HAUSTORIUM

Parasitic Plants Newsletter

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IPPS

Dear IPPS Members,

Last June we have enjoyed the very successful 9th World Congress on Parasitic Plants, which was carefully organized by our American colleagues in Virginia. Both the scientific program and the venue were perfectly prepared, and allowed both oral and poster presentations with fruitful discussion on key issues in parasitic plants research and parasitic weed management. All Congress abstracts can be found at http://www.cpe.vt.edu/wcopp/Abstracts_Final.pdf. A review of the scientific presentations, kindly prepared by Chris Parker, is given below.

Experts and students from more than twenty countries attended the Congress, and the pleasant venue plus the weather conditions also allowed enjoying the pleasant atmosphere of downtown Charlottesville. The tour to Monticello and the visit to a local winery added a glimpse into the US history and the local wine industry.

This is an opportunity to thank, again, the Local Organizing Committee chaired by Mike Timko, who did an excellent job in preparing all Congress details. We are also grateful to Jim Westwood, Lytton Musselman and Mike Timko for putting together an excellent scientific program with the aid of the International Scientific Advisory Committee, which represented various aspects of research and development related to parasitic plants.

Please visit http://www.cpe.vt.edu/wcopp/photos.html for a selection of photographs taken during the Congress.

We are happy to announce that **the next IPPS Conference will be in Turkey during the first half of June 2009**. We are presently negotiating the details, and will send you the first Circular as soon as we have more details.

This is my last message to you as president of the IPPS. Jim Westwood, who currently serves as Vice-President, will become the new IPPS President, and we will soon have elections for a new Executive Committee. A detailed announcement on the elections will be given separately.

Daniel M. Joel

IPPS President

9TH WORLD CONGRESS ON PARASITIC PLANTS

A total of 80 delegates from 24 countries gathered at the Omni Hotel in Charlottesville, Virginia, USA from 3 to 7 June for the 9th International meeting of the parasitic plant community. A total of 37 oral papers and 39 posters were presented. A list of titles is included under MEETINGS below. There will be no published proceedings but the abstracts of all contributions are available at the conference website (http://www.cpe.vt.edu/wcopp/index.html).

An opening address by Klaus Wegmann set the scene with a truly historic review tracing the subject back to Theophrastus in about 300 BC and noting many other very early literature references.

In the next invited paper Jeffrey Palmer reviewed the topic of horizontal gene transfer (subject of a Literature Highlight in Haustorium 48). The genes transferred (often several at once) are mostly in the mitochondrial genome and rarely in nuclear or plastid genomes. Agents of transfer are believed to include lichens, pollination, fungi or insects, but about half the known occurrences involve parasitic plants and their hosts.

A series of papers on genomic studies and evolution of parasitic plants included a masterly review by Dan Nickrent on the different modes of aerial and root parasitism in the Santalales, and the evidence for 5 separate evolutionary origins of parasitism in that group, based on intensive DNA and fossil studies. Further papers explored the evolution and phylogenetic relationships within other groups of parasitic plant - by Funk *et al.* (presented by Kirsten Krause) on *Cuscuta*; by Sasa Stefanovic and Costea also on *Cuscuta*; and by Schneeweiss *et al.* on *Orobanche*. Chris Thorogood presented preliminary evidence for host specificity leading to speciation in British *Orobanche* spp.

Another invited paper dealt with the newly established link between germination stimulants for parasitic plants, and the arbuscular mycorrhizae, for which these substances area a vital signal (topic of a Literature Highlight in Haustorium 47). In a wide-ranging and detailed review Maria Harrison described the morphology and development of the mycorrhiza and the fact that about 80% of all plant species can be infected. She also explored the molecular events and specific genes that underlie development and functioning of the symbiosis.

Related papers on germination included one by Plakhine *et al.* (presented by Danny Joel) which surprisingly showed that there appear to be genes responsible for suppressing spontaneous germination and a certain combination of genes in hybrids from *Orobanche cernua* and *O. cumana* could result in high levels of spontaneous germination. Koichi Yoneyama presented a paper by Xie *et al*. in which the full range of strigolactones was reviewed, 6 new structures described, and the structure of 'alectrol' re-investigated, showing it to be an acetate of 'orobanchol'. They conclude that most host species (and many unaffected by parasitic plants) exude several different strigolactones. Another important finding was the effect of reduced phosphorus in increasing stimulant exudation in both legumes and in sorghum. Harro Bouwmeester described work on the biosynthesis of the strigolactones from carotenoids, suggesting that they should be referred to as 'apocarotenoids' rather than 'sesquiterpene lactones'. A step in the biosynthetic pathway could be blocked by the herbicide fluridone, and low doses applied to rice could be shown to reduce attack by *Striga hermonthica*. Yukihiro Sugimoto described the use of aseptic plant tissue cultures of several species for copious production of stimulant substances, identified mainly as strigol or 5-deoxystrigol. The latter proved equal to GR24 for stimulation of *S. hermonthica* and *O. crenata* and 10-fold more active on *O. minor*.

Among several papers on post-germination events, one presented by Andrew Palmer, suggested that elevated cytoplasmic calcium is among the very earliest responses to exposure of *S. asiatica* to the xenognosin DMBQ, occurring within 15 minutes. The involvement of hydrogen peroxide and NADPH oxalate were also discussed. Ralf Kaldenhoff had explored gene expression in *Cuscuta reflexa* and its host tomato and shown the importance of cysteine protease production in *Cuscuta* tissue. He had shown that application of a polypeptide inhibitor of cysteine protease activity could lead to death of the *Cuscuta*. This concept is the subject of a patent. John Yoder presented detailed work by Tomilov *et al.* which explored the genes involved in haustorial development in *Triphysaria*. With nearly 12,000 gene sequences now generated from *Triphysaria*, analyses of haustorial initiation are producing intriguing findings, such as a connection between touch and haustorial formation.

Jay Bolin introduced many of us to the interesting structure and physiology of the African *Hydnora* spp., plants with an almost totally subterranean habit, without stomata and extremely resistant to desiccation. Isotope studies confirm that all carbon derives from the host, while levels of P and K are much higher in the parasite than in the host. Studies on the mistletoe, *Viscum album*, presented by Michiel de Mol confirmed direct vessel to vessel connections at the host-parasite interface, allowing mass transport of water and nutrients. Philippe Simier presented work by Draie *et al*. exploring in detail the enzyme systems involved in sucrose metabolism in the tubercles of *Orobanche ramosa*. Mike Timko then described the latest studies exploring the range of biotypes of *Striga gesnerioides*, their specificity to particular host species or cowpea varieties, and mapping the relevant resistance and avirulence genes in host and parasite.

A further invited paper from Julie Scholes discussed the molecular basis of susceptibility and resistance to *Striga*, describing detailed exploration of the up- and down-regulation of genes in both host and parasite and seeking to relate these to the various types of resistance mechanism observed. Many hundreds of genes appear to be involved.

There were then 3 papers presented by Ms Gunathilake on *Triphysaria*, Jim Westwood (for Roney *et al*.) on *Cuscuta,* and Radi Ali on *Orobanche,* describing the intriguing phenomenon of 'trafficking' of double-stranded RNA molecules between host and parasite. Ali *et al.* showed how the phenomenon could perhaps be exploited for 'silencing' key metabolic genes in the parasite – mannose 6-phosphate reductase could be

inhibited and significant reduction of *O. aegyptiaca* achieved on suitably transformed tomato.

Moving on to a more ecological level, Duncan Cameron described how species richness could be enhanced by the introduction of *Rhinanthus minor* into a plant community, thanks to selective suppression of susceptible grass species, while non-grasses showed resistance based on a hypersensitive response or host lignification. Darryl Miguel described the problem of *O. ramosa* in S. Australia, which has caused some 100,000 ha to be placed under quarantine. Studies suggest very slow loss of viability in the seed bank, and the need for chemical treatments to enhance seed loss and/or prevent new seed production. A commercial pine oil product has given up to 95% reduction but results are variable and the large volumes of water required lead to very high costs of application. Studies by Janice Alers-Garcia suggest that *Cuscuta gronovii* tends to select and grow more successfully on larger individuals of the host plant *Pilea pumila*. Alistair Murdoch reviewed work on the influence of temperature on the after-ripening, conditioning and germination of *Orobanche* and *Striga* spp. and discussed the potential design and use of predictive models based on these data.

Alex Pérez de Luque reviewed the topic of resistance mechanisms and incidentally made a plea for the term 'haustorium' to be reserved for the organ once it had made vascular connection with the host: prior to that it should be referred to as the 'appressorium'. Yasutomo Takeuchi then presented a paper by Kusumoto *et al.* on the induction of resistance in *Trifolium* and rice via salicylic acid-mediated defences. Application of BTH to clover reduced attack by *O. minor* and application of tiadinil to rice reduced attack by *Aeginetia indica*. Julien de Zélicourt described work exploring the resistance of sunflower var. LR1 to race E of *O. cumana*, which suggested a major role for the peptide defensin.

A final session on Management and Control began with an invited paper from Fred Kanampiu who gave a detailed description of the development and use of the herbicide imazapyr as a seed-dressing for control of *Striga* spp. on naturally herbicide-resistant maize. The treatment has been commercialised since 2005 and is proving successful in East Africa. It can be used in conjunction with inter-planted legumes, provided they are at least 12 cm from the maize row. Hanan Eizenberg then described a minirhizotron technique for monitoring underground development of *Orobanche* tubercles as a means of validating a Growing Degree Days model, designed to ensure optimum timing of herbicide application. Hilary Sandler described the problem from *Cuscuta gronovii* in cranberry and described valuable results on the germination behaviour of seeds over the years following shedding, allowing more effective timing of flooding and chemical control methods. A further paper on the *O. ramosa* problem in Australia was presented by Anna Williams who described the development of a Growing Degree Days model on which to base the optimum timing of herbicide treatments. Djibril Yonli reported on studies with a range of *Fusarium* isolates for suppression of *S. hermonthica* in Burkina Faso. Promising results were obtained even when innoculum was placed up to 10 cm away from the sorghum planting hole. Simon Shamoun provided an update on the development of *Colletotrichum gloeosporioides* and *Neonectria neomacrospora* for biocontrol of *Arceuthobium tsugense* in Canada, which is of increased concern with the prohibition on clear-cutting and consequent persistence of old heavily infected trees. Both organisms had proved partially effective, though some wounding of host tissue may be needed for maximum effect. Combinations of the two are to be tested. A final presentation by Charlie Riches described the successful results achieved with green manure crops, especially *Crotalaria ochroleuca* for control of *S. asiatica* in rice and maize in Tanzania. Crop yields were often doubled following treatment, compensating for the lost season of food-crop cropping, and farmers were adopting the practice with enthusiasm.

Among the 39 posters there was a study on *Cuscuta* spp. in Taiwan (Chiang *et al.*); demonstration of the increased production/exudation of stimulant at reduced phosphate levels, a phenomenon not previously well-documented (Lopez-Raez *et al.;* Yoneyama *et al*.); identification of orobanchol as the major *Orobanche* stimulant exuded by *Arabidopsis thaliana* (Goldwasser *et al.*); an effect of trehalose in increasing germination of *Orobanche minor* (Okazawa *et al.*); evidence for suberization and protein cross-linking in the cell walls of the sunflower variety HE-39999 resistant to race F of *O. cumana* (Echevarria-Zomeño *et al.*); a series of studies on the virulence of different accessions of *Medicago trunculata* on a range of hosts and the associated variations in resistance mechanism and germination stimulation activity, all of potential value in the study of host-parasite interaction (Fernández-Aparicio *et al*.; Lozano-Baena *et al* (x2)*.;* Castillejo *et al.*); identification of a *Streptomyces* isolate in Jordan, with potential for control of *Orobanche cernua* (Saadoon *et al*.); a study suggesting no correlation of tocopherol levels with carotenoid or chlorophyll content in *Cuscuta* spp., suggesting an unrelated function (van der Krooj *et al.*); a study showing generally excellent but not completely reliable control of *Cuscuta* spp. by glyphosate in Roundup Ready alfalfa (Lanini *et al.*); evidence for reduced hydraulic conductivity in the stems of spruce trees infected by *Arceuthobium*

pusillum (Dunlavey *et al.*); detailed study of the site of production of hydrogen peroxide in *S. asiatica* and evidence for its importance in the initiation of the haustorium (Palmer *et al.*); identification of 2 lignin biosynthesis genes in *S. asiatica* with presumed roles in the development of the vascular connection with the host (Liu *et al.*); an update on the development of *Alternaria destruans* as a biocontrol agent for *Cucuta gronovii* in cranberry, which is hopefully close to commercial release (Bewick and Cascino); identification of a sunflower variety AO-548 resistant to a new highly virulent race of *O. cumana* in Romania, based on two independent dominant genes (Pacureanu-Joita *et al.*); updates on the development of *Fusarium oxysporum* (Foxy 2) for control of *Striga* in cereals, application by seed treatment, and synergism with resistant cultivars (Heller *et al.*; Elzein *et al.*).

Social events included a welcome reception on the first evening, a field trip to the home of President Jefferson at Monticello which was rounded off with a visit to the Jefferson Winery, and a banquet, at which a number of elder statesmen of the community were honoured. Bob Eplee, Doug Worsham and Chris Parker were presented with 'Legacy Awards', while Yasutomo Takeuchi, Binne Zwannenburg, Jose Ignacio Cubero (not present), Klaus Wegmann and Patrick Thaluarn (not present) were recognised as 'Significant Contributors'.

Jim Westwood, Mike Timko and others on the organising committee are to be congratulated on a superbly planned meeting and an excellent choice of venue - the hotel and its setting were ideal.

Chris Parker.

A DIFFERENT KIND OF PARASITIC PLANT: A BRIEF HISTORY OF MYCO-HETEROTROPHY AND EPIPARASITISM

Debunking the myth of saprotrophic plants

Some 400 species of plants, termed myco-heterotrophs (Leake 1994), lack chlorophyll but do not form haustorial connections to other plants and are nourished instead by forming (parasitic) associations with fungi (Smith & Read 1997). Most of these plants have commonly been referred to as "saprophytes" on the assumption that they obtain carbon *directly* from decaying soil organic matter. Indeed the myth of the "saprophytic" plant has been perpetuated by floras through to the current day; even the New Atlas of the British Flora (Preston *et al*., 2002) describes the myco-heterotrophic *Neottia nidus-avis, Corallorhiza trifida, Epipogium aphyllum* and *Monotropa hypopitys* as "saprophytic perennial herbs of rotting vegetation" despite the absence of evidence for this (Leake 2005).

Myco-heterotrophy has evolved in both lower plants such as the myco-heterotrophic liverwort *Cryptothallus mirabilis* and on at least five separate occasions in higher plants in the dicotyledonous families; Monotropaceae (and the closely related Pyrolaceae), Polygalaceae and Gentianaceae which combined represent 12% of myco-heterotrophic species (Leake 1994). The remainder belong to two orders of the monocotyledons; Triuridales and the Orchidales (Leake 1994). Job Kuijt highlighted this disparity commenting on the abundance of (myco)heterotrophs in the monocotyledonous plants and the extreme contrast with haustorial parasitism which occurs exclusively in dicotyledonous plants (Kuijt 1969).

Myco-heterotrophy in the orchids

Perhaps the most studied of all plant families with myco-heterotrophic species are the orchids. There are estimated to be around 200 species of achlorophyllous or largely achlorophyllous orchids but all orchids in fact begin their lives with a myco-heterotrophic growth phase. Like many haustorial parasitic plants, orchids produce prodigious numbers of minute dust seeds, typically in excess of 100,000 seeds per plant that do not have sufficient seed reserves to germinate unaided, instead orchids engage in a symbiosis with fungal partners where by the fungus supplies the developing orchid seedling with all of the carbon and mineral nutrients it requires for establishment (Smith & Read 1997). Whilst some orchids never produce chlorophyll, the majority of adult orchids are green and putatively photosynthetic. As green adults, orchids were believed to continue in this parasitic habit throughout their lives but recent evidence has cast doubt on this dogma demonstrating that the green orchid *Goodyera repens* can, as an adult, supply its fungal symbiont, *Ceratobasidium cornigerum*, with carbon (Cameron *et al*. 2006) in return for mineral nutrients (Cameron *et al*. 2006 & 2007) suggesting the potential for mutualism in the symbiosis. Thus, as with the haustorial parasites, it appears there is a continuum from autotrophy to heterotrophy (holoparasitism) in the orchids.

Epiparasitic myco-heterotrophs

The source of carbon for fungi parasitised by myco-heterotrophic plants falls into two distinct categories. Firstly, myco-heterotrophs may form associations with fungi which gain their carbon saprotrophically from organic matter. It is important to make the distinction that we do not imply that myco-heterotrophs are directly saprophytic, they parasitise fungi, but their fungal partners may gain carbon saprotrophically, and/or be weakly parasitic on other plants. Typically but not

exclusively, these fungi belong to the polyphyletic *Rhizoctonia* complex. Secondly, some myco-heterotrophic plants are associated with fungi that obtain their carbon through forming mutualistic mycorrhizal symbioses with other autotrophic plants and are thus in tripartite symbiosis with the myco-heterotroph connected to an autotrophic plant through a shared fungal network (Bidartondo *et al*. 2004). These plants are referred to as the epiparasites (Bidartondo *et al*. 2002), the "epi" prefix referring to the indirect nature of the parasitism of the co-associated plant (and being distinct from epiphytic plants which rely on structures such as other plants for mechanical support). Moreover, using radioactive ^{14}C tracers, carbon transfer has been directly demonstrated from green plant (*Betula pendula*) though an ectomycorrhizal fungal network to the largely achlorophyllous orchid *Corallorhiza trifida* (McKendrick *et al*. 2000). This epiparasitic mode of nutrition has underpinned the convergent morphology of myco-heterotrophic and haustorial parasitic plants.

Parallels and contrasts between epiparasitic plants and haustorial holoparasites

Heterotrophic plants, such as the enigmatic "Ghost orchid" *Epipogium aphyllum*, have long been considered botanical curiosities and in the past they have even been inaccurately included in parasitic genera. Indeed, before being described by Linnaeus in 1753, *Monotropa hypopitys* (Monotropaceae) was considered to be an *Orobanche* (Leake 1994)! At one level such confusion is not surprising given the striking convergent morphology of myco-heterotrophs and haustorial holoparasites. Both exhibit highly reduced leaves, often to scale leaves or bracts, contain little or no chlorophyll and produce prodigious numbers of seeds that depend upon host-derived cues to initiate germination as they cannot establish in the absence of a host plant (for haustorial holoparasites) or fungus (for myco-heterotrophs).

In summary, there is no doubt that the epiparasitic myco-heterotrophs and haustorial holoparasitic plants are physiologically very different in terms of their carbon acquisition strategies from other plants. In the case of the epiparasites the connection to the host plant is a fungal "bridge" whereas in the haustorial holoparasites the physiological bridge is the haustorium, but beneath this they are functionally the same, they are parasitic on other plants!

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(Editors' note: in the light of the discussion above, Haustorium will in future include reference to literature on at least some 'saprophytic' higher plants.)

OFFICIAL LAUNCH OF PUSH-PULL TECHNOLOGY

The 'push-pull' technology that has been under development by ICIPE (International Centre for Insect Physiology and Ecology) for the past 10 years was given an official launch at ICIPE's Mbita Point station on the shores of Lake Victoria, Kenya, in early July 2007 (see Butonyi, 2007 a,b). The technique, as described in Haustorium 37, was developed for control of stem-borers (*Busseola* and *Chilo* species) in maize, *Desmodium* spp. being grown as an intercrop to repel the adult moths and Napier grass (*Pennisetum purpureaum*) grown around the field edges to attract the moths to lay their eggs which hatch, but fail to develop on this species. After some years it was noticed that *Striga hermonthica* was being suppressed by the *Desmodium* and extensive trials confirmed that the parasite was massively reduced while soil fertility was enhanced and maize yields greatly increased. The technique has been used successfully by over 10,000 farmers in Kenya and Uganda and has now been shown to work well also with sorghum. The aim now is to extend the technique to reach 20,000 farms by the end of 2009. Apart from benefiting from improved cereal yields, farmers find they have sufficient fodder from the *Desmodium* and Napier grass to be able to keep a cow and improve their nutrition and farm income. Dr Zeyaur Khan and his colleagues at ICIPE are to be

congratulated on this highly successful and promising development. See the following item for news of further efforts to understand how it works.

Chris Parker.

A PROJECT TO ELUCIDATE THE *DESMODIUM* EFFECT ON *STRIGA*

In studies by ICIPE and Rothamsted Research, it has been demonstrated that the suppressive effect of *Desmodium* spp. on *Striga* can be provided by passing water over the roots of *Desmodium* and then into soil containing the *Striga* and maize seeds. Furthermore, when *Desmodium* was grown in water with nutrients but without soil, the water captured the activity, which could then be transferred to the *Striga* and maize seeds in soil, and again conferred control of the parasite. Fractionation of the chemicals from the water affecting this control identified a fraction that reduced radicle growth of the parasite. Chemicals from this fraction have been identified. However, the exact way in which these chemicals work to prevent *Striga* infestation has not been determined. Thus, the aim of a new BBSRC (Biotechnology and Biological Science Research Council)-funded project between the University of Sheffield (Professor Julie Scholes and Professor Malcolm Press) and Rothamsted Research (Professor John Pickett and Dr Tony Hooper) is to identify the stage(s) of the *Striga* lifecycle affected by the inhibitory compounds present in *Desmodium* root exudates, to purify some of these compounds and to use them to test the hypothesis that they are responsible for the suppression of *Striga* seen in the field. Finally, the root exudates of another legume that is commonly used in molecular studies, *Lotus japonicus,* that we know also produces root exudates that inhibit *Striga* radicle growth, will be examined to determine whether they contain compounds that suppress *Striga* infection. Although *L. japonicus* would not be agronomically suitable for practical control of *Striga*, the wealth of genomic information and tools available for this model legume would enable the biosynthetic pathways involved in the synthesis of the novel flavones to be elucidated in the future.

Julie Scholes. University of Sheffield.

CUSCUTA JAPONICA IN CALIFORNIA

Tim Tidwell of California Department of Food and Agriculture has drawn our attention to the unwelcome appearance of the Asian species *Cuscuta japonica* in California. A total 159 infestations have now been documented, apparently resulting from the deliberate introduction of seed from Asia in the form of e.g. compressed dodder cakes, for use as traditional Chinese medicine. They occur mainly in urban areas settled by residents with Asian background. Such importations should not include any viable seed, but many samples are being tested and found to germinate. *C. japonica* is a robust species occurring on fruit trees, including apple and citrus, and on woody ornamentals and is capable of completely smothering its host. In northern California, where most infestations have occurred, flowering may occur but no seed set has yet been observed. This is partly attributable to the lateness of flowering, followed by cool conditions, but also to the self-incompatibility of the species - even large infestations may be clonal, having developed by vegetative spread from a single seed. Aerial survey is being considered as a means of monitoring high risk areas. Fears are that it will occur further south where winter conditions are less severe, allowing seed-set and spread. *C. japonica* has also been found in Texas and South Carolina. This note is based on the report by Hrusa and Kelch, 2006, listed below, and on personal communication with Tim Tidwell, Carla Markmen and R. Marushia.

Chris Parker.

REQUESTS

Host records for *Orobanche* species

Dr Yaakov Goldwasser is looking for published and non-published data on the WEED host range of *Orobanche* spp. (data regarding *Striga* spp. will be interesting as well). In case of any publication, the source of the material will be acknowledged.
Please email to: gold@agri.huji.ac.il

Seed samples of *Orobanche* and other parasitic species

Bristol University is currently developing a parasitic plant bed at the University of Bristol Botanic Garden. Seed has been collected from a variety of species this year, but we would very much appreciate seed from other sources to cultivate a wide variety of plants. We currently have seed from *Orobanche minor, O. elatior, O. ramosa, O. crenata, O. amethystea. O. gracilis* and *O. foetida* as well as seed from *Cistanche phelypaea*. We are particularly interested in obtaining seed from rare or endangered species in Europe or elsewhere, and those that would not be difficult to cultivate in a temperate climate. If you have any seed that you would be willing to donate, we would very much like to hear from you (we are willing to exchange).
Please contact:
Chris Thorogood - email chris.thorogood@bristol.ac.uk

OBITUARY

Professor Ostin Chivinge

Haustorium readers will wish to join me in remembering the life of Professor Ostin Chivinge of Harare, Zimbabwe who died in a road traffic accident in February. Ostin was one of the first African scientists to make a career in weed science. He worked tirelessly to alert the international research community to the issues and to encourage funding and research student projects to focus on the weed problems, including *Striga*, of smallholder farmers in both Zimbabwe and southern Africa. Ostin learnt his trade as a member of the Weed Research Team at Henderson Research Station before joining the University of Zimbabwe. In a distinguished academic career he went on to become head of the Crop Science Department, Dean of Agriculture and subsequently Pro-vice Chancellor of the University. Ostin was equally at home with academics, researchers, local decision makers as well as extension officers and farmers in the communal areas. He will be remembered in many ways, not least for his enthusiasm for good science which truly benefited farmers and in striving to make Zimbabwe a better place for everyone. I had the honour of working with Ostin on a number of weed management projects and was privileged to share his friendship. The leadership he gave to weed science in southern Africa and his commitment to assisting farmers to combat *Striga* will be greatly missed.

Charlie Riches, Natural Resources Institute, UK.

FOR SALE

Hansen, B. The genus *Balanophora*. A taxonomic monograph. Copenhagen, 1972. 188 pp Euro 26.
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MEETINGS

IPPS 9th World Congress on Parasitic Plants, Charlottesville, VA, USA, 3-7 June 2007. Papers and posters presented at this meeting were as follows. There is no publication from this meeting. Abstracts are available at the conference website (http://www.cpe.vt.edu/wcopp/index.html).

PRESENTED PAPERS:

Alers-Garcia, J. and Bever, J.D. - Size dependent parasitism of *Cuscuta gronovii*: its implications on host population size structure and dynamics.
Aly, R. *et al.* - A new approach to parasitic weed control based on silencing of a key metabolic gene in the parasite.
Bolin, J.F. *et al.* - Stable isotope and nutrient relationships of the root holoparasite *Hydnora* (Hydnoraceae) in southern Africa.
Bouwmeester, H.J. *et al.* - Strigolactones, signals for friends and enemies.
Cameron, D.D. *et al.* - *Rhinanthus minor* as an ecosystem engineer: understanding the mechanistic basis of parasitic plant-induced changes in community structure.
de Mol, M. and Heller, A. - Sap slow from host to mistletoe: an anatomical approach
de Zélicourt, A. *et al.* - Molecular analysis of resistance mechanisms to *Orobanche cumana* in sunflower.
Draie, R. *et al.* - The sucrose-degrading enzymes in *Orobanche ramosa*. Characterization and involvement in growth, cell wall synthesis and starch accumulation.
Eizenberg, H. *et al.* - Temporal thermal and special model for *Orobanche* management.
Funk, H. *et al.* - Complete DNA sequences of the plastid genomes of two parasitic flowering plant species, *Cuscuta reflexa* and *Cuscuta gronovii.*
Gunathilake, P. *et al.* - Macromolecular trafficking from host plants into the hemiparasitic plant *Triphysaria versicolor.*
Harrison, M.J. - The arbuscular mycorrhizal symbiosis; genomics approaches to dissect development and function.
Kaldenhoff, R.W.E. - Molecular events during *Cuscuta* infection.
Kanampiu, F. - *Striga* weed management options under smallholder agriculture in Africa.
Kusumoto, D. *et al.* - Induction of systemic acquired resistance in root parasitic weeds.
Miegel, D. *et al.* - Seedbank and seedbank management of *Orobanche ramosa* in South Australia.
Murdoch, A.J. and Kebreab - Predictive empirical modelling of parasitic weed life cycle.

Nickrent, D.L. and Vidal-Russell, R. - The evolutionary origins of aerial parasitism in Santalales.
Palmer, A.G. *et al.* - Calcium mediated transduction of haustorial inducing signals in *Striga asiatica.*
Palmer, J. - Horizontal gene transfer gone wild in parasitic and other flowering plants.
Pérez-de-Luque, A. - Mechanisms of resistance to parasitic plants: from field screenings to laboratory microscopic studies.
Plakhine, D. *et al.* - Non-stimulated spontaneous germination of *Orobanche* is genetically controlled.
Riches, C.R. and Mbwaga, A.M. - Green manure: a *Striga* management technology whose time has come?
Roney, J.K. *et al.* - Trafficking of host mRNAs into dodder: A new frontier in host-parasite cCommunication.
Sandler, H.A. - Integrating germination patterns, chemical, and nonchemical options to manage swamp dodder in Massachusetts cranberry production.
Schneeweiss, G.M. *et al.* - Phylogeny and evolution of *Orobanche* and related genera (Orobanchaceae).
Scholes J. and Press, M. - The molecular basis of susceptibility and resistance to *Striga*: insights from transcript profiling.
Shamoun, S.F. *et al.* - Development of a biological control strategy for management of hemlock dwarf mistletoe in coastal British Columbia, Canada.
Stefanovic, S. and Costea, M. - Reticulate evolution in the parasitic genus *Cuscuta* (dodders; Convolvulaceae).
Sugimoto, Y. *et al.* - In vitro production of strigolactones by plant root cultures.
Thorogood, C.J. *et al.* - Speciation and host specificity in *Orobanche.*
Timko, M.P. *et al.* - Deciphering the interaction of *Striga* with hosts and non-hosts.
Tomilov, A. *et al.* - Early haustorium development in *Triphysaria*: A view from inside the nucleus.
Wegmann, K. - 2000 Years of observation, knowledge and research on *Orobanche.*
Williams, A.M. and Virtue, J.G. - Calculation of growing degree days to determine optimum timing of herbicide application for control of branched broomrape *Orobanche ramosa* in pastures.
Xie, X *et al.* - Qualitative and quantitative differences of strigolactone exudation determine host specificity of root parasites *Orobanche* and *Striga*
Yonli, D. *et al.* - Integrated *Striga hermonthica* management based *Fusarium.*

POSTER PRESENTATIONS:

Ahom, R.I. and Okereke, O.U. - Varietal differences in ability of sesame and pigeon pea as trap crops to induce suicidal seed germination in *Striga hermonthica* (Scrophulariaceae).
Alers-Garcia, J. *et al.* - Parasite mediated maternal effects in bitter and sweet lupins.
Aouali, S. *et al.* - Genetic diversity among *Orobanche crenata* ecotypes revealed by RAPD and AFLPs markers, in Algeria.
Bewick, T.A. and Cascino, J. - Development of a biological herbicide for control of *Cuscuta* spp.
Castillejo, M.A. *et al.* - Differential expression proteomics to investigate responses and resistance to *Orobanche crenata* in legumes.
Chachalis, D. and Murdoch, A.J. - Potential use of Nijmegen-1 and smoke water solutions to deplete *Orobanche ramosa* seed banks in Greece
Chiang, M.Y. *et al.* - *Cuscuta* species in Taiwan: molecular differentiation and related findings.
Dewaele, D. *et al.* - A study of biodiversity of African *Radopholus similis* in Uganda.
Dhanapal, G.N. *et al.* - Integrated management of broomrape in India.
Dubé, M-P. and Belzile, F.J. - Genetic variability among five races of *Striga gesnerioides* (Willd.) Vatke detected by ISSR, AFLP and cpSSR analysis.
Dunlavey, R. *et al.* - The influence of *Arceuthobium pusillum* infection on the hydraulic architecture of white spruce stems.
Dzomeku, I.K. and Murdoch, A.J. - Studies on seed dormancy, germination and seedling emergence of *Striga hermonthica*
Echevarría-Zomeño, S. *et al.* - Histochemical analysis of defense responses involved in resistance of sunflower (*Helianthus annuus*) to *Orobanche cumana* .
Elzein A. *et al.* - Synergy between *Striga*-mycoherbicides '*Fusarium oxysporum* f.sp. *strigae*' and resistant cultivars under field conditions: step towards integrated *Striga* control in Africa.
Fan, Z.W. *et al.* - Induced host resistance as a control method for parasitic weeds.
Fernández-Aparicio, M. *et al.* - Response of *Medicago truncatula* accessions to various species of *Orobanche*.
Fernández-Aparicio, M. *et al.* - Yield increase in oat-faba bean intercrops under heavy *Orobanche crenata* infections.
Fernández-Aparicio, M. *et al.* - Yield losses in pea as a function of *Orobanche crenata* levels of infection.
Gharib, C. *et al.* - Germination and viability of *Cuscuta* spp. (dodder) seeds after digestion in sheep rumen.
Goldwasser, Y. *et al.* - Identification of the stimulants produced by *Arabidopsis thaliana* responsible for the induction of *Orobanche* seed germination
Haddad, A. and Pala, M. - Significance of parasitic weeds for food legumes in Syria.

Heller, A. *et al.* - Colonization of *F. oxysporum* f.sp. *strigae* (Foxy 2) on roots of sorghum plants and its implication for *Striga* control using a seed treatment delivery system: an anatomical study.
Höniges, A. *et al.* - Ecological and physiological investigations on *Orobanche* species in the spontaneous flora of Romania.
Lanini, W.T. *et al.* - Dodder (*Cuscuta pentagona*) control in Roundup-ready alfalfa.
Liu, Y. *et al.* - Gene regulation during haustorial development and shoot initiation in *Striga asiatica*.
Lopez-Raez, J.A. *et al.* - The biosynthesis of the tomato germination stimulants is promoted by phosphate starvation
Lozano-Baena, M.D. *et al.* - Analysis of *Medicago truncatula* resistance against *Orobanche crenata* using cytochemical techniques.
Lozano-Baena, M.D. *et al.* - Laser capture microdissection (LCM): new technologies apply to study of the parasitic plant interactions.
Matusova, R. and Bouwmeester, H.J. - The strigolactone germination stimulants of the plant-parasitic *Striga* and *Orobanche* spp are derived from the carotenoid pathway.
Okazawa, A. *et al.* - Trehalose promotes seed germination of a holoparasitic plant, *Orobanche minor* Sm.
Pacureanu-Joita, M. *et al.* – AO-548, a sunflower inbred line, carrying two genes for resistance against a new highly virulent Romanian population of *Orobanche cumana*.
Palmer, A.G. *et al.* - ROS production and semagenesis in pathogenesis.
Saadoun, I. *et al.* - Biological control of *Orobanche cernua* seed germination utilizing an indigenous actinomycete isolate in Jordan.
Takagi, K. *et al.* - Photoresponse analysis of phytochrome A in the non-photosynthetic parasitic plant; *Orobanche minor* Sm.
Tennakoon, K.U. - Potential of establishing root hemiparasitic sandalwood (*Santalum album* L.) as a NTF species in the buffer zones of forests and degraded lands in Australasia: a Sri Lankan experience.
Tennakoon, K.U. *et al.* - Structural and functional attributes of the hypogeous root holoparasite *Hydnora triceps* Drege & Meyer (Hydnoraceae).
Ueda H. *et al.* - Molecular analysis of *Lotus japonicus* response against *Orobanche aegyptiaca* and *Striga hermonthica* parasitism.
van der Kooij, T.A.W. *et al.* - Characterization of the tocochromanol content and composition of different species of the parasitic flowering plant genus *Cuscuta*.
Yoneyama, K. *et al.* - Nitrogen and phosphorus deficiencies promote the production and exudation of 5-deoxystrigol in sorghum
Yoshida, S. and Shirasu, K. - Agrobacterium-mediated transformation of *Striga hermonthica.*

FORTHCOMING MEETINGS

The International Conference 'Novel and Sustainable Weed Management in Arid and Semi-Arid Agro-Ecosystems' ,Rehovot, Israel. Please note that the deadline for abstract submission was September 1st, 2007. Later submission will be possible for poster presentations only. A Session on Parasitic Weeds is being organized jointly with the EWRS Working Group on Parasitic Weeds. See the conference website: http://agri3.huji.ac.il/aridconference or contact: Dr Baruch Rubin,. Faculty of Agricultural, Food and Environmental Science, Hebrew University of Jerusalem, Rehovot 76100, Israel. E-mail: rubin@agri.huji.ac.il

The 5th International Weed Science Congress, June 23 to 27, 2008, in Vancouver, Canada**.** Session 13 - Management of parasitic weeds, will include one invited talk and 8 other presentations to be selected from the abstracts submitted. The topics will be:
Biology and evolution (to include genomics etc.)
Germination sequence (to include chemistry etc.)
Host-parasite interrelations in agro-ecosystems (to include modelling etc.)
Host resistance
Management and control efforts
Conference information is available at: http://iws.ucdavis.edu/5intlweedcong.htm or contact: Koichi Yoneyama, yoneyama@cc.utsunomiya-u.ac.jp or Joachim Sauerborn, sauerbn@uni-hohenheim.de

GENERAL WEB SITES

For individual web-site papers and reports see LITERATURE

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

LITERATURE

* indicates web-site reference only

Abadie, J-C., Püttsepp, Ü., Gebauer, G., Faccio, A., Bonfante, P. and Selosse, M-A. 2006. *Cephalanthera longifolia* (Neottieae, Orchidaceae) is mixatrophic: a comparative study between green and nonphotosynthetic individuals. Canadian Journal of Botany 84: 1462-1477. (No mention of parasitism, but a study in Estonia shows that albino *C. longifolia* gained 100% of their carbon from ectomycorrhizal fungi in Thelophoraceae, versus 33% for green individuals, and that surrounding trees (*Juniperus* and *Pinus* spp.) '…were likely the ultimate carbon source.')

Abdel-Kader, M.M. and El-Mougy, N.S. 2007. Applicable control measure against *Orobanche ramosa* in tomato plants. Australasian Plant Pathology 36: 160-164. (Reporting successful suppression of *O. ramosa* in tomato by application of *Trichoderma harzianum* and *T. viride* to the planting medium, with or without a following application of glyphosate.)

Abdulai, M.S., Denwar, N.N. and Haruna, M. 2006. Combating the menace of *Striga hermonthica* infestation: an integrated approach adopted in North-Eastern Ghana. Journal of Agronomy 5: 617-620. (Three *Striga*-resistant maize varieties ACR 94 TZE Comp 5-W, ACR 97 TZL Comp 1-W and IWD STR C1 recorded lower *Striga* infestation and produced up to 70% more grain than the farmers' maize. Rotation of these varieties with soyabean 'may be one of the best and practical methods of *S. hermonthica* control.')

Adagba, M.A., Lagoke, T.O. and Usman, A. 2002. Management of *Striga hermonthica* (Del.) Benth in upland rice: influence of upland rice varieties and rates of nitrogen fertilizer. Nigerian Agricultural Journal 33: 119-127. (Confirming suppression of *S. hermonthica* and enhanced yield of rice at 90 and 120 kg N/ha.

Albert, M., Belastegui-Macadam, X. and Kaldenhoff, R. 2006. An attack of the plant parasite *Cuscuta reflexa* induces the expression of *attAGP*, an attachment protein of the host tomato. Plant Journal 48: 548-556. (Concluding that *C. reflexa* infection induces a signal in the host leading to expression of tomato *attAGP*, which promotes the parasite's adherence.)

Alvarado-Rosales, D. and Saavedra-Romero, L. de L. 2005. (The genus *Cladocolea* (Loranthaceae) in Mexico: true mistletoe or graftlike.) (in Spanish) Revista Chapingo. Serie Ciencias Forestales y del Ambiente 11(1): 5-9. (Noting at least 19 species of *Cladocolea,* parasitizing and damaging hardwoods mostly, especially *Salix* spp. but also some conifers.

Reporting effects of pruning on *C. loniceroides* on *S. bonplandiana* trees in an urban area. Significance of 'graftlike' in title not clear.)

Ameloot, E., Verheyen, K., Bakker, J., de Vries, Y. and Hermy, M. 2006. Long-term dynamics of the hemiparasite *Rhinanthus angustifolius* and its relationship with vegetation structure. Journal of Vegetation Science 17: 637-646. (Concluding that the main fluctuations in *R. angustifolius* population are due to spring droughts. Abundance is correlated positively with forbs and negatively with grasses.)

Amico, G.C., Vidal-Russell, R. and Nickrent, D.L. 2007. Phylogenetic relationships and ecological speciation in the mistletoe *Tristerix* (Loranthaceae): the influence of pollinators, dispersers, and hosts. American Journal of Botany 94: 558-567. (DNA analysis supported the transfer of two *Tristerix* spp. (*T. verticillatus* and *T. penduliflorus*) from the *Metastachys* subgenus of the *Tristerix* subgenus.)

Amusa, N.A. 2006. Microbially produced phytotoxins and plant disease management. African Journal of Biotechnology 5: 405-414. (Discussing the potential for toxins from microorganisms for control of parasitic weeds.)

Annapurna, D., Rathore, T.S. and Geeta Joshi. 2006. Modern nursery practices in the production of quality seedlings of Indian sandalwood (*Santalum album* L.) - stage of host requirement and screening of primary host species. Journal of Sustainable Forestry 22(3/4): 33-55. (Six leguminous species and 5 non-legumes were compared as 'primary hosts' to support *S. album* when transplanted. Legumes were generally better and *Mimosa pudica* and *Cajanus cajan* among the best. *Alternanthera sessilis* was the best non-legume.)

Archana Khare and Singh, P.K. 2006. Weed flora of vegetable crop of Chitrakoot District (U.P.). Journal of Living World 13(2): 17-21. (Recording one (unspecified) *Orobanche* sp. among weeds of vegetables.)

Arshad Javaid, Asad Shabir and Khan, S.N. 2006. Preliminary report on tree dieback in Balochistan. International Journal of Biology and Biotechnology 3: 711-715. (Causes of die-back of *Juniperus excelsa* at least partially due to *Arceuthobium oxycedri*.)

Badu-Apraku, B. 2006. Estimates of genetic variances in *Striga* resistant extra-early-maturing maize populations. Journal of New Seeds 8(2): 23-43. (A detailed analysis of the genetic variability of the populations described in the following paper.)

Badu-Apraku, B., Fakorede, M.A.B. and Lum, A.F. 2007. Evaluation of experimental varieties from recurrent selection for *Striga* resistance in two extra-early maize populations in the savannas of West and Central Africa. Experimental Agriculture 43: 183-200. (Two very early maturing lines of maize, white and yellow, were crossed with *Striga*-resistant inbreds and subjected to back-crossing, random mating and recurrent selection for resistance to *S. hermonthica*. Resulting populations proved to have high-yield potential in the presence or absence of *Striga*.)

Badu-Apraku, B. and Lum, A.F. 2007. Agronomic performance of *Striga* resistant early-maturing maize varieties and inbred lines in the savannas of West and Central Africa. Crop Science 47: 737-750. (Acr 94 TZE Comp 5-W, Acr TZE Comp 5-Y, and TZE-W Pop x 1368 STR C_1 were identified as promising varieties. Acr 94 TZE Comp. 5-W outyielded the reference entry by 45% under *Striga hermonthica* infestation. A number of promising inbred lines were also selected.)

Badu-Apraku, B., Menkir, A., Fakorede, M.A.B., Lum, A.F. and Obeng-Antwi, K. 2006. Multivariate analyses of the genetic diversity of forty-seven *Striga* resistant tropical early maturing maize inbred lines. Maydica 51: 551-559. (Principal component analysis of 47 maize inbred lines suggested 4 clusters. Eight lines combined high grain yield with reduced *Striga* attack.)

Badu-Apraku, B., Menkir, A. and Lum, A.F. 2005. Assessment of genetic diversity in extra-early *Striga* resistant tropical inbred lines using multivariate analyses of agronomic data. Journal of Genetics & Breeding 59(1): 67-79. (Covering the same study as the entry above.)

Bajgrowicz, J. and Gaillard, A. 2007. Perfumer's notes: Javanol. Fragrance creation with sandalwood oil substitutes. Perfumer & Flavorist 32(1): 32-37. (Discussing the use of Javanol, derived from turpentine from pine trees, as a substitute for sandalwood oil, thus protecting *Santalum album* from over-exploitation.)

Barua, I.C., Rajkhowa, D.J., Deka, N.C. and Kandali, R. 2003. Host range study of *Cuscuta reflexa* Roxb. in Assam. Indian Journal of Forestry 26: 414-417. (Recording 86 host species including the gymnosperm *Thuja orientale*.)

Bhatt, D.C., Patel, P.K. and Dodia, S.K. 2006. Various hosts of two species of *Cuscuta* L. Journal of Economic and Taxonomic Botany 30(1): 170-171. (Listing 104 hosts of *Cuscuta 'chinensis'* (possibly *C. campestris*?) and *C. reflexa* in Gujarat, India, none being common to both species.)

Bickford, C.P., Kolb, T.E. and Geils, B.W. 2005. Host physiological condition regulates parasitic plant performance: *Arceuthobium vaginatum* subsp. *cryptopodum* on *Pinus ponderosa.* Oecologia 146(2): 179-189. (Thinning of the host trees increased tree uptake of water and carbon and this in turn resulted in more vigorous growth of *A.vaginatum*.)

Botanga, C.J. and Timko, M.P. 2006. Phenetic relationships among different races of *Striga gesnerioides* (Willd.) Vatke from West Africa. Genome 49: 1351-1365. (AFLP analysis suggested that genetic variability within and among populations of each of the 5 previously recognized races of cowpea-parasitic *S. gesnerioides* was extremely low, and also revealed 2 new races, from Senegal and Benin. Molecular markers were identified for each race. A race specific to *Indigofera hirsuta* was genetically distinct.)

Bouwmeester, H.J., Roux, C., Lopez-Raez, J.A. and Bécard, G. 2007. Rhizosphere communication of plants, parasitic plants and AM fungi. Trends in Plant Science 12: 224-230. (Reviewing the new information on the importance of strigolactones in the development of mycorrhiza as well as for germination of parasitic plants.)

Braby, M.F. and Trueman, J.W.H. 2006. Evolution of larval host plant associations and adaptive radiation in pierid butterflies. Journal of Evolutionary Biology 19: 1677-1690. (The ancestral host of the family Pieridae appears to be Fabales, with multiple independent shifts to other orders, including three to Santalales. There were later shifts from Brassicales to mistletoes (Loranthaceae?) and from mistletoes to mistletoe hosts.)

Butonyi, C. 2007. ICIPE unveils new method to fight weed. Daily Nation (Kenya) Tuesday 10 July, 2007. (Reporting the launch of the 'push-pull' technology for control of stem borers and *Striga hermonthica,* after 10 years of development. See news item above)

Butonyi, C. 2007. Doomsday for stubborn pests. Daily Nation (Kenya) Thursday July 12, 2007: 36. (Extended version of item above with pictures.)

Cameron, D.D. and Seel, W.E. 2007. Functional anatomy of haustoria formed by *Rhinanthus minor*: linking evidence from histology and isotope tracing. New Phytologist 174: 412-419. (Showing that the lack of occurrence of *R. minor* on forbs such as *Plantago lanceolatum* and *Leucanthemum vulgare* is associated with resistance mechanisms which prevent connection with the host xylem.)

Chaudhary, M.A. and Muhammad Aslam. 2005. Biological and climatic factors responsible for dieback of juniper in Ziarat, Balochistan. Mycopath 3(1/2): 17-22. (*Arceuthobium oxycedri* affected 33% of *Juniperus excelsa* in the Sasnak locality, but insect and fungal problems were more widespread and responsible for most of the dieback in Ziarat.)

Chen XueLin, Jing GuoHai and Guo Hui. 2007. Ornamentation characteristics of seed coats in nineteen plants of *Pedicularis* from alpine meadow in east Qinghai-Xizang plateau and its ecological significance. Acta Prataculturae Sinica 16(2): 60-68. (Describing 4 types of ornamentation in 19 species of *Pedicularis* and discussing their possible evolution.)

Chye LimHuat. 2006. Traditional Asian folklore medicines in sexual health. Indian Journal of Urology 22: 241-245. (*Cuscuta* and *Cistanche* listed among about 30 plant species cited as sources of products with value for erectile disfunction and other sexual health problems in Asia.)

Culley, T.M. and Klootster, M.R. 2007. The cleistogamous breeding system: a review of its frequency, evolution, and ecology in angiosperms. Botanical Reviews 73: 1-30. (Including reference to cleistogamy in *Epifagus* ad *Triphysaria*.)

Dalrymple, S.E. 2007. Biological Flora of the British Isles: *Melampyrum sylvaticum* L. Journal of Ecology (Oxford) 95: 583-597. (A detailed review of the biology and ecology of *M. sylvaticum* noting that in UK it is restricted mainly to the Scottish Highlands, and is currently vulnerable and endangered.)

Daschinamzhilov, Zh.B.**,** Yatzenko, T.V.**,** Lyarskaya, L.V.**,** Aseeva, T.A.**,** Nikolaev, S.M.**,** Badluev, O.A. and Sambueva, Z.G. 2007. Hepatoprotective effect of herbal medicine "dig-da-shi-tan" on liver damaged by ethanol. Rastitel'nye Resursy 43(1): 130-135. (*Odontites vulgaris* is one of the 4 plant species involved in the preparation of 'dig-da-shi-tan', which is shown to help alleviate damage to liver from ethanol, when injected into laboratory animals.)

De Vega, C. and de Oliveira, R.C. 2007. A new procedure for making observations of embryo morphology in dust-like seeds with rigid coats. Seed Science Research 17(1): 63-67. (A successful procedure for seeds of *Cytinus hypocistis* and *C. ruber* involved successive treatments with Franklin's and Jeffrey's softening fluids and then with Herr's clearing fluid.)

Debabrata Das. 2007. Host range diversity of *Cuscuta reflexa* Roxb. in South 24-Parganas District of West Bengal. Environment and Ecology 25(1): 106-108. (Recording 67 host species with *Excoecaria agallocha* and *Acanthus ilicifolius* most commonly attacked.)

Devkota, M.P. and Kunwar, R.M. 2006. Diversity, distribution and host range of mistletoes in Godawari-Phulchoki area, Kathmandu, Nepal. Journal of Japanese Botany 81: 255-261. (Of 10 mistletoe species recorded on 69 hosts, *Scurrula parasitica* and *Helixanthera ligustrina* affected the most hosts. Others included *Scurrula gracilifolia, S. pulverulenta , Macrosolen cochinchinensis*, *Viscum loranthi* and *Loranthus odoratus*. The main host species included *Castanea sativa, Populus deltoides, Callistemon citrinus* and *Pyrus pashia*.)

Devkota, M.P. and Kunwar, R.M. 2006. Pollination and dispersal of three *Scurrula* species (Loranthaceae) in Godawari Area of Kathmandu Valley, Nepal. Indian Journal of Botanical Research. 2(2):115-128. (Describing the role of 4 bird species in the pollination and 3 species in the dispersal of *Scurrula pulverulenta, parasitica* and *elata*.)

Dias, D.P. and Marenco, R.A. 2007. (Photosynthesis and photoinhibition in mahogany and acariquara as a function of irradiance and leaf temperature.)(in Portuguese) Pesquisa Agropecuária Brasileira 42: 305-311. (Studies included *Minquartia guianensis* (Olacaceae).)

Diminic, D. and Kauzlaric, Ž. 2006. (The occurrence of common mistletoe (*Viscum album* ssp. *abietis*/Wiesb./Abromeit) on silver fir (*Abies alba* Mill.) in Gorski Kotar (Croatia).)(in Croatian) Glasnik za Šumske Pokuse, 2006, No. Posebno izdanje 5: 365-376. (*A. alba* heavily infected by *V. album* in 3 localities. Vigour of *V. album* was greater in trees on silicate soils than on dolomitic limestone.)

Dimitrova, T. 2004. Check of *Amaranthus blitoides* W. var. *reverchoni* Th. - an element of the control of *Cuscuta epithymum* Murr in lucerne (*Medicago sativa* L.). Bulgarian Journal of Agricultural Science 10: 579-582. (*Amaranthus blitoides* acts as a host of *C. epithymum* and enhances the *Cuscuta* problem in lucerne. Satisfactory control achieved by combination of S-metolachlor before lucerne emergence and imazethapyr 3 days after cutting infected growth.)

Dor, E., Evidente, A., Amalfitano, C., Agrelli, D. and Hershenhorn, J. 2007. The influence of growth conditions on biomass, toxins and pathogenicity of *Fusarium oxysporum* f. sp. *orthoceros*, a potential agent for broomrape control. Weed Research 47: 345-352. (Shaking led to highest rate of biomass accumulation of *F. oxysporum*; but the greatest pathogenicity against several *Orobanche* spp., perhaps associated with the toxic metabolites fusaric acid and 9,10-dehydrofusaric acid, was obtained under illumination, without shaking.)

Douthwaite, B., Schulz, S., Olanrewaju, A.S. and Ellis-Jones, J. 2007. Impact pathway evaluation of an integrated *Striga hermonthica* control project in northern Nigeria. Agricultural Systems 92: 201-222. (Discussing the extension techniques including impact pathway evaluation, believed to have been helpful in the dissemination of *Striga* control techniques, involving improved crop varieties and the growing of soyabean.)

Dzomeku, I.K. and Murdoch, A.J. 2007. Effects of prolonged conditioning on dormancy and germination of *Striga hermonthica.* Journal of Agronomy 6: 29-36. (Studies with different temperatures, urea concentrations and water stress showed that optimum temperature for conditioning was lower at high concentrations of urea, while optimum conditioning period decreased with both water stress and with high urea concentration.)

Echevarría-Zomeño, S., Pérez-de-Luque, A., Jorrín, J. and Maldonado, A.M. 2006. Pre-haustorial resistance to broomrape (*Orobanche cumana*) in sunflower (*Helianthus annuus*): cytochemical studies. Journal of Experimental Botany 57: 4189-4200. (In studies with race F of *O. cumana* and the resistant sunflower var. HE-39999 root tubercles were never observed, resistance being associated with accumulation of phenolic compounds, browning of both parasite and host tissues, and suberization and protein cross-linking in the sunflower cell wall.)

Eizenberg, H., Lande, T, Achdari, G., Roichman, A. and Herschenhorn, J. 2007. Effect of Egyptian broomrape (*Orobanche aegyptiaca*) seed-burial depth on parasitism dynamics and chemical control in tomato. Weed Science 55: 152-156. (Increasing depth of placement delayed and reduced emergence and biomass of *O. aegyptiaca*, but some emerged from 30 cm. Herbicide sulfosulfuron prevented emergence of *O. aegyptiaca* from all depths but its efficacy in preventing attachment and development below ground was best when seeds were at 6 cm and negligible when at 30 cm.)

El-Hamid, M.M.A. and El-Khanagry, S.S. 2006. Studies on dodder (*Cuscuta* spp.) infestation in clover (*Trifolium alexandrinum* L.) fields in some governorates in Nile Delta. Egyptian Journal of Agricultural Research 84(1): 287-300. (A survey showed 11% of fields infested with a mixture of *Cuscuta planiflora* and *C. pedicellata* and 87% of farmer seed samples contaminated with *Cuscuta* spp.)

Escher, P. and Rennenberg, H. 2006. Influx of double labelled glutamine into mistletoes (*Viscum album*) from the xylem sap of its host (*Abies alba*). Plant Physiology and Biochemistry 44: 880-884. (Results suggest the glutamine is metabolised in the *V. album*, the C component being distributed to metabolic sinks, while N is over-supplied, and remains mainly in the stem.)

Fan, Z.W., Buschmann, H. and Sauerborn, J. 2007. Prohexadione-calcium induces sunflower (*Helianthus annuus*) resistance against the root parasitic weed *Orobanche cumana*. Weed Research (Oxford) 47: 34-43. (Results suggest that PHDC reduces *O. cumana* infection by inducing host resistance. Lignification is not induced but free phenolics play an important role in the response, which is stronger in the more resistant var. HA89 than in var. Albena.)

Fan, Z.W., Buschmann, H., Müller-Stöver, D. and Sauerborn, J. 2007. Main effects and interactions among acibenzolar-S-methyl, a biocontrol fungus and sunflower cultivar on control of *Orobanche cumana* Walk. Journal of Plant Diseases and Protection 114(2): 76-81. (The 'plant activator' acibenzolar-S-methyl (ASM) applied 3 times as a soil drench at 5 mg/l soil, and the biocontrol fungus *Fusarium oxysporum* f. sp. *orthoceras* each gave substantial suppression of *O. cumana*, while the combination gave improved reliability.)

Finall, A.I., McIntosh, S.A. and Thompson, W.D. 2006. Subcutaneous inflammation mimicking metastatic malignancy induced by injection of mistletoe extract. British Medical Journal 333(7582): 1293-1294. (Reporting the case of a woman with subcutaneous inflammation mimicking metastatic malignancy induced by subcutaneous injections of mistletoe (*Viscum album*) extract self-administered at 20 mg, three times a week for the previous 12 months.)

Gebisa Ejeta and Gressel, J. (eds) 2007. Integrating new technologies for *Striga* control. Towards ending the witch-hunt. Hackensack, USA: World Scientific Publishing Co. 356 pp. (A publication based on the papers presented at the meeting in Addis Abeba in September, 2006. A review will appear in the next issue of Haustorium.)

Gillespie, M., Hodkinson, I.D., Cooper, E.J., Bird, J.M. and Jónsdóttir, I.S. 2007. Life history and host-plant relationships of the rare endemic Arctic aphid *Acyrthosiphon calvulus* in a changing environment. Entomologia Experimentalis et Applicata 123: 229-237. (Describing the life cycle of *A. calvulus* in Spitzbergen where it is closely synchronized with the phenology of *Salix polaris* but also occurs on *Pedicularis hirsuta*.)

Gondola, I. 2006. (Control of broomrape (*Orobanche ramosa* L.) in herbicide resistant tobacco.)(in Hungarian) Növényvédelem 42: 537-543. (Confirming complete selective control of *O. ramosa* by chlorsulfuron at 8 g/ha in chlorsulfuron-resistant tobacco derived from protoplast culture.)

González-Verdejo, C.I., Dita, M.A., di Pietro, A., Moreno, M.T., Barandiarán, X. Rubiales, D., González-Melendi, P. and Pérez-de-Luque, A. 2007. Identification and expression analysis of a MYB family transcription factor in the parasitic plant *Orobanche ramosa*. Annals of Applied Biology 150: 123-130. (This MYB gene appears to be associated with early stages of development and localized to parenchymatic cells near vascular tissue.)

GRAIN (Spain) 2006. Swapping striga for patents: yet another quick fix for Africa's farmers? Seedling October 2006: 5-9. (Discussing the new 'Clearfield' or 'Strigaway' technology involving herbicide-treated crop seed for *Striga* control, as developed by CIMMYT and BASF, and raising serious doubts about its suitability to traditional farmers in Kenya, and concluding that it is 'a misguided attempt to introduce a complex, expensive and risky technological solution into African farming systems.')

Guchu, S.M., Yenesew, A., Tsanuo, M.K., Gikonyo, N.K., Pickett, J.A., Hooper, A.M. and Hassanali, A. 2007. C-methylated and C-prenylated isoflavonoids from root extract of *Desmodium uncinatum*. Phytochemistry 68: 646-651. (A number of components of a root extract which induced germination of *Striga hermonthica* were identified but none individually stimulated germination.)

Gupta, R.S. and Kachhawa, J.B.S. 2007. Evaluation of contraceptive activity of methanol extract of *Dendrophthoe falcata* stem in male albino rats. Journal of Ethnopharmacology 112(1): 215-218. ('It is concluded that *D. falcata* methanol stem extract showed a significant effect on fertility in male rats as reported in folk remedies.')

Gworgwor, N.A. 2007. Trees to control weeds in pearl millet. Agronomy for Sustainable Development 27(2): 89-94. (Observing that millet growing under the canopy of *Faidherbia albida* trees was completely free of *S. hermonthica* and yielded up to 3 times that outside the canopy.)

Harbaugh, D.T. and Baldwin, B.G. 2007. Phylogeny and biogeography of the sandalwoods (*Santalum*, Santalaceae): repeated dispersals throughout the Pacific. American Journal of Botany 94: 1028-1040. (Analysis of DNA sequences suggest an origin of *Santalum* in Australia with at least 5 presumed bird-assisted dispersal events outwards to different Pacific islands, including the Hawaii group. Also suggesting that several recognized sections are not monophyletic and need revision.)

Harsha, V.H., Hebbar, S.S., Shripathi, V. and Hegde, G.R. 2006. Additions to the host-range of *Cassytha filiformis* L. (Cassythaceae) recorded in the Uttara Kannada District of Karnataka State (India). Journal of Economic and Taxonomic Botany 30: 231-234. (Listing 35 hosts of *C. filiformis* in 24 families, 3 of these being monocot.)

Howell, B., Kenaley, S. and Mathiasen, R. 2006. First report of *Psittacanthus macrantherus* on *Pinus devoniana* and *Quercus castanea* in Mexico. Plant Disease 90: 1461. (*P. macrantherus* seen frequently in *P. devoniana* and *P. douglasiana,* once only in *Q. castanea*.)

Hrusa, G.F. and Kelch, D. 2006. Giant dodders 2004-2006. In: Kodira, U.C. (ed.) 2006. Plant Pest Diagnostics Center. 2006 Annual Report. Sacamento, USA: California Department of Food and Agriculture, pp. 9-19 and 41. (Reporting repeated occurrences of *C. japonica* in California,

thought to originate from deliberate introduction as an Asian herbal remedy. It may flower but fails to set seed thanks to self-incompatibility and climate. See note in text above.)

Hunziker-Basler, N., Zuzak, T.J., Eggenschwiler, J., Rist, L., Simões-Wüst, A.P. and Viviani, A. 2007. Prolonged cytotoxic effect of aqueous extracts from dried *Viscum album* on bladder cancer cells. Pharmazie 62: 237-238. (Extracts of *V. album* from different host trees showed some variation in cytotoxic effect, not necessarily correlated with lectin content. In the form of 'Iscucin', extracts showed therapeutic potential for bladder cancer patients.)

Ibrahima, A., Mapongmetsem, P.M., Mompea, H.M., Moussou, L. and Nyomo. 2006. Vascular epiphytes and parasitic plants on *Vitellaria paradoxa* Gaertn. (Sapotaceae) in the Sudano-Guinean savannas of Ngaoundere, Cameroon. Selbyana 27(1): 72-78. (A survey found *Tapinanthus globiferus* ssp. *apodanthus* common on shea-butter trees, occurring mainly on the less humid canopy fringes.)

Idžojtic, M., Glavaš, M., Zebec, M., Pernar, R., Dasovic, M. and Pavlus, N. 2005. (Infestation of silver fir (*Abies alba* Mill.) with mistletoe (*Viscum album* L. ssp. *abietis* /Wiesb./ Abrom.) in Croatia.)(in Croatian) Šumarski List, 129: 559-573. (In the areas surveyed, 28% of *A. alba* were infested by *V. album*. Not all infested trees showed damage, but all the trees in the least healthy category were infested.)

Iuoras, M., Stanciu, D., Ciucă, M., Joita, M.P., Năstase, D. and Costache, S.M. 2006. (Preliminary research related to marker assisted selection in sunflower for *Orobanche cumana* Wallr. resistance.)(in Romanian) Cercetări de Genetică Vegetală si Animală 9: 27-34. (Work to identify a marker associated with the *Or5* resistance gene locus failed to find a tightly linked marker, but three SSR markers segregated in different proportions.)

Jäger, S., Winkler, K., Pfüller, U. and Scheffler, A. 2007. Solubility studies of oleanolic acid and betulinic acid in aqueous solutions and plant extracts of *Viscum album* L. Planta Medica 73(2): 157-162. (Discussing solubilities as relevant to extraction methods for compounds with anti-tumour properties.)

Jiang Fan, Timergalina, L., Kudoyarova, G., Jeschke, W.D. and Hartung, W. 2007. Growth and development of the facultative root hemiparasite *Rhinanthus minor* after removal of its host. Functional Plant Biology 34: 237-245. (After removal of the host (barley) shoot, *R. minor* continued to grow strongly. It grew stronger roots and closed its stomata during the day. It may also have benefited from degradation of host roots.)

Jiménez, M., André, S., Siebert, H.C., Gabius, H.J. and Solís, D. 2006. AB-type lectin (toxin/agglutinin) from mistletoe: differences in affinity of the two galactoside-binding Trp/Tyr-sites and regulation of their functionality by monomer/dimer equilibrium. Glycobiology 16: 926-937.

Joel, D.M. 2007. Direct infection of potato tubers by the root parasite *Orobanche aegyptiaca.* Weed Research 47: 276-279. (Reporting attachment and penetration of potato tubers by secondary haustoria of *O. aegyptiaca*. The parasite was also attached to the roots of potato but not to stolons or sprouts. This may be the first report of attachment of an *Orobanche* sp. to shoot tissue.)

Joel, D.M., Bar, H., Mayer, A.M., Verdoucq, V., Welbaum, G. and Westwood, J. 2007. Characterization of a dioxygenase gene with a potential role in steps leading to germination of the root parasite *Orobanche aegyptiaca*. In: Adkins, S.W., Ashmore, S. and Navie, S.C. (eds) Seeds: biology, development and ecology. Proceedings of the Eighth International Workshop on Seeds, Brisbane, Australia, May 2005: 296-306. (Differential display was used to identify genes with expression changes during conditioning. One of these, a dioxygenase, was characterized.)

Jones, C.G., Plummer, J.A. and Barbour, E.L. 2007. Non-destructive sampling of Indian sandalwood (*Santalum album* L.) for oil content and composition. Journal of Essential Oil Research 19: 157-164. (Reporting on the difficulties of estimating oil yield of trees, based on cores taken from different heights and the method of analysing these cores.)

Khalik, K.N.A. 2006. Seed morphology of *Cuscuta* L. (Convolvulaceae) in Egypt and its systematic significance. Feddes Repertorium 117: 217-224. (SEM and light microscopy used to distinguish 8 taxa of *Cuscuta* in Egypt, and a key prepared.)

Khan, Z.R., Midega, C.A.O., Hassanali, A., Pickett, J.A. and Wadhams, L.J. 2007. Assessment of different legumes for the control of *Striga hermonthica* in maize and sorghum. Crop Science 47: 730-736. (Inter-planting sorghum or maize with cowpea, greengram (*Vigna radiate*) or crotalaria (*Crotalaria ochroleuca*) resulted in some useful reduction of *S. hermonthica* though much less than *Desmodium uncinatum*. which provided nearly complete suppression. Only *Desmodium* in sorghum, and cowpea, crotalaria and *Desmodium* in maize gave significant increases in crop yield.)

Khan, Z.R., Midega, C.A.O., Hassanali, A., Pickett, J.A., Wadhams, L.J. and Wanjoya, A. 2006. Management of witchweed, *Striga hermonthica*, and stemborers in sorghum, *Sorghum bicolor*, through intercropping with greenleaf desmodium, *Desmodium intortum.* International Journal of Pest Management 52: 297-302. (Confirming that the 'push-pull' technique for suppression of stem-borers and *Striga* works well in sorghum as well as in

maize. *S. hermonthica* was reduced 89-100%, stem-borers by 67-85% and sorghum yields increased by 63-140%.)

Kiesling, R. 1994. (Flora of San Juan, Argentina: Volume I: Pteridophyta, Gymnosperma, multiple-leaf dicotyledons (Salicaceae and Leguminosae).)(in Spanish) In: Kiesling, R. (ed.) Buenos Aires, Argentina: Vasquez Mazzini Editores, 348 pp. (Including keys to Olacaceae and Santalaceae.)

Kültür, S. 2007. Medicinal plants used in Kirklareli Province (Turkey). Journal of Ethnopharmacology 111: 341-364. (*Viscum album* subsp. *album* listed among 126 traditional medicinal plants.)

Lázaro Bello, J.A. 2005. (Chorological notes on the vascular flora of Duero river basin (Valladolid, Spain).)(in Spanish) Anales de Biología 27: 113-118. (Including a new record for *Cuscuta campestris.*)

Lee KueBae. 2007. Structure and development of the upper haustorium in the parasitic flowering plant *Cuscuta japonica* (Convolvulaceae). American Journal of Botany 94: 737-745. (A detailed description of the early stages in attachment of the parasite using both light and electron microscopy.)

Lehmkuhl, J.F., Kistler, K.D. and Begley, J.S. 2006. Bushy-tailed woodrat abundance in dry forests of Eastern Washington. Journal of Mammalogy 87: 371-379. (Noting that mistletoe brooms (caused by unspecified *Arceuthobium* spp.) contributed to higher densities of woodrat in ponderosa pine and Douglas fir forest.)

Lejeune, A., Constant, S., Delavault, P., Simier, P., Thalouarn, P. and Thoiron, S. 2006. Involvement of a putative *Lycopersicon esculentum* wall-associated kinase in the early steps of tomato - *Orobanche ramosa* interaction. PMPP Physiological and Molecular Plant Pathology 69(1/3): 3-12. (Suggesting that a wall-associated kinase increases early in tomato roots and in cell suspensions challenged with *Orobanche ramosa*.)

Lehmkuhl, J.F., Kistler, K.D., Begley, J.S. and Boulanger, J. 2006. Demography of northern flying squirrels informs ecosystem management of western interior forests. Ecological Applications 16: 584-600. (Noting the possible benefit for *Glaucomys sabrinus* of retaining trees with *Arceuthobium* brooms.)

Lendzemo, V.W., van Ast, A. and Kuyper, T.W. 2006. Can arbuscular mycorrhizal fungi contribute to *Striga* management on cereals in Africa? Outlook on Agriculture 35: 307-311. (Reporting pot and field experiments which confirmed reduction of germination, attachment and emergence of *Striga* by AM fungi.)

Letousey, P., de Zélicourt, A., dos Santos, C.V., Thoiron, S., Monteau, F., Simier, P., Thalouarn, P. and Delavault, P. 2007. Molecular analysis of resistance mechanisms to *Orobanche cumana* in sunflower. Plant Pathology 56: 536-546. (A defensin gene is correlated with resistance in sunflower variety LR1. Three other genes, a putative methionine synthase, glutathione S-transferase and quinone oxidoreductase, might be involved in detoxification of reactive oxygen species during resistance responses.)

Mabrouk, Y., Zourgui, L., Sifi, B., Delavault, P., Simier, P. and Belhadj, O. 2007. Some compatible *Rhizobium leguminosarum* strains in peas decrease infections when parasitised by *Orobanche crenata*. Weed Research (Oxford) 47: 44-53. (Two isolates of *Rhizobium*, P.SOM and P.1236 did not directly affect germination of *O. crenata*, but when pea roots were inoculated, there was reduced germination and increased necrosis of the parasite, apparently associated with enhanced activity of peroxidases and phenylalanine ammonia lyase.)

Malkomes, H.P. 2006. (Influence of neem products on higher plants and its possible usage for sucker and weed control - an overview.)(in German) Gesunde Pflanzen 58: 93-98. (Neem products had been tested for control of *Orobanche* and *Striga* but with inadequate effect.)

Maširevic, S. and Malidža, G. 2006. (Problem and control of broomrape.)(in Serbian) Biljni Lekar (Plant Doctor) 34: 353-360. (Reviewing the importance of *O. cumana* on sunflower in Serbia and referring to use of resistant hybrids and imidazolinone herbicides.)

Mathiasen, R.L. and Daugherty, C.M. 2006. Additional taxonomic studies of *Arceuthobium pendens* (Viscaceae): a rare dwarf mistletoe from Central Mexico. Madroño 53(1): 69-71. (Reporting new data on the morphology, phenology and host reaction of this rare parasite on *Pinus orizabensis* in Mexico.)

Mathiasen, R., Howell, B. and Garnett, G. First report of *Arceuthobium aureum* subsp. *aureum* in Mexico. Plant Disease 91: 469. (*A. aureum* observed on a few trees of *Pinus maximinoi* causing serious damage to some.)

Mathiasen, R., Sediles, A. and Sesnie, S. 2006. First report of *Arceuthobium hondurense* and *Sruthanthus deppeanus* in Nicaragua. Plant Disease 90: 1458. (Both species recorded on *Pinus tecunumanii* and *P. oocarpa.*)

Menkir, A. and Kling, J.G. 2007. Response to recurrent selection for resistance to *Striga hermonthica* (Del.) Benth in a tropical maize population. Crop Science 47: 674-684. (A maize composite subjected to 6 cycles of recurrent selection claimed to show a remarkable 24% improvement in yield per cycle under *S. hermonthica* infestation.)

Mikó, P. and Gulyás, A. 2007. (Investigation of the distribution and pathogenity of sunflower broomrape (*Orobanche cernua* Loefl./*Orobanche cumana*

Wallr.) in North-Bácska Region in the year 2003 and 2005.)(in Hungarian) Növényvédelem 43(1): 25-29. (Reporting some intense losses from race E of *O. cumana* in Hungary but noting that with the correct resistant sunflower varieties there was no infestation.)

Mishra, J.S., Moorthy, B.T.S., Manish Bhan and Yaduraju, N.T. 2007. Relative tolerance of rainy season crops to field dodder (*Cuscuta campestris*) and its management in Niger (*Guizotia abyssinica*). Crop Protection 26: 625-629. (*G. abyssinica* was the most susceptible to *C. campestris* of 10 crops tested, suffering 86% loss, followed by *Phaseolus radiatus,* sesamum, soyabean and *Vigna mungo*. Cowpea and rice were unaffected. Pendimethalin pre-emergence at 1 kg/ha provided excellent selective control in *G. abyssinica*.)

Mohamed, H.M., Khan, Z.R., Mueke, J.M., Hassanali, A., Kairu, E. and Pickett, J.A. 2007. Behaviour and biology of *Chilo partellus* (Swinhoe) on *Striga hermonthica* (Del.) Benth. infested and uninfested maize plants. Crop Protection 26: 998-1005. (There was some tendency for *C. partellus* to prefer maize plants highly infested with *S. hermonthica* for oviposition, but larvae consumed more and grew more rapidly on un-infested host plants.)

Mohamed, K.I., Papes, M., Williams, R., Benz, B.W. and Peterson, A.T. 2006. Global invasive potential of 10 parasitic witchweeds and related Orobanchaceae. Ambio 35: 281-288. (Using tools from ecological niche modelling in combination with occurrence records from herbarium specimens to evaluate global invasive potential, and concluding that all tropical and subtropical countries, and most temperate countries are at risk from one or more parasitic species of *Striga, Orobanche, Alectra vogellii* or *Aeginetia indica*.)

Mutengwa, C.S., Tongoona, P., Mabasa, S. and Chivinge, O.A. 1999. Resistance to *Striga asiatica* (L.) Kuntze in sorghum: parent characterisation and combining ability analysis. African Crop Science Journal 7: 321-326. (In pot experiments sorghum varieties SAR 19 and SAR 29 showed resistance to *S. asiatica*, associated with low stimulant exudation. SAR 16 proved susceptible.)

Mutengwa, C.S., Tongoona, P.B. and Sithole-Niang, I. 2005. Genetic studies and a search for molecular markers that are linked to *Striga asiatica* resistance in sorghum. African Journal of Biotechnology 4: 1355-1361. (Describing efforts to identify molecular markers for the low germination stimulant (lgs) gene.)

Nadal, S., Cubero, J.I. and Moreno, M.T. 2007. Sources of resistance to broomrape (*Orobanche crenata* Forsk.) in narbon vetch. Plant Breeding 126: 110-112. (Among 200 accessions of *Vicia narbonensis* tested, 8 accessions were selected and identified as new sources of resistance to *O. crenata*.)

Nicol, J., Muston, S., D'Santos, P., McCarthy, B. and Zukowski, S. 2007. Impact of sheep grazing on the soil seed bank of a managed ephemeral wetland: implications for management. Australian Journal of Botany 55(2): 103-109. (Grazing reduced the density and species richness of the seed bank and in turn changed the plant community. However, in the absence of grazing, *Cuscuta campestris* was one of the species to flourish, and may need control.)

Olakojo, S.A. and Olaoye, G. 2005. Combining ability for grain yield, agronomic traits and *Striga lutea* tolerance of maize hybrids under artificial striga infestation. African Journal of Biotechnology 4: 984-988. (Studies with 10 inbred maize lines showed good general combining ability and identified inbreds suitable for commercial hybrid maize production for *Striga*-infested areas of south western Nigeria.)

Owens, N.L., Tucker, G.C. and Ebinger, J.E. 2006. Flora and vegetation of Coneflower Glacial Drift Hill Prairie Natural Area, Moultrie County, Illinois. Rhodora 108(936): 370-386. (Listing *Comandra umbellata* as an important forb.)

Pampi Ghosh and Debabrata Das. 2006. A preliminary census and taxonomic survey of host plant diversity of *Cuscuta reflexa* Roxb. in the Dakshin Dinajpur District of West Bengal. Journal of Economic and Taxonomic Botany 30: 217-220. (Listing 58 hosts of *C. reflexa*, including one monocot.)

Park JeongMi, Schneeweiss, G.M. and Weiss-Schneeweiss, H. 2007. Diversity and evolution of Ty1-*copia* and Ty3-*gypsy* retroelements in the non-photosynthetic flowering plants *Orobanche* and *Phelipanche* (Orobanchaceae). Gene 387: 75-86. (This first look at retroelements in parasitic plants suggests that genomes of *Orobanche* are more dynamic than those of *Phelipanche*. Potential of horizontal gene transfer is discussed.)

Pernar, R., Bajic, M., Ančic, M. **,** Seletkovic, A. and Idžojtic, M. 2007. Detection of mistletoe in digital colour infrared images of infested fir trees. Periodicum Biologorum 109(1): 67-75. (*Abies alba* is an important but endangered tree species in Croatia and is significantly attacked by *Viscum album*. The study confirmed that *V. album* can be detected using a digital visible near-infrared camera and hybrid interpretation that consists of unsupervised classification and manual merging of clusters.)

Popov, C., Guran, M., Raranciuc, S., Rotărescu, M., Spiridon, C., Vasilescu, S. and Gogu, F. 2006. (Phytosanitary state of cereals, leguminous for grain, industrial and fodder crops in Romania, in 2005.)(in Romanian) Probleme de Protectia Plantelor 34(1/2):

15-37. (Including the situation of *Orobanche cumana* in sunflower.).

Ramsay, P.M. and Fotherby, R.M. Implications of the spatial pattern of Vigur's Eyebright (*Euphrasia vigursii*) for heathland management. Basic and Applied Ecology 8: 242-251. (Spatial analysis of the rare endemic *E. vigursii* (and of *E. anglica*) at a site in SW England suggested association with, and possible parasitism of, *Ulex gallii*. A decline in populations is thought to be associated with a deliberate increase in density of *U. gallii* resulting in more shade at this site.)

Ray, B.R. and Dasgupta, M.K. 2006. Sugarcane crop loss due to wilt caused by parasitic angiosperm *Aeginetia pedunculata* (Roxb.) Wall. (Orobanchaceae). Journal of Mycology and Plant Pathology 36(1): 31-34. (A report on *A. pedunculata* causing an overall 37% loss of sugar yield in a 100 ha area along the river Bhagirathi in West Bengal, India. Some control is achieved by repeated hand-pulling. As reported earlier n Haustorium 45.)

Rispail, N., Dita, M.A., González-Verdejo, C., Pérez-de-Luque, A., Castillejo, M.A., Prats, E., Román, B., Jorrín, J. and Rubiales, D. 2007. Plant resistance to parasitic plants: molecular approaches to an old foe. New Phytologist 173:703-712. (Reviewing current approaches to the characterization of resistance mechanisms and discussing the application of new technologies to breeding programmes.)

Román, B., González Verdejo, C.I., Satovic, Z., Madrid, M.D., Cubero, J.I. and Nadal, S. 2007. Detecting *Orobanche* species by using cpDNA diagnostic markers. Phytoparasitica 35: 129-135. (Discussing the development of diagnostic DNA markers for the identification of the *Orobanche crenata, O. cumana* and *O. ramosa* in soil or seed lots.)

Roney, J.K., Khatibi, P.A. and Westwood, J.H. Cross-species translocation of mRNA from host plants into the parasitic plant dodder. Plant Physiology 143: 1037-1043. (Demonstrating that host mRNAs move from pumpkin and tomato hosts into *Cuscuta*. Movement of 10 transcripts, including the phloem-mobile GAI (gibberillic acid-insensitive) is demonstrated.)

Roxburgh, L. 2007. The effect of gut processing on the quality of mistletoe seed dispersal. Journal of Tropical Ecology 23: 377-380. (A study of *Phragmanthera dschallensis* on *Acacia sieberiana* in Zambia showed that regurgitation of seeds by birds resulted in higher germination rates and more direct contact with host branches, than defecation. No mention in abstract of the bird species involved.)

Roychoudhury, N., Singh, B.P. and Joshi, K.C. 2005. Some aspects on the biology of the common jezebel *Delias eucharis* (Drury) feeding on *Dendrophthoe falcata* (L. F.). Indian Journal of Entomology 67(2): 102-108. (Presenting observations on the biology and parasitism of the insect *D. eucharis* on *D. falcata*.)

Rungmekarat, S., Iino, M., Sato, M., Takahashi, T., Natsuaki, T., Takeuchi, Y. and Yoneyama, K. 2007. Characterization of mRNAs encoding ethylene biosynthesis enzymes in the root holoparasitic plants *Orobanche.* Journal of Pesticide Science 32: 24-31, 55. (ACC synthases and ACC oxidases from *O. minor* and *O. ramosa* have high homology to counterparts from other plants, particularly *Striga hermonthica*. Only the genes from *O. ramosa* were induced following stimulation by strigol.)

Sauerborn, J., Müller-Stöver, D. and Hershenhorn, J. 2007. The role of biological control in managing parasitic weeds. Crop Protection 26: 246-254. (A general discussion of the potential for biocontrol of parasitic plants.)

Schädler, M., Roeder, M., Brandl, R. and Matthies, D. 2005. Is palatability of a root-hemiparasitic plant influenced by its host species? Oecologia 146: 227-233. (*Melampyrum arvense* was grown on 11 different hosts and all were exposed to the slug *Arion lusitanicus* and to larvae of the moth *Spodoptera littoralis*. Both herbivores discriminated *M. arvense* grown on different host plants but there was no correlation between the palatability of a host species and that of the parasite grown on that host.)

Schnitzler, P., Koch, C. and Reichling, J. 2007. Susceptibility of drug-resistant clinical herpes simplex virus type 1 strains to essential oils of ginger, thyme, hyssop, and sandalwood. Antimicrobial Agents and Chemotherapy 51: 1859-1862. (Involving *Santalum* sp., presumably *S. album.*)

Showemimo, F.A. 2006. Effect of *Striga hermonthica* on yield and yield components of sorghum in Northern Guinea Savanna of Nigeria. Journal of Plant Sciences 1: 67-71. (Field experiments with 5 sorghum varieties indicated losses of 14-64% due to *S. hermonthica*. Samsorg-17 and Samsorg-3 were the least damaged.)

Showemimo, F.A. 2007. Relationships between sources and levels of nitrogen fertilization and the control of *Striga hermonthica* in sorghum. International Journal of Agricultural Research 2: 170-174. (Apparently a pot experiment in which N at 50 to 100 ppm (equivalent to 170 kg of N ha^{-1}) significantly reduced *S. hermonthica.* Sorghum varieties SK-5912, KSV-4, KSV-8 and NR71150 showed potential as sources of *Striga* resistance.)

Singh, B. B. and Ajeigbe, H. 2007. Improved cowpea-cereals-based cropping systems for household food security and poverty reduction in West Africa. In: Kang, M.S. (ed.) Journal of Crop Improvement 19(1/2): 157-172. (Reporting over 300% increases in

productivity, and reduced *Striga hermonthica,* from improved strip-cropping systems involving minimum fertilizer and pesticide applied to two rows of a densely planted improved cereal, sorghum or maize, and four rows of a densely planted, improved cowpea variety. Crop residues are fed to small ruminants in enclosures and manure is returned to the fields. Tested on 2000 farms and claimed to be popular.)

Singh, G., Chen, W., Rubiales, D., Moore, K., Sharma, Y.R. and Gan, Y. 2007. Diseases and their management. In: Yadav, S.S., Redden, R.J., Chen, W. and Sharma, B. (eds) Chickpea breeding and management. Wallingford, UK: CABI. pp. 497-519. (Covering a range of important diseases in chickpea, plus *Orobanche* and *Cuscuta*.)

Singh, P. 2007. Mitochondrial activity in *Orobanche cernua* from different regions of the scape and as influenced by host. Journal of Phytopathology 155: 45-49. (Results indicated greater metabolic activity in the proximal region of the *O. cernua* scape. When growing on eggplant, activity was higher than on *Petunia hybrida* or *Datura metel.*)

Škoric, D., Jocic, S. and Gvozdenovic, S. 2006. (Achievements in sunflower breeding for resistance to diseases, broomrape and insects.)(in Serbian) Biljni Lekar (Plant Doctor) 34: 299-313. (A review including reference io *Orobanche cumana*.)

Snapp, S. and Minja, E. 2003. Integration of integrated pest management in integrated crop management: experiences from Malawi. In: Maredia, K.M., Dakouo, D. and Mota-Sanchez, D. (eds) Integrated pest management in the global arena 2003: 157-167. (Case studies include one on *Striga* in maize.)

Spurrier, S. and Smith, K.G. 2007. Desert mistletoe (*Phoradendron californicum*) infestation correlates with blue palo verde (*Cercidium floridum*) mortality during a severe drought in the Mojave desert. Journal of Arid Environments 69: 189-197. (Reporting high mortality of *C. floridum* under a combination of *P. californicum* infestation and severe drought, and contrasting these results with those reported previously by Boweers, and Turner, 2001 (see Haustorium 42).)

Stefanovic, S., Kuzmina, M. and Costea, M. 2007. Delimitation of major lineages within *Cuscuta* subgenus *Grammica* (Convolvulaceae) using plastid and nuclear DNA sequences. American Journal of Botany 94: 568-589. (DNA studies confirmed that the sub-genus *Grammica* with 130 species was monophyletic with the exception of *C. appendiculata* which shows more affinity to section *Cuscuta*.)

Steyermark, J. A., Berry, P.E., Yatskievych, K. and Holst, B.K. 2004. Flora of the Venezuelan Guayana. Volume 8: Poaceae-Rubiaceae.In: Steyermark, J. A., Berry, P.E., Yatskievych, K. and Holst, B.K. (eds.) Flora of the Venezuelan Guayana. Volume 8: Poaceae-Rubiaceae. St Louis, USA: Missouri Botanical Gardens Press. 874 pp. (Covering Rafflesiaceae.)

Stringer, L. C., Twyman, C. and Thomas, D.S.G. 2007. Learning to reduce degradation on Swaziland's arable land: enhancing understandings of *Striga asiatica*. Land Degradation & Development 18: 163-177. (Noting increasing infestation and yield losses from *S. asiatica* in maize in Swaziland and the need for farmers to be helped in understanding and coping with the problem, but also emphasising the need for more attention to issues of soil fertility and land degradation at the national level.)

Sun, S.K. 2006. Oiltea disease caused by dwarf mistletoe. Plant Pathology Bulletin 15(2): 125-128. (Reporting leaf yellowing and abnormal growth of oiltea trees, *Camellia oleifera*, as a result of infection with *Bifaria opuntia* (= *Korthalsella opuntia*).)

Sundararaj, R., Karibasavaraja, L.R., Gaurav Sharma and Muthukrishnan, R. 2006. Scales and mealybugs (Coccoidea: Hemiptera) infesting sandal (*Santalum album* Linn.). Entomon 31: 239-241. (23 species listed, including 7 thought to be new records.)

Swanson, M.E., Shaw, D.C. and Marosi, T.K. 2006. Distribution of western hemlock dwarf mistletoe (*Arceuthobium tsugense* [Rosendahl] G.N. Jones subsp. *tsugense* in mature and old-growth Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco) forests. Northwest Science 80: 207-217. (*A. tsugense* was frequent in a 500 year-old stand, while in an area burnt over about 150 years ago it occurred only in riparian patches which did not burn completely.)

Świerczyńska, J., Kozieradzka-Kiszkurno, M. and Bohdanowicz, J. 2005. Polyploidization of endosperm chalazal haustorium of *Rhinanthus serotinus* (Scrophulariaceae). Acta Biologica Cracoviensia. Series Botanica 47(1): 123-127. (LJM)

Świerczyńska, J. and Bohdanowicz, J. 2003. Microfilament cytoskeleton of endosperm chalazal haustorium of *Rhinanthus serotinus* (Scrophulariaceae). Acta Biologica Cracoviensia. Series Botanica 45(1): 143-148. (LJM)

Tellier, A. and Brown, J.K.M. 2007. Stability of genetic polymorphism in host-parasite interactions. Proceedings of The Royal Society B 274: 809-817. (Claiming to provide a simplified and generalized theory of co-evolution of host-parasite specificities. No reference to parasitic plants but of potential relevance?)

Tennakoon, K. U., Bolin, J. F., Musselman, L. J. and Maass, E. 2007. Structural attributes of the hypogeous holoparasite *Hydnora triceps* Drège & Meyr (Hydnoraceae). American Journal of Botany 94: 1439-1449. (The vegetative body is shown to be

a rhizome based on its endarch collateral bundles. Most parasite connections were xylem to xylem.)

Tennakoon K.U. and Cameron, D.C. 2006. The anatomy of *Santalum album* (Sandalwood) haustoria. Canadian Journal of Botany. 84: 1480-3305. (Study of the haustoria of *S. album* on *Tithonia diversifolia* shows that the parasite-host interface consists of parenchymatous tissue, suggesting cross-membrane (potentially selective) uptake of host solutes rather than mass flow via vascular continuity.)

Udom, G.N., Babatunde, F.E. and Tenebe, V.A. 2007. Suppression of witch-weed (*Striga hermonthica*) in sorghum: cowpea mixture as affected by cowpea varieties and planting patterns. International Journal of Agricultural Research 2: 268-274. (Intercropping sorghum with cowpea variety Kano 1696 in alternate ridges significantly reduced *S. hermonthica*.)

*University of Virginia 2007. U.Va. Biologist Michael Timko Helps Africans Breed Disease-Resistant Plant. Genetics News. http://www.checkbiotech.org/green_News_Genetics.aspx?infoId=15185 (An account of the project described above under Botanga and Timko, above.)

USA, United States Department of Agriculture Forest Service 2005. Forest insect and disease conditions in the United States 2004. Washington DC, USA: USDA Forest Service. 142 pp. (Includes appraisal of the status of problems due to *Arceuthobium* spp.)

Vaughn, K.C. 2006. Conversion of the searching hyphae of dodder into xylic and phloic hyphae: a cytochemical and immunocytochemical investigation. International Journal of Plant Sciences 167: 1099-1114. (A detailed study of the development of phloem and xylem connections in *Cuscuta*, emphasising the similarities and significant differences in the fine structure of corresponding tissues in parasite and host.)

Velasco, L., Pérez-Vich, B., Jan, C.C. and Fernández-Martínez, J.M. 2007. Inheritance of resistance to broomrape (*Orobanche cumana* Wallr.) race F in a sunflower line derived from wild sunflower species. Plant Breeding 126: 67-71. (Resistance to race F of *O. cumana* in sunflower variety J1, derived from the wild *Helianthus grosseserratus*, previously assumed to be due to a single dominant gene, was re-examined and found to be digenic, involving a second gene, susceptible to environmental influence.)

Veronesi, C., Bonnin, E., Calvez, S., Thalouarn, P. and Simier, P. 2007. Activity of secreted cell wall-modifying enzymes and expression of peroxidase-encoding gene following germination of *Orobanche ramosa*. Biologia Plantarum 51: 391-394. (Discussing the role of pectinolytic enzymes, polygalacturonase and rhamnogalacturonase in host root attack and haustorium formation. After 6 days germinated seeds also secreted proteins which exhibited peroxidase activity.)

Vissoh, P.V. 2006. Participatory development of weed management technologies in Benin. Participatory development of weed management technologies in Benin. Wageningen University, Wageningen: Netherlands, 182 pp. (Endorsing Farmer Field Schools as a means of helping farmers to understand and manage their weed problems, including *Striga,* the latter being addressed via integrated crop and soil fertility management involving early planting, sorghum transplanting, crop rotation, intercropping and trap crops.)

Voss, C., Eyol, E., Frank, M., Lieth, C.W. and von der Berger, M.R. 2006. Identification and characterization of riproximin, a new type II ribosome-inactivating protein with antineoplastic activity from *Ximenia americana.* FASEB Journal 20: 1194-1196. (Reporting the identification of riproximin in *Ximenia americana* (Olacaceae) and confirming its anti-cancer activity in rats.)

Walters, D., Newton, A. and Lyon, G. (eds) 2007. Induced Resistance for Plant Defence A Sustainable Approach to Crop Protection. Oxford, UK: Blackwell Publishing. 272 pp. (A comprehensive review of the development and exploitation of induced resistance for the control of pathogens. No specific reference to parasitic plants but of possible interest and relevance. Chapters review current knowledge of the agents that can elicit induced resistance, genomics, signalling cascades, transgenic approaches, mechanisms of defence to pests and pathogens, and molecular tools.)

Ward, M.J. and Paton, D.C. 2007. Predicting mistletoe seed shadow and patterns of seed rain from movements of the mistletoebird, *Dicaeum hirundinaceum*. Austral Ecology 32(2): 113-121. (Distribution of *Amyema miquelii* was influenced by the tendency for the bird disperser to deposit seeds mainly within 100 m of the source, though over 500 m was sometimes recorded. Seeds deposited could be as high as 66,000 per ha.)

Watson, D.M., Roshier, D.A. and Wiegand, T. 2007. Spatial ecology of a root parasite - from pattern to process. Austral Ecology 32: 359-369. (Ripley's K-function and the O-ring statistic were used in a study of the distribution of *Santalum lanceolatum* in relation to its principal host *Acacia tetragonophylla* in New South Wales. Results suggest that *S. lanceolatum* was associated mainly with the host growing in the most favourable conditions.)

Wei XueZhi, Lian LingYun, Cheng ZhiFang and Su JunXia. 2006. The anatomic research on vegetative organ in two parasite species of Loranthaceae. Bulletin of Botanical Research 26: 663-666.

(Recording detailed anatomical observations on *Viscum coloratum* and *Loranthus tanakae*.)

Westerman, P.R., van Ast, A., Stomph, T.J. and van der Werf, W. 2007. Long-term management of the parasitic weed *Striga hermonthica*: strategy evaluation with a population model. Crop Protection 26: 219-227. (Use of a model demonstrates that crop varieties producing low levels of stimulant risk perpetuating or increasing the *Striga* seedbank. Alternative strategies are discussed.)

Wu ZhengYi, Raven, P.H. and Hong DeYuan 2003. Flora of China. Volume 5: Ulmaceae through Basellaceae. In: Wu ZhengYi, Raven, P.H. and Hong DeYuan (eds) Flora of China. Volume 5: Ulmaceae through Basellaceae. Beijing, China: Science Press. 505 pp. (Covering Olacaceae (5 genera, 10 species), Opiliaceae (5 genera, 5 species), Santalaceae (7 genera, 33 species), Loranthaceae (8 genera, 51 species), Viscaceae (3 genera, 18 species), Rafflesiaceae (2 genera, 2 species), Balanophoraceae (2 genera, 13 species).)

Yang ChunFeng and Guo YouHao. 2007. Pollen-ovule ratio and gamete investment in *Pedicularis* (Orobanchaceae). Journal of Integrative Plant Biology 49: 38-245. (Pollen-ovule ratio, gamete investment, and their correlations were studied in 40 species of *Pedicularis*. Pollen-ovule ratio did not differ among either different corolla types or taxonomic groups, suggesting parallel evolution.)

Yang, F.S. and Wang, X.Q. 2007. Extensive length variation in the cpDNA *trnT-trn*F region of hemiparasitic *Pedicularis* and its phylogenetic implications. Plant Systematics and Evolution 264: 251-264. (Documenting frequent deletions in the chloroplast genome of the hemiparasitic lineage of the family Orobanchaceae. Section Cyathophora appears to be monophyletic, perhaps with recent origin followed by rapid radiation.)

Yen FengLin, Wu TzuHui, Lin LiangTzung and Lin ChunChing. 2007. Hepatoprotective and antioxidant effects of *Cuscuta chinensis* against acetaminophen-induced hepatotoxicity in rats. Journal of Ethnopharmacology 111(1): 123-128. (The seeds of *C. chinensis* , known as Tu-Si-Zi, are used medicinally to improve kidney and liver conditions. This study suggests that the ethanolic extract of *C. chinensis* can prevent hepatic injuries from APAP-induced hepatotoxicity in rats and this is likely mediated through its antioxidant activities.)

Yordanova, E., Gorinova, N., Bachvarova, R., Nedkovska, M., Atanassov, A. and Ohkawa, H. 2000. Genetic transformation of tobacco with rat cytochrome P4501A1 mono-oxygenase gene. Bulgarian Journal of Agricultural Science 6(1): 1-7. ('The resulting transgenic plants with higher tolerance to chlortoluron will help to study the effects of the expression of rat cytochrome P4501A1 on parasitic plant (such as *Orobanche ramosa*)-tobacco interactions.')

*Young, N.D. and de Pamphilis, C.W. 2005. Rate variation in parasitic plants: correlated and uncorrelated patterns among plastid genes of different function. BMC Evolutionary Biology 5(16): (15 February 2005). http://www.biomedcentral.com/content/pdf/1471-2148-5-16.pdf (The rate of change in genes (*rbcL*, *matK*, and *rps*) was not always immediate upon the loss of photosynthesis. A stronger correlation was observed for synonymous changes than for non-synonymous changes.)

Zuzak, T.J., Rist, L., Eggenschwiler, J., Grotzer, M.A. and Viviani, A. 2006. Paediatric medulloblastoma cells are susceptible to *Viscum album* (Mistletoe) preparations. Anticancer Research 26: 3485-3492. (Paediatric medulloblastoma cells were exposed to 8 different preparations of *V. album*, from 8 different host tree species. All showed significant growth inhibition correlated with lectin content.)

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