HAUSTORIUM

Parasitic Plants Newsletter

ISSN 1944-6969

Official Organ of the International Parasitic Plant Society

(http://www.ppws.vt.edu/IPPS/)

July 2009 **Number 55**

MESSAGE FROM THE IPPS PRESIDENT

Dear IPPS Members,

Thanks to all of you who attended the 10th World Congress on Parasitic Plants in Kusadasi, Turkey this past June. I think all would agree that the meeting was a resounding success. In every way there were signs of progress and gathering momentum for our society.

First of all, the attendance was strong. With 118 participants, it was just shy of our largest meeting ever. Moreover, the participants represented an astounding 37 different nations and nearly every continent. The 'World' adjective in World Congress is well deserved!

The program included the usual wide variety of topics and Diego Rubiales and members of the Scientific Committee deserve credit. The program is reviewed in more detail in a separate article below, but was remarkable in terms of the breadth of coverage of different parasites. In addition to the usual abundance of presentations on *Striga* and *Orobanche*, the program included substantial talks on several other parasitic species, as well as some comprehensive regional reviews of parasitic weeds

The venue was spectacular. Soaked by the sun and rich history of the area, participants appeared to enjoy the "all inclusive" concept of the Pine Bay resort. For those of you who were unable to attend, this was an all-you-can-eat-and-drink deal within the hotel. Perhaps this is why there was so much dancing by the participants (late night at the disco and even on the tour bus!). Ahmet Uludag and his team are to be congratulated for their work with the local arrangements.

We took a few moments to induct some new honorary members to the society. Danny Joel and André Fer were awarded Honorary Memberships, based on their long careers of contributions to understanding parasitic plants and their instrumental roles in the initiation and leadership of the IPPS.

Of course we still have much work to do. We have more questions than ever about parasitic plants, and despite some encouraging reports about control, the problem of parasitic weeds remains acute in most of their ranges. I look forward to hearing about the latest progress at out next meeting, which is set for 2011 in Italy. The lead organizers are Maurizio Vurro handling local arrangements and Hanan Eizenberg coordinating the program. We expect that meeting will continue the tradition of great science and good fun.

Sincerely,

Jim Westwood, IPPS President

CALL FOR PHOTOS

As part of our new IPPS website we would like to have a variety of photos featuring the beauty and fascinating biology of parasitic plants. The pictures will be used to enhance the attractiveness of the site and help generate more interest in our work. Please take a few moments now to submit just 2 or 3 of your favorite images.

Some guidelines:

- All photos are welcome (best are clear and attractive, but may show any aspect of parasitic plant research – e.g., damaged crops, micrographs, etc.)
- Don't reduce the image quality (we may want to crop them)
- Include species names or short description of the photo
- Send photos to westwood@vt.edu

Thanks for your contributions to our society.

Jim Westwood

MEETING REPORT

10th World Congress on Parasitic Plants, Kusadasi, Turkey, June 8-12, 2009

This international meeting, arranged by the International Parasitic Plant Society, was attended by 118 participants from 37 countries, presenting over 100 papers and posters. After a welcome from Mr Kamil Tabak representing the Turkish Ministry of Agriculture, the meeting was opened with remarks from IPPS President Jim Westwood, and Chairmen of the Organizing and Scientific Committees, Ahmet Uludag and Diego Rubiales. Papers and posters presented are listed below.

An opening lecture by Prof. Bob Zimdahl emphasised the role of ethics in science and the need for all involved to re-examine their motives and judgment at all levels of their work.

A first invited presentation from Danny Joel presented convincing evidence for the long-evolved distinction between the two main sections of the *Orobanche* genus and called for the future mandatory use of *Phelipanche* for *O. ramosa* etc. This generated lively discussion but no consensus for change.

In the second invited lecture, Dr Marc-André Selosse presented interesting evidence for the indirect parasitism of forest species, not only by non-photosynthetic heteromycotrophs but also by some green orchid species such as *Epipactis microphylla* via ectomycorrhizal truffle fungi, describing this as 'mixotrophy'.

The meeting in general may be remembered as the beginning of the genomics era for weedy parasitic species. In addition to many excellent presentations describing molecular studies, there were announcements that a large amount of gene sequence information would become available soon. In the session on **Evolution and Phylogeny of Parasitic Plants** the rationale and initial data from the Parasitic Plant Genome Project (Westwood *et al*. and de Pamphilis *et al*.) was described. This project is sequencing expressed genes from *Triphysaria versicolor, Striga hermonthica* and *Orobanche aegyptiaca* and has already generated 29,000 and 24,000 gene sequences from *Striga* and *Orobanche*, respectively. Another project (presented by Yoshida and Shirasu in the Host and Non-host Response to Parasitism session) revealed that 17,000 expressed genes have been sequenced from *Striga hermonthica*. Public access to these data is expected to greatly facilitate molecular research and add momentum to gene/genome sequencing of other parasitic species. Other papers described the possible role of host specificity towards speciation of *Orobanche minor* (Thorogood *et al.*), and phylogenetic clarification within the Orobanchaceae via proteome analysis (Castillejo *et al.*). Molecular techniques were also used to help clarify the relationships within the Hydnoraceae, leading to the proposed description of a new species previously included in *Hydnora africana* (Bolin *et al.*). Posters illustrated the use of molecular techniques in the taxonomic clarification of Orobanchaceae in Bulgaria (Stoyanov and Denev).

Under the heading of **Parasite Biochemistry and Physiology**, we heard of the relative importance of transpiration and osmotic mechanisms in the creation of sinks in xylem feeders (e.g. *Striga*) and phloem feeders (e.g. *Orobanche*) respectively (Peron *et al.*). Important metabolites in the seeds of *Orobanche minor* were shown to be allantoin as a substrate for glutamine and gentianose for sugars (Okazawa *et al.*). A paper on the medicinally important *Cynomorium songaricum* and *Cistanche deserticola* in China showed some progress in the understanding of germination requirements (GuiLin and ShangWu) and a poster described preliminary evidence on the structure of a germination stimulant from the host of *C. songaricum, Nitararia sibirica* (ShangWu and GuiLin). There was also a poster on the possibility of tissue culture of *C. songaricum* as an aid to propagation (Yue and Chen). *Cynomorium coccineum* in Bahrain was shown to depend on its host for carbohydrates but perhaps not for nitrogenous metabolites (Almansoori *et al*.). The ability of *Orobanche aegyptiaca* to acquire a range of plant viruses from its hosts tobacco or tomato was confirmed (Aly *et al.*).

Sessions on **Ecology and Population Biology** began with a description of pollination in *Hydnora* species in Namibia, and the interesting changes in the flower controlling the trapping and eventual release of the pollinating beetles involved (Maas *et al.*). There were welcome papers on the unfamiliar *Pilostyles ulei* (Apodanthaceae) in Brazil a highly reduced dioecious holoparasite on two spp. of *Mimosa*, dealing with the ratio between the sexes (Brasil and Ceccantini) and the anatomy of the endophyte and its connections with the host stele (do Amaral and Ceccantini). Studies on endangered populations of *Cuscuta epithymym* in Belgium showed that mowing or cutting is needed to provide freshly disturbed *Calluna vulgaris* on which to establish (Meulebrouck *et al.*). The rarity of many *Orobanche* species in Romania is explained by a combination of specialised germination requirements and insect predation (Hoeniges *et al.*). It was also suggested that the narrow host range of certain *Orobanche* species could be attributed to a requirement for specific combinations of stimulant (Hoeniges *et al.*). Studies on *Rhamphicarpa fistulosa* in West Africa and in Tanzania report its increasing significance as a weed of rice, causing up to 60% yield loss and confirm that it is facultative and can set seed without a host (Rodenburg *et al.*). Distribution and severity of *O. ramosa* and *O. aegyptiaca* in Greece are shown to be correlated with a range of soil characters including pH and organic matter (Economou *et al.*). A survey of *Cuscuta* infestations in Malaysia revealed a wide range of hosts. The species was referred to as *C. australis* but in discussion it was suggested that at least some *C. campestris* was likely to be present (Bakar *et al.*). New information was provided on the range of Orobanchaceae in Iran (Mehrvarz) and on a very wide and apparently increasing range of parasitic weed problems, including *Plicosepalus acaciae* (Loranthaceae), in Jordan (Qasem). Among a range of posters under this heading, there were descriptions of the *Striga asiatica* problem on sugar cane in Tamilnadu, India (Chinnusamy *et al.*), of *Cuscuta monogyna* on fruit tress in Morocco (Baye *et al.*), the potential for *O. ramosa* to become an increasing problem on oilseed rape in Bulgaria (Shindrova and Kostov), the potential of populations of *Orobanche foetida* from a wild host in Tunisia to parasitize faba bean and lentil (Amri *et al.*) and an increasing problem of the mistletoe *Tapinanthus globiferus* on fruit trees in Central Sudan (Zaroug *et al.*). In Turkey, the range of parasites, apart from *Orobanche* species, includes several *Cuscuta* species, *Viscum album*, *Loranthus europaeus, Arceuthobium oxycedri, Melampyrum arvense, Cytinus hypocistis, Thesium humile, Pilostyles olympica* and many others (Uludag and Nemli). Posters described the distribution and importance of *Orobanche ramosa* in tomato (Isik and Kaya; Rusen and Yaslik) and in tobacco (Kaya and Isik) in Turkey.

Under the heading of **Special Topics – Hemiparasites** the interesting diurnal nutation of *Viscum album* in mid summer is shown to be associated with a remarkable increase in jasmonic acid content, of possible relevance for the time of harvesting for medicinal use (Dorka *et al.*). Studies on another mistletoe of medicinal interest in India suggested that there may be differences in the potentially active flavanoid, terpenoid and phenolic components in *Helicanthes elastica* according to the host it is parasitizing (Girija *et al.*). *Dendrophthoe falcata* is the commonest of a wide range of other mistletoes occurring in India (Girija *et al.*). Another mistletoe, *Struthanthus vulgaris*, is shown to cause serious damage to the quality of timber from the host tree *Tipuana tipu* in Brazil by competing for moisture in the dry season (Domeignos and Ceccatini).

The topic of **Host-Parasite Communication** was introduced with a review on strigolactones by Harro Bouwmeester, who discussed new information on the biosynthetic pathway for strigolactones, their new-found role in suppressing branching, and the reduction of their synthesis in rice by higher levels of phosphate. Some more detailed results involving mutant rice and varying levels of N and P were also presented (Jamil *et al.*). The higher susceptibility of a standard Pioneer variety of maize is shown to be due to its greater exudation of the relatively stable 5-deoxystrigol while the tolerant KST94 exudes mainly the less stable sorgomol (Yoneyama *et al.*). A poster showed that abamine, an inhibitor of strigolactone biosynthesis, can reduce germination by reducing levels of 5-deoxystrigol (Ito *et al.*). The isoflavone formononetin, used commercially to promote colonization by AM fungi is shown to be highly active in stimulating germination of *O. ramosa*, *O. aegyptiaca* and *Striga hermonthica* (but not *O. cumana* or *O. crenata*) and has potential as a control measure? (Kohlschmid *et al.*). Germination of *Orobanche* species has for the first time been shown to be stimulated by a number of actinomycetes in the soil (Naumova *et al.*). The need for the conditioning phase before seeds of *Orobanche* will respond to stimulant was challenged, it being shown that, for *O. aegyptiaca* and *O. cumana* there is merely a need to allow adequate time for germination (Plakhine *et al.*).

Under **Parasitic Weed Management**, the first paper described the sophisticated decision support system PICKIT, that has been developed for highly successful control of *O. aegyptiaca* in tomatoes in Israel, depending on monitoring growing degree days (GDD) using an inexpensive soil probe, to predict the growth stage of the parasite and applying sulfosulfuron at 200, 400 and 600 GDD followed by imazapic between 45 and 24 days before harvest (Eizenberg *et al.*).

The status and control of *Orobanche* in Turkey was the subject of a multi-author paper presented by Eda Aksoy and a number of other papers and posters. Among a range of herbicide and other treatments for control of *Orobanche* spp. in tomato in Turkey, encouraging results were reported for catch-cropping with vetch and the use of chicken manure (Nemli *et al.*); use of metham sodium, trifluralin and maleic hydrazide (Toshkova *et al.*); and soil solarization for greenhouse crops (Bulbul and Uygur).

Herbicides (glyphosate and iamzethapyr) also show potential for control of *O. ramosa* in potato, in combination with *Fusarium* isolates. Imazapic has potential in lentil (Haddad *et al.*).

For *O. crenata* waste water from olive processing showed promise in Morocco (Saffour *et al.*) while in Tunisia, *O. crenata* emergence was well reduced by inter-cropping with fenugreek (Amri *et al.*)

Control of *O. cernua* in tobacco in India is achieved with imazethapyr post-emergence and also by applying neem cake in the planting hole (Prabhakaran *et al.*).

A comparable success story to that for *Orobanche* in tomato in Israel involves the control of *Striga hermonthica* and *S. asiatica* in maize in East Africa, using seed treatment with imazapyr on (non-GM) imidazolinone-tolerant maize, leading to 3-fold increases in crop yield (Kanampiu *et al.*). Equivalent studies with imidazolinone-tolerant sorghum (again non-GM) show potential for *Striga* control using seed treatment with imazapyr and metsulfuron-methyl (Al-Khatib *et al.).*

The success of another means of suppressing *S. hermonthica* in maize, inter-cropping with *Desmodium* species, is shown to be attributable to inhibition of *Striga* radicle elongation and haustorial initiation by flavone compounds including isoschaftoside, exuded by the *Desmodium* (Tittcomb *et al*). Less dramatic but some benefit from intercropping with soyabean in maize is reported from Nigeria (Ahom *et al.*), and from leguminous trap crops, cowpea and *Dolichos lablab* in Sudan (Abbasher *et al.*).

In India pendimethalin proves effective for control of *Cuscuta 'chinensis'* (perhaps *C. campestris*?) in lucerne (Chinnusamy *et al.*), while trifluralin proved the best of a range of treatments for control of *C. europaea* in lucerne in Serbia (Konstantinovic and Meseldzija).

There was encouraging news of progress in the development of techniques for the culture and application of **mycoherbicides** based on *Fusarium* for control of *Striga* in Africa. DNA techniques suggest that the strains Foxy2 from Ghana and PSM 197 from Nigeria are genetically identical (Elzein *et al*; Ndambi *et al.*). Recognition of the *F. oxysporum* strain FT2 by AFLP markers represents a valuable tool for the identification and monitoring of the strains used as mycoherbicides (Cipriani *et al.*). Use of *Fusarium* for control of *Orobanche cumana* was described but results are influenced by a range of climatic and agronomic factors (Mueller-Stover *et al.*).

Among a range of **insects** identified on *Orobanche* in Turkey, *Phytomyza orobanchia* occurred commonly in lentil fields, less commonly in tomato and tobacco, perhaps because of insecticide use? (Uygur *et al.*). In Slovakia, *P. orobanchia* shows host preference for *O. flava, O. alba* and *O. reticulata* (Toth and Bouwmeester). In neither country is *P. orobanchia* seen as a practical means of control.

Host and Non-host Responses to Parasitism. Study of gene expression in cowpea shows up-regulation of a range of genes relating to chitinase, cyt 450 and protein synthesis in varieties showing resistance to *Striga gesnerioides* (Lis *et al.*). In a cowpea line resistant to *S. gesnerioides* race 3, a gene was identified which, when 'knocked down' eliminated the resistant response (Li and Timko). The failure of *Striga hermonthica* to parasitize the non-host *Lotus japonicus* could be attributed to the induction of the synthesis of the phytoalexin vestitol (Sugimoto and Ueda) while its failure on *Phtheirospermum japonicum* is attributed to incompatibility at an earlier stage (Yoshida and Shirasu). The failure of *Orobanche crenata* on resistant varieties of *Medicago trunculata* appears due to elicitation of phytolexins including medicarpin, maackiain and scopoletin (Lozano-Baena *et al.*). The resistance of *Phaseolus* bean to *Cuscuta campestris* could also be due to chemical defence mechanisms (Farah). It was also suggested that resistance of crops to *Cuscuta reflexa* might be induced by application of a propeptide interfering with up-regulation of a cysteine protease (Bleischwitz *et al.*).

Breeding for Parasitic Plant Control. A valuable appraisal of the sources of resistance to *Orobanche crenata* in faba bean have shown those based on Giza 429 to have some of the widest stability and many large-seeded lines are now available (Maalouf *et al*). In discussion it was pointed out that 4 further lines had been developed in Spain and should be exploited. A technique for regeneration and transformation of faba bean explants should prove valuable for future genetic modification of the crop (Abdelwahd *et al.*). In the absence of useful natural resistance in tomato, the possibilities for chemical mutagenesis are being explored in Bulgaria (Kostov *et al.*). In Nigeria the area planted to maize had increased 20-fold over the past 20 years and it was being planted in areas severely infested with *Striga hermonthica*. One way of minimising the risk of loss, and build-up of infestation was to use short-season varieties and these had now been developed with some resistance and made available to farmers (Adeosun *et al.*). Useful resistance to *Cuscuta campestris* had been identified in 3 out of 52 lines of chickpea; these were not successfully penetrated by the parasite (Goldwasser *et al.).*

Special Topic – *Orobanche cumana*. In sunflower, resistance to *Orobanche cumana* has been linked to elicitation of theHaDEF1 defensin gene. In an elegant study its activity in *O. cumana* is shown to involve a rapid increase in cellular calcium levels, causing cell death. Some link is also suggested to the up-regulation of this defensin by ABA (Thoiron *et al.*). In European Turkey infestations have peaked at 20 year intervals (1960, 1980, 2000) followed by successful introduction of resistant varieties. Now some 80% of crops are infested with new races. Imazapic is being widely used in conjunction with imidazolinone-resistant varieties (Kaya and Evci) and some encouraging results are being obtained from mutation breeding (Evci *et al.*). A useful appraisal of the races of *O. cumana* in Romania show that there are sources of resistance to virtually all races and there is emphasis on combining genes for horizontal and vertical resistance, together with resistance to imidazolinone herbicide (Pacuraenu-Joita *et al.*). A comparable study in Spain has compared a wide range of races from across Europe (Pineda-Martos *et al.*).

Field trips On a full day field trip we enjoyed a brief stop in the old town of Birgi, a relaxing lake-side picnic lunch and a visit to the site of potato field trials on *Orobanche* control.

No parasite was to be seen here but nearby and elsewhere at least four *Orobanche* species were collected. *Loranthus europaeus* was seen in sweet chestnut trees and *Cuscuta campestris* frequently on roadsides. No *Arceuthobium oxycedi* was seen this day but your intrepid editors (LJM and CP) tracked it down on Mt Sypilos on an unofficial post-conference excursion. Many delegates also took the opportunity to visit the ancient site of Ephesus

Closing ceremony. In closing the meeting, Jim Westwood was pleased to announce that Maurizio Vurro had agreed to host the next, 11th Congress in Puglia, Italy in June 2011. See below for detail.

Thanks and congratulations are due to Ahmet Uludag and all others in the local organising committee for arranging and hosting a memorably relaxed and enjoyable meeting.

There will be no printed Proceedings but abstracts are available on the IPPS website (http://www.ppws.vt.edu/IPPS/). Titles of all papers and posters presented are listed below. **NB** The web-site lists some papers and posters which were not presented. These were numbers 9, 34, 35, 37, 47, 509, 69, 70, 77, 93, 94, 110, 112, 114, 116, 124, 125.

Chris Parker
Jim Westwood

Oral presentations:

R. Zimdahl - The role of ethics in science.
D.M. Joel - Taxonomic and evolutionary justifications for considering *Phelipanche* as a separate genus.
M.A. Selosse - One way of forest plants to make their living in deep shade: eating mycorrhizal fungi.
Westwood *et al.* - The Parasitic Plant Genome Project: A massive gene discovery project for the Orobanchaceae.
dePamphilis *et al.* - The Parasitic Plant Genome Project II: Large-scale EST sequencing of *Triphysaria, Striga,* and *Phelipanche.*
Bolin *et al.* - Molecular phylogenetic relationships and a revised taxonomy of the holoparasitic family Hydnoraceae.
Thorogood *et al.* - Host specificity and speciation in *Orobanche minor.*
Péron *et al.* - Molecular, biochemical and histological characterization of the sucrose-degrading enzymes involved in the sink-strength of *Phelipanche ramosa.*
Okazawa *et al.* - Metabolome analysis of *Orobanche minor* seed germination for selective control of parasitic weeds.
Aly *et al.* - Could plant viruses move from a host plant to the parasitic weed *Phelipanche*?
Gui-Lin and Shang-Wu Research progresses of *Cistanche deserticola* and *Cynomorium songaricum* in western China.
Almansoori *et al.* - Stable isotope ratios and mineral nutrient composition of *Cynomorium coccineum* and its halophytic host *Zygophyllum qatarense* in Bahrain.
Maass *et al.* - Pollination biology in the genus *Hydnora.*
Brasil *et al.* - Distribution and sex ratio of the holoparasite *Pilostyles ulei* Solms-Laubach (Apodanthaceae) in Serra do Cipo, Minas Gerais, Brazil.
Hristova *et al.* - Application of ISSR methods in studying broomrape (Orobanchaceae) biodiversity in South/South-Western Balkans.
Meulebrouck *et al.* - Putting things on their heads: host age thwarts establishment of the holoparasite *Cuscuta epithymum.*
Hoeniges *et al.* - Why are rare *Orobanche* species rare?
Dorka *et al.* - Rhythms of nutational movement and seasonal changes in jasmonate levels during the course of the year and under constant conditions in mistletoe (*Viscum album*).
Girija *et al.* - Effect of host interaction on the phytochemical composition of *Helicanthus elastica*
Domeignoz and Ceccantini - Modifications in wood anatomy caused by the mistletoe *Struthanthus vulgaris* in the host *Tipuana tipu* in Sao Paulo, Brazil.
Rodenburg *et al.* - Invasion, impact and possible integrated management of the facultative hemi-parasitic weed *Rhamphicarpa fistulosa* in rain-fed lowland rice.
Economou *et al.* - Assessing the role of abiotic factors on *Orobanche* infestation in Solaneous crops using GIS.
Bakar *et al.* - Population spread, host status and damage of crop plants and weed species by *Cuscuta australis* R.Br. in Johore, Malaysia.
Mehrvarz - Taxonomic revision of Orobanchaceae in Iran.
Qasem - Parasitic weeds, a possible threat to fruit and forest trees in Jordan.
Boumeester - Strigolactones: signaling molecules with surprising activities.
Jamil *et al.* - Quantifying the relationship between strigolactones and *Striga hermonthica* under varying levels of nitrogen and phosphorus in rice (*Oryza sativa*).
Plakhine *et al.* - Broomrape seed conditioning and response to germination stimulants in soil.
Yoneyama *et al.* - Qualitative and quantitative differences in strigolactone exudation between *Striga* tolerant and susceptible maize cultivars.
Kohlschmid *et al.* - Can formononetin induce germination of parasitic weeds?
Eizenberg *et al.* - PICKIT- a decision support system for rational control of *Phelipanche aegyptiaca* in tomato.
Kanampiu *et al.* - Empowering smallholder farmers for integrated *Striga* control in Africa.
Tittcomb *et al.* - How does *Desmodium uncinatum* control the parasitic plant *Striga*?
Aksoy *et al.* - National broomrape project in Turkey.

Elzein *et al.* - nnovations for scaling-up of *Striga* mycoherbicides application in Africa.

Ndambi *et al.* - Colonisation of *Striga hermonthica* and its host sorghum by the mycoherbicide *Fusarium oxysporum* f.sp. *strigae.*

Muller-Stoever *et al.* - Mycoherbicidal management of *Orobanche cumana*: observations from three years of field experiments.

Toth and Bouwmeester - Is *Phytomyza orobanchia* fastidious?

Lis *et al.* - Global gene expression profiling during resistant and susceptible interactions of cowpea with *Striga gesnerioides.*

Hoeniges *et al.* - he secret of broomrape host-specificity .

Sugimoto and Ueda - Induction of phytoalexin biosynthesis in *Lotus japonicus* roots in response to *Striga hermonthica* attachment.

Yoshida and Shirasu - Multiple layers of non-host incompatibility to *Striga hermonthica*

Farah - The response of two legume crops (hyacinth bean and kidney bean) to the parasitism of field dodder (*Cuscuta campestris*).

Lozano-Baena *et al.* - Resistance mechanism to *Orobanche crenata* in the model legume *Medicago truncatula*: The isoflavonoid response.

Thoiron *et al.* - Implication of HaDEF1 defensin in sunflower resistance to *Orobanche cumana.*

Evci *et al.* -The mutation breeding for broomrape resistance in sunflower.

Pacureanu-Joita *et al.* - Resistance and sensitivity in the parasitic system *Helianthus annuus* - *Orobanche cumana.*

Pineda-Martos *et al.* - Genetic diversity of *Orobanche cumana* populations from Spain and Eastern Europe.

Nemli *et al.* - Research on broomrape control in tomato fields in western Turkey.

Sinha and De - Management of parasitic weeds in Eastern India.

Haddad *et al.* - Integrated control of *Phelipanche ramosa* on potato in Syria.

Chinnusamy *et al.* - Integrated management of Chinese dodder (*Cuscuta chinensis*) in lucerne (*Medicago sativa*) and in *Amaranthus viridis* - a leafy vegetable.

Ahom *et al.* - Suppressing *Striga hermonthica* parasitism in *Zea mays* with *Sesamum indicum* and *Glycine max* and nitrogen fertilization in Benue State, Nigeria.

Maalouf *et al.* - Stability of *Orobanche* resistance of faba bean lines in various environments.

Adeosun *et al.* - Evaluation of early and extra-early maize cultivars for their reaction to *Striga hermonthica* in the North-Western Nigeria.

Slavov and Batchvarova - Chemical mutagenesis and haploidy - combined approach for breeding broomrape resistant tobacco.

Goldwasser *et al.* - Screening of chickpea (*Cicer arietinum*) genotypes for field dodder (*Cuscuta campestris*) resistance.

Posters:

Castillejo *et al.* - Proteome analysis for phylogenetic clarification in the Orobanchaceae.

Stoyanov and Denev - Taxonomic evaluation of five *Phelipanche* species (Orobanchaceae) in Bulgaria using ISSR markers.

Stoyanov and Denev - Evaluation of *Orobanche* subsect. *Glandulosae* in Bulgaria using ISSR markers.

Abbes *et al.* - Effect of *Orobanche foetida* parasitism on carbohydrates and organic acid composition in faba bean.

do Amaral and Ceccantini - The structure of the endoparasite *Pilostyles ulei* (Apodanthaceae) in *Mimosa* hosts: vegetative body and vascular connection.

Rahmani *et al.* - Evolution of the osmolality, proline and certain polyols contents in *Orobanche crenata* and its host *Vicia faba* subjected to water stress.

Bouya *et al.* - Contents of certain heavy metals and toxic elements in crenate broomrape (*Orobanche crenata*) and in its host (*Vicia faba*) collected from soils irrigated with wastewater.

Yue and Chen - Callus induction of *Cynomorium songaricum.*

Mukhtar - Antifungal activity of *Cuscuta reflexa.*

Prabhakaran - Eco-biological characterisation of *Orabanche cernua* and its management in tobacco (*Nicotiana tabacum*) planted in alfisols of Southern India.

Chinnusamy - Ecobiological quantification and integrated management of parasitic weed *Striga asiatica* in sugarcane (*Saccharum officinarum*) planted in alfisols of southren penninsular India.

Rusen and Yazlik - Density and frequency of *Phelipanche ramosa* in tomato fields in Marmara Region.

Baye *et al.* - Current status of Tadla region (Morocco) infestation by parasitic weeds.

Lyra *et al.* -. *In vivo* exploration of *Phelipanche*'s populations differential parasitism.

Tsveta and Stoyanov - The trophic plasticity of *Phelipanche* in Bulgaria.

Uludag and Nemli - Parasitic flowering plants in Turkey.

Isik and Kaya - Broomrape survey in tomato fields in Samsun Turkey.

Macukanovic-Jocic and Acic - Distribution and ecology of two *Cuscuta* species in Belgrade urban environment.

Kaya and Isik - A survey on broomrape in tobacco fields in Samsun, Turkey.

Shindrov and Kostov - Broomrape as a future problem for oilseed rape production in Bulgaria.

Amri *et al.* - Pathogenicity of different broomrape populations on five host plant species.

Zaroug *et al.* - Occurrence of mistletoe (*Tapinanthus globefeous*) on orchards in central Sudan.
Babiker *et al. - Orobanche crenata*: A genuine threat to agricultural productivity of the Nile Valley in Sudan.
ShangWu and GuiLin - Simultaneous isolation and purification of three compounds from the root extracts of *Nitraria sibirica* by HSCCC.
Saric *et al.* - Effect of plant growth-promoting rhizobacteria on the germination of *Cuscuta campestris* Yunck.
Fernandez-Aparicio *et al.* - Stimulation of *Orobanche* seed germination by *Pisum sativum* root exudates.
Ueno Iet al. - Preparation of multideuterium-labeled 5-deoxystrigol as an internal standard for quantitative analyses by LC/MS.
Naumova *et al.* - Actinomycetal stimulation of in vitro broomrape seed germination.
Ahom *et al.* - Suppressing *Striga hermonthica* parasitism in *Zea mays* with *Sesamum indicum* and *Glycine max* and nitrogen fertilization in Benue State, Nigeria.
Al-Khatin *et al.* - Managing *Striga* infestation with herbicide seed treatment in acetolactate synthase-resistant grain sorghum.
Bulbul and Uygur - Effect of soil solarization on broomrape in greenhouse tomato.
Cipriani *et al.* - Identification of molecular markers by f-AFLP technique for the detection of *Fusarium oxysporum* strain FT2, a potential mycoherbicide of *Phelipanche ramosa.*
Ozdemir *et al.* - Detection of tomato spotted wilt virus and cucumber mosaic virus on *Cuscuta* sp. in Denizli province of Turkey.
Konstantinovic and Meseldzija - Control possibilities of parasitic flowering plant *Cuscuta europea* and some perennial weeds in lucerne.
Demirkan *et al.* - Research on broomrape control in potato in Bozdag (Odemis), Turkey.
Toshkova *et al.* - Possibilities for broomrape control in tomato fields.
Dehaghi *et al.* - Evaluation of cover crops for decreasing the infestation of Egyptian broomrape (*Pelypanche aegyptiaca*).
Ghotbi *et al.* - Environmental factors on disease incitement of *Fusarium oxysporum* attacking Egyptian broomrape (*Phelipanche aegyptiaca*).
Er and Nemli - Effect of plant residues and exudates on broomrape germination on tomatoes.
Baye - Eastern dodder (*Cuscuta monogyna*) control by glyphosate in citrus and olive orchards.
Sarpe - Chemical control of dodder in alfalfa in conditions of Romania.
Saffour *et al.* - Effect of olive wastewater on germination and early growth stages of *Orobanche crenata.*
Amri *et al.* - Intercropping with fenugreek reduce *Orobanche foetida* infection of two faba bean cultivars.
Aksoy - Effect of trap and catch crops on Egyptian broomrape (*Phelipanche aegyptiaca*) in tomato.
Abbasher et al. - Leguminous crops as trap crops for *Striga hermonthica* control under field conditions.
Bleischwitz *et al.* - Generating parasitic plant resistant crops using a *Cuscuta* cysteine protease and a parasite inducible promoter.
Li and Timko - Race-specific resistance of cowpea to *Striga gesnerioides* parasitism is conferred by a CC-NBS-LRR type R protein.
Abdelwahd *et al.* - Regeneration and transformation method for faba bean.
Kaya and Evci - Recent development of chemical control and breeding for broomrape resistance in sunflower.
Kostov *et al.* - Application of chemical mutagenesis to increase the resistance of tomato to *Phelipanche ramosa*.
Girija *et al.* - Hemiparasitic plants of the humid tropics of India.
Cepeda-Puente and Sanchez-Arizpe - Identification and distribution of mistletoe and possible biological control agents in Sierra de Arteaga, Coahuila, México.
Domeignoz and Ceccantini - Specificity and preference of the mistletoe *Struthanthus vulgaris* (Loranthaceae) for urban tree hosts in Sao Paulo, Brazil.

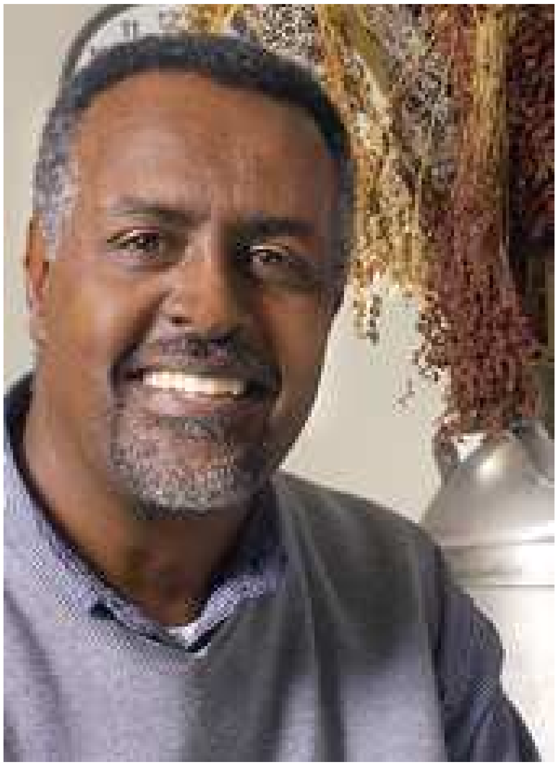
PARASITIC PLANT SEQUENCES NOW AVAILABLE

The Parasitic Plant Genome Project (PPGP) has unveiled a project website that provides access to tens of thousands of partial or complete cDNA sequences from parasitic Orobanchaceae: *Triphysaria versicolor*, *Striga hermonthica*, and *Orobanche aegyptiaca*. The website is http://ppgp.huck.psu.edu/ and contains functions for BLAST, search (by key word or Gene Ontogeny classification), and data downloading. Currently, most of the sequences available are from above-ground tissues of each species, but the number of sequences will increase over the next several months.

Jim Westwood (westwood@vt.edu)
Claude dePamphilis (cwd3@psu.edu)
Mike Timko (mpt9g@cms.mail.virginia.edu)
John Yoder (jiyoder@ucdavis.edu)

CONGRATULATIONS TO PROFESSOR GEBISA EJETA - 23RD WORLD FOOD PRIZE LAUREATE

Our heartiest congratulations are extended to Prof. Gebisa Ejeta following the announcement, June 11th, at a ceremony in Washington DC, that he is to be awarded the highly prestigious 2009 World Food Prize. The formal presentation is to take place on the 15th of October in the Iowa State Capitol.



Dr. Ejeta, a distinguished leader in global sorghum research and in promoting technical solutions in the fight against hunger and poverty, is an Ethiopian born in 1950 in rural Shewa in Ethiopia. He obtained his B. Sc. (1973) from Alemaya University in Ethiopia and his Ph.D (1978) from Purdue University in USA. His first employment was with the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) where he was dispatched to Sudan (1979) to serve with dedication and devotion for 5 years as a sorghum breeder. Dr. Ejeta returned to Purdue as a faculty member in 1984. Since then Gebisa has been involved in international agricultural research and development. He focused his efforts and devoted his time to sorghum, the crop of choice and the main staff of life for millions of African subsistence farmers and poor families. Dr. Ejeta, among others, realized that low soil fertility, drought and *Striga* are the major constraints that besiege sorghum production in Africa. However, his approach is unique in being holistic. Dr. Ejeta realized that for development, technology generation is a means and not an end and its dissemination and tuning to farmers needs and capabilities are of equal importance. To him illiteracy among farmers, lack of systems for seed propagation, and their negative impact on technology transfer, adoption and sustainability have been targets of importance and needed to be addressed.

Over a period of 30 years since graduation from Purdue University Dr. Ejeta has conducted, coordinated and lead multidisciplinary research programmes in Africa and the US on sorghum targeting biotic and abiotic stresses and their impact on yield, quality and utilization. His focus has always been to develop a technology simple and easy to implement by end users. He strived to attain his objectives through genetic manipulation and management based on simple agronomy.

In Sudan Dr. Ejeta released Hageen Dura-1, which was the first sorghum hybrid to be released in Sub-Saharan Africa. Hageen Dura-1 outyielded traditional varieties and local land races by 50 to 100% under irrigation and gives 2-to-3-fold more yield under rain fed conditions. More important than the unique and historical release of the hybrid was the ability to anticipate, predict and address problems associated with hybrid production. Dr. Ejeta's assiduous efforts led to formation of a National Advisory Committee to monitor production of hybrid seed. Farmers' and policy-makers' awareness of the importance of improved seeds were raised. A seed industry was born and both governments and private sectors were enticed to get involved in the business. The seed industry has extended beyond sorghum to include other crops.

Upon joining Purdue University another hybrid, NAD-1, was released in Niger. The experience in Sudan was repeated and a seed industry has been established. In the US Dr. Ejeta released more than 50 parental inbred lines that have been taken up by the US industry and sorghum breeders for use in synthesis of sorghum hybrids for domestic and international markets.

Dr Ejeta's remarkable and distinguished research and achievements on *Striga* have been based on knowledge of the parasite, the host, and their interactions. To eliminate or minimize damage by the parasite Dr. Ejeta's zealous efforts have been directed at perturbation of the early developmental stages through genetic manipulation of the host with the objective of developing cultivars with multiple mechanisms for more stable and durable resistance. Efficient laboratory methods for rapid screening for resistance and resistance mechanisms were developed at Purdue. Genetic basis of the interactions of *Striga* and its hosts have been elucidated using conventional and molecular approaches. Genes for *Striga* resistance in various germplasms were identified Based on the methods and knowledge developed, intensive field work was launched at Purdue University. Varieties with multiple resistance to the parasite were synthesized and released for field testing in Africa through a network of collaborators including National Agricultural Research (NARS) and NGOS. Dr. Ejeta managed to have the eight lines he developed at Purdue tested for resistance, and adaptability to agro-ecological zones, in 12 African countries namely, Senegal, Mali, Niger, Sudan, Ethiopia, Eritrea, Somalia, Rwanda, Tanzania, Zimbabwe, Botswana and Mozambique. Three cultivars were released in Ethiopia, two in Tanzania, one in Eriteria and one is very promising in Sudan.

Dr. Ejeta's work on *Striga* has focused on integration of resistance with agronomic practices. The *Striga* control package in Ethiopia includes a resistant variety, a fertilizer and water harvest using tied ridges. Under these conditions the yield attained was 3 to 4 times that of local land races planted by neighbouring farmers. In Ethiopia adoption of the package of practice released by Dr. Ejeta for *Striga* control is phenomenal. Arrangements for community-based seed multiplication have already been made and plans are underway to find and organize markets for the surplus. In 2008 cropping season it was estimated that over 500,000 rural families had received seeds of *Striga* resistant cultivars in parts of Tigray, Oromoia, Amhara and the southern parts of Ethiopia. Parallel progress is expected in other African countries.

Apart from his direct personal contribution to progress in *Striga* management and control we have to thank Gebisa for raising the profile of *Striga* to a whole new audience, including the US Secretary of State Hillary Clinton who was among those speaking at the announcement ceremony (see http://www.worldfoodprize.org/about/about.htm)

Abdel Gabar Babiker,
Sudan University of Science and Technology,
P. O. Box 71, Shamabat, Khartoum North, Sudan.
agbabiker@yahoo.com

AATF PROJECT ON *STRIGA* CONTROL IN SMALLHOLDER MAIZE FIELDS IN SUB-SAHARAN AFRICA

In 2005, AATF (African Agricultural Technology Foundation) initiated a project with the objective of controlling *Striga* species which curtail maize production, resulting even in total grain loss in severely infested fields. The project embodies the public-private partnership approach, in which AATF, CIMMYT and BASF are key partners, collaborating with several other stakeholders in target countries. Currently, the project is in the deployment phase, which aims to facilitate 'Strigaway' (IR) maize technology, product awareness, uptake and sustainable utilization. The IR maize technology comprises maize seed that is resistant to imazapyr herbicide; the seed is coated with the herbicide without affecting its viability. To achieve this deployment, the project supports product demonstration, information dissemination amongst stakeholders, product commercialization, and stewardship for long term benefit to farmers. Potential benefits from the implementation of the project include:-

Improvement of food security in sub-Saharan Africa through increased grain harvests
Grain surplus that can earn farmers income
Significant reduction of *Striga* seed bank in the soil
Opening up of abandoned land for cultivation and
Encouraging farming as a business.

In the AATF experience, delivery and uptake of *Striga* management technologies require value chain management and institutional partnerships that enable smallholder farmers to control the weed, produce surplus maize and access efficient and equitable markets. This has led to greater income generation and motivation of farmers to invest in the uptake of new technologies.

Against this background, AATF's **objective** is to enable smallholder farmers in sub-Saharan Africa to access appropriate *Striga* management technologies such as 'Strigaway' maize (IR-Maize) seed, *Striga* tolerant maize varieties and suppression and trap cropping management systems.

Progress to date: reduction of *Striga* damage and improved maize grain yield: field work with the 'Strigaway' (IR) maize technology has shown marked reduction in emerged *Striga* with fields being almost clear of the weed. Maize yield has been driven from the paltry average of about 500 to 3,000 kg/ha. This significant yield increase is a stimulus to sale of the surplus grain, after household food security is achieved by some project farmers.

Product demonstration and Stakeholder Outreach: since 2005, a total of 60,000 demonstrations have taken place in Kenya; and, since 2007, 2,000 in Uganda and 6,000 in Tanzania. These have illustrated the product performance, and particularly given farmers a chance to learn how to use the 'Strigaway' (IR) maize within their farming systems, thus promoting uptake of the technology. The demonstrations have built demand for the technology, sensitized seed producers, regulators and policy makers, who as a result have facilitated subsequent commercialization and delivery of this technology to farmers in target countries.

Information dissemination: various publications have been developed and circulated amongst stakeholders. These include baseline studies from Kenya, Uganda, Malawi, and Tanzania and a farmer perception study report from Kenya.

Product commercialization: IR maize varieties have been registered and released for certified seed production in Kenya since 2006; and in Tanzania in December 2008.

Technology Stewardship: stewardship has assessed performance of the 'Strigaway' technology, and farmer adherence to user instruction, thus ensuring optimal benefits from the technology. Superior performance of IR maize under *Striga* infestation is easily evident and indeed farmland that had been abandoned is now being opened for cultivation once again.

Future Activities:

Wide-scale expansion: AATF and its partners will work jointly to cover all key *Striga* infested maize growing fields in Eastern, Southern and Western Africa. The target countries are Kenya, Malawi, Tanzania, Uganda, Zambia, Ethiopia, Ghana, Mozambique, Nigeria and Zimbabwe. These countries account for 85% of the *Striga* weed occurring within Africa's maize fields. Both *S. hermonthica* and *S. asiatica* are equally controlled. Project activities within each country will focus on severely *Striga*-infested areas identified by national cooperators.

Product Stewardship: work will continue to ensure that the product is used appropriately for optimal performance. This will encompass monitoring and evaluation missions, field workshops, training meetings for various stakeholders, including farmers, extension officers, agro-dealers and seed companies.

Commercialization: AATF will facilitate national performance trials and distinctiveness, uniformity and stability tests to ensure variety registration and release, so that the improved seeds are available to agro-dealers and further acquisition by farmers in *Striga* infested areas. As the project rolls out and intensifies work in Sub-Saharan Africa, AATF will also plan impact studies to assess and document adoption of the technology and lessons that can be used to continually improve the deployment strategy.

Partners and stakeholders include CIMMYT (International Maize and Wheat Improvement Centre), BASF , Weizmann Institute of Science , Israel, TSBF-CIAT – (Tropical Soil Biology and Fertility Program of the International Centre for Tropical Agriculture) IITA (International Institute of Tropical Agriculture Kenya) and a wide range of government institutions and NGOs in Kenya, Tanzania, Uganda and Malawi.

Further detail of partners, etc can be found on the web-site: www.aatf-africa.org

Gospel Omanya, Seed Systems Manager, AATF, P.O. Box 30709 Nairobi 00100 Kenya; g.omanya@aatf-africa.org

UNLOCKING THE CEREAL PRODUCTION POTENTIAL IN EAST AFRICA BY ELIMINATING THE *STRIGA* THREAT THE KILIMO TRUST PROJECT

The parasitic weed *Striga* has infested more than 1.5 million hectares (ha) of land across East Africa, causing economic losses of up to $335 million per year for maize alone.

A team of experts formed a Consortium in 2008 to build synergies in eliminating the *Striga* threat in East Africa using the available proven technologies which include the 'push-pull' technology involving use of the legume fodder crop, *Desmodium*, a herbicide-based approach using impazyr with herbicide-resistant mutant (IR) maize varieties, crop varieties resistant to *Striga*, especially for sorghum and maize, and cultural control methods like crop rotation.

The Consortium comprised Kilimo Trust, AGRA (Alliance for a Green Revolution in Africa), IFAD (International Fund for Agricultural Development), CIMMYT, AATF (African Agricultural Technology Foundation), ICIPE (International Centre of Insect Physiology and Ecology), Seed and Cereal Traders, Seed Certification Institutions, National Research Systems, Public Extension and Universities and the Ministries of Agriculture in Kenya, Tanzania and Uganda. With funding from Kilimo Trust, a consultancy was commissioned to assess the ex-ante impact of the threat and benefits of *Striga* with the broad strategic objectives of quantifying and documenting the magnitude of the *Striga* problem in East Africa, conducting a critical evaluation of the efficacy of the available solutions to control *Striga* and estimating the social, economic, and environmental impacts of introducing improved *Striga* control measures in East Africa. This provided information to guide the development of a regional *Striga* control program in East Africa.

Using a modeling framework developed to predict the economic benefits of introducing *Striga* control measures in the three East Africa countries, the model was constructed using the results of field trial data from sixteen independent studies conducted over the past eight years in East and Central Africa. The field trial results were extrapolated to other *Striga* infested locations

Key findings: (see p. 12)

a) There are four major *Striga* zones in East Africa: the Lake Victoria Zone, the Inland Semi Arid Zone in Tanzania, the Inland Moist Zone in Uganda and South Highlands of Tanzania and Kenya, and the Coastal zone in Kenya and Tanzania. The Lake Victoria Zone in Kenya, Tanzania and Uganda has the largest extent of infestation of over 850,000 hectares with the heaviest *Striga* infestations (over

50% of the cropland) being medium to severely infested. This area also experienced crop losses ranging between 50% and 80% due to *Striga*.

b) On average, Tanzania loses 961,000 tons of maize per year due to *Striga* or about 28% of the annual crop, Kenya 226,565 tonnes (10% of annual crop) and Uganda 725,000 tons per year (about 57% of annual crop).

c) In the heavily infested *Striga* zones rural poverty rates often exceed 70% and where *Striga* infestation is lighter, poverty rates are often 20% or less.

d) It is feasible to design a special program to accelerate elimination of the *Striga* threat in cereal production systems based on the existing technologies.

e) Cereal cropping systems have a considerable and proven potential (improved varieties, agronomic practices and farmers' skills) of improving food security and reducing poverty, but this potential has not been realized in areas infested by *Striga*. None of the methods can solve the problem on their own in the entire region and an integrated approach is required. Removal of the *Striga* threat will therefore contribute to the unlocking of such potential to enable smallholders to i) contribute to regional supply of cereals, and, if market access is improved, to ii) increase their incomes.

f) An investment of $US 40 million would be required over a 20 year period with the most benefits obtainable from *Striga* control with an investment of $US 20 million, one half of the $US 40 million required to reach the full adoption.

The Project:

Considering the opportunities and the challenges, the regional program entitled: 'Unlocking Cereal Production Potential in East Africa through Elimination of *Striga* Threat' is being designed to address the current challenges of putting the existing technologies into use, such that by 2020, yields of maize, sorghum, rice and millet in 60% of cropped lands currently infested by *Striga* in East Africa, will have been substantially increased (for instance in maize to an average of 3 t/ha per season) as a result of reduction by at least 50% of *Striga* infestation and seed bank in the soil of the target areas.

Jointly facilitated by Kilimo Trust and AGRA, the regional program has six key pillars addressing the cereal value chain that will be implemented in country sub-level projects with each project covering about 50,000 households. In this case the Consortium invests jointly in key geographic regions where the problem is severe, targets a large number of households, and scales up *Striga* control technologies and practices as part of a package that will include work on the entire value chain.

The six key pillars:

a) Establish baseline information for monitoring and evaluation of the work that needs to be done.

b) Ensure sufficient technology dissemination through guaranteeing a dedicated extension service and other capacities to support the fight against *Striga* on a continuous basis.

c) Facilitate regulatory services, especially seed certification and phyto-sanitary services to approve the various

d) Involve a motivated private sector in the inputs' supply for the push-pull and IR-maize technologies

e) Further Technological Innovation that includes identification of the necessary research required to adapt the technologies and practices to different situations, especially the recent spread of *Striga* to upland rice.

f) An advocacy thrust to leverage infrastructure and market access investments.

The Goal:

To enhance sustained contribution of cereals production systems to incomes and food security in the East Africa region with the purpose focused on substantially reducing and finally eliminating the threat of *Striga* in cereal production systems in East Africa.

Implementation:

It was resolved that implementation of the proposed program while targeting the entire East Africa region, should be through country level sub-programmes, supported by special regional-wide sub-program to deal with cross-cutting issues. It was thus agreed that each country (Uganda, Tanzania and Kenya) should take the initiative to develop the necessary sub-programmes to deal with the *Striga* problem in the infested areas of the country. The purpose of each sub-program will be 'to scale-up the most appropriate technologies and practices to control *Striga* in the Target Area, in an integrated package that addresses the entire value chain from resource management to marketing in cereal production systems affected by *Striga*'.

Further information can be found at www.thekilimotrust.org

Christine Alokit
Kilimo Tust, Kampala, Uganda.
CAlokit@kilimo.co.ug

Summary of key findings by country

Country	Total area infested by *Striga* (ha)	Annual cereal losses (MT) caused by *Striga*	Annual economic losses ($US) with no control measure in place	Potential annual production gains (MT)	Potential annual economic gains ($US) if control program is implemented successfully
Kenya	340,978	Maize: 184,237	45,144,780 *(54,000,000)	Maize: 695,963	166,523,880
		Sorghum: 27,646		Sorghum: 90,821	
		Millet: 1,855		Millet: 6,338	
Tanzania	963,532	Maize: 464,599	333,283,200 *(356,000,000)	Maize: 1,442,502	1,122,250,240
		Sorghum: 192,975		Sorghum: 584,538	
		Rice: 232,913		Rice: 837,599	
Uganda	107,799	Maize: 76,568	23,557,120 *(27,000,000)	Maize: 220,303	287,193,640
		Sorghum: 4,944		Sorghum: 14,301	
		Rice: 8,574		Rice: 24,600	

Notes: Rice is currently being promoted in Kenya as well but no immediate data was available being a new initiative
*Overall Economic losses inclusive of other cereals in the respective countries

(FORTHCOMING) MEETINGS

Novel and sustainable weed management in arid and semi-arid agro-ecosystems 7-10 September 2009, Santorini, Greece.

The 2nd International Conference on 'Novel and sustainable weed management in arid and semi-arid agro-ecosystems' will take place in Santorini, Greece from 7 to 10 September 2009 and is organised by the EWRS Working Group Weed Management in Arid and Semi-Arid Climate. The aim of the conference is to establish a forum of weed scientists involved in research in weed biology, distribution and management in arid and semi-arid agriculture.

A wide variety of topics will include Parasitic weeds.

Further information can be found at **www.ewrs.org/arid/default.asp** or from Dr. Garifalia Economou **economou@aua.gr** or Dr. Ilias Travlos **htravlos@yahoo.gr**

(Apologies that due to the delay in publication, this meeting is no longer 'forthcoming' – Ed.)

BOOK – ERRATA

Parasitic Flowering Plants. Henning S. Heide-Jørgensen. 2008. Brill: Leiden. 438 pages.

The author has listed a large number of corrections to this volume. Please contact Chris Parker for a copy of this list.

THESIS

Ana Höniges, (PhD, Eberhard-Karls University Tübingen, Germany, December 2009)
Ecological and Physiological Studies on Orobanche Species in Natural Ecosystems

The main objective of this thesis was to find out why rare broomrapes (*Orobanche* spp.) in the spontaneous flora are rare and endangered, while weedy broomrapes threat crops in agriculture.

During extensive field work 13 of 22 listed *Orobanche* spp. were found in Romania, namely *Orobanche alba, O. arenaria, O. caryophyllacea, O. coerulescens, O. elatior, O. gracilis, O. lucorum, O. lutea, O. minor, O. purpurea, O. reticulata, O. salviae* and *O. teucrii*. In Baden-Württemberg, Southwest Germany, 11 of 21 listed *Orobanche* spp. were found, namely *Orobanche alsatica, O. arenaria, O. caryophyllacea, O. elatior, O. hederae, O. lutea, O. mayeri, O. minor, O. picridis, O. purpurea* and *O. teucrii.* The studies result in the statement, that the number of sites, where *Orobanche* occurs, and the number of individuals, where they are found, is generally declining.

Climate warming plays a minor role, although it would favour *Orobanche*. Collected local weather data over the past 3-4 years showed a distinct tendency towards dryer spring months (April-June). The precipitation over the days and months is irregularly distributed and changes from year to year. Dry spring months are unsuitable for conditioning and germination of *Orobanche* seeds. This explains, why some *Orobanche* spp. were not found in every year.

Rare *Orobanche* spp. compared with the noxious *Orobanche* spp. in agriculture are biologically handicapped. Their seed production is lower, since their flower stands are much smaller than that of noxious species. Due to insect attack the stems dry off early, so that the seed development leads to immature or empty seeds. This was shown by germination tests under standardised laboratory conditions, and was confirmed by electron microscopy. Some *Orobanche* spp. develop only short germination tubes (radicles), which have a very limited chance to come in contact with a host plant root and to form a haustorium.

Due to these biological disadvantages the rare *Orobanche* spp. are not expected to become noxious species endangering crop plants. The transition to crop damaging pathotypes in rare cases may happen by mutative adaptation (*Orobanche foetida*) or by hybridisation (*Orobanche lavandulacea* x *O. ramosa*).

Series of germination tests were carried out with *Orobanche* seeds, stimulating them with root exudates of their host plants or with the synthetic germination stimulant GR 24, without or with the addition of potential germination inhibitors, and/or gibberellic acid, which could increase elongation growth of the germ tubes. With GR 24 the germination rates of *O. elatior* and *O. lutea* were zero, that of *O. hederae* extremely low. This deserves attention, because GR 24 generally serves as a standard in germination tests. In all the germination test series in this thesis *Orobanche ramosa*, a noxious species in agriculture, was used for comparison.

In order to study allelopathic interactions with the associated flora analyses of root exudates by HPLC with UV/VIS diode array detector, and GC-MS were carried out. Benzoic acid was a significant component in half of the investigated root exudates, including that of the associated flora. Its identity was verified by the retention time in the HPLC chromatograms and by the absorption spectrum. Germination inhibitors of the cinnamic acid family were not found. Germination inhibition, shown by standardised germination tests, resulted in significant differences in sensitivity among the *Orobanche* spp.

Suicidal germination is considered a significant factor in the limitation of rare *Orobanche* spp. Almost all plant roots exude strigolactones, the natural germination stimulants, because these are required for mycorrhiza development. Hence, the exudates of the associated flora stimulates germination, without being parasitised afterwards. Under these circumstances no seed potential is built up in the soil, which during a favourable year could lead to a mass appearance of *Orobanche*.

After the observation during the germination tests that fungi grow out of the seed, these were investigated by transmission electron microscopy. When the presence of endophytic Ascomycetes was discovered, their molecular-genetic identification was carried out. Two fungi have been positively identified as *Alternaria tenuissima* strain IA 285 and *Cladosporium* sp.

For the first time strigolactones have been isolated from the root exudates of host plants of rare *Orobanche* spp. and identified by HPLC-Tandem-MS. Known structures have been found, but there are also indications for related compound, whose structures are not yet revealed. The results show host plant specific qualitative differences in the composition of strigolactones. This supports the hypothesis that host specificity may depend on specific mixtures of strigolactones exuded by the host plant.

The surface of seed coats of *Orobanche* spp. has been investigated by scanning electron microscopy, in order to prove the suitability for the identification of *Orobanche* spp. According to the obtained results *Orobanche* and *Phelipanche* (*Trionychon*) sections can be distinguished, but scarcely the species within these sections.

PRESS RELEASES

'Chemical genetics' approach used to regulate the activity of plant hormones.'

'Plant researcher Tobias Sieberer of the Max F. Perutz Laboratories of the University of Vienna works on signal transduction of hormones called strigolactones. Within his search for chemical substances to influence the activity of this pathway, he is establishing a high-throughput approach to test thousands of different chemical compounds. The project is funded by the Vienna Science and Technology Fund (WWTF).

The project allows the establishment of the first academic compound screening facility in Austria. In pharmaceutical companies such libraries are routinely used for drug discovery. For scientists from public research institutes the use of such libraries is cost-intensive and results are subjected to complicate patent laws. 'Our library will be open for collaboration with interested scientists from the Viennese area', Sieberer illustrates the possibility to use this library for research on additional model organisms. Results of this chemical genetics technique will support basic and applied research. For the strigolactone project this means that discovered inhibitors might be used to enlighten the basic mechanisms of biosynthesis and signalling of the hormone. But also in applied research this might lead to the development of directed shoot branching regulation or impact on the infection rate of plant parasites.'

Extracted from ScienceDaily, Aug. 13, 2009. For the full story see: http://www.sciencedaily.com/releases/2009/08/090810044822.htm

'Development and promotion of *Alectra* resistant cowpea cultivars'

'Improved regional collaboration cowpea research will result from implementation of this project. Recent donor funded legume improvement projects in E. and S. Africa have focused on beans and groundnuts and have neglected cowpea. Up-scaling of outputs beyond the lifetime of the project can lead to improved nutrition and income in semi-arid areas of E. and S. Africa. This will be achieved by improved reliability of cowpea production through use of early maturing, *Alectra*, pest and disease resistant cultivars.

New knowledge will be generated about farmer preferences in cowpea and the current cowpea market structure. *Alectra* resistant cowpea lines that are acceptable to farmers and the market will be identified. Best bet lines identified through a PVS approach from existing collections can be progressed to begin registration by national authorities by the fourth year of the project. From literature reviewed it is expected that a range of resistant lines with different traits will be needed by farmers. Breeding will produce stable lines of high yielding, early maturing, pest, disease and *Alectra* resistant lines by the end of the project. These will need further on-farm evaluation prior to registration. A further output will be knowledge on variability of *A. vogelii* in E. Africa., necessary for confident deployment of resistance over wide geographic areas. Involvement of agricultural service providers and farmers in the project will increase their understanding of cowpea production constraints and opportunities to increase productivity. Lessons learnt with experienced farmer groups will provide foci for up-scaling multiplication use of high-yielding cultivars in the future.'

(Funded by McKnight Foundation (United States) to run from 01/09/2006 to 31/08/2010 in Malawi and Tanzania.)

Extracted from IITA 5 March, 2009. For full version see: http://www.iita.org/cms/details/cereal_legume_project_details.aspx?newsid=269&rid=29&pg=o&activity=Cereals and legumes systems&mainzoneid=67

'Cowpea growers see 55 per cent jump in profits from improved varieties'

'Resource-poor cowpea farmers in sub-Saharan Africa have seen their profits jump by 55 per cent thanks to improved dual-purpose cowpea varieties developed and introduced by IITA and its national partners in Nigeria. Paul Amaza, IITA Agricultural Economist, says that farmers who use traditional varieties earn about US$ 251 per hectare, while those who are growing the improved cowpea are getting US$390, or US$139 more, per hectare with proper crop management.

The improved varieties -- IT89KD-288, IT89KD-391, IT97K-499-35, and IT93K-452-1 -- produce high-quality grains for use as food and fodder and are also resistant to *Striga*, a parasitic weed that reduces yields of susceptible local cowpeas by as much as 80 per cent.

Alpha Yaya Kamara, IITA's Savannah Systems Agronomist, says over 100,000 farmers in Borno and Kano states in northern Nigeria and in the Niger Republic are currently using the improved varieties, where their adoption rate is conservatively estimated at 65 per cent. He explains that farmers in the savannah region view cowpea as both food and cash crop. Therefore, when the varieties were introduced, farmers took to them quickly since they serve both ends well. "Those who cultivate it are basically better off than those who do not", Kamara adds.

The improved cowpea varieties were developed and deployed in partnership with the Borno State Agricultural Development Project, Kano State Agricultural and Rural Development Authority, Kaduna State Agricultural Development Project, the Institute of Agricultural Research - Zaria and the University of Maiduguri. Other local development partners are also promoting the improved varieties by organizing farmers' field days, exchange visits, training and farmer-to-farmer diffusion.'

Extracted from IITA, 05 March 2009. For full version see: http://www.iita.org/cms/details/news_details.aspx?articleid=2190&zoneid=81

'US$27 million annually to dangerous weed'

'Uganda loses 27 million dollars annually due to *Striga* weeds which affect cereal crops. The Senior Agricultural Inspector in the ministry of Agriculture Mary Asio says *Striga* has reduced production of cereals to about 90,000 tonnes. Asio says *Striga* weeds are mostly affecting the West Nile, Eastern and the northern part of the country. She calls upon scientists to design a strategy that will help reduce the seed bank of *Striga* in the soil.'

From New Vision, Thursday, 28th May, 2009: http://www.newvision.co.ug/D/1/10/682783

'Expert tasks African countries on agricultural biotechnology'

'Two centers supported by the Consultative Group on International Agricultural Research, CGIAR – the International Maize and Wheat Improvement Center (CIMMYT) and the International Institute of Tropical Agriculture (IITA) have jointly initiated the Drought-Tolerant Maize for Africa Initiative aimed to protect Africa's maize crop from drought and other threats. Their combined efforts are vital for improving and stabilizing Africa's maize production in an era of food price volatility and emerging climate change.

Drought, which is expected to become more frequent and severe with climate change, already reduces maize yields by an average of 15% annually, amounting to about US$200 million worth of lost grain. Recent droughts in eastern and southern Africa have been particularly disastrous.

For many years, CIMMYT and IITA tended to divide their responsibilities for maize research in Africa geographically, with CIMMYT working in eastern and southern Africa and IITA focusing on West Africa, explains Paula Bramel, IITA's deputy director general in charge of research for development. The big advantage of the DTMA Initiative, she says, is that bringing together the complementary strengths and research products of the two centers, in an effort that spans the continent, enables national public and private partners to tap into and benefit from a much broader base of improved germ-plasm, knowledge and expertise.

More recently, IITA researchers have registered important gains against parasitic weeds of the genus *Striga*, also called witchweed. The single most important biotic constraint of cereal crops in Africa, *Striga* causes especially severe damage to maize yields in the savannas of coastal and central sub-Saharan Africa.

By significantly scaling up current efforts through more intensive collaboration, the DTMA Initiative expects to provide over the next decade 30-40 million farmers with improved maize varieties that will help to boost maize productivity on small farms by 20-30%. It is working in 13 African countries where maize is particularly important, with support from Germany's Federal Ministry for Economic Cooperation and Development (BMZ, its acronym in German), Howard G. Buffett Foundation, Hermann Eiselen, Bill & Melinda Gates Foundation, International Fund for Agricultural Development (IFAD), Rockefeller Foundation, Swiss Agency for Development and Cooperation (SDC), and US Agency for International Development (USAID).

Two newly released varieties - Sammaz 15 and 16, developed in collaboration with Nigeria's Institute for Agricultural Research (IAR) show high yields, with only minor losses to the weeds, even under extreme infestation.'

Extracted from African Science News Service, 27 April 2009, written by Henry Neondo.
For full press release see:
http://www.truthabouttrade.org/index2.php?option=com_content&do_pdf=1&id=13784

'Nigeria: ABU introduces three maize varieties'

'In its efforts of boosting agricultural advancement and food production in the country, the Ahmadu Bello University's (ABU) Institute for Agricultural Research (IAR), Zaria, has released three new maize varieties capable of fully maturing within 70-120 days with a yield potential of 6.9 tonnes per hectare. Unveiling the new seeds christened SAMMAZ 15, 16, and IAR-07-1050 in Zaria, its Director, Professor Balarabe Tanimu, said the three new seeds are resistant to *Striga* and tolerant to streak virus and suitable for cultivation in the Nigerian savannas.

Another new variety of cowpea called SAMPEA 10 was also released by IAR, with full maturity within 60 - 70 days. The new cowpea is also resistant to *Striga* and *Alectra*. Its yield potential is 2.5 tonnes per hectare and it can be grown in savanna ecological zones.'

Extracted from AllAfrica.Com, 9 March 2009. Author Samuel Aruwan, For full version see:
http://allafrica.com/stories/200903090890.html

GENERAL WEB SITES

For individual web-site papers and reports see LITERATURE

For information on the International Parasitic Plant Society, 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 announcement of Gebisa Ejeta's World Food Prize, including video of Hillary Clinton's address see: http://www.worldfoodprize.org/about/about.htm

For abstracts from the 10th World Congress on Parasitic Plants in Kusadasi, Turkey, June 8-12, 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 the ODU parasite site see: http://www.odu.edu/~lmusselm/plant/parasitic/index.php

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

For the Parasitic Plant Genome Project (PPGP) see: http://ppgp.huck.psu.edu/

For The Mistletoe Center (including a comprehensive Annotated Bibliography on mistletoes, up to 2005) see: http://www.rmrs.nau.edu/mistletoe/

For information on the EU COST 849 Project(now completed) 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/parasitic_weeds.asp

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

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

For past and future issues of the Sandalwood Research Newsletter, see: http://www.jcu.edu.au/mbil/srn/index.html

For information on the Kilimo Trust *Striga* project see: www.thekilimotrust.org

For information on the work of the African Agricultural Technology Foundation (AATF) on *Striga* control in Kenya, including periodical 'Strides in *Striga* management' newsletters, see: http://www.aatf-africa.org/

LITERATURE

* indicates web-site reference only

Abbes, Z., Kharrat, M., Delavault, P., Chaïbi, W. and Simier, P. 2009. Nitrogen and carbon relationships between the parasitic weed *Orobanche foetida* and susceptible and tolerant faba bean lines. Plant Physiology and Biochemistry 47(2): 153-159. (Tolerance of faba bean line XBJ90.03-16-1-1-1 is associated with low N content in phloem exudates and reduced carbohydrate utilization in the parasite, suggesting an important role for a glutamine-dependent asparagine synthetase (EC 6.3.5.4) in the N metabolism of the parasite.)

Abukutsa-Onyango, M. 2007. Response of slenderleaf (*Crotalaria brevidens* Benth) to inorganic nitrogen application. African Journal of Food, Agriculture, Nutrition and Development 7(3): unpaginated. (Concluding that nitrogen application has little influence on growth of *C. brevidens*, of value as a trap crop for *Striga* spp.)

Adebayo-Tayo, B.C. and Ajibesin, K.K. 2008. Antimicrobial activities of *Coula edulis.* Research Journal of Medicinal Plant 2(2): 86-91. (Leaves, stem bark, roots and fruits of *Coula edulis* (Olacaceae) exhibited varying degrees of antimicrobial activity.)

Agbaje, S.A., Badu-Apraku, B. and Fakorede, M.A.B. 2008. Heterotic patterns of early maturing maize inbred lines in *Striga*-free and *Striga*-infested environments. 53(2): 87-96. (Three testcross hybrids had consistently positive SCA effects in two environments and are potentially good hybrids for both the savanna and forest zone ecologies.)

Akanji, M.A., Ayorinde, B.T. and Yakubu, M.T. 2009. Anti-lipidaemic potential of aqueous extract of *Tapinanthus globiferus* leaves in rats. In: Singh, V.K. and Govil, J.N. (eds.) Chemistry and medicinal value 2009: 1-8. (Providing some evidence for the value of *T. globiferus* extracts in reducing the incidence of coronary artery diseases such as hypertension and atherosclerosis.)

Akanvou, L, Akanvou, R. and Toto, K. 2006. (The effects of different maize varieties and the use of pulse species as intercrops on the control of *Striga hermonthica* in the savannah region of Cote d'Ivoire.) (in French) Agronomie Africaine 18(1): 13-21. (Intercrops of cowpea and soyabean reduced *S. hermonthica* numbers but maize yields were not increased.)

Aksoy, E. and Uygur, F.N. 2008. Effect of broomrapes on tomato and faba bean crops. Türkiye Herboloji Dergisi 11(1): 1-7. (In pots, *Orobanche ramosa* reduced yield of tomato but did not affect root weight. *O. crenata* affected all aspects of faba bean growth.)

Alvarado-Cárdenas, L.O. 2009. (Systematics of the genus *Bdallophytum* (Cytinaceae).) (in Spanish) Acta Botanica Mexicana 87: 1-21. (A detailed review of the genus, occurring mainly in Mexico, defines three species, which fall within the Cytinaceae rather than Rafflesiaceae as previously assumed.)

Aly, R., Cholakh, H., Joel, D.M., Leibman, D., Steinitz, B., Zelcer, A., Naglis, A., Yarden, O. and Gal-On, A. 2009. Gene silencing of mannose 6-phosphate reductase in the parasitic weed *Orobanche aegyptiaca* through the production of homologous dsRNA sequences in the host plant. Plant Biotechnology Journal 7:487-498. (Jim2)

Ameer, O.Z., Salman, I.M., Yam, M.F., Abd Allah, H.H., Abdulla, M.H., Shah, A.M., Sadikun, A. and Asmawi, M.Z. 2009. Vasorelaxant properties of *Loranthus ferrugineus* Roxb. methanolic extract. IJP - International Journal of Pharmacology 5(1): 44-50. (The data suggests that extracts of *L. ferrugineus* (= *Scurrula ferruginea*?) contain some biologically active substances perhaps polyphenolics that produce a significant blood pressure lowering effect which may explain its use in the management of hypertension.)

Amico, G.C. and Nickrent, D.L. 2009. First report of the mistletoe *Tristerix verticillatus* on *Schinus fasciculatus* from the Sierra de San Luis, Argentina. Plant Disease 93(3): 317. (Reporting a new host, and the first record of *T. verticillatus* south of the Andes.)

Amico, G.C. and Nickrent, D.L.. 2009. Population structure and phylogeography of the mistletoes *Tristerix corymbosus* and *T. aphyllus* (Loranthaceae) using chloroplast DNA sequence variation. American Journal of Botany 96: 1571-1580. (121 individuals of these two species were sequenced for two chloroplast regions and the haplotypes analyzed using Bayesian and parsimony methods. The haplotype distribution is complex and resulted from post-glaciation migrations from multiple Pleistocene refugia.)

Amudavi, D.M., Khan, Z.R., Wanyama, J.M., Midega, C.A.O., Pittchar, J., Hassanali, A. and Pickett, J.A. 2009. Evaluation of farmers' field days as a dissemination tool for push-pull technology in Western Kenya. Crop Protection 28(3): 225-235. (Discussing the value of farmer field days in the promotion of push-pull technology, including the use of *Desmodium* to control *Striga*.)

Angone, S.A., Bardor, M., Nguema-Ona, E., Rihouey, C., Ishii, T., Lerouge, P. and Driouich, A. 2009. Structural characterization of cell wall polysaccharides from two plant species endemic to central Africa, *Fleurya aestuans* and *Phragmanthera capitata*. Carbohydrate Polymers 75(1): 104-109. (Exploring the complex of polysaccharides that might explain the value of *P. capitata* in traditional medicine.)

Anikó, H. and Gergely, J. 2009. (Life history and importance of mistletoes (*Viscum album* and *Loranthus europaeus*) in Hungary.) (in Hungarian) Növényvédelem 45(4): 184-190. (The areas damaged by *V. album* and *L. europaeus* are 1158 and 885 ha respectively, with a tendency to be increasing.)

Ariyaratne, M., Takamure, I. and Kato, K. 2009. Shoot branching control by *reduced culm number 4* in rice (*Oryza sativa* L.). Plant Science 176(6): 744-748. . (The gene *rcn4* appears to control axillary bud activity in a manner independent from the strigolactone associated pathway for inhibition of branching.)

Awasthi, A.K., Anjana Gupta and Goel, A.K. 2008. *Alectra parasitica* var. *chitrakutensis*: a rare traditional remedy for leucoderma and virility in Chitrakoot region of Uttar Pradesh. Ethnobotany 20(1/2): 154-156. (Noting that *A. parasitica* has been used locally to treat leucoderma and virility.)

Babayi, H.M. *et al.* (13 other authors). 2007. Effect of oral administration of aqueous whole extract of *Cassytha filiformis* on haematograms and plasma biochemical parameters in rats. Journal of Medical Toxicology 3(4): 146-151. (A toxicological study concluding that normal therapeutic doses of *C. filiformis* extract are not seriously harmful.)

Badu-Apraku, B., Fakorede, M.A.B., Lum, A.F. and Akinwale, R. 2009. Improvement of yield and other traits of extra-early maize under stress and nonstress environments. Agronomy Journal 101(2): 381-389. (Analysing the various characteristics of maize populations, TZEE-W Pop STR (white) and TZEE-Y Pop STR (yellow) contributing to their additional yield under *Striga*-infested conditions.)

Badu-Apraku, B. and Yallou, C.G. 2009. Registration of *Striga*-resistant and drought-tolerant tropical early maize populations TZE-W Pop DT STR C_4 and TZE-Y Pop DT STR C_4. Journal of Plant Registrations 3(1): 86-90. (These two populations have been released as source germplasm in West Africa. Field trials have shown over 40% yield benefit over the susceptible TZE Comp under *Striga* infestation.)

*Balachandran, N. and Kichenamourthy, S. 2007. Profile of natural stands of *Santalum album* L.in the Pondicherry region, India. Sandalwood Research Newsletter 22: 4. http://www.jcu.edu.au/mbil/srn/Papers/064%20Kichenamourthy%202007.pdf (Clay with limestone and sandy soils had substantially greater numbers of sandal trees than clay and red earth soils. *Azadirachta indica, Glycosmis mauritiana, Lantana camera, Morinda pubescens* and *Phoenix pusilla* are the main associates (hosts?) in this study region.)

Balázs, E., Vurro, M. and Gressel, J. 2009. Managing parasitic weeds: integrating science and practice. Proceedings of a conference held at Apulia, Italy, 21-26 September 2008. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 451-614. (Reviewing the origins, aims and output of the meeting in Ostuni.)

Ballmer, G.R. 2008. Life history of *Purlisa gigantea* in south Thailand (Lepidoptera: Lycaenidae, Theclini). Tropical Lepidoptera Research 18(1): 32-39. (Larvae of *P. gigantea* were found feeding on *Helixanthera cylindrica*.)

Balouchi, H.R. and Sanavy, S.A.M.M. 2009. Electromagnetic field impact on annual medics and dodder seed germination. International Agrophysics 23(2): 111-115. (*Cuscuta monogyna* was suppressed by 'electromagnetic field application' while the growth of cultivated *Medicago* spp. was enhanced.)

Begho, E.R., Omokhafe, K.O., Omo-Ikerodah, E.E. and Akpaja, E.O. 2007. Some observations on the fruit set and incidence of mistletoes on rubber trees in Nigeria. American-Eurasian Journal of Sustainable Agriculture 1(1): 13-18. (Recording observations on *Phragmanthera capitata* and *Agelanthus brunneus*, their flowering pattern, relatively low fruit set, and differential damage on different clones of rubber.)

Bhardwaj, S.K. and Laura, J.S. 2009. Antifungal activity of some plant extracts against *Chaetomium globosum*. Journal of Pure and Applied Microbiology 3(1): 163-168. (*Cuscuta reflexa* among species whose aqueous extract showed anti-fungal activity.)

Blick, R. and Burns, K.C. 2009. Network properties of arboreal plants: are epiphytes, mistletoes and lianas structured similarly? Perspectives in Plant Ecology, Evolution and Systematics 11(1): 41-52. (Concluding that mistletoe and liana species tended to have mutually exclusive host preferences.)

Bolin, J.F., Maass, E. and Musselman, L.J.. 2009. Pollination biology of *Hydnora africana* Thunb. (Hydnoraceae) in Namibia: Brood-site Mimicry with Insect Imprisonment. International Journal of Plant Science 170(2): 157-163. (The hide beetle *Dermestes maculates* (Tenebrionidae) accounted for 77% of the insects imprisoned in the smooth walled chamber in the flower's protogynous stage. Stippling, and texturing allowed *D. maculatus* to escape after pollen release.)

Boulet, C., Pineault, D., Benharrat, H., Bozec, D., Delavault, P. and Simier, P. 2007. (Oilseed rape weeds and branched broomrape (*Orobanche ramosa* L.).) (in French) 20ème Conférence du COLUMA. Journées Internationales sur la Lutte contre les Mauvaises Herbes, Dijon, France, 11-12 décembre, 2007 326-345. (Indicating over 50% occurrence of *O. ramosa* in rapeseed in Pays de la Loire, and noting that many weedspecies can act as alternate hosts.)

Bowen, M.E., McAlpine, C.A., House, A.P.N. and Smith, G.C. 2009. Agricultural landscape modification increases the abundance of an important food resource: mistletoes, birds and brigalow. Biological Conservation 142(1): 122-133. (Bird disperser abundance, patch shape, dead trees and connectivity had the strongest influence on *Amyema quandang* abundance on *Acacia harpophylla*.)

Brophy, J.J., Goldsack, R.J., Doran, J.C. and Niangu, M. 2009. Heartwood oils of *Santalum macgregorii* F. Muell. (PNG sandalwood). Journal of Essential Oil Research 21(3): 249-253. (Fourteen samples showed wide variation in oil content, some close to that of *S. album*.)

Bussing, A., Stumpf, C., Troger, W. and Schietzel, M. 2007. Course of mitogen-stimulated T lymphocytes in cancer patients treated with *Viscum album* extracts. Anticancer Research 27(4C): 2903. (Concluding that a long course of treatment with *V. album* extracts should be interrupted periodically to allow T-cell reactivity to recover.)

Carbyn, S., Catling, P.M., van der Kloet, S.P. and Basquill, S. 2006. An analysis of the vascular flora of Annapolis Heathlands, Nova Scotia. Canadian Field-Naturalist 120(3): 351-362. (Including mention of *Melampyrum lineare*.)

Cardoso-Lopes, E.M., Carreira, R.C., Agripino, D.G., Torres, L.M.B., Cordeiro, I., Bolzani, V.da S., Ditrich, S. M.de C. and Young, M.C.M. 2008. Screening for antifungal, DNA-damaging and anticholinesterasic activities of Brazilian plants from the Atlantic Rainforest - Ilha do Cardoso State Park. Revista Brasileira de Farmacognosia 18(Supplement): 655-660. (*Tetrastylidium grandifolium* (Olacaceae) one of only 2 out of 17 spp. which reduced acetyl-cholinesterase activity by more than 50%.)

Carnegie, A.J., Bi HuiQuan, Arnold, S., Li Yun and Binns, D. 2009. Distribution, host preference, and impact of parasitic mistletoes (Loranthaceae) in young eucalypt plantations in New South Wales, Australia. In: Shamoun, S.F. (ed.) Botany 87(1): 49-63. (About 10% of 450 eucalyptus plantations were infested by mistletoes, mainly by *Dendrophthoe vitellina* and *Amyema bifurcata*. Effects on *Corymbia maculata* and *C. citriodora* subsp. *variegata* were variable but could exceed 10% growth reduction.)

Cernusak, L.A. *et al.* (13 other authors). 2009. Why are non-photosynthetic tissues generally 13^{C} enriched compared with leaves in C_3 plants? Review and synthesis of current hypotheses. Functional Plant Biology 36(3): 199-213. (Offering 6 different hypotheses for 13^{C} enrichment in non-photosynthetic tissues, including that of holoparasitic plants. one of the more interesting being the differential use of day *v.* night sucrose between leaves and sink tissues, with day sucrose being relatively ^{13}C-depleted and night sucrose ^{13}C-enriched.)

Chastagner, G.A., Riley, K. and Dart, N. 2008. *Phytophthora ramorum* isolated from California bay laurel inflorescences and mistletoe: possible implications relating to disease spread. In: Frankel, S.J., Kliejunas, J.T. and Palmieri, K.M. (eds.) General Technical Report - Pacific Southwest Research Station, USDA Forest Service No.PSW-GTR-214: 169-171. (Confirming that *Phoradendron serotinum* on walnut can be infected by *Phytophthora ramorum* and contribute to its spread among neighbouring conifers (*Abies concolor* and Douglas fir). Bay laurel (*Umbellularia*) not involved in this.)

Chen Hua, Hu XiaoYing, Shen Hao, Cao HongLin and Ye WanHui. 2008. Influence of the obligate parasite *Cuscuta campestris* on the leaf stomatal behavior of its host *Mikania micrantha*. Guangxi Zhiwu / Guihaia 28(5): 655-660. (Infection with *C. campestris* had significant effects on diurnal stomatal behavior of *M. micrantha*, but not on stomatal density.).

Consolini, A.E. and Ragone, M.I. 2008. Cardiovascular effects of some medicinal plants from the South American regions of the Rio de La Plata basin and Patagonia. In: Eddouks, M. (ed.) Handbook of Ehnopharmacology 2008: 233-260. (Reviewing the experimental and clinical findings of cardiovascular effects of native plants, including *Ligaria cuneifolia* (Loranthaceae).)

Coop, J.D. and Schoettle, A.W. 2009. Regeneration of Rocky Mountain bristlecone pine (*Pinus aristata*) and limber pine (*Pinus flexilis*) three decades after stand-replacing fires. Forest Ecology and Management 257(3): 893-903. (Noting that fire decreased the frequency of *Pedicularis* but increased *Castilleja* and *Ribes* species (alternate hosts of white pine blister rust).)

Cordero, C., Bicchi, C., Galli, M., Galli, S. and Rubiolo, P. 2008. Evaluation of different internal-diameter column combinations in comprehensive two-dimensional gas chromatography in flavour and fragrance analysis. Journal of Separation Science 31(19): 3437-3450. (Including reference to sandalwood oil from *Santalum album* etc.)

da Silva, A.L., da Martins, B.S., de Linck, V.M., Herrmann, A P., Mai, N., Nunes, D.S. and Elisabetsky, E. 2009. MK801- and scopolamine-induced amnesias are reversed by an Amazonian herbal locally used as a "brain tonic". Psychopharmacology 202(1/3): 165-172. (Extracts of *Ptychopetalum olacoides* (Olacaceae) are used in the Amazon region to alleviate age-related conditions. This study confirms that they do have potential for treating cognitive deficits, especially those linked with cholinergic malfunction.)

Dayan, F.E., Howell, J'L. and Weidenhamer, J.D. 2009. Dynamic root exudation of sorgoleone and its *in planta* mechanism of action. Journal of Experimental Botany 60(7) 2107-2117. (No mention of *Striga* but exploring the allelopathic effects of sorgoleone on neighbouring seedlings, resulting from absorbtion by hypocotyls and cotyledonary tissues and translocation to shoots where it inhibits photosynthesis.)

de Araújo, M.R.S., Monte, F.J.Q. and Braz Filho, R. 2009. A new sesquiterpene from *Ximenia americana* Linn. Helvetica Chimica Acta 92(1): 127-132. (The new compound, ximonicane, did not inhibit selected human leukemia, human colon, or human breast cancer cell lines.)

de Vega, C., Arista, M., Ortiz, P.L., Herrera, C.M. and Talavera, S. 2009. The ant-pollination system of *Cytinus hypocistis* (Cytinaceae), a Mediterranean root holoparasite. Annals of Botany 103(7): 1065-1075. (Confirming that *C. hypocistis* in Spain is predominantly dependent on ants for pollination, with a small contribution from the fly *Oplisa aterrima*.)

Delos, M., Eychenne, N., Croin, V. and Cariou, L. 2007. (Interactions between weeds in crops and other pest analysis.) (in French) 20ème Conférence du COLUMA. Journées Internationales sur la Lutte contre les Mauvaises Herbes, Dijon, France, 11-12 décembre, 2007: 410-416. (Discussing the potential inter-relations between pests, fungi, viruses, bacteria diseases and parasitic plants.)

Dias, K.S., Almeida, D.S., Silva, A.B.L., Marques, M.S., Menezes, I.A.C., Santos, T.C., Mello, I.C.M., Carvalho, A.C.S., Antoniolli, Â.R. and Marçal, R.M.: 2007. (Investigation on miorelaxant, antispasmodic and analgesic effects of the aqueous extract of *Phoradendron piperoides*.) (in Portuguese) Revista Brasileira de Farmacognosia 17(3): 373-377. (Showing *P. piperoides* to be non-toxic and to have miorelaxant and antispasmodic activity.)

Didier, D.S., Laurier, E.O.N., Din, N., Jules, P.R., Victor, T., Henri, F., Georges, S. and Akoa, A. 2009. Artificial infestations of *Tapinanthus ogowensis* (Engler) Danser (Loranthaceae) on three host species in the Logbessou Plateau (Douala, Cameroon). African Journal of Biotechnology 8(6): 1044-1051. (Results suggest that *T. ogowensis* grows more readily on mango than on *Dacryodes edulis* or avocado.)

Die, J.V., González Verdejo, C.I., Dita, M.Á., Nadal, S. and Román, B. 2009. Gene expression analysis of molecular mechanisms of defense induced in *Medicago truncatula* parasitized by *Orobanche crenata*. Plant Physiology and Biochemistry 47(7): 635-641. (Jim2)

Die, J.V., Román, B., Nadal, S., Dita, M.Á. and González-Verdejo, C.I. 2009. Expression analysis of *Pisum sativum* putative defence genes during *Orobanche crenata* infection. Crop & Pasture Science 60(5): 490-498. (Jim2)

Doumbia, S. and Thomas, J.M. 2007. (*Striga hermonthica* infestation of sorghum in Mali control by restoring soil fertility. Effects of manures and cultivated fallow.) (in French) 20ème Conférence du COLUMA. Journées Internationales sur la Lutte contre les Mauvaises Herbes, Dijon, France, 11-12 décembre, 2007: 678-687. (In 17 farmer-managed trials, manure application or rotation with cowpea, failed to reduce *Striga* infestation but improved sorghum yields.)

Dunham, P.A. 2008. Incidence of insects, diseases, and other damaging agents in Oregon forests. Resource Bulletin - Pacific Northwest Research Station, USDA Forest Service No.PNW-RB-257, 89 pp. (Including reference to *Arceuthobium* spp.)

Eberwein, R., Nickrent, D.L. and Weber, A. 2009. Development and morphology of flowers and inflorescences in *Balanophora papuana* and *B. elongata* (Balanophoraceae). American Journal of Botany 96: 1055-1067. (Male flower and bract ontogeny conform to patterns seen in other angiosperms. More problematic are the carpellate flowers whose primordia arise in irregular order between club-shaped, radially symmetrical organs called claviform bodies.)

Eizenberg, H., Hershenhorn, J. and Ephrath, J.E. 2009. Factors affecting the efficacy of *Orobanche cumana* chemical control in sunflower. Weed Research (Oxford) 49(3): 308-315. (Using a minirhizotron technique to explore the optimum timing of post-emergence application of imazapic and proposing a decision support system based on growing degree days.)

El-Husseini, N., El-Ghani, M.M.A. and El-Naggar, S.I. 2008. Biogeography and diversity of the Tubiflorae in Egypt. Polish Botanical Journal 53(2): 105-124. (Noting *Cuscuta* and *Orobanche* among the dominant species-rich genera in Egypt.)

Elzein, A., Kroschel, J. and Cadisch, G. 2008. Efficacy of Pesta granular formulation of *Striga*-mycoherbicide *Fusarium oxysporum* f. sp. *strigae* Foxy 2 after 5-year of storage. Journal of Plant Diseases and Protection 115(6): 259-262. (Pesta granules based on chlamydospores in a matrix of durum wheat-flour, kaolin, and sucrose were still highly active after 5 years storage at 4^0C.)

Elzein, A., Kroschel, J., Marley, P. and Cadisch, G. 2009. Does vacuum-packaging or co-delivered amendments enhance shelf-life of *Striga*-mycoherbicidal products containing *Fusarium oxysporum* f. sp. *strigae* during storage? Biocontrol Science and Technology 19(3): 349-367. (Vacuum packaging did not increase the shelf life of Pesta granules incorporating *F. oxysporum* f. sp. *strigae* strains Foxy2 or PSM197, but 4^0C was better than 22^0C or -3^0C for storage of their mixtures with fungicide Apron XL(R).)

Encheva, J., Christov, M. and Shindrova, P. 2008. Developing mutant sunflower line (*Helianthus annuus* L.) by combined use of classical method with induced mutagenesis and embryo culture method. Bulgarian Journal of Agricultural Science 14(4): 397-404. (Describing the development of line 35 RM with improved characteristics including resistance to *Orobanche cumana* and its use to form Hybrid No 61, tested successfully in the field.)

Evstativea, L., Hardalova, R. and Stoyanova, K. 2008. (Trade and protection of medicinal and aromatic plants in Bulgaria.) (in German) Zeitschrift für Arznei- & Gewürzpflanzen 13(4): 151-152. (*Euphrasia* spp. among the 15 000-18 000 tonnes of medicinal plants produced annually in Bulgaria.)

Fernández-Aparicio, M., Flores, F. and Rubiales, D. 2009. Recognition of root exudates by seeds of broomrape (*Orobanche* and *Phelipanche*) species. Annals of Botany 103(3): 423-431. (A valuable study involving exudates from 41 potential host species and the germination of 9 *Orobanche/Phelipanche* spp., confirming that *O. densiflora*, *O. gracilis* and *O. hederae* have very narrow host ranges; *P. aegyptiaca*, *P. ramosa* and *O. minor* germinate in response to most species, including many non-hosts, while *O. crenata*, *O. cumana* and *O. foetida* are intermediate. Weedy species (other than *O. foetida*) respond to GR24 but non-weedy species do not.)

Fernández-Aparicio, M., Sillero, J.C. and Rubiales, D. 2009. Resistance to broomrape in wild lentils (*Lens* spp.). Plant Breeding 128(3): 266-270. (Among 23 wild *Lens* spp. accessions, high resistance to *Orobanche crenata* was found in *L ervoides, L. odemensis* and *L. orientalis,* showing as impeded tubercle development following normal germination.)

García, D., Rodríguez-Cabal, M.A. and Amico, G.C. 2009. Seed dispersal by a frugivorous marsupial shapes the spatial scale of a mistletoe population. Journal of Ecology (Oxford) 97(2): 217-229. (Analysing the way in which the distribution of *Tristerix corymbosus,* is influenced by the marsupial *Dromiciops gliroides* in Patagonia.)

Gardin, N.E. 2009. Immunological response to mistletoe (*Viscum album* L.) in cancer patients: a four-case series. Phytotherapy Research 23(3): 407-411. (After 7 subcutaneous doses of *V. album* extract, 4 cancer patients showed enhanced humoral and cellular immune responses, without side effects.)

Géza, F., Lászlo, J., Ildikó, V. and Szilvia, P. 2009. (Parasitic fungi of European mistletoe (*Viscum album* L.).) (in Hungarian) Növényvédelem 45(4): 178-183. (*Botryosphaerostroma visci*, *Plectophomella visci, Septoria visci*, *Colletotrichum gloeosporioides, Diplodia visci* and a *Fusarium* sp. were identified from *V. album*. *B. visci* shows potential as a biocontrol agent.)

Glatzel, G. and Geils, B.W. 2009. Mistletoe ecophysiology: host-parasite interactions. In: Shamoun, S.F. (ed.) Botany 87(1): 10-15. (An in-depth appraisal of the nutrient and water relations affecting the growth of mistletoes and their effects on their hosts.)

Green, A.K., Ward, D. and Griffiths, M.E. 2009. Directed dispersal of mistletoe (*Plicosepalus acaciae*) by yellow-vented bulbuls (*Pycnonotus xanthopygos*). Journal of Ornithology 150(1): 167-173. (Distribution of *P. acaciae* is much influenced by the behaviour of *P. xanthopygos* which moves mainly between host *Acacia raddiana* and *A. tortilis* trees along (but not between) river beds.)

Gronhaug, T.E., Glaeserud, S., Skogsrud, M., Ballo, N., Bah, S., Diallo, D. and Paulsen, B.S. 2008. Ethnopharmacological survey of six medicinal plants from Mali, West-Africa. Journal of Ethnobiology and Ethnomedicine 4(26): (27 December 2008) (The survey suggested good consensus among traditional healers, for the uses of extracts of *Opilia celtidifolia*, but less agreement on the value of *Ximenia americana*.)

Gomez, S.K. and Harrison, M.J. 2009. Laser microdissection and its application to analyze gene expression in arbuscular mycorrhizal symbiosis. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 504-511. (Microdissection is used to help understand the localization of gene expression following infection of roots by AM fungi.)

Gressel, J. 2009. Crops with target-site herbicide resistance for *Orobanche* and *Striga* control. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 560-565. (Reviewing the uses of herbicide resistance, involving glyphosate, ALS inhibitors and asulam, and proposing the use of multiple crop resistances to reduce the risk of evolution of resistance in the parasites.)

Gundrey, A.L., Tallowin, J.R.B. and Pilgrim, E.S. 2007. The response of yellow-rattle *Rhinanthus minor* L. to a range of fertilizer inputs on a neutral hay meadow. In: Hopkins, J.J., Duncan, A.J., McCracken, D.I., Peel, S. and Tallowin, J.R.B. (eds.) High value grassland: providing biodiversity, a clean environment and premium products. Proceedings of the BGS/BES/BSAS Conference held at Keele University, Staffordshire, UK, 17-19 April, 2007: 233-236. (*R. minor* declined steadily in manured plots. In unfertilized plots there were large year to year variations and no consistent trend.)

Habashi, C. and Jeanmonod, D. 2008. (Supplements to the prodrome of the Corsican flora: Orobanchaceae.) (in French) In: Habashi, C. and Jeanmonod, D. (eds.) Compléments au prodrome de la flore corse: Orobanchaceae: 1-126. (A detailed treatise on the Orobanchaceae of Corsica, with descriptions, keys, distribution, molecular biology etc of 10 species of *Orobanche* and 3 of *Phelipanche.*)

Hamdan, I.I. and Afifi, F.U. 2008. Screening of Jordanian flora for α-amylase inhibitory activity. Pharmaceutical Biology 46(10/11): 746-750. (Extracts from *Osyris alba* were the most potent among 35 species in controlling the surge of glucose after sucrose ingestion and also exhibited the highest α-amylase inhibitory activity *in vitro*.)

Harbaugh, D.T. 2008. Polyploid and hybrid origins of Pacific Island sandalwoods (*Santalum*, Santalaceae) inferred from low-copy nuclear and flow cytometry data. International Journal of Plant Sciences 169(5): 677-685. (Exploring the evolution of 4 ploidy levels (diploid n=10 to octaploid n=80) in 16 species of *Santalum* and finding more than twice as many long-distance island colonizations from polyploid as from diploid ancestors, providing evidence for the role of polyploidy in plant colonization.)

Hearne, S.J. 2009. Control - the *Striga* conundrum. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 603-614. (Suggesting the need for more use of integrated control approaches, improved crop germplasm phenotyping, enhanced understanding of the host/non-host - parasite interaction and better integration of research, development and extension communities.)

Heinken, T. and Winkler, E. 2009. Non-random dispersal by ants: long-term field data versus model predictions of population spread of a forest herb. Perspectives in Plant Ecology, Evolution and Systematics 11(1): 1-15. (Discussing the complex influences of different ant species on the dispersal of seeds of *Melampyrum pratense* in a German forest situation.)

Helgason, T. and Fitter, A.H. 2009. Natural selection and the evolutionary ecology of the arbuscular mycorrhizal fungi (Phylum Glomeromycota). Journal of Experimental Botany 60(9): 2465-2480. (Jim2)

Hennessey, M.K., Gould, W.P. and Steck, G.J. 2009. *Anastrepha edentata* and other fruit flies (Diptera: Tephritidae) detected on Key Largo, Florida. Florida Entomologist 92(1): 173-176. (*Anastrema suspense* reared from *Ximenia americana* L. (Olacaceae) for the first time.)

Hensel, M., Zoz, M. and Ho, A.D. 2009. Complementary and alternative medicine in patients with chronic lymphocytic leukemia. Supportive Care in Cancer 17(1): 47-52. (In a survey, 9 % of leukaemia patients in Germany used *Viscum album* extracts.)

*Hettiarachichi, D.S. 2008. Volatile oil content determination in the Australian sandalwood industry: Towards a standardised method. Sandalwood Research Newsletter 23, 1-4. http://www.jcu.edu.au/mbil/srn/Papers/065%20Hettiarachichi%202008.pdf (Proposing continuation of the hydro-distillation method as standard for assessing *Santalum spicatum* (and *S. austrocaledonicum*?) until quicker reliable methods are developed.)

Hiraoka, Y., Ueda, H. and Sugimoto, Y. 2009. Molecular responses of *Lotus japonicus* to parasitism by the compatible species *Orobanche aegyptiaca* and the incompatible species *Striga hermonthica*. Journal of Experimental Botany 60(2): 641-650. (Suppression subtractive hybridization was used to identify host genes responsive to parasitism. Major differences included findings that *Orobanche* induced more nodulation-related genes and systemic gene expression as compared to *Striga*.)

Hooper, A.M., Hassanali, A., Chamberlain, K., Khan, Z. and Pickett, J.A. 2009. New genetic opportunities from legume intercrops for controlling *Striga* spp. parasitic weeds. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 546-552. (Suggesting that the biosynthesis of isoschaftoside, the di-*C*-glycosylflavone responsible for the effectiveness of *Desmodium* as a suppressant of *Striga*, might be introduced by bio-engineering to other legume or cereal crops to make them equally effective.)

Hosseini, S.M.**,** Kartoolinejad, D**.,** Mirnia, S.K.**,** Tabibzadeh, Z., Akbarinia, M. and Shayanmehr, F. 2008. The European mistletoe effects on leaves and nutritional elements of two host species in Hyrcanian forests. Silva Lusitana 16(2): 229-237. (Results suggest that *Viscum album* L. can damage leaf structure, physiological and nutritional status of host trees (*Carpinus betulus* and *Parrotia persica*) at high levels of infection.)

Houston, K. and Wolff, K. 2009. Eight polymorphic microsatellite markers for *Rhinanthus minor*. Molecular Ecology Resources 9(1): 174-176. (Identifying microsatellite markers of value in studying genetic structure and subspecies differences of *R. minor*.)

Hristeva, T. and Drachev, D. 2008. Investigation on chemical composition of Basmi variety group oriental tobacco infected with supreme flower parasite broomrape (*Orobanche* sp.). Ecology and Future - Journal of Agricultural Science and Forest Science 7(1): 35-39. (Infected Basmati tobacco had modified concentrations of nicotine, reducing sugars, total nitrogen, protein nitrogen, ash, micronutrients and macronutrients.)

Hui, D.F. and Jackson, R.B. 2009. Assessing interactive responses in litter decomposition in mixed species litter. Plant and Soil 314(1/2): 263-271. (Including reference to *Bartsia* spp.)

Ibikunle, O.A., Menkir, A., Kamara, A.Y., Ajeigbe, H.A. and Smith, M.A.K. 2008. Evaluation of artificial field infestation techniques with *Striga hermonthica* for resistance screening in maize (*Zea mays* L.). Maydica 53(2): 97-100. (A slighty modified screening technique, not involving covering with sand, gave equally good results.)

Jackson, M.B. 2008. Douglas-fir dwarf mistletoe spread, intensification, and tree growth impact: thirty-eight year re-measurement. Forest Health Protection Report - Northern Region, USDA Forest Service No.08-09: 12 pp. (In a long-term study of *Arceuthobium douglasii* infection of Douglas fir, a trend towards reduced height growth after 38 years was apparent as dwarf mistletoe rating increased above 3 or 4.)

James, D.B., Owolabi, A.O., Ibiyeye, H., Magaji, J. and Ikugiyi, Y.A. 2008. Assessment of the hepatic effects, haematological effect and some phytochemical constituents of *Ximenia americana* (Leaves, stem and root) extracts. African Journal of Biotechnology 7(23): 4274-4278. (Roots have higher content of potentially active compounds than leaf or stem.) Jayasuriya, K.M.G.G., Baskin, J.M., Geneve, R.L. and Baskin, C.C. 2009. Phylogeny of seed dormancy in Convolvulaceae, subfamily Convolvuloideae (Solanales). Annals of Botany 103(1): 45-63. (Discussing the evolution and anatomical mechanisms of dormancy in Convolvulaceae, including *Cuscuta* spp.)

Jiang, Y., Li, S.P., Wang, Y.T., Chen, X.J. and Tu, P.F. 2009. Differentiation of Herba Cistanches by fingerprint with high-performance liquid chromatography-diode array detection-mass spectrometry.In: Xie, P.S. and van Beek, T.A. (eds.) Journal of Chromatography, A 1216(11): 2156-2162. (Herba Cistanche ('Rou Cong Rong'), is 'officially' prepared from *Cistanche deserticola* or *C. tubulosa*. This study suggests the extent to which the 'unofficial' species, *C. salsa* and *C. sinensis* can be distinguished chromatographically.)

Jiang Yong and Tu PengFei 2009. Analysis of chemical constituents in *Cistanche* species. In: Xie, P.S. and van Beek, T.A. Journal of Chromatography, A 1216(11): 1970-1979. (Reviewing the range of chemical constituents of *Cistanche* spp. responsible for their various antioxidation, neuroprotection, and anti-aging effects.)

Joita, M.P. 2007. (Resistance to diseases - a priority in sunflower breeding at NARDI Fundulea.) (in Romanian) Analele Institutului National de Cercetare-Dezvoltare Agricolă Fundulea 74: 75-80. (Noting the success of backcross methods in the development of resistance to *Orobanche cumana*.)

Joita, M.P., Raranciuc, S., Stanciu, D., Sava, E. and Năstase, D. 2008. Virulence and aggressiveness of sunflower broomrape (*Orobanche cumana* Wallr.) populations, in Romania. Romanian Agricultural Research 2008(25): 47-50. (The resistance to *O. cumana* in the highly resistant line AO-548 is shown to depend on two independent dominant genes.)

Kaewchumnong, K. and Price, A.H. 2008. A study on the susceptibility of rice cultivars to *Striga hermonthica* and mapping of *Striga* tolerance quantitative trait loci in rice. New Phytologist 180(1): 206-216. (Mapping QTLs of potential value in understanding, and breeding for, *Striga* resistance in rice.)

Kamara, A.Y., Ellis-Jones, J., Amaza, P., Omoigui, L.O., Helsen, J., Dugje, I.Y., Kamai, N., Menkir, A. and White, R.W. 2008. A participatory approach to increasing productivity of maize through *Striga hermonthica* control in Northeast Nigeria. Experimental Agriculture 44(3): 349-364. (Describing a successful campaign resulting in wide-scale adoption of *Striga* control practices, and trebling of cereal yields.)

Karakas, A., Serin, E., Gündüz, B. and Türker, A.U. 2008. The effects of mistletoe (*Viscum album* L. subsp. *album*) extracts on isolated intestinal contractions. Turkish Journal of Biology 32(4): 237-242. (Concluding that *V. album* extracts could be effective against intestinal motility problems and have potential as a therapeutic remedy for intestinal colic.)

Kawai, Y. and Kudo, G. 2009. Effectiveness of buzz pollination in *Pedicularis chamissonis*: significance of multiple visits by bumblebees. Ecological Research 24(1): 215-223. (Concluding that buzz pollination (vibrating the anthers) in *P. chamissonis* improves the chance of cross-pollination upon multiple visits if pollinator visitation is frequent.)

Kayeke, J., Sibuga, P.K., Msaky, J.J. and Mbwaga, A. 2007. Green manure and inorganic fertiliser as management strategies for witchweed and upland rice. African Crop Science Journal 15(4): 161-171. (Confirming the value of *Crotolaria ochlroleuca* as a green manure/trap crop to reduce *S. asiatica* infestation and increase yield of rice in Tanzania.)

Keymanesh, K., Hamedi, J., Moradi, S., Mohammadipanah, F. and Sardari, S. 2009. Antibacterial, antifungal and toxicity of rare Iranian plants. IJP - International Journal of Pharmacology 5(1): 81-85. (Concluding that *Cistanche tubulosa* 'could be worthy of attention for finding anticancer phytochemicals'.)

Kelly, D., Ladley, J.J., Robertson, A.W. and Crowfoot, L. 2008. Flower predation by *Zelleria maculata* (Lepidoptera) on *Peraxilla* mistletoes: effects of latitude and fragmentation, and impact on fruit set. New Zealand Journal of Ecology 32(2): 186-196. (Discussing the variable degrees of damage from *Z. maculata* on the endemic *Peraxilla tetrapetala* and *P. colensoi* in New Zealand.)

Khushboo Varshney and Singh, A.K. 2008. Inventory of some ethno-medicinal plant species used by rural people of Etah district, U.P., India. Plant Archives 8(2): 757-759. (Including reference to *Cuscuta reflexa*.)

Kiwia, A., Imo, M., Jama, B. and Okalebo, J.R. 2009. Coppicing improved fallows are profitable for maize production in striga infested soils of western Kenya. In: Jose, S. (ed.) Agroforestry Systems 76(2): 455-465. (*Tephrosia vogelii* proved the best of a number of leguminous species as fallow, reducing *Striga hermonthica* and increasing profitability in the following maize crop.)

Klooster, M.R. and Culley, T.M. 2009. Comparative analysis of the reproductive ecology of *Monotropa* and *Monotropsis*: two mycoheterotrophic genera in the Monotropoideae (Ericaceae). American Journal of Botany 96(7):137-1347. (*Monotropa uniflora*, *M. hypopitys* and *Monotropsis odorata* all show mainly outcross pollination, but differ in many other aspects of their breeding systems.)

Klooster, M.R., Hoenle, A.W. and Culley, T.M. 2009. Characterization of microsatellite loci in the myco-heterotrophic plant *Monotropa hypopitys* (Ericaceae) and amplification in related taxa. Molecular Ecology Resources 9(1): 219-221. (The method is cost-effective and applicable to *M. uniflora* and five other closely related genera.)

Kolo, M.G.M. and Mamudu, A.Y. 2008. Water treatment of *Parkia biglobosa* pulp dressed maize (*Zea mays* L.) seeds for *Striga hermonthica* control at Minna, Nigeria. Agricultura Tropica et Subtropica 41(3): 96-105. (Trials in 2004/2005 showed that soaking maize seeds for 18 hours with 164 g *P. biglobosa* pulp and 50 ml water per kg seed, reduced emergence of *S. hermonthica* by 60-70% and increased maize yield by 80%. Any follow-up to these interesting results? The pulp is high in N.)

Konieczka, C.M., Colquhoun, J.B., Rittmeyer, R.A. 2009. Swamp dodder (*Cuscuta gronovii*) applied ecology in carrot production. Weed Technology 23(1): 175-178. (Five varieties of carrot were found to be relatively tolerant of infestation by *C. gronovii*.)

Kovacs, E., Link, S. and Toffol-Schmidt, U. 2008. Comparison of *Viscum album* QuFrF extract with vincristine in an *in vitro* model of human B cell lymphoma WSU-1. Arzneimittel Forschung 58(11): 592-597. (The effects of the *V. album* extract on the B cell lymphoma cell line WSU-1 were comparable to those of vincristine.)

Kubo, M., Ueda, H., Park PyoYun, Kawaguchi, M. and Sugimoto, Y. 2009. Reactions of *Lotus japonicus* ecotypes and mutants to root parasitic plants. Journal of Plant Physiology 166(4): 353-362. (The model legume *L. japonicus* is susceptible to *Orobanche aegyptiaca* but not to *O. minor*, *Striga hermonthica* or *S. gesenerioides*. The reaction of selected mutants of *L. japonicus* suggests there are interactions with nodulation and, mycorrhizal colonization.)

Kudi, T.M. and Kureh, I. 2006. Economic analysis of striga (*Striga hernonthica*) management strategies in Sudan, Northern Guinea and Southern Guinea Savanna zones of Nigeria. Journal of Agriculture, Forestry and Social Sciences 4(2): 60-67. (Showing positive economic returns from the on-farm use of *Striga*-resistant maize varieties.)

Kwon-Ndung, E.H. and Ismaila, A. 2009. Prospects of host resistance in improved and domesticated species of *Parkia biglobosa* to African mistletoes (*Tapinanthus* spp.) in Central Nigeria. Electronic Journal of Environmental, Agricultural and Food Chemistry 8(5): 382-388. (Noting that *P. globosa* is host to three (unspecified) *Tapinanthus* species, and discussing the potential for selecting resistant lines of the tree.)

Lendzemo, V., Kuyper, T.W., Urban, A., Vegvari, G., Puschenreiter, M., Schickmann, S., Langer, I., Steinkellner, S. and Vierheilig, H. 2009. The arbuscular mycorrhizal host status of plants cannot be linked with the *Striga* seed-germination-activity of plant root exudates. Journal of Plant Diseases and Protection 116(2): 86-89. (Confirming that plants which do not host AM fungi do not exude strigolactones, but that some AM host plants also fail to stimulate germination of *Striga hermonthica*.)

Li, J. and Timko, M.P. 2009. Gene-for-gene resistance in *Striga*-cowpea associations. Science 325: 1094. (This article is notable for being the first documentation of a coiled coil nucleotide binding site leucine-rich repeat domain protein being involved in response to a parasitic plant; these "R" genes are well known from other plant pathogen interactions. The RSG3-301 describe here is responsible for race-specific resistance in cowpea.)

Li, J.X., Lis, K.E. and Timko, M.P. 2009. Molecular genetics of race-specific resistance of cowpea to *Striga gesnerioides* (Willd.). In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 520-527. (Reporting valuable progress in understanding the resistance pattern in cowpea. Several race-specific resistance genes have been identified and located to linkage groups LG1 or LG6. Expression of *PR5* (pathogen-resistance gene 5) may be a useful marker of *Striga* infection, suggesting that salicylic acid signalling may play a role in the cowpea-*Striga* interaction.)

Li JunMin and Dong Ming 2009. Fine-scale clonal structure and diversity of invasive plant *Mikania micrantha* H.B.K. and its plant parasite *Cuscuta campestris* Yuncker. Biological Invasions 11(3): 687-695. (Clonal diversity of *M. micrantha* (14 genets of 20 ramets) was significantly greater than that of *C. campestris* (4 genets of 20 ramets).)

Llugany, M., Lombini, A., Dinelli, E., Poschenrieder, C. and Barceló, J. 2009. Transfer of selected mineral nutrients and trace elements in the host-hemiparasite association, *Cistus-Odontites lutea*, growing on and off metal-polluted sites. Plant Biology 11(2): 170-178. (*Odontites lutea* withstood enhanced Zn and Pb concentrations and low Fe/Cu ratios in shoot tissue without developing toxicity symptoms.)

López-Ráez, J.A., Matusova, R., Cardoso, C., Jamil, M., Charnikhova, T., Kohlen, W., Ruyter-Spira, C., Verstappen, F. and Bouwmeester, H. 2009. Strigolactones: ecological significance and use as a target for parasitic plant control. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 471-477. (Reviewing the strigolactones, their biosynthetic origin, ecological significance and physiological and biochemical regulation, and noting the need to consider any consequence of their manipulation, on their other functions, especially on AM fungi.)

Lu Yi, Wang QingGuo, Melzig, M.F. and Jenett-Siems, K. 2009. Extracts of *Cynomorium songaricum* protect SK-N-SH human neuroblastoma cells against staurosporine-induced apoptosis potentially through their radical scavenging activity. Phytotherapy Research 23(2): 257-261. (Results confirm the neuroprotective activity of *C. songaricum* extracts *in vitro*, thus supporting their traditional use.)

Lyu SuYun and Park WonBong. 2008. Transport of mistletoe lectin by M cells in human intestinal follicle-associated epithelium (FAE) *in vitro*. Archives of Pharmacal Research 31(12): 1613-1621. (Lectin from *Viscum album*.)

Lyu SuYun and Park WonBong 2009. Mistletoe lectin modulates intestinal epithelial cell-derived cytokines and B cell IgA secretion. Archives of Pharmacal Research 32(3): 443-451. (Lectin from *Viscum album*.)

Ma ChaoMei, Wei Ying, Wang ZhiGang and Hattori, M. 2009. Triterpenes from *Cynomorium songaricium* - analysis of HCV protease inhibitory activity, quantification, and content change under the influence of heating. Journal of Natural Medicines 63(1): 9-14. (Malonyl ursolic acid hemiester the most potent element, but also the most affected by heating.)

*Ma, G-H. and Bunn, E. 2007. Embryology and pollination trials support dichogamy in *Santalum album* L. Sandalwood Research Newsletter 22: 1-4. http://www.jcu.edu.au/mbil/srn/Papers/063%20Ma%202007.pdf (Results indicate that the flower of *S. album* is dichogamous where the pollen matures before the embryo sac. Following fertilization, 1-3 embryos and endosperms are formed in the same fruit. Seeds mostly produce only a single seedling, but sometimes 2 or 3.)

Ma JingJing, Zhao Fan and Sun Yun 2009. The effects of acteoside on nourishing kidney and strengthening Yang in Yang deficient mice. Source: Journal of Yangzhou University, Agricultural and Life Sciences Edition 30(1): 22-25. (Acteoside, distilled from *Cistanche tubulosa* decreased the latent period of penis erection, increased the number of germ cells, increased the coefficient of sexual organs and improved pathology changes of testes. Good news for the Yang-deficient?)

Ma YanHui, Cheng WeiZhi, Gong Fang, Ma AnLun, Yu QiWen, Zhang JiYing, Hu ChaoYing, Chen XueHua and Zhang DongQing. 2008. Active Chinese mistletoe lectin-55 enhances colon cancer surveillance through regulating innate and adaptive immune responses. World Journal of Gastroenterology 14(34): 5274-5281. (Demonstrating that *Viscum album* lectin ACML-55 therapy can enhance function in immune surveillance in colon cancer-bearing mice through regulating both innate and adaptive immune responses.)

Ma ZhiGuo, Yang ZhongLin, Li Ping and Li ChengHua. 2008. Simultaneous determination of eight phenylethanoid glycosides in different species of the genus *Cistanche* by high performance liquid chromatography. Journal of Liquid Chromatography & Related Technologies 31(18): 2838-2850. (Another example of the use of HPLC to distinguish between extracts from different *Cistanche* spp. (cf. Jiang Y, *et al*, and Shi HaiMing *et al.*).)

Malo, S. and Shuka, L. 2008. New records on the flora of the Gjirokastra region (South Albania). Natura Montenegrina 2008(7): 369-373. (A first record for *Orobanche lavandulacea* in Albania.)

Maloney, P.E., Smith, T.F., Jensen, C.E., Innes, J., Rizzo, D.M. and North, M.P. 2008. Initial tree mortality and insect and pathogen response to fire and thinning restoration treatments in an old-growth mixed-conifer forest of the Sierra Nevada, California. Canadian Journal of Forest Research 38(12): 3011-3020. (Noting that thinning treatments may provide a sanitation effect in which more vigorous trees have lower levels of *Arceuthobium* attack.).

Mathiasen, R.L. 2008. New combinations for *Arceuthobium aureum* (Viscaceae) in Mexico and Central America. Novon 18(4): 501-507. (Taxa previously treated under *A. aureum* are recombined under *A. globosum*: *A. globosum* ssp. *aureum* and *A. globosum* ssp. *petersonii*.)

Mathiasen, R.L. 2009. Comparative susceptibility of conifers to knobcone pine dwarf mistletoe. Western North American Naturalist 69(1): 42-48. (Concluding that Jeffrey pine (*Pinus jeffreyi*) should be regarded as a principal host of *Arceuthobium siskiyouense*, and shore pine (*Pinus contorta* var. *contorta* as an occasional host. White pine, Douglas fir and incense-cedar are immune.)

Mathiasen, R. and Daugherty, C. 2009. First report of mountain hemlock dwarf mistletoe (*Arceuthobium tsugense* subsp. *mertensianae*) on sugar pine (*Pinus lambertiana*) from Oregon. Plant Disease 93(3): 321. (Just a few infections observed.)

Matsushima, K., Minami, M. and Nemoto, K. 2009. Usage of edible wild plants in Bhutan. Journal of the Faculty of Agriculture, Shinshu University 45(1/2): 49-54. (Tea made from *Viscum nepalense* is purported to cure bone fracture and body pain.)

Mattiasson, G. 2008. (Broomrapes *Orobanche* in Sweden.) (in Swedish) Svensk Botanisk Tidskrift 102(6): 277-292. (Eight species listed including *O. purpurea*, *O. elatior* and *O. reticulata*, classified as endangered.)

Mazzio, E A. and Soliman, K.F.A. 2009. *In vitro* screening for the tumoricidal properties of international medicinal herbs. Phytotherapy Research 23(3): 385-398. (In a wide study of 374 natural products on ‘immortal neuroblastoma of spontaneous malignant origin’, ‘mistletoe’ (*Viscum* album?) was among the vast majority showing ‘no pattern of tumoricidal effects’.)

Mbagwu, F.N., Unamba, C.I.N., Onuoha, C.I. and Ezeibekwe, I.O. 2009. Histochemical studies on five variants of *Viscum* L. (Loranthaceae). Research Journal of Biological Sciences 4(3): 254-257. (Reporting different-shaped oxalate crystals in different variants of ‘*Viscum*’ in Nigeria, but completely unclear what species was/were involved.)

Meir, S., Amsellem, Z., Al-Ahmad, H., Safran, E. and Gressel, J. 2009. Transforming a *NEP*1 toxin gene into two *Fusarium* spp. to enhance mycoherbicide activity on *Orobanche* - failure and success. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 588-595. (Introduction of the transformed *NEP*1 toxin gene enhanced virulence on *Orobanche* of *Fusarium* CNCM I-1621, an unidentified type previously identified as *F. arthrosporioides* which lacks any form of this gene; but it failed to do so on other *Fusarium* types which already have a form of the gene.)

Metcalf, C.J.E., Clark, J.S. and Clark, D.A. 2009. Tree growth inference and prediction when the point of measurement changes: modelling around buttresses in tropical forests. Journal of Tropical Ecology 25(1): 1-12. (Including reference to *Minquartia guianensis* (Olacaceae).)

Mitei, Y.C., Ngila, J.C., Yeboah, S.O., Wessjohann, L. and Schmidt, J. 2009. Profiling of phytosterols, tocopherols and tocotrienols in selected seed oils from Botswana by GC-MS and HPLC. Journal of the American Oil Chemists' Society 86(7): 617-625. (Including study of *Ximenia caffra* seed oils.)

Montanha, J.A., Schenkel, E.P., Cardoso-Taketa, A.T., Dresch, A.P., Langeloh, A. and Dallegrave, E. 2009. Chemical and anti-ulcer evaluation of *Jodina rhombifolia* (Hook. & Arn.) Reissek extracts. Revista Brasileira de Farmacognosia 19(1A/1B): 29-32. (Oral administration of *J. rhombifolia* extracts led to a significant decrease in the gastric ulcer index.)

Meulebrouck, K., Ameloot, E., Brys, R., Tanghe, L., Verheyen, K. and Hermy, M. 2009. Hidden in the host - unexpected vegetative hibernation of the holoparasite *Cuscuta epithymum* (L.) L. and its implications for population persistence. Flora (Jena) 204(4): 306-315. (Confirming that *C. epithymum* (correctly *C. epithymum* Murr.) is capable of over-wintering vegetatively on *Calluna vulgaris*. An average 85% of infections arise from re-sprouting haustoria.)

Montenegro, A.L. and Vargas, O. 2008. (Vital traits of woody species in High Andean forest edges of the Cogua Forest Reserve (Colombia).) (in Spanish) Revista de Biología Tropical 56(2): 705-720. (Including observations on *Gaiadendron punctatum* (Loranthaceae).)

Moreno Salazar, S.F., Enríquez Verdugo, A., Cuamea López, C., Bolado Martínez, E., Medrano Candelas, T. and Robles-Zepeda, R.E. 2008. Activity of medicinal plants, used by native populations from Sonora, Mexico, against enteropathogenic bacteria. Pharmaceutical Biology 46(10/11): 732-737. (The methanol extract of

Struthanthus haenkeanus had strong antimicrobial activity against *Shigella flexneri*.)

Mortimer, S.R. *et al.* (10 other authors). 2007. Impact of facilitator plant species on the enhancement of botanical diversity of species-poor grasslands. In: Hopkins, J.J., Duncan, A.J., McCracken, D.I., Peel, S. and Tallowin, J.R.B. (eds.) High value grassland: providing biodiversity, a clean environment and premium products. Proceedings of the BGS/BES/BSAS Conference held at Keele University, Staffordshire, UK, 17-19 April, 2007: 285-288. (Reporting the use of *Rhinanthus minor* as one of the management tools to increase diversity.)

Müller-Stöver, D., Kohlschmid, E. and Sauerborn, J. 2009. A novel strain of *Fusarium oxysporum* from Germany and its potential for biocontrol of *Orobanche ramosa*. Weed Research (Oxford) 49(2): 175-182. (Reporting good host-specific results from lab and pot experiments with a German strain of *F. oxysporum* on *O. ramosa*.)

Muir, J.A. and Hennon, P.E. 2007. A synthesis of the literature on the biology, ecology, and management of western hemlock dwarf mistletoe. General Technical Report No.PNW-GTR-718 - Pacific Northwest Research Station, USDA Forest Service. 142 pp. (Emphasising the need for further research on *Arceuthobium tsugense* in western N. America in the light of new policies restricting its previously effective management by clear felling.)

Muniappan, R., Reddy, G.V.P. and Raman, A. 2009. Biological control of tropical weeds using arthropods. In: Muniappan, R., Reddy, G.V.P. and Raman, A. (eds.) Biological control of tropical weeds using arthropods. 495 pp. (Including reference to *Striga* spp.)

NARCCIM 2009. Abstracts from the 2009 North American Research Conference on Complementary and Integrative Medicine, Minneapolis, Minnesota, USA, 12-15 May 2009. Alternative Therapies in Health and Medicine 15:(3): S78-S186. (Including abstracts on the potential of *Viscum album* extract to alleviate adverse effects of cancer chemotherapy.)

Nickrent, D.L. and García, M.A. 2009. On the brink of holoparasitism: plastome evolution in dwarf mistletoes (*Arceuthobium*, Viscaceae). Journal of Molecular Evolution 68(6): 603-615. (Chloroplast DNA sequences from the inverted repeat of *Arceuthobium campylopodum* and *A. pendens* were generated and compared to other plants. Changes paralleling those seen in the holoparasite *Epifagus* (Orobanchaceae) were seen. The 16S–23S rDNA intergenic spacer was shown to have phylogenetic information at the species level in dwarf mistletoes.)

Nutsugah, S.K., Atokple, I.D.K. and Leth, V. 2008. Sorghum diseases prevalent in Ghana. Ghana Journal of Agricultural Science 40(2): 119-126. (A survey (in 1997) showed *Striga hermonthica* was more prevalent in the two Upper regions than in the Northern Region.)

Ogura-Tsujita, Y., Gebauer, G., Hashimoto, T., Umata, H. and Yukawa, T. 2009. Evidence for novel and specialized mycorrhizal parasitism: the orchid *Gastrodia confusa* gains carbon from saprotrophic *Mycena*. Proceedings of the Royal Society of London. Series B, Biological Sciences 276(1657): 761-767. (Concluding from ^{13}C and ^{15}N studies, that *G. confusa* is parasitic on litter- and wood-decomposing *Mycena* fungi.)

Ouattara, K., Coulibaly, A., N'Guessen, J. D., Gueda-Guina, F. and Djaman, A.J. 2007. (Effects of *Thonningia sanguinea* (Thos) on the quality of the eggs and egg-laying rate of hens during an experimental salmonellosis induced by the ingestion of *Salmonella enterica* serotype Enteritidis lysotype 6.) (in French) Agronomie Africaine 19(1): 21-28. (Extracts of *T. sanguinea* eradicated *S. enteritidis* from the eggs and can therefore be recommended as an efficient treatment to improve laying ability and egg quality in the case of chicken salmonellosis.)

Ofem, O.E., Ani, E.J., Okongor, E.Y., Okot-Asi, A., Eno, A.E. and Ibu, J.O. 2008. Effect of *Viscum album* (mistletoe) on some serum enzymes, weight and cytoarchitectue of the liver in high salt loaded rats. Nigerian Journal of Health and Biomedical Sciences 7(1): 1-6. (Indicating beneficial effects of *V. album* treatment in countering effects of high salt.)

Okazawa, A. 2007. Study on parasite plants regarding loss of photosynthesis ability and mutant phytochrome. Kagaku to Seibutsu 45(10): 674-676. (Involving genetic analysis of phytochrome A in *Orobanche minor*.) (Apologies - this was listed in the last issue under the incorrect name of Oakazaki.)

Omeje, E.O., Osadebe, P.O., Okoye, F.B.C., Agwu, A.K. and Esimone, C.O. 2008. Immunomodulatory activities of n-hexane and methanol extracts of *Loranthus micranthus* Linn. parasitic on *Parkia biglobosa*. Asian Pacific Journal of Tropical 1(3): 48-54. (Presenting evidence for some immuno-stimulatory activity from *L. micrantha* which is considered locally in Nigeria to possess anti-diabetic, anti-motility, anti-microbial and anti-hypertensive activities which are host-tree dependent.)

Özcelık, B., Orhan, D.D., Özgen, S. and Ergun, F. 2008. Antimicrobial activity of flavonoids against extended-spectrum β-lactamase (ESβL)-producing *Klebsiella pneumoniae*. Tropical Journal of Pharmaceutical Research 7(4): 1151-1157. (Extracts of *Viscum album* among those showing activity.)

Palmer, A.G., Chen, M.C., Kinger, N.P. and Lynn, D.G. 2009. Parasitic angiosperms, semagenesis and general strategies for plant-plant signaling in the rhizosphere. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 512-519. (A wide-ranging exploration of the role of haustorial-initiating compounds in parasitic and non-parasitic plants. Incidentally emphasizing the role of dihydrosorgoleone rather than strigolactones in the stimulation of *Striga* germination by sorghum.)

Parker, C. 2009. Observations on the current status of *Orobanche* and *Striga* problems worldwide. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 453-459. (Noting the lack of reliable statistics on the exact areas affected and the damage caused by the main parasitic weed species, but confirming that they continue to cause massive losses. Control measures are having some impact on a localised basis, but the scale of *Striga* problems may still be increasing.)

Pattanayak, S.P. and Mazumder, P.M. 2009. Assessment of neurobehavioral toxicity of *Dendrophthoe falcata* (L.f) Ettingsh in rats by functional observational battery after a subacute exposure. Pharmacognosy Magazine 5(18): 98-105. (Results suggest that hydroalcoholic extracts of *D. falcata* have no serious neurobehavioral toxicity and are safe to use. The many traditional uses in India include treating ulcers, asthma, impotence, paralysis, skin diseases, and wounds.)

Pattanayak, S.P., Mazumder, P.M. and Sunita, P. 2008. *Dendrophthoe falcata* (L.f) Ettingsh: a consensus review. Pharmacognosy Reviews 2(4): 359-368. (Reviewing the very wide range of traditional medicinal uses for *D. falcata* and the scientific evidence for their effectiveness.)

Pattanayak, S.P. and Sunita, P. 2008. Wound healing, anti-microbial and antioxidant potential of *Dendrophthoe falcata* (L.f) Ettingsh. Journal of Ethnopharmacology 120(2): 241-247. (Indicating that an ethanol extract of *D. falcata* has potent antioxidant activity, inhibiting lipid peroxidation, reducing glutathione, superoxide dismutase levels and increasing the catalase activity.)

Pérez-de-Luque, A. and Rubiales, D. 2009. Nanotechnology for parasitic plant control. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 540-545. (Proposing a range of ways in which nanotechnology might be exploited in parasitic weed control.)

Pest Management Science. 2009. OECD Special Issue: Managing Parasitic Weeds, Integrating Science and Practice. Pest Management Science 65(5): 451-614. (This issue is devoted to the 23 papers presented at the meeting in Ostuni, Italy, in September, 2008. The individual papers are all reviewed in this issue. A copy of this single issue is available to Haustorium readers for $US 85.00 + p&p – a 50% discount on the standard issue price. To order, email cs-journals@wiley.co.uk or phone +44 1243-843335.)

Piato, Â.L., Rizon, L.P., Martins, B.S., Nunes, D.S. and Elisabetsky, E. 2009. Antidepressant profile of *Ptychopetalum olacoides* Bentham (Marapuama) in mice. Phytotherapy Research 23(4) 519-524. (Confirming antidepressant-like effects, possibly mediated by β-adrenergic and D_1 dopamine receptors of extracts of *P. olacoides* (Olacaceae) consistent with traditional use for depression in Brazil.)

Plakhine, D., Ziadna, H. and Joel, D.M. 2009. Is seed conditioning essential for *Orobanche* germination? In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 492-496. (Demonstrating that a conditioning phase is not required before exposure to stimulant in *O. cumana* or *O. aegyptiaca* but is for *O. crenata*.)

Ploetz, R.C. and Freeman, S. 2009. Foliar, floral and soilborne diseases. In: Litz, R.E (ed.) The mango: botany, production and uses. Ed.2: 231-302. (Including reference to unspecified ‘parasitic plants’.)

Prider, J., Watling, J. and Facelli, J.M. 2009. Impacts of a native parasitic plant on an introduced and a native host species: implications for the control of an invasive weed. Annals of Botany 103(1): 107-115. (*Cassytha pubescens* had a greater effect on the introduced host, *Cytisus scoparius*, than on the native *Leptospermum myrsinoides*. Possible reasons are discussed.)

Pujadas-Salvà, A.J. and Fraga i Arguimbau, P. 2008. A new species of *Orobanche* (Orobanchaceae) from the Balearic Islands. Botanical Journal of the Linnean Society 158(4): 722-729. (*O. iammonensis* is described from coastal rocky slopes on the west coast of Minorca, parasitic on *Anthemis maritima*. It is most closely related to *O. litorea* (section *Orobanche* L. grex *Minores*).)

Qasem, J.R. 2009. Parasitic weeds of the Orobanchaceae family and their natural hosts in Jordan. Weed Biology and Management 9(2): 112-122. (Results of a survey over several years, recording 10 spp. of *Orobanche* and 3 spp. of *Cistanche* and a wide range of host species, a number of these not previously reported.)

Qiu HuaXing, Chen BingHui and Zeng FeiYan 2008. Noteworthy taxa from Southern China. Guangxi Zhiwu / Guihaia 28(6): 721-723. (New records for *Viscum yunnanense*, *Taxillus levinei* and *T. liquidambaricola* in Hainan; *Dendrophthoe pentandra,* which grows in Guangdong, Guangxi and Yunnan, does not occur in Hainan.)

Radenkovic, M., Ivetic, V., Popovic, M., Brankovic, S. and Gvozdenovic, L. 2009. Effects of mistletoe (*Viscum album* L., Loranthaceae) extracts on arterial blood pressure in rats treated with atropine sulfate and hexocycline. Clinical and Experimental Hypertension 31(1): 11-19. (The total ethanol extract of *V. album* exhibited the best effect and significantly decreased the blood pressure after applied concentration 1.00 x 10^{-3} mg kg^{-1}.)

Ramsfield, T.D., Shamoun, S. F. and van der Kamp, B.J. 2009. The phenology and impact of *Caliciopsis arceuthobii* on lodgepole pine dwarf mistletoe, *Arceuthobium americanum*. In: Shamoun, S.F. (ed.) Botany 87(1): 43-48. (Confirming that the *Arceuthobium*-specific fungus *C. arceuthobii* can reduce fruit production of *A. americanum* by over 50% and has potential as a biocontrol agent.)

Rector, B.G. 2009. A sterile-female technique proposed for control of *Striga hermonthica* and other intractable weeds: advantages, shortcomings and risk management. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 596-602. (Discussing the potential value and limitations of the induction of female sterility into *Striga* populations via genetically modified pollen.)

Reid, N. and Shamoun, S.F. 2009. Contrasting research approaches to managing mistletoes in commercial forests and wooded pastures. In: Shamoun, S.F. (ed.) Botany 87(1): 1-9. (Reviewing recent research on silvicultural treatments, selective herbicides and inundative biological control of mistletoes in North America and Australia.)

Restuccia, A., Marchese, M., Mauromicale, G. and Restuccia, G. 2009. Biological characteristics and control of *Orobanche crenata* Forsk., a review. Italian Journal of Agronomy 4(1): 53-68. (A general review.)

Rodríguez, M., Hasegawa, M., González-Mújica, F., Motta, N., Castillo, A., Castillo, J., Zea, E., Mora, K., Sousa, L., González, A. and Camejo, D. 2008. Antidiabetic and antiradical activities of plants from Venezuelan Amazon. Revista Brasileira de Farmacognosia 18(3): 331-338. (*Phthirusa verruculosa*, *P. castillana* and *Psittacanthus acimarius* among species showing antioxidant activity.)

Rodríguez-Pontes, M. 2009. Seed formation and pollination system in *Cuscuta obtusiflora*: first record of preanthesis cleistogamy in parasitic plants and some functional inferences. Flora (Jena) 204(3): 228-237. (Results suggest that in predominantly cleistogamous populations of *C. obtusiflora*, gene flow occurs through hydrochoric seed dispersal. Pre-anthesis cleistogamy, likely to increase reproductive performance, is recorded for the first time in a parasitic plant.)

Romero M.F. and González, J.M. 2009. Notes on some poorly known Pierine butterflies from the Henri Pittier National Park, Aragua, Venezuela (Lepidoptera: Pieridae). SHILAP Revista de Lepidopterología 37(145): 101-104. (Noting the occurrence of *Cunizza hirlanda minturna, Hesperocharis crocea idiotica* and *Melete lycimnia harti* on Loranthaceae, including *Struthantus dichotrianthus* and *Phthirusa stelis*.)

Rubiales, D. and Fernández-Aparicio, M. 2009. First report of cottony-cushion scale (*Icerya purchasi*) on red berried mistletoe (*Viscum cruciatum*). Entomological Research 39(1): 95-96. (*I. purchasi* occurred on *V. cruciatum* but not on the host olive.)

Rubiales, D., Fernández-Aparicio, M., Pérez-de-Luque, A., Castillejo, M.A., Prats, E., Sillero, J.C., Rispail, N. andFondevilla, S. 2009. Breeding approaches for crenate broomrape (*Orobanche crenata* Forsk.) management in pea (*Pisum sativum* L.). In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 553-559. (Suggesting that basic genomic research and genetic engineering can contribute to more rapid pea improvement for resistance against *O. crenata* and/or herbicides.)

Sands, D.C. and Pilgeram, A.L. 2009. Methods for selecting hypervirulent biocontrol agents of weeds: why and how. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 581-587. (Proposing the selection of natural mutants of *Fusarium* and other pathogens for over-production of certain amino acids, increasing their virulence on *Orobanche* or other target parasitic weeds.)

Satovic, Z., Joel, D.M., Rubiales, D., Cubero, J.I. and Román, B. 2009. Population genetics in weedy species of *Orobanche*. Australasian Plant Pathology 38(3): 228-234. (A detailed appraisal of the genetic variation in the weedy species of *Orobanche* as influenced by mating systems, geographic distribution and host-induced selection.)

Sawant, U.K., Sardeshpande, J.S., Kadam, J.J. and Joshi, M.S. 2008. Host range of *Loranthus* in Konkan region of Maharashtra. Journal of Plant Disease Sciences 3(2): 222-225. (Sixty hosts reported for unspecified '*Loranthus*' spp.)

Sawant, U.K., Sardeshpande, J.S., Kadam, J.J. and Joshi, M.S. 2008. Studies on growth, flowering and haustoria behaviour of *Loranthus* on mango. Journal of Plant Disease Sciences 3(2): 155-158. ('*Loranthus*' unspecified.)

Sengul, M.**,** Yildiz, H.**,** Gungor, N.**,** Cetin, B.**,** Eser, Z. and Ercisli, S. 2009. Total phenolic content, antioxidant and antimicrobial activities of some medicinal plants. Pakistan Journal of Pharmaceutical Sciences 22(1): 102-106. (Methanol extracts from *Vicum album* showed high antioxidant activity; also antimicrobial activity against 9 out of 32 microorganisms.)

Serebryanaya, A. and Shipunov, A. 2009. Morphological variation of plants on the uprising islands of northern Russia. Annales Botanici Fennici 46(2): 81-89. (Including reference to *Euphrasia wettsteinii*.)

Shah, G.M., Khan, M.A., Mushtaq Ahmad, Muhammad Zafar and Khan, A.A. 2009. Observations on antifertility and abortifacient herbal drugs. African Journal of Biotechnology 8(9): 1959-1964. (Noting from a survey that *Cuscuta reflexa* is among plants used traditionally as contraceptives in N. Pakistan.)

Shamoun, S.F. 2009. Special issue on stem and shoot fungal pathogens and parasitic plants: the values of biological diversity. In Shamoun, S.F. (ed.) Botany 87(1)1-63. (Containing a number of papers on mistletoes in N. America, reviewed elsewhere in this list.)

Sharma, P., Steckel, H., Koschinsky, A. and Schnug, E. 2009. Potential correlation of heavy metals in surface soils with infestation of *Viscum album* in poplar trees.

Landbauforschung Völkenrode 59(1): 11-18. (No clear correlations demonstrated.)
*Shepherd, D.P., Fox, J.E.D., Duff, H. and Schatral, A, 2008. An effective technique for performing in-vitro pollination experiments with flowers of *Santalum spicatum* and *Santalum album* . Sandalwood Research Newsletter 23, 7-8. http://www.jcu.edu.au/mbil/srn/Papers/067%20Shepherd%202008.pdf (Exploring a technique involving excised flowers kept moist on 'Oasis' floral foam.)
Sherman, T.D., Bowling, A.J., Barger, T.W. and Vaughn, K.C. 2008. The vestigial root of dodder (*Cuscuta pentagona*) seedlings. International Journal of Plant Sciences 169(8): 998-1012. (Concluding from detailed anatomical analysis that the swollen appearance of the dodder root (perhaps more properly described as the base of the shoot) is due to a low level of microtubules, so that neither mitotic divisions nor cell elongation can occur.)
Shi HaiMing, Wang Jing, Wang MengYue, Tu PengFei and Li XiaoBo. 2009. Identification of *Cistanche* species by chemical and inter-simple sequence repeat fingerprinting. Biological & Pharmaceutical Bulletin 32(1): 142-146. (Eight ISSR found to be sufficient to distinguish four *Cistanche* species, serving as markers for quality control of Herba Cistanches (cf. Jiang. Y. *et al.*).)
Smith, J.L., de Moraes, C.M. and Mescher, M.C. 2009. Jasmonate- and salicylate-mediated plant defense responses to insect herbivores, pathogens and parasitic plants. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 497-503. (Discussing the relative importance of salicylates and jasmonates and their interactions as defence mechanisms against parasitic plants.)
So HyunKyung, Mandal, P.K., Baatartsogt, O., Lim HeeKyong, Lee ChiHo, Lee JunHeon and Choi KangDuk 2009. Biomarkers identified by proteomic study of spleen lymphocyte from broilers infected with *Salmonella gallinarum* after feeding Korean mistletoe (*Viscum album coloratum*). Asian Journal of Animal and Veterinary Advances 4(3): 148-159.
Staples, G.W. and Traiperm, P. 2008. New species, new combinations, and new records in Convolvulaceae for the Flora of Thailand. Thai Forest Bulletin (Botany) 2008(36): 86-108. (Recording one or more new records for *Cuscuta* species, unspecified in abstract.)
Štech, M., Chán, V., Lepší, M., Lepší, P., Paulič, R., Rektoris, L. and Soukup, M. 2008. (*Melampyrum cristatum* in South Bohemia.) (in Czech) Sborník Jihočeského Muzea v Českých Budějovicích, Přírodní Vědy 48: 123-129. (Recording the few sites where the critically endangered *M. cristatum* still persists.)
Stein, C., Rissmann, C., Hempel, S., Renker, C., Buscot, F., Prati, D. and Auge, H. 2009. Interactive effects of mycorrhizae and a root hemiparasite on plant community productivity and diversity. Oecologia 159(1): 191-205. (AM fungi increased diversity, but at the expense of *Holcus lanatus* and *Plantago lanceolata*, thus decreasing productivity. *Rhinanthus minor* benefited from AM fungi and contributed to the reduced productivity but not to increased diversity.)
Sun WeiDong, Chen Fei and Sun Yun 2008. The pharmacological research of acteoside on the action inhibited benign prostatic hyperplasia in rats. Journal of Yangzhou University, Agricultural and Life Sciences Edition 29(4): 33-36. (Acteoside from *Ciastanche tubulosa* could promote rat prostate apoptosis, and play a role in inhibiting benign prostatic hyperplasia.)
Sutha, S., Mohan, V.R., Murugan, P. and Athiperumalsami, T. 2008. Antibacterial activity of *Alstonia venenata* R. Br. and *Erythropalum scandens* Bl., Bijdr. Plant Archives 8(2): 609-610. (Including reference to *E. scandens* (Olacaceae).)
Šutovská, M.**,** Fraňová, S.**,** Prisežnaková, L.**,** Nosál'ová, G.**,** Togola, A.**,** Diallo, D.**,** Paulsen, B.S. and Capek, P. 2009. Antitussive activity of polysaccharides isolated from the Malian medicinal plants. International Journal of Biological Macromolecules 44(3): 236-239. (Reporting some evidence for the effectiveness of the polysaccharides in extracts of *Opilia celtidifolia* (Opiliaceae) against coughing.)
Swarbrick, P.J., Scholes, J.D., Press, M.C. and Slate, J. 2009. A major QTL for resistance of rice to the parasitic plant *Striga hermonthica* is not dependent on genetic background. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 528-532. (The study verified and narrowed down the position of a *Striga* resistance QTL of major effect in rice, and demonstrated that it may be a tractable target for marker-assisted selection.)
Sweetapple, P.J. 2008. Spatial variation in impacts of brushtail possums on two Loranthaceous mistletoe species. New Zealand Journal of Ecology 32(2): 177-185. (Discussing the variable impact of possums on *Alepis flavida* and *Peraxilla tetrapetala* in *Nothofagus solandri* forests.)
Takagi, K., Okazawa, A., Wada, Y., Mongkolchaiyaphruek, A., Fukusaki, E., Yoneyama, K., Takeuchi, Y. and Kobayashi, A. 2009. Unique phytochrome responses of the holoparasitic plant *Orobanche minor*. New Phytologist 182(4): 965-974. (Confirming that phytochrome-mediated responses are retained in *O. minor*, but show some unique characteristics. Shoot elongation was inhibited by FR but not by R. This pattern is unique among known patterns of plant photoresponses.)
Takikawa, H., Jikumaru, S., Sugimoto, Y., Xie XiaoNan, Yoneyama, K. and Sasaki, M. 2009. Synthetic disproof of the structure proposed for solanacol, the germination stimulant for seeds of root parasitic weeds. Tetrahedron Letters 50(31): 4549-4551. (Showing that the previously

proposed structure of solanacol, stimulant from tobacco, was incorrect.)

Tang WanXia, Kubo, M., Harada, K., Hioki, H. and Fukuyama, Y. 2009. Novel NGF-potentiating diterpenoids from a Brazilian medicinal plant, *Ptychopetalum olacoides*. Bioorganic & Medicinal Chemistry Letters 19(3): 882-886. (Describing the structure/activity relations of compounds from *P. olacoides,* considered to have activity on chronic degenerative conditions of the nervous system.)

Thorogood, C.J., Rumsey, F.J. and Hiscock, S.J. 2009. Host-specific races in the holoparasitic angiosperm *Orobanche minor*: implications for speciation in parasitic plants. Annals of Botany 103(7): 1005-1014. (Confirming the existence of distinct physiological races within *O. minor,* with a strong degree of host-specificity, and suggesting such host specificity as the basis for gradual evolution of new species.)

Tripathy, N.K. and Behera, N. 2008. Traditional methods of crop protection used in Bolangir district of Orissa. Ethnobotany 20(1/2): 147-149. (Noting that *Olax scandens* is used for insect control.)

Tuinstra, M.R., Soumana, S., Al-Khatib, K., Kapran, I., Toure, A., van Ast, A., Bastiaans, L., Ochanda, N.W., Salami, I., Kayentao, M. and Dembele, S. 2009. Efficacy of herbicide seed treatments for controlling *Striga* infestation of sorghum. Crop Science 49(3): 923-929. (Confirming that seed treatments with metsulfuron and imazapyr on sorghum with ALS herbicide resistance could reduce *Striga* and increase crop yield.)

Unaldı, U.E. and Toroglu, S. 2009. Studies on antimicrobial activity of pyramidal black pine (*Pinus nigra* ssp. *pallasiana* var. *pyramidata*): an endemic plant close to become extinct. Journal of Environmental Biology 30(2): 197-204. (Noting mistletoe (unspecified) as one of the factors threatening *P. nigra* in Turkey.)

Uramoto, K. Martins, D.S., Lima, R.C.A. and Zucchi, R.A.2008. Host plant record for the fruit flies, *Anastrepha fumipennis* and *A. nascimentoi* (Diptera, Tephritidae). Journal of Insect Science (Tucson) 8: 45. (A first record for *A. nascimentoi* on *Cathedra bahiensis* (Olacaceae), in Brazil.)

Venne, J., Beed, F., Avocanh, A. and Watson, A. 2009. Integrating *Fusarium oxysporum* f. sp. *strigae* into cereal cropping systems in Africa. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 572-580. (Synergistic effects between a *Striga*-resistant maize line and *F. oxysporum* f. sp *strigae* (PSM197 or Foxy 2 on pesta granules) led to over 90% reduction in *Striga* emergence. Results were poorer on sorghum or with isolate M12-4A.)

Véronési, C., Delavault, P. and Simier, P. 2009. Acibenzolar-*S*-methyl induces resistance in oilseed rape (*Brassica napus* L.) against branched broomrape (*Orobanche ramosa* L.). Crop Protection 28(1): 104-108. (Potassium phosphonate did not induce resistance in oilseed rape, but acibenzolar-*S*-methyl, bi-weekly as foliar sprays or soil drenches, reduced *O. ramosa* attachment by 70% and prevented the loss of crop biomass.)

Vijayaragahavan Kannan and Raman Sureendar 2009. Synergistic effect of beneficial rhizosphere microflora in biocontrol and plant growth promotion. Journal of Basic Microbiology 49(2): 158-164. (A consortium of rhizosphere organisms from the root zone of *Santalum album* promoted growth of tomato.)

Vitt, P., Havens, K., Kendall, B.E. and Knight, T.M. 2009. Effects of community-level grassland management on the non-target rare annual *Agalinis auriculata*. Biological Conservation 142(4): 798-805. (Showing that management to reduce grazing by deer and to clear brush are needed for conservation of *A. auriculata* in USA.)

Vrbničanin, S., Malidža, G., Stefanovic, L., Elezovic, I., Stankovic-Kalezic, R., Marisavljevic, D., Radovanov-Jovanovic, K., Pavlovic, D. and Gavric, M. 2008. (Distribution of some harmful, invasive and quarantine weeds on the territory of Serbia. Part II: Spatial distribution and frequency of nine weeds species.) (in Serbian) Biljni Lekar (Plant Doctor) 36(6): 408-417. (Including *Cuscuta campestris*.)

Vrbničanin, S., Malidža, G., Stefanovic, L., Elezovic, I., Stankovic-Kalezic, R., Marisavljevic, D., Radovanov-Jovanovic, K., Pavlovic, D. and Gavric, M. 2009. (Distribution of some harmful, invasive and quarantine weeds on the territory of Serbia. Part III: Spatial distribution and frequency of eight weeds species.) (in Serbian) Biljni Lekar (Plant Doctor) 37(1): 21-30. (Including *Orobanche cumana*.)

Vurro, M., Boari, A., Evidente, A., Andolfi, A. and Zermane, N. 2009. Natural metabolites for parasitic weed management. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 566-571. (Discussing the potential of fungal phytotoxins for control of parasitic weeds, including macrocyclic trichothecenes (inhibitory to *O. ramosa* germination at 0.1 micro M); phyllostictine A, highly active on both *O. ramosa* and *Cuscuta campestris*; also methionine and arginine, active below 1 mM.)

Wang, H., Yu, W.B., Chen, J.Q. and Blackmore, S. 2009. Pollen morphology in relation to floral types and pollination syndromes in *Pedicularis* (Orobanchaceae). Plant 277(3/4): 153-162. (The structure of pollen of 23 *Pedicularis* spp. from N.America, Japan and China were studied and differences related to their floral biology and pollination system.)

Wang LiXin, Kgope, B., D'Odorico, P. and Macko, S.A. 2008. Carbon and nitrogen parasitism by a xylem-tapping mistletoe (*Tapinanthus oleifolius*) along the Kalahari Transect: a stable isotope study. African Journal of Ecology 46(4): 540-546. (*T. oleifolius* derives 35-80%

of its carbon from its hosts (as well as N), depending on host species.)

Wanntorp, L. and de Craene, L.P.R. 2009. Perianth evolution in the sandalwood order Santalales. American Journal of Botany 96(7):1361-1371. (This SEM developmental study of several members of Santalales presents data supporting a bracteolar origin of the calyculus. For taxa without a calyx or calyculus, the single perianth whorl is interpreted as petals.)

Watson, D.M. 2009. Determinants of parasitic plant distribution: the role of host quality. In: Shamoun, S.F. (ed.) Botany 87(1): 16-21. (Hypothesising that the non-random distribution of many parasitic plants (especially mistletoes?) is dictated by the 'quality' of their hosts, in terms of access to water, nutrients, etc.)

*Wedding, B.B., White, R.D., Grauf, S., Tilse, B. and Gadek, P.A. 2008 Near infrared spectroscopy as a rapid method for sandalwood oil determination. Sandalwood Research Newsletter 23, 5-7. http://www.jcu.edu.au/mbil/srn/Papers/066%20Wedding%202008.pdf (Proposing Near Infrared Spectroscopy as a rapid and potentially inexpensive means of quality control for processing and breeding new cultivars of *Santalum austrocaledonicum*.).

Westwood, J.H., Roney, J.K., Khatibi, P.A. and Stromberg, V.K. 2009. RNA translocation between parasitic plants and their hosts. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 533-539. (Discussing the significance of RNA translocation and its potential for improved understanding and control of parasitic plants.)

Woomer, P.L., Bokanga, M. and Odhiambo, G.D. 2008. *Striga* management and the African farmer. Outlook on Agriculture 37(4): 277-282. (A general review of the problems from *Striga hermonthica* and *S. asiatica* in Africa and the latest ideas on control using herbicide-treated seed and/or cereal-legume intercropping and rotation.)

Xiao YiJun, Chen YuanZhong and Chen BingHua. 2009. Selective effect of Nispex in inhibiting human cancer cell proliferation and inducing cell apoptosis. Chinese Journal of Integrated Traditional and Western Medicine 29(2): 148-152. (Nispex, a preparation based on flavonoids from *Scurrula parasitica*, shows good selectivity for killing human cancer cells.)

Xie XiaoNan, Yoneyama, K., Harada, Y., Fusegi, N., Yamada, Y., Ito, S., Yokota, T., Takeuchi, Y. and Yoneyama, K. 2009. Fabacyl acetate, a germination stimulant for root parasitic plants from *Pisum sativum*. Phytochemistry 70(2): 211-215. (Describing the structure of fabacyl acetate, a strigolactone related to (+)-2'-epiorobanchol which also occurs in faba bean and lucerne.)

Xu Rong, Chen Jun, Chen ShiLin, Liu TongNing, Zhu WeiCheng and Xu Jiang. 2009. *Cistanche deserticola* Ma cultivated as a new crop in China. Genetic Resources and Crop Evolution 56(1): 137-142. (Giving information on the taxonomy, distribution, cultivation and genetic diversity of *C. deserticola*, now being grown as a crop for use as a tonic.)

Yallou, C.G., Menkir, A., Adetimirin, V.O. and Kling, J.G. 2009. Combining ability of maize inbred lines containing genes from *Zea diploperennis* for resistance to *Striga hermonthica* (Del.) Benth. Plant Breeding 128(2): 143-148.

Yang GuanE, Chen BaiNian, Zhang ZhaoMing, Gong Jun, Bai HongJun, Li JianKuan, Wang YuFen and Li BaoZhen. 2009. Cytotoxic activities of extracts and compounds from *Viscum coloratum* and its transformation products by *Rhodobacter sphaeroides.* Applied Biochemistry and Biotechnology 152(3): 353-365. (Concluding that transformation of *V. coloratum* extracts converted by *R. sphaeroides* have lower toxicity and higher anti-tumour activity compared to standard treatments.)

Yang HongXin, Yang Yong and Yan XiaoHong. 2008. Experimental study of anti-sports fatigue effect mechanisms of cistanche deserticola. Chinese Journal of Information on Traditional Chinese Medicine 15(4): 24-25, 28. (*C. deserticola* decreased LDH5, protected the liver of mice subjected to a strenuous swimming test and accelerated glycogen accumulation by increasing the expression of NOS3 to protect the liver and improve physical recovery.)

Yang HyunMo, Shin HyunKyung, Kang YoungHee and Kim JinKyung. 2009. *Cuscuta chinensis* extract promotes osteoblast differentiation and mineralization in human osteoblast-like MG-63 cells. Journal of Medicinal Food 12(1): 85-92. (This study, in Korea, suggest that *C. chinensis* can play an important role in osteoblastic bone formation and may possibly lead to the development of bone-forming drugs.)

Yeboah, E.M.O. and Majinda, R.R.T. 2009. Radical scavenging activity and total phenolic content of extracts of the root bark of *Osyris lanceolata*. Natural Product Communications 4(1): 89-94. (Antioxidant activity varied according to the type of solvent extract of *O. lanceolata*.)

Yoder, J.I., Gunathilake, P., Wu, B., Tomilova, N. and Tomilov, A.A. 2009. Engineering host resistance against parasitic weeds with RNA interference. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 460-466. (Review describing the successful application of host-to-parasite gene silencing of a GUS reporter gene in *Triphysaria*. Includes useful discussion of considerations and resources for transferring this approach to the development of parasite resistant crops.)

Yoneyama, K., Xie XiaoNan, Yoneyama, K. and Takeuchi, Y. 2009. Strigolactones: structures and biological activities. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 467-470. (A detailed review of the strigolactones, their functions and the structural features required for potent germination stimulation.)

Yoshida, S. and Shirasu, K. 2009. Multiple layers of incompatibility to the parasitic witchweed, *Striga hermonthica*. New Phytologist 183(1): 180-189. (Exposing 4 dicot non-host species, *Arabidopsis*, cowpea, *Lotus japonicus* and *Phtheirospermum japonicum* to *S. hermonthica* revealed four different types of incompatibility.)

Yu Hua , He WeiMing, Liu Jian, Miao ShiLi and Dong Ming 2009. Native *Cuscuta campe*stris restrains exotic *Mikania micrantha* and enhances soil resources beneficial to natives in the invaded communities. Biological Invasions 11(4): 835-844. (Suppression of *M. micrantha* by *C. campestris* significantly enhanced soil water, pH and nutrient content and greatly increased the cover and species richness of native plants.)

Yu QiWen, Zhang JiYing, Gong Fang, Ma YanHui, Cheng WeiZhi, Chen XueHua, Ma AnLun and Zhang DongQing. 2009. Preparation and immune modulation of Mistletoe lectin. Chinese Journal of Immunology 25(1): 59-62. (Concluding that a 55 kD lectin purified from Chinese mistletoe, *Viscum album*, is a potent immunomodulator to human T cell cytotoxicity, cytokine production and apoptosis of tumour cells.)

Zeid, M., Mitchell, S., Link, W., Carter, M., Nawar, A., Fulton, T. and Kresovich, S. 2009. Simple sequence repeats (SSRs) in faba bean: new loci from *Orobanche*-resistant cultivar 'Giza 402'. Plant Breeding 128(2): 149-155. (Jim2)

Zhang RuMin, Bai Jing, LüChunLing, Chen HongWei and Gao Yan. 2008. Fluctuating-temperature stratification induced seed germination of *Cistanche deserticola*. Scientia Silvae Sinicae 44(9): 170-173. (Best germination was achieved with two repeated stratification treatments and exogenous plant hormone treatment, especially with GA_3.)

Zhou YuBi, Ye RunRong, Lu XueFeng, Lin PengCheng, Yang ShiBing, Yue PengPeng, Zhang ChangXian and Peng Min 2009. GC-MS analysis of liposoluble constituents from the stems of *Cynomorium songaricum*. Journal of Pharmaceutical and Biomedical Analysis 49(4): 1097-1100. (Noting differences in the oil components of samples of *C. songaricum* growing on *Nitraria* spp. (*N. sibirica* and *N. tanguticum*) and those growing on *Zygophyllum xanthoxylum* or *Peganum harmala*.)

Ziegler, R.2009. Mistletoe preparation Iscador: are there methodological concerns with respect to controlled clinical trials? Evidence-based Complementary and Alternative Medicine 6(1): 19-30. (Reviewing the short-comings of many clinical studies with the *Viscum album* preparation Iscador.)

Ziegler, H., Weber, J. and Lüttge, U.E. 2009. Thermal dissipation probe measurements of sap flow in the xylem of trees documenting dynamic relations to variable transpiration given by instantaneous weather changes and the activities of a mistletoe xylem parasite. Trees: Structure and Function 23(3): 441-450. (Suggesting that the flow of water through roots and stems of the host *Tilia mandschurica* into *Viscum album* results from larger sap flow rates in the xylem as well as stronger transpiration.)

Zuber, D. and Widmer, A. 2009. Phylogeography and host race differentiation in the European mistletoe (*Viscum album* L.). Molecular Ecology 18(9): 1946-1962. (Molecular analysis of chloroplast DNA variation supported the distinction of the four main taxa within *V. album*, three widespread and one endemic to Crete. Haplotypes from Turkey were distinct and may represent new taxa.)

Zwanenburg, B., Mwakaboko, A.S., Reizelman, A., Gopinathan Anilkumar and Divakaramenon Sethumadhavan. 2009. Structure and function of natural and synthetic signalling molecules in parasitic weed germination. In: Balázs, E., Vurro, M. and Gressel, J. (eds.) Pest Management Science 65(5): 478-491. (Exploring the structure/activity relations in the strigolactones, their synthetic pathway and site of action, and the ways this information can help in design of further synthetic stimulants.)

HAUSTORIUM 55

has been edited by Chris Parker, 5 Royal York Crescent, Bristol BS8 4JZ, UK (Email chrisparker5@compuserve.com), Lytton Musselman, Parasitic Plant Laboratory, Department of Biological Sciences, Old Dominion University, Norfolk Virginia 23529-0266, USA (fax 757 683 5283; Email lmusselm@odu.edu), Jim Westwood, Dept. of Plant Pathology, Physiology and Weed Science, Virginia Tech, Blacksburg, VA 24061-0331, USA (Email westwood@vt.edu) and Diego Rubiales, Dep. Mejora y Agronomía, Instituto Agricultura Sostenible, CSIC, Apdo 4084, E-14080 Cordoba, Spain (Email: ge2ruozd@uco.es); with valued assistance from Dan Nickrent, Southern Illinois University, Carbondale, USA. It is produced and distributed by Chris Parker and published by Old Dominion University (ISSN 1944-6969). Send material for publication to any of the editors.

NB. Haustorium is no longer distributed in hard-copy form. It is available by email free of charge and may also be down-loaded from the IPPS web-site (see above).