampered by scarcity of proper sources of resistance and of a reliable and practical screening procedure. In this PhD we identified sources of resistance and studied the defence reactions involved both in the field, in pot, and in mini-rhyzotron experiments and studied the possibility of control by intercropping.

A wide range of responses to crenate broomrape were identified both in cultivated lentil (Fernández-Aparicio, *et al.* 2008a) and in wild *Lens* relatives (Fernández-Aparicio, *et al.* 2008b), although complete resistance

was not detected. Low infection seemed to be based on a combination of various escape and resistance mechanisms from lower root density, lower induction of *Orobanche* seed germination, and reduced establishment of broomrape radicles. In order to identify alternative systems for ulterior genetic and genomic analysis, we studied early stages of the interaction between *M. truncatula* accessions and a range of *Orobanche* species. We found significant differences in the induction of germination and in the number of attachments supported (Fernández-Aparicio, *et al.* 2008c).

Root exudate of 22 plant species was applied separately to seeds of 9 broomrape species, finding various levels of specialisation in the *Orobanche* species. A wide range of species are described as potential trap crops due to their ability to induce germination on several *Orobanche* species to which they are resistant. Many of the species that stimulate the germination of these last two groups of broomrapes are not infected, being resistant in a later stage of the infection process, representing interesting examples of trap crops. The crude root exudate of fenugreek stimulated both *O. ramosa* and *O. crenata* seed germination. Active fractions of root exudate stimulated germination of broomrape species in a differential pattern (Fernández-Aparicio, *et al.* 2008d).

Our field experiments showed that *O. crenata* infection on faba bean and pea is reduced when these host crops are intercropped with oat (Fernández-Aparicio, *et al.* 2007) and with fenugreek (*Trigonella foenum-graecum*) (Fernández-Aparicio, *et al.* 2008e), the mechanism for reduction of *O. crenata* infection apparently being inhibition of *O. crenata* seed germination by allelochemicals released by oat and fenugreek roots. Fenugreek root exudates were extracted with organic solvent and fractionated giving several fractions, two of which showed moderate and strong inhibition of *O. crenata* seed germination. The most active metabolite is a new monosubstituted trioxazonane, named by us trigoxazonane (Evidente *et al.* 2007).

References:

- Fernández-Aparicio, *et al.* 2008a (see Literature item below)
 Fernández-Aparicio, *et al.* 2008b. Resistance to broomrape in wild lentils (*Lens* spp.) Plant Breeding (in press)
 Fernández-Aparicio, *et al.* 2008c. Infection of barrel medic (*Medicago truncatula*) by *Orobanche* species. Annals of Biology (accepted)
 Fernández-Aparicio, *et al.* 2008d. Fenugreek root exudates with *Orobanche* species specific seed

germination stimulatory activity. Weed Research, 48: 1-6 (in press)

Fernández-Aparicio, *et al.* 2007. (see Literature item below)

Fernández-Aparicio, *et al.* 2008e. Control of *Orobanche crenata* in legumes intercropped with fenugreek (*Trigonella foenum-graecum*). Crop Protection (in press)

Evidente *et al.* 2007. (see Literature item below)

BOOK REVIEWS

Integrating New Technologies for *Striga* Control: Toward Ending the Witch-hunt. Edited by Gebisa Ejeta and Jonathan Gressel. 2007, Hackensack, USA: World Scientific Publishing Co. 356 pp.

This recent peer-reviewed volume is a product of the International Symposium 'Integrating New Technologies for *Striga* Control: Towards Ending the Witch-hunt' held November 2006 in Addis Ababa, Ethiopia. Published in 2007 by World Scientific Publishing and edited by the conference chair Gebisa Ejeta and committee member Johnathan Gressel, this represents a significant contribution to the *Striga* literature. It includes 24 chapters by 70 co-authors, many of whom are leaders in the field.

The chapters are well organized by topic and include helpful reviews of the numerous approaches to combating *Striga*. The first sections, including host-parasite chemical signalling, molecular marker assisted crop breeding, and progress in the genetic basis of *Striga* resistance, underscore advances in biotechnology and genomics. Appropriately, the largest section emphasizes agronomic options and reviews integrated *Striga* management and the downstream socio-economic effects of these control programs. The final section includes chapters focused on the soil borne fungus *Fusarium oxysporum* as a bio-herbicide against *Striga* and the process of increasing pathogen virulence.

Due to the proliferation of journals and the increasingly compartmentalized world of modern science, this volume provides a timely synthesis of the state of *Striga* research. The research assembled here reflects the current direction of *Striga* control and as the editors emphasize, each approach to control is unlikely to succeed independently without true integration.

Jay F. Bolin, Dept. of Biological Sciences, Old Dominion University, Norfolk VA 23529

Biology and management of weedy root parasites.

Joel, D.M., Hershenhorn Y., Eizenberg H., Aly R., Ejeta G., Rich P.J., Ransom J.K., Sauerborn J. and Rubiales D. 2007. In: Janick, J. (ed.) Horticultural Reviews 33: 267-349.

Our apologies for the delay in reviewing this most valuable publication. It is in the form of a journal review but with 84 pages and about 350 references it has most of what you would expect of a book, and together with the volume reviewed above, helped persuade the authors of Parker and Riches to forgo the pain involved in updating their volume from 1993. Where the first volume above deals only with *Striga*, this deals slightly more comprehensively with *Orobanche*, though both are dealt with in very considerable detail (the less important genera in the old Scrophulariaceae receive only passing mention). It was completed in 2006 and covers most of the significant literature up to that time, including developments in biotechnology, plant genomics and genetic engineering. One disappointing omission is the lack of reference to the work with *Desmodium* species and their potential role in control of *Striga* spp.

Chris Parker.

GENERAL WEB SITES

For individual web-site papers and reports see
LITERATURE

For information on the 10th World Congress on Parasitic Plants in Turkey, 2009, see:
<http://www.ippsturkey.com/>

For abstracts from the 9th World Congress on Parasitic Plants see:
<http://www.cpe.vt.edu/wcopp/index.html>

For information on the International Parasitic Plant Society, past and current issues of *Haustorium*, etc. see: <http://www.ppws.vt.edu/IPPS/>

For past and current issues of *Haustorium* see also:
<http://www.odu.edu/~lmusselm/haustorium/index.shtml>

For the ODU parasite site see:
<http://www.odu.edu/~lmusselm/plant/parasitic/index.php>

For Lytton Musselman's *Hydnora* site see:
<http://www.odu.edu/webroot/instr/sci/plant.nsf/pages/lecturesandarticles>

For Dan Nickrent's 'The Parasitic Plant Connection' see:
<http://www.parasiticplants.siu.edu/>

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

For information on, and to subscribe to PpDigest see:
http://omnisterra.com/mailman/listinfo/pp_omnisterra.com

For information on the EU COST 849 Project and reports of its meetings see:
<http://cost849.ba.cnr.it/>

For information on the EWRS Working Group 'Parasitic weeds' see: <http://www.ewrs.org/>

For the Parasitic Plants Database including '4000 entries giving an exhaustive nomenclatural synopsis of all parasitic plants' (last updated 2003), the address is:
http://www.omnisterra.com/bot/pp_home.cgi

For a description and other information about the *Desmodium* technique for *Striga* suppression, see:
<http://www.push-pull.net>

For information on EC-funded project 'Improved *Striga* control in maize and sorghum (ISCIMAS) see:
<http://www.plant.dlo.nl/projects/Striga/>

For the work of Forest Products Commission (FPC) on sandalwood, see: www.fpc.wa.gov.au

For past and future issues of the Sandalwood Research Newsletter, see: www.jcu.edu.au/school/tropbiol/srn/

For information on the work of the African Agricultural Technology Foundation (AATF) on *Striga* control in Kenya, see: <http://africancrops.net/striga/>

To view the list of presentations and participants at the *Striga* meeting in Addis Abeba, November 2006, see:
<http://www.agry.purdue.edu/strigaconference/index.html>

For information on the 5th International Weed Science Congress, June, 2008, in Vancouver, Canada see:
<http://iws.ucdavis.edu/5intlweedcong.htm>

LITERATURE

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- Aizen, M.A. and Harder, L.D. 2007. Expanding the limits of the pollen-limitation concept: effects of pollen quantity and quality. *Ecology* 88: 271-281. (Discussing the distinction between quantity limitation and quality limitation using *Tristerix corymbosus* as the test species.)
- Akiyama, K. 2007. Chemical identification and functional analysis of apocarotenoids involved in the development of arbuscular mycorrhizal symbiosis. *Bioscience, Biotechnology and Biochemistry* 71: 1405-1414. (Referring to strigolactones as signals for AM fungi and reviewing recent research into the chemical identification and role of AM-related apocarotenoids.)
- Aksoy, E., Öztemiz, S. and Uygur, F.N. 2006. (Determination of natural insect enemies of broomrape species (*Orobancha* spp.) and investigation on using possibilities of *Phytomyza orobanchia* Kalt. (Diptera: Agromyzidae) for biological control.) (in Turkish) *Türkiye Herboloji Dergisi* 9(1): 10-17. (Insects attacking *Orobancha* spp. in Kilis and Mersin regions of Turkey included *Phytomyza orobanchia*, *Phytomyza* sp., *Drosophila busckii*, *D. melanogaster*, *Liriomyza huidobrensis* and *Napomyza* sp.)
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- (N.B. over 20 other papers in the same journal, not listed here, report results with various proprietary products, each containing 4 to 16 ingredients which included *Cuscuta chinensis* seeds, and/or in some cases *Cistanche deserticola*, *Scurrula parasitica*, *Santalum album* or *Cynomorium songaricum*, for treatment of a wide range of problems including diabetes, chronic obstructive pulmonary disease, infertility in women, vascular dementia, chronic aplastic anaemia, and cancer, generally with some beneficial effect.)**

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