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MESSAGE FROM THE IPPS PRESIDENT

Dear IPPS Members,

Best wishes for 2011 to all of you! This will be another big year for IPPS as this summer we will again gather together to share science and meet friends old and new. The 11th World Congress on Parasitic Plants will take place on June 7-12, 2011 in Martina-Franca, Italy. See the Meetings section of this issue to find important information on the Congress such as registration and abstract submission dates. Information is also available at the congress website (http://ipps2011.ba.cnr.it/). I encourage all of you to attend. The congress venue and program will be outstanding.

Although we have not even held the 11th Congress yet, now is the time to think about where to meet for the 12th Congress in 2013. We are entertaining all options, so please send me your ideas for (and better still, your willingness to help host!) the next congress. We aim to announce the 2013 venue at the end of the congress in Italy.

IPPS is approaching an anniversary. When we meet in Italy it will be ten years since the formal inception of the society, which occurred at the 7th International Parasitic Weed Symposium in Nantes, France. On one hand, ten years seems like a long time ago and it feels like much has changed in science and our understanding of parasite biology since the turn of the century (Sounds

even longer ago when put that way!). On the other hand, less has changed when considering that parasitic weeds continue to spread and devastate crops and effective control measures continue to elude us. Likewise with our society, we have had ten years of IPPS and the society has definitely matured over that time. We have established a comfortable rhythm of meeting schedules and an unprecedented level of organizational and financial stability. Yet as a society whose members are scattered around the globe and only meet every two years, we are young and still finding the best ways to operate. Although we are well beyond infancy, we still have some growing to do.

On that note I want to announce that it is time to elect new IPPS officers. You may recall that we created a staggered election cycle to avoid complete turnover of the Executive Committee at one time, and two years ago we elected vice president, secretary, and member at large. We now need to elect an editor and treasurer, with Diego Rubiales and Philippe Delavault having filled these positions, respectively, for four years. One wrinkle in this plan is that for much of his time as Treasurer, Philippe had no access to the IPPS bank account, which had been established in The Netherlands. Having gone to much work to transfer the bank account and reregister IPPS in France, my fellow IPPS officers and I think it is sensible to keep it in France for a while. Philippe has agreed to serve a second term as Treasurer and I hope all will agree with us that it is prudent to keep him in that position. Thus, we will be electing just the Editor position this time. We will solicit nominations and hold the election within the next few months.

See you in Italy!

Jim Westwood, IPPS President westwood@vt.edu

RECENT ADVANCES IN THE BIOLOGY OF *HYDNORA* (HYDNORACEAE):

The holoparasitic Hydnoraceae have long been considered botanical oddities even in the bizarre world of parasitic plants. Despite often being discussed in relation to the Rafflesiaceae due to gross similarities including habit and mode of nutrition, DNA sequence data have confirmed the prescient taxonomic judgment of Solms-Laubach and Baillon and placed the Hydnoraceae among the Piperales (Nickrent *et al.* 2002; Barkman *et al.* 2007). Often compared to their quite unrelated and rightfully admired brethren *Rafflesia* 'queen of parasites', *Hydnora* and *Prosopanche*, the two small genera of Hydnoraceae are somewhat more enigmatic and are not experiencing a contemporary explosion in taxonomic interest as noted for *Rafflesia* (Nickrent 2010), however s significant recent progress has been made. Our aim here is to briefly summarize our recent research on the genus *Hydnora* in southern Africa.

The strange *Hydnora africana* chamber flower, emitting putrid odors of rotting meat have piqued the interest of botanists and scavenging jackals for many years. Our field studies have summarized the complex pollination biology of *Hydnora*. Year round, *H. africana* remains underground except when in flower. Large fleshy flower buds of *Hydnora africana* emerge from the soil and after opening, immediately emit fetid odors from recessed osmophores located in each tepal. Despite their awful odor, South African botanist Robert Marloth (1907) remarked that *Hydnora* osmophores were 'like a spongy pudding, not only in appearance but also in taste'. Although overall thermogenesis is low in *Hydnora* relative to other thermogenic plants, the osmophores have the highest mass-specific respiration rate of any *Hydnora* floral part, thus thermogenesis in *Hydnora* is assumed to be associated with scent production (Seymour *et al.* 2010). The fetid odors produced by the thermogenic osmophores predictably attract carrion feeders and ovipositors, mainly hide beetles (*Dermestes maculatus*), which soon after alighting on the flower inevitably tumble into the chamber and are trapped by the smooth chamber walls. A marked beetle addition experiment demonstrated that hide beetles are trapped for several days until pollen is shed, after which structural changes to the chamber wall allow beetles, heavy with pollen, to escape (Bolin *et al.* 2009a). A University of Namibia undergraduate capstone thesis project conducted by Victor Libuku using pollinator exclosures has shown convincingly that *Hydnora* is an obligate outcrosser in a severely pollinator limited environment (Maass, Libuku, and Bolin; unpublished data). Thus the specialized pollination ecology of *Hydnora* flowers: brood site mimicry with insect imprisonment and thermogenesis appears to have evolved in the context of its breeding system and pressure from pollinator limitation.

In regard to the germination ecology of *Hydnora*, Job Kuijt predicted, 'a fascinating story awaits the botanist who is fortunate to have access to viable seeds' (Kuijt 1969). We found Job Kuijt's assertion warranted in a germination study of *Hydnora triceps.* This plant is unusual in several ways; it flowers completely underground, is an obligate parasite of *Euphorbia dregeana*, and is restricted to a small area of Namibia and South Africa near the mouth of the Orange River. The study applied whole root extracts of host and non-host *Euphorbia* spp. to seeds of *H. triceps* (Bolin *et al.* 2009b). We found that germination of *H. triceps* only

occurs when whole root extracts of its obligate host *E. dregeana* were applied to seeds and not when extracts of other co-occurring *Euphorbia* spp. were applied, even those that are parasitized by *H. africana* and occur sympatrically. Importantly these results suggest that partitioning of the host resource (*Euphorbia* spp.) between *Hydnora* spp. occurs at the host recognition stage of seed germination. The germination strategies of other *Hydnora* spp. are unknown.

The hypogeous flower of *Hydnora triceps*. Photographed at Farm Namuskluft, Rosh Pinah, Namibia. Photo by Jay Bolin.

In contrast to the well-known strategy of water and nutrient uptake used by mistletoes (high transpiration rates to maintain favorable water potential gradients), in *Hydnora*, the mode of transport is markedly different since it lacks leaves and other transpirative surfaces. We report extremely low transdermal water loss (Bolin *et al.* 2010) from subsurface *Hydnora* rhizomes (Tennakoon *et al.* 2007), comparable to the transpiration of xerophytes. Interestingly the stable carbon isotopic signature of *Hydnora* mirrors that of its hosts, thus *H. abyssinica* on *Acacia* hosts show a range of carbon isotopic values typical of C3 plants while *H. africana* on *Euphorbia* hosts show a CAM signature, confirming complete heterotrophy in *Hydnora* (Bolin *et al.* 2010).

Stable isotopic signatures of host roots from herbarium sheets coupled with DNA sequencing of barcoding loci from the same roots have proven useful in the identification of *Hydnora* host plants. These data are critical for our ongoing studies of host-parasite co-speciation using molecular markers because host information reported from herbarium sheets is notoriously unreliable. We are currently preparing a multi-locus phylogeny of the Hydnoraceae for publication, which we hope will inform future taxonomic work and highlight areas of incongruity in the family. Our studies of the Hydnoraceae have revealed much, however surely much is left to be written and discovered about these, strangest of parasites, if one doesn't mind digging.

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PERSPECTIVES ON THE SANDALWOOD ORDER

Among the twelve orders of flowering plants in which haustorial parasitism evolved, only two have more than three genera: Lamiales and Santalales. Of these, Lamiales contains a single family of hemi- and holoparasitic plants: Orobanchaceae (ca. 93 genera/ 1725 species). Santalales is the largest order of parasitic plants composed of 18 families, 160 genera, and ca. 2280 species. Its size increases if one includes the holoparasitic family Balanophoraceae (17/43). Incidentally, these numbers derive from a list posted on the Parasitic Plant Connection (http://www.parasiticplants.siu.edu/ParPlantNumbers.pdf). I highly suggest using this list instead of others (from older literature) when reporting such statistics. As far as I know, this is the only continuously updated list of parasitic plant genera and species.

Recently, my collaborators and I published a revision of Santalales (Nickrent *et al.* 2010) that synthesized results from many sources of evidence to arrive at our classification. I present below answers to some frequently asked questions – hopefully this will clear up some of the confusion that persists concerning various concepts.

1. 'How many families in the order?' We recognized 18 families in 'core' Santalales. Balanophoraceae were not discussed as we do not know its exact relationship to photosynthetic Santalales.

1. 'How were the families determined in your new classification?' The principle of monophyly was followed based on results from various molecular phylogenetic analyses (particularly Malécot and Nickrent 2008 and Der and Nickrent 2008, and Vidal-Russell and Nickrent 2008a). Indeed, there are other perspectives about how to generate a classification, (e.g. the recognition of paraphyletic taxa – see Hörandl 2010), but we adhered to the monophyly philosophy following Backlund and Bremer (1998).

3. 'I thought I knew Olacaceae and Santalaceae, but now everything has changed!' Indeed the most change, compared to traditional classifications, involved 'Olacaceae' and 'Santalaceae'. These names are enclosed by quotation marks because they were found to be para- or polyphyletic. 'Olacaceae' has traditionally been a very heterogeneous group. Three of the families segregated from it (Erythropalaceae, Strombosiaceae, and Coulaceae) and are apparently not parasitic. These families occur at the base of the Santalales tree; all the remaining families are parasites, which indicates this nutritional mode evolved just once in the order. Members of 'Olacaceae' are now found in eight families. One of these segregates (Schoepfiaceae) is actually sister to the South American mistletoes in Misodendraceae. In addition to *Schoepfia*, the family includes two genera formerly placed in Santalaceae: *Arjona* and *Quinchamalium*. Finally, these two families are sister to Loranthaceae – the most speciose family in the order (990 species).

The former 'Santalaceae' was split into seven families. These families are monophyletic and diagnosable via a combination of morphological characters. A key to all families in the order is given in Nickrent *et al.* (2010). If one were to recognize all of these as one family, the seven genera of Viscaceae would also have to be included to retain monophyly. Indeed, this is what was done in the various Angiosperm Phylogeny Group publications (APG 1998, 2003, 2009). Given that 'lumping' vs. 'splitting' is often a matter of taste (see 6 below), we preferred to retain the name Viscaceae for this clade of mistletoes. To do so, however, required splitting 'Santalaceae'.

4. 'Are Loranthaceae and Viscaceae distinct?' Older classifications frequently classified the genera of Viscaceae as a subfamily within Loranthaceae (e.g. Engler and Krause 1935, Danser 1935). Unfortunately this concept continues to plague writing today. For example, the recent review by Fay *et al.* (2010) erroneously stated (p. 298) that APGIII included Viscaceae in Loranthaceae (sic. Santalaceae). I recently received an email from a student in Iran whose project was to show, via molecular methods, that Viscaceae were different from Loranthaceae! The morphological, embryological, and cytological differences between these two families are numerous (see Barlow 1964, Barlow and Wiens 1971, Johri and Bhatnagar 1960) and this has been strongly substantiated with molecular phylogenetic methods (see Vidal-Russell and Nickrent 2008a, b). Thus, whether the two groups are distinct or not is no longer an issue. It is important to recognize Viscaceae, a name well-established in the literature, as distinct from Santalaceae and Loranthaceae, if only to avoid misinterpretations that are residuals of history.

5. 'What happened to Eremolepidaceae?' Three genera of neotropical mistletoes, *Antidaphne, Eubrachion* and *Lepidoceras* were considered by Kuijt (1988) to constitute a family, Eremolepidaceae. Kuijt (1969) believed this family evolved from Olacaceae via *Opilia*

(Opiliaceae). Our phylogenetic studies have shown that indeed these mistletoes do form a clade, but that clade is deeply embedded within Santalaceae *sensu stricto*. Our early work using *rbcL* and 18S rDNA sequences (Nickrent and Duff 1996) first indicated this, and additional sequencing and analyses confirmed and strengthened the result (e.g. Der and Nickrent 2008). Thus, it is unfortunate that this 'family' is still being used in recent floristic treatments such as Flora of the Guianas (Kuijt 2007) and Flora Mesoamericana (Kuijt 2009). To accept Eremolepidaceae would require also accepting a paraphyletic Santalaceae *s.s.* Eremolepidaceae was sunk into Santalaceae (in the broad sense) by APG I, II and III. No matter whether a broad or narrow family concept is used, these three mistletoe genera should reside in Santalaceae.

6. 'Why does your Santalales classification differ from that in APG III?' A common misconception is that the APG classifications represent one agreed upon by the majority of the systematics community. Although APG represents itself as presenting the authoritative angiosperm classification, it has not been demonstrated that their family concepts are the majority opinion. APG III contains 415 rather than the 457 families recognized in APG II. This was achieved by 'lumping', thereby resulting in more inclusive families. Could the decrease in the number of collaborators from APG I to III (22 to 9) possibly reflect dissatisfaction with such decisions?

As stated on Wikipedia, 'Independent researchers, including members of the APG, continue to publish their own views on areas of angiosperm taxonomy.' Indeed this is exactly what the Nickrent *et al.* (2010) classification represents – a different view than APG. In the case of 'Santalaceae' and Viscaceae, one can employ a broad concept and recognize one family (Santalaceae *senso lato*.), but one must also then ask 'why stop here?'. Why not also include Opiliaceae? The specific criteria used by APG to define Santalaceae *s.l.*. and exclude Opiliaceae are not specified. So, if one chooses to recognize Santalaceae *s.l.*, there still exist seven clades that could be recognized and named (as subfamilies?). This opens up the topic of trying to define what taxonomic rank is most appropriate for a particular assemblage of biological diversity – a topic well beyond the scope of this contribution!

7. 'How many mistletoe families and species?' Of course, the answer to this question depends upon whose family concept one follows. According to Nickrent *et al.* (2010), mistletoes evolved on five separate occasions (clades) and are in the following families: Misodendraceae, Loranthaceae*, Santalaceae*, Amphorogynaceae* and Viscaceae. The three families marked with an asterisk contain root parasitic plants as well as mistletoes. Only Misodendraceae and Viscaceae contain only mistletoes. Aerial parasitism was apparently very successful, for mistletoes constitute ca. 1600 of the 2280 species in Santalales. For more information about the evolution of the mistletoe habit, see Vidal-Russell and Nickrent (2008a). General reviews of mistletoes include Mathiasen *et al.* (2008) and Nickrent (2010).

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REUVEN JACOBSOHN

We are sad to report that Reuven Jacobsohn died suddenly at the end of December 2010. An obituary will be included in the next issue.

PRESS RELEASES

‘Discovery offers hope of saving sub-Saharan crops from devastating parasites.’

Each year, thousands of acres of crops are planted throughout Africa, Asia and Australia only to be laid to waste by a parasitic plant called *Striga*, also known as witchweed. It is one of the largest challenges to food security in Africa, and a team of scientists led by researchers from the University of Toronto have discovered chemicals and genes that may break *Striga*'s stranglehold. When crops grow, their roots release a plant hormone called strigolactone. If the soil contains *Striga* seed, it will use the released strigolactone as a cue to germinate and infect the crop plants. Once connected to the crop, the *Striga* plant kills the crop by sucking out its nutrients. ‘In sub-Saharan Africa alone, *Striga* has infected up to two-thirds of the arable land,’ says U of T cell and systems biologist Peter McCourt, principle investigator of a study published this week in Nature Chemical Biology (see Yuichiro Tsuchiya *et al.* below**).** With chemicals and genes in hand that influence strigolactone production in plants, we should be able to manipulate the level of this compound by chemical application or plant breeding which would break the *Striga*-crop interaction.

The scientists used a model genetic plant system called *Arabidopsis* to screen 10,000 compounds and identify a set of five chemicals, designated cotylimides, which increase the accumulation of strigolactone in plants. They also found related chemicals that decrease strigolactone levels. From there, they screened for mutants of *Arabidopsis* that were resistant to cotylimides and identified mutants that made less strigolactone. These mutants identified genes that regulate strigolactone levels in plants.

Provided by University of Toronto
September 10th, 2010.

‘Witchweed: 50-year war may be nearing its final skirmish.’

For the past 50 years, areas near the border between North and South Carolina have been ground zero for a fierce battle in the war against a devastating weed. Federal and state officials and local farmers have been fighting the only known U.S. infestations of witchweed (*Striga asiatica*), an invasive plant that has crippled key segments of the agricultural industry in countries around the globe. The parasitic weed is a danger to some of our nation's most important crops, including corn, sorghum, sugarcane, rice and other plants belonging to the grass family. It taps directly into a plant's root system to rob it of nutrients and moisture - dramatically reducing yields.Unfortunately witchweed also is very prolific. A single plant can produce as many as 50,000 dust-like seeds that can live in the soil for a decade or more, making eradication a tough and time-consuming process.

But for farmers battling the weed in North and South Carolina, the end seems tantalizingly close.
‘We're 99 percent of the way there,’ says Alan Tasker, national noxious weed program manager with the USDA's Animal and Plant Health Inspection Service. ‘Not only have we halted the spread of witchweed over the past five decades, but we've dramatically reduced the number of infested acres as well - down from 450,000 in the 1950s to about 2,000 today. Our goal is to eradicate it once and for all.’

Witchweed is native to Africa, India, the Middle East and China. So how did it make its way to the Carolinas? No one is sure. A graduate student from India first spotted the slender, red-blossomed pest in 1955. He knew it well because of its devastating impact on his own country's sorghum crops.To avert a similar disaster for U.S. growers, Congress created an eradication program in 1957 led by a USDA program that later became the Animal and Plant Health Inspection Service. The agency established a research station and farm where it developed the science-based control methods that have produced outstanding results. The successful program is built around three critical phases - each involving close collaboration among federal and state officials and farmers in the Carolinas:

1. Locate and map all infestations.
Since witchweed is so prolific, finding each and every specimen of the foot-tall plant is vital. In addition to farmers checking their own land, scouts are sent out to locate infested sites - traveling on foot and on horseback early in the program and later in all-terrain vehicles. There are penalties for failing to report the weed ... and bounties paid for sightings by eligible parties. 'We typically have great cooperation from local farmers, who know the danger witchweed poses to their crops,' Tasker said.

2. Quarantine.
Though tiny witchweed seeds can be spread by wind or by water, human activity is often the most common culprit. For that reason, the areas where witchweed is found are quickly quarantined. Machinery used at the site and any crops harvested with soil attached must be cleaned thoroughly to remove witchweed seeds. Growing the grass crops favored by witchweed is strictly prohibited until the pest is totally eradicated in the quarantined segment of a field. Instead, farmers must leave the land fallow or convert to crops that are harvested well above the soil line.

3. Control.
Officials remove witchweed plants when they are found and use both foliar-applied and soil-applied herbicides for deterrence. Destroying the tens of thousands of microscopic seeds that may already be in the soil, though, is tougher and more time-consuming. Some seeds sprout right away and are killed by the herbicide. But others can lurk for years. 'Allowing grassy weeds to grow in the area or planting a crop that is susceptible to witchweed can actually trigger dormant sends to germinate, even if they are deep underground, Tasker says. 'We have examples of parasitic weed seeds remaining dormant in a fallow field for 50 years and then sprouting as soon as the preferred host crop is planted.' One effective technique for controlling dormant seed is 'suicidal germination.' Ethylene gas - a natural ripening agent produced by fruits, vegetables and flowers - is injected into the soil and causes the seeds to sprout. Without a host plant to attach to, the new seedlings wither and die. Another approach is to fumigate the soil with chemicals to destroy any seeds that remain. 'Regardless of the technique used, we spot-check the fields for years afterwards to make certain the weed is truly eradicated,' Tasker says.

Tasker and Dr. Jim Westwood of Virginia Tech have organized a special day-long symposium on the witchweed program and other parasitic weeds that will be featured during the 51st annual meeting of the Weed Science Society of America. The event is scheduled for Feb 7-10 2011 in Portland, Oregon. To register or to find out more, visit www.wssa.net. (These presentations will be reviewed in the next issue of Haustorium – Ed.)

Posted: Monday, December 13, 2010.

'World Food Prize Laureate Dr. Gebisa Ejeta named Science Envoy'

Dr. Gebisa Ejeta is one of three eminent Americans who are selected to represent the U.S. as scientist-diplomats. Dr. Gebisa Ejeta, a distinguished Professor of Agronomy at Purdue University and an acclaimed plant breeder and geneticist, has been named an envoy in the U.S. Science Envoy Program, established to nurture science and technology collaborations between the United States and nations throughout the Middle East, North Africa, and South and Southeast Asia. Senator Richard Lugar (R-Ind.) made the announcement on September 17 at an event hosted by the U.S. Civilian Research and Development Foundation. 'The Science Envoy program, announced by President Obama in Cairo in June 2009, is a centerpiece program to implement U.S. global engagement in science and technology', the State Department said in a press release. 'These pre-eminent scientists will seek to deepen existing ties and foster new relationships with foreign counterparts and gain insights from other nations about potential areas of collaboration that will help address global challenges and realize shared goals.'

The Ethiopian-born scientist, who was also winner of the 2009 World Food Prize, is one of three Americans who are selected to represent the U.S. as scientist-diplomats, including Dr. Rita Colwell, a Professor at both the University of Maryland College Park and Johns Hopkins University, and Dr. Alice Gast, President of Lehigh University.

Professor Gebisa, whom along with a Purdue colleague, discovered the chemical basis of the relationship

between the deadly parasitic weed *Striga* and sorghum and was able to produce sorghum varieties resistant to both drought and S*triga*, won the 2009 World Food Prize for his major contributions in the production of sorghum, one of the world's five principal grains. His work has dramatically enhanced the food supply for millions of people in sub-Sahara Africa.

The science envoys travel in their capacity as private citizens, and they advise the White House, the Department of State, and the U.S. scientific community about the knowledge and insights they gain from their travels and interactions.'

Published by Tadias, October 4th, 2010.

'Japanese Dodder found in Clarksburg area '

Yolo County Agriculture Department officials have confirmed the presence of an infestation of Japanese dodder (*Cuscuta japonica*) in Yolo County, found in the riparian area adjacent to the Sacramento River in the Clarksburg area. A vibrant yellow-orange to yellow-green vine, Japanese dodder is an exotic, potentially invasive parasitic vine introduced into California in recent years. Japanese dodder has robust twining stems that are leafless and stout, comparable in size to cooked spaghetti. It can grow up to six inches per day and reproduces vegetatively (through stem fragments) and seeds. Japanese dodder is likely to be found near roads and freeways and hosts include fruit trees and ornamental shrubs.

'This parasitic vine is a significant threat to our native ecosystems and to agriculture,' said Yolo County Agricultural Commissioner John Young. 'We are working with the California Department of Food and Agriculture to come up with an eradication plan.'

The Daily Democrat, Woodland, California
November 9, 2010

'New mistletoe species discovered '

A new species of tropical mistletoe has been described by scientists at the Royal Botanic Gardens, Kew in London. The research team found the plant on an expedition to Mount Mabu in northern Mozambique in 2008. Now, just in time for Christmas, they have confirmed that *Helixanthera schizocalyx* is new to science. The plant tops a list of Kew's botanical discoveries of 2010, which includes a Vietnamese orchid and an exceptionally rare tree from Cameroon. Butterfly specialist, Colin Congdon, spotted the mistletoe in the dense foliage near the summit of Mount Mabu. He realised that it was different from anything he had seen on the mountains in neighbouring Malawi and Tanzania. Closer inspection back at Kew confirmed it as a new species. Mistletoes are 'hemi-parasitic', meaning they take some of the nutrients they need from other plants. When birds eat the small fleshy white sweet fruits, the seeds are wiped onto branches of trees, where they stick. Once germinated, the root grows into the living tissue of the tree to 'suck out' its nutrients.

By Victoria Gill
Science and nature reporter, BBC News
Story from BBC NEWS: 20 December 2010.
http://news.bbc.co.uk/go/pr/fr/-/earth/hi/earth_news/newsid_9304000/9304881.stm

'Could mistletoe help to halt skin cancer?'

Mistletoe can halt the growth of malignant melanoma, the most lethal type of skin cancer. Mistletoe holds the secret to beating skin cancer, new research suggests. A study by German scientists shows the plant can halt the growth of malignant melanoma — the most lethal type of skin cancer — when combined with the diabetes drug rosiglitazone. Scientists at the University Hospital of - Hamburg combined mistletoe with rosiglitazone because, although the diabetes drug has recently been dogged by fears that it may raise the risk of heart attacks, some studies suggest it may be able to tackle cancer. When the combination was applied to melanoma cells in the laboratory, the rate of cancer growth was slashed by up to 79 per cent. It's thought mistletoe helps the body's immune system fight tumours and speeds up the disposal of toxic 'debris' left behind from chemotherapy. Previous German research using mistletoe extract found patients had fewer side-effects from toxic chemotherapy and radiotherapy and - survived longer.

Daily Mail Reporter 28 December 2010.

FROM GOOGLE ALERTS – STRIGA – NEW SPECIES?

'The Striga, former dragon owl from the Middle Kingdom beyond the Unnamed Sea, has come to stay at the great tree. He has earned the trust of all by saving Bell, Soren's owlet, from Nyra, and he grows daily closer to the young king Coryn, with whom he seems to share a strange bond. As The Striga's power waxes, he accuses the Band of treason and produces flimsy evidence to support his abominable claim. And so the Band is exiled, strengthening the Striga's hold over Coryn'……..What happens next? – more research needed!

A SEARCHABLE COMPOSITE FILE OF OLD HAUSTORIUM ISSUES

I have been routinely using a composite Word file (about 3.7 Mb) comprising all the Haustorium issues I have available elctronically on my computer (issues 33 onwards). This has been useful for searching particular species, authors or topics, back to 1998. I had hoped to add all the earlier issues, using the scanned versions on Lytton Musselman's website (http://www.odu.edu/~lmusselm/haustorium/index.shtml) but this is not proving easy with many serious formatting problems. We shall continue to work on this but meanwhile, please find my composite file via the above site (also automatically available via the IPPS web-site (http://www.parasiticplants.org/). This has many formatting imperfections and apologies are particularly due to authors whose names include accented or other diacritical letters. These are often corruupted and will make searches for those names unreliable. We hope, however, that readers will find this a useful resource.

Chris Parker.

REFERENCES FROM HAUSTORIUM IN ENDNOTE FORMAT

As many of you may appreciate, Chris Parker painstakingly assembles a literature list for every issue of Haustorium. These lists are extremely useful for me because they encompass some of the less "mainstream" journals, i.e. the ones that I don't usually browse. I use EndNote (commercial software from Thompson Reuters, see www.EndNote.com) as a means to keep track of my bibliographic information. A free demo version of the software can be downloaded from the above web site and used for 30 days. For Haustorium 51 to 58, I have imported the citations into EndNote. The references are not perfectly formatted, but the basic information (names, dates, titles, journals, etc.) are in the proper fields and all of these can be sorted and searched. The file contains over 1700 references on parasitic plants. I plan to continue formatting Haustorium references in this manner for future issues. These EndNote files will be made available to download from the International Parasitic Plant Society web page: http://www.parasiticplants.org/

Dan Nickrent (Southern Illinois University, Carbondale, IL USA).

PHD OPPORTUNITY

Parasitic plants 'hijack' host signalling pathways to successfully invade their hosts

Parasitic plants are common in both natural and agro-ecosystems accounting for 1% of angiosperm species; they are taxonomically diverse and they rob the host plant of carbon, water and inorganic nutrients. Parasitism results in alterations in host growth and performance. In natural plant communities this leads to changes in competitive interactions between host and non host species and to changes in community diversity and in agro-ecosystems to severe losses in yield threatening the food security of millions of poor farmers worldwide. Parasitic plants attach to either the roots or shoots of their hosts by a specialised organ, the haustorium. Haustorial cells penetrate into the root or stem of the host and link to the host xylem e.g. the root parasite *Striga* (witchweed) and/or phloem vessels e.g. the shoot parasite *Cuscuta* (dodder). Recent work at the University of Sheffield, using Arabidopsis as a model host, suggests that parasite-induced reprogramming of host plant hormone biosynthetic and signalling pathways are critical for successful infection. A PhD studentship is available for a bright, enthusiastic individual to use a range of, genetic (*Arabidopsis* or *Medicago* mutants) molecular (transcriptomics, quantitative RT-PCR) and bioimaging techniques (promoter-reporter fusions, confocal and light microscopy) to elucidate the changes in host gene expression and signalling pathways that allow *Striga* and *Cuscuta* to successfully parasitise the host plant.

Starting date 1 October 2011

How to apply: Complete an on-line application form via University of Sheffield web site at http://www.shef.ac.uk/postgraduate/research/apply/index.html.

NB funding will be available for UK applicants only
Closing date for applications: 31 January 2011.

THESIS

Emily Suzanne Marquardt (Ph.D., University of Houston**,** 2009) **'Foraging and host use of the parasitic plant *Cuscuta indecora*'** 122 pages; AAT 3371162

Parasitic plants provide a unique opportunity to test the generality of ecological models intended for herbivores. Both types of consumers display preferences for hosts, reduce host biomass and allocation patterns, interact

directly and indirectly with other organisms, and can alter community dynamics. My goal was to understand how abiotic stress, host constraints, diet mixing, and interactions with below-ground symbionts affected foraging by the parasitic plant *Cuscuta indecora* in the salt marsh. First, I examined how abiotic stress affecting host plants mediated *Cuscuta* performance on a variety of hosts (*Batis maritima, Salicornia virginica, Suaeda linearis, and Borrichia frutescens*). Salinity had a severely negative affected host and *Cuscuta* performance, while flooding was better tolerated by both host and *Cuscuta*. In the salt marsh, plants that tolerate high salinities may avoid *Cuscuta* parasitism. Second, I looked at three possible constraints (phenology, height, and sexual reproduction) that could make some hosts (*Batis maritima, Salicornia virginica, Salicornia bigloveii* , and *Suaeda linearis*) less susceptible to parasitism, thereby affecting *Cuscuta* 's host range in the field. All three constraints influenced *Cuscuta*. *Cuscuta* only parasitized plants that shared the same phenological schedule. *Cuscuta* attacked taller host plants and the upper canopy portions of hosts. Instead of reproducing sexually by seeds, *Cuscuta* reproduced asexually by vegetatively overwintering in hosts. Constraints on host use eliminated half of *Cuscuta* 's potential hosts. Third, because *Cuscuta* can parasitize many hosts simultaneously, I examined if *Cuscuta* selectively foraged to obtain a mixed diet. *Cuscuta* did not prefer or perform better on a mixed diet comprised of *Iva frutescens* and *Borrichia frutescens* than a diet of either host alone. Host preference for *Iva* or *Borrichia* was not significant but trends showed that *Cuscuta* preferred hosts that were more abundant. Diet mixing is a result of lack of mobility of *Cuscuta*. Finally, I examined the relationship between *Cuscuta* and arbuscular mycorrhizal (AM) fungi that share the same host plant *Iva frutescens* . *Cuscuta* did not have a strong effect on AM fungi. It is possible that pathogenic fungi decreased host and *Cuscuta* biomass, perhaps by disrupting the plant-mycorrhizal symbiosis. Interactions between *Cuscuta* and AM fungi seem to be weak. Overall, my results show that a variety of factors influence the foraging of *Cuscuta indecora* . Although there are fundamental differences between plants and herbivores such as mobility, foraging by holoparasitic plants can be understood within the framework of existing plant-herbivore theory.

FORTHCOMING MEETINGS

11th World Congress on Parasitic Plants 7 - 12 June 2011, Martina Franca, Italy

The Congress continues a long tradition of regularly assembling the world's experts on parasitic plants for professional and scientific meetings, which started in 1973 with the first international meeting in Malta.

The Congress will bring together scientists representing a wide spectrum of disciplines, research approaches, and geographical representation of parasitic plant research. Assembling specialists with different perspectives, all focused around the common theme of plant parasitism, provides a stimulating environment for learning, exchanging ideas, and connecting with old and new colleagues.

Palazzo Ducale, Martina Franca

Parasitic plants - both the weedy species that severely constrain agriculture and the many other non-weedy species - present unanswered questions with regard to their origin and evolution from non parasitic plants, population structures and dynamics, evolutionary pathways towards crop parasitism, ecology, physiology, molecular biology, and the structure, function and development of their haustoria.

The Congress will include presentations at the cutting edge of parasitic plant research and management of parasitic weeds. A major emphasis in the Congress will be the fostering of interaction among participants.

Information can be found at the official Website of the Congress at: http://ipps2011.ba.cnr.it
Please visit it regularly, or pre-register to receive updates on all the news about the Congress.

Deadlines:

March 1st 2011 - Abstract titles submission
April 1st 2011 - Early registration
April 15th 2011 - Abstracts to be considered for oral presentation
May 1st 2011 - Abstract submission
May 27th 2011 - Registration

Contacts:

Any information about accommodation, tours, location, etc. can be requested from the following email address: ipps2011@ispa.ba.cnr.it

Second Conference of the Near East Weed Science Society 16-19 November 2011, University of Jordan, Amman, Jordan.

The Near East Weed Science Society (NEWSS) will hold its second conference with cooperation of the local and international supporting parties during the period 16-19 November 2011 at the University of Jordan, Amman, Jordan. The conference will include sessions for presenting research papers and posters. Keynote speakers will be invited to address recent issues in weed science including parasitic weed management.

N.B. Last date for registration is 1 May 2011

Further information from:
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Amman 11942 Jordan
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Or via the NEWSS website
http://www.ju.edu.jo/sites/newss

GENERAL WEB SITES

For individual web-site papers and reports see LITERATURE

For information on the International Parasitic Plant Society, current issue of Haustorium, etc. see: http://www.parasiticplants.org/

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

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

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

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

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

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

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

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

For information on the 11th World Congress on Parasitic Plants in Martina Franca, Italy, June 2011, see: http://ipps2011.ba.cnr.it

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

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

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

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

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

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

LITERATURE

*indicates web-site reference only

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*AATF. 2010. Strides in *Striga* management. Newsletter Issue 5. July 2010. African Agricultural Technology Foundation (http://www.aatf-africa.org/userfiles/Strides_Issue-5_July10.pdf) (Reporting the upscaling of production of herbicide-resistant (IR) maize – 30 t in Kenya, 10 t in Tanzania. Also some new IR maize varieties and demos and training for their use with herbicide coating in *Striga* control.)

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Abubakar, A.A. and Salka, M.N. 2010. Neuromuscular behaviour of wister rats administered methanol extract of *Ximenia americana*. Archives of Applied Science Research 2(5): 217-225. (Identifying inhibitory effects which could be a cause for concern in clinical use of *X. americana* extracts.)

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Connop, S., Hill, T., Steer, J. and Shaw, P. 2010. The role of dietary breadth in national bumblebee (*Bombus*) declines: simple correlation? Biological Conservation 143(11): 2739-2746. (Noting that the nationally rare *Bombus sylvarum* collected the majority of its pollen from flowers of *Odontites verna*.)

Costa, E.M.M.de B., Barbosa, A.S., de Arruda, T.A., de Oliveira, P.T., Dametto, F., de Carvalho, R. A. and Melo, M.das D. 2010. *In vitro* antimicrobial activity of plant extracts against *Enterococcus faecalis*. Jornal Brasileiro de Patologia e Medicina Laboratorial 46(3): 175-180. (*Ximenia americana* (Olacaceae) showed only moderate activity.)

Cullings, K. and Hanely, J. 2010. Dwarf mistletoe effects on soil basidiomycete community structure, soil fungal functional diversity, and soil enzyme function: implications for climate change. Soil Biology & Biochemistry 42(11): 1976-1981. (Severe infection of *Pinus contorta* by *Arceuthobium* (presumably *A. americanum*) not only significantly affected soil fungal species composition and

increased species diversity, but also impacted on carbon-related function and functional diversity.)

Dakskobler, I., Anderle, B. and Vreš, B. 2010. (Novelties in the flora of the Julian Alps (northwestern Slovenia).) (in Slovenian) Folia Biologica et Geologica 50(1): 73-119. (Including reference to *Orobanche lycoctoni* and *Pedicularis hoermanniana*.)

de Abreu, L.M., Almeida, A.R.. Salgado, M. and Pfenning, L.H. 2010. Fungal endophytes associated with the mistletoe *Phoradendron perrottettii* and its host tree *Tapirira guianensis*. Mycological Progress 9(4): 559-566. (A total of 99 species isolated from *P. perrottettii* and its host. The mistletoe was less intensely colonised but had the greater species richness., the dominant species being *Paraconiothyrium brasiliense*, *P. sporulosum* and *Verticillium leptobac*.)

de Groote, H., Rutto, E., Odhiambo, G., Kanampiu, F., Khan, Z., Coe, R. and Vanlauwe, B. 2010. Participatory evaluation of integrated pest and soil fertility management options using ordered categorical data analysis. Agricultural Systems 103(5): 233-244. (Twelve demonstration trials in Western Kenya included a range of treatments for control of *Striga* and pests, and improvement of soil fertility. These were evaluated by over 500 farmers and detailed analysis showed keen interest in all the technologies, especially push-pull, but there were substantial differences between years, sites and farmers. Farmers looked especially for increased yield followed by soil fertility and *Striga* control.)

de Groote, H., Vanlauwe, B.. Rutto, E., Odhiambo, G.D., Kanampiu, F. and Khan, Z.R. 2010. Economic analysis of different options in integrated pest and soil fertility management in maize systems of Western Kenya. Agricultural Economics 41(5): 471-482. (A valuable analysis of the economics of a range of management options for *Striga hermonthica* in maize, based on 6 seasons' work, concluding that rotation with 'promiscuous soybean' gave good returns. 'Push-pull', using *Desmodium*, was even more profitable but required high initial investment. Green manure rotation, herbicide-resistant-maize, and fertilizer all increased yields, but were not generally justified by their increased revenue.)

de Vega, C., Arista, M., Ortiz, P.L. and Talavera, S. 2010. Anatomical relations among endophytic holoparasitic angiosperms, autotrophic host plants and mycorrhizal fungi: a novel tripartite interaction. American Journal of Botany 97(5): 730-737. (Showing that mycorrhizae were associated with the host *Halimium* and the parasite *Cytinus hypocistis*, reaching high frequencies of colonization in both parasite and host root tissues.)

Didier, D.S., Zenabou, N., Ruth, M., Joseph, B.I. and Akoa, A. 2010. A parasitic study of *Phragmanthera capitata* (Sprengel) S. Balle (Loranthaceae) in the anthropic environments: the case of the Ndogbong chieftain's compound orchard (Douala, Cameroon). African Journal of Agricultural Research 5(15): 2051-2055. (Among 11 species surveyed, the indigenous *Spondias mangifera* was the most infested by *P. capitata*, 7 exotics were susceptible including citrus, cocoa, guava and avocado, while mango, *Dacryodes edulis* and *Manniophyton fulvum* were apparently resistant.)

Dindi, M., Ireland, C., Harper, M.K., Bugni, T. and Matainaho, T. 2009. TB-active metabolite from *Exocarpus latifalius*. Science in New Guinea 29: 93-104. (Describing several compounds isolated from *E. latifolius*, which is used traditionally in PNG to cure coughs.)

Dube, M.P. and Belzile, F.J. 2010. Low genetic variability of *Striga gesnerioides* populations parasitic on cowpea might be explained by a recent origin. Weed Research (Oxford) 50(5): 493-502. (AFLP studies on 43 populations across the 5 recognised biotypes of *S. gesenerioides* attacking cowpea showed remarkably low variability, both within and between biotypes, suggesting a recent origin.)

Durdana Kanwal, Rubina Abid and Qaiser, M. 2010. The Seed Atlas of Pakistan - III. Cuscutaceae. Pakistan Journal of Botany 42(2): 703-709. (Describing the seed morphology of 8 *Cuscuta* spp.)

Durdun, N.C., Papuc, C.P., Crivineanu, M. and Nicorescu, V. 2009. The effect of polyphenols from some plants' alcoholic extracts on lipid peroxidation and nonenzymatic haemoglobin glycosylation. Scientific Works - University of Agronomical Sciences and Veterinary Medicine, Bucharest Series C, Veterinary Medicine 55(1): 299-306. (Extracts from *Viscum album* showed lower antioxidant activity than those from *Chelidonium majus* and *Aristolochia clematitis*.)

Ebihara, A. and Miyashita, K. 2008. Type collection in the herbarium of National Museum of Nature and Science (TNS): salicales, fagales, urticales, proteales, santalales, polygonales and chenopodiales. Bulletin of the National Museum of Nature and Science. Series B, Botany 34(1): 23-29. (TNS (Japan) houses one type specimen from Balanophoraceae.)

Efuntoye, M.O., Ayodele, A.E., Thomas, B.T. and Ajayi, T.O. 2010. Does host plant affect the antibacterial activity of *Tapinanthus bangwensis* (Engl. & K. Krause) Danser (Loranthaceae)? Journal of Medicinal Plants Research 4(13): 1281-1284. (Extracts from *T. bangwensis* were active against *Shigella dysenteriae* and *Salmonella typhimurium*.

This activity varied to some degree according to the host on which it was growing.)

El-Maksoud, M.M.A., Hamada, M.S., Amer, M.I. and El-Rodeny, W.M. and 2007. Biochemical and histological markers for prediction of *Vicia faba* tolerance to *Orobanche.* Ahmed, K.Z. (ed.) 8th African Crop Science Society Conference, El-Minia, Egypt, 27-31 October 2007: 1997-2003. (Identifying molecular markers of value in recurrent selection.)

El-Rehban, B., Hussein, N., Obeid, A.F., Al-Rahban, B., Al-Hussein, N. and Abied, A.F. 2009. Chemical control of two *Orobanche* species (*O. crenata* and *O. aegyptiaca*) which attack lentil crop in Syria. Arab Journal of Plant Protection 27(2): 152-158. (Imazapic applied at early *Orobance* emergence gave over 80% control and 100% yield increase.)

Elzein, A., Heller, A., Ndambi, B., de Mol, M., Kroschel, J. and Cadisch, G. 2010. Cytological investigations on colonization of sorghum roots by the mycoherbicide *Fusarium oxysporum* f. sp. *strigae* and its implications for *Striga* control using a seed treatment delivery system. Biological Control 53(3): 249-257. (Hyphae of *F. oxysporum* penetrate rhizodermal cells including root hairs of sorghum, and colonize the intercellular space and the cells of the cortical parenchyma but generally fail to penetrate the endodermis, confirming its non-pathogenicity to the crop.)

Evidente, A., Cimmino, A., Fernández-Aparicio, M., Andolfi, A., Rubiales, D. and Motta, A. 2010. Polyphenols, including the new peapolyphenols A-C, from pea root exudates stimulate *Orobanche foetida* seed germination. Journal of Agricultural and Food Chemistry 58(5): 2902-2907. (Polyphenols from pea were found to stimulate germination of a range of *Orobanche/Phelipanche* spp. Two of these stimulated only *O. foetida*, which does not respond to GR24.)

Farah, A.F. 2007. Resistance of some plant species to field dodder (*Cuscuta campestris).* In: Ahmed, K.Z. (ed.) 8th African Crop Science Society Conference, El-Minia, Egypt, 27-31 October 2007: 913-917. (All ten crop species studied showed apparent resistance to *C. campestris* including okra, chard, butterfly pea (*Clitoria ternatea*), sweet melon, cotton, vetch, tomato, pepper mint, kidney bean and potato. Various resistance patterns are described and discussed.)

Fernández-Aparicio, M., Emeran, A.A. and Rubiales, D. 2010. Inter-cropping with berseem clover (*Trifolium alexandrinum*) reduces infection by *Orobanche crenata* in legumes. Crop Protection 29(8): 867-871. (Indicating a reduction in *O. crenata* infestation but without any indication of benefit to pea or faba bean.)

Fernández-Martínez, J.M., Domínguez, J., Pérez-Vich, B. and Velasco, L 2010. Update on breeding for resistance to sunflower broomrape. Helia 33(52): 1-11. (Discussing potential sources of resistance genes as well as the genetics of resistance to races E and F.)

Figueiró, M., Ilha, J., Pochmann, D., Porciúncula, L.O., Xavier, L.L., Achaval, M., Nunes, D.S. and Elisabetsky, E. 2010. Acetylcholinesterase inhibition in cognition-relevant brain areas of mice treated with a nootropic. Phytomedicine 17(2): 956-962. (Confirming anticholinesterase activity in extracts of *Ptychopetalum olacoides* (Olacaceae) compatible with observed promnesic and anti-amnesic effects in mice, and its traditional use by the elderly in Amazon communities to counter dementia.)

Filipowicz, N. and Renner, S.S. 2010. The worldwide holoparasitic Apodanthaceae confidently placed in the Cucurbitales by nuclear and mitochondrial gene trees. BMC Evolutionary Biology 10(219): 48. (Mitochondrial matR and nuclear small-subunit ribosomal DNA sequences were used to address the placement of Apodanthaceae (*Apodanthes*, *Berlinianche*, and *Pilostyles*) among photsynthetic angiosperms. Molecular phylogenetic results support earlier work which placed this family in Cucurbitales.)

Frederick, E.O., Kayode, A.M. and Slyvester, U. 2010. Evaluation of the methanolic extract of mistletoe (*Tapinanthus bangwensis*) leaves grown on orange trees for the phytochemical properties and its physiological effects on streptozotocin induced *Diabetes mellitus* in laboratory animals. World Applied Sciences Journal 9(9): 975-979. (Concluding that a crude methanolic extract from *T. bangwensis* leaves have significant anti-diabetic activity, confirming its traditional use for this purpose in Nigeria.)

Freudlsperger, C., Dahl, A., Hoffmann, J., Reinert, S. and Schumacher, U. 2010. Mistletoe lectin-I augments antiproliferative effects of the PPARγ agonist rosiglitazone on human malignant melanoma cells. Phytotherapy Research 24(9): 1354-1358. (Showing that the combination of lectin from *Viscum album* with rosiglitazone significantly augments their antiproliferative effect on human canceer cells in comparison with their separate application.)

Furukawa, R. 2010. Potential power of Australian essential oils as an alternative to antibiotics. Aroma Research 11(2): 113-118. (Noting that oil from Australian *Santalum spicatum* is used as an antibiotic in hospitals. Also noting a difference between this and Indian *S. album*.)

Galdames, R. and Diaz, J. 2010. Stem rot of branched broomrape (*Orobanche ramosa*) caused by

Sclerotium rolfsii in Chile. Plant Disease 94(10): 1266. (Recording *S. rolfsii* on *O. ramosa* in Chile for the first time, but also noting that it may also damage tomato and is not suitable for biocontrol.)

Galiano, L., Martínez-Vilalta, J. and Lloret, F. 2010. Drought-induced multifactor decline of Scots pine in the Pyrenees and potential vegetation change by the expansion of co-occurring oak species. Ecosystems 13(7): 978-991. (Noting an association between drought damage to pine and occurrence of mistletoe (presumably *Viscum album*), together with a tendency for increased dominance of *Quercus* spp.)

Gonzalez, A.M. and Mauseth, J.D. 2010. Morphogenesis is highly aberrant in the vegetative body of the holoparasite *Lophophytum leandrii* (Balanophoraceae): all typical vegetative organs are absent and many tissues are highly modified. International Journal of Plant Sciences 171(5): 499-508. (Detailed descriptions of the structure (or lack of it) in the tuber of *L. leandrii* and of the interface with the host *Parapiptadenia rigida* (Leguminosae).)

Goulet, C. and Klee, H.J. 2010. Climbing the branches of the strigolactones pathway one discovery at a time. Plant Physiology 154(2): 493-496. (A general review with emphasis on effects on branching.)

Green, E., Samie, A., Obi, C.L., Bessong, P.O. and Ndip, R.N. 2010. Inhibitory properties of selected South African medicinal plants against *Mycobacterium tuberculosis*. Journal of Ethnopharmacology 130(1): 151-157. (*Ximenia caffra* was not among the effective species.)

Guo Hui, Mazer, S.J. and Du GuoZhen. 2010. Geographic variation in primary sex allocation per flower within and among 12 species of *Pedicularis* (Orobanchaceae): proportional male investment increases with elevation. American Journal of Botany 97(8): 1334-1341. (Study across 12 species of *Pedicularis* in Tibet, suggested that high elevation favoured greater allocation to male parts, possibly associated with decreased plant size)

Guo Hui, Mazer, S.J. and Du GuoZhen. 2010. Geographic variation in seed mass within and among nine species of *Pedicularis* (Orobanchaceae): effects of elevation, plant size and seed number per fruit. Journal of Ecology (Oxford) 98(5): 1232-1242. (Failing to confirm the previous presumption that seed mass declines at higher elevations on the Tibetan Plateau.)

Haidar, M.A., Gharib, C. and Sleiman, F.T. 2010. Survival of weed seeds subjected to sheep rumen digestion. Weed Research (Oxford) 50(5): 467-471. (Viability of seeds of *Cuscuta campestris* was very little affected by 4 days in the rumen.)

Hanumantha, M., Gunaga, R.P., Doddabasawa, Biradar, S.S. and Roopa, S.P. 2010. Infestation status of loranthus among teak plantations of Dandeli province of Karnataka, India. Environment and Ecology 28(2B): 1345-1347. (About 20% of trees were infested by unspecified mistletoe. Intensity level tended to increase with greater tree density.)

Hartung, J.S., Paul, C., Achor, D. and Brlansky, R.H. 2010. Colonization of dodder, *Cuscuta indecora*, by *'Candidatus Liberibacter asiaticus*' and *'Ca. L. americanus'*. Pytopathology 100(8): 756-762. (Studying the colonisation of the dodder itself when *C. indecora*, was being used to transfer the citrus greening pathogens to other hosts.)

Hautier, Y., Hector, A., Vojtech, E., Purves, D. and Turnbull, L.A. 2010. Modelling the growth of parasitic plants. Journal of Ecology (Oxford) 98(4): 857-866. (Presenting a model of host-parasite interaction in which parasite growth rate is a function of host growth rate that offers a new explanation for why hemiparasitic plants reduce ecosystem productivity. Based on studies of facultative parasite *Rhinanthus* spp.) (Duncan to add?)

Heetika Malik, Rutjes, F.P.J.T. and Zwanenburg, B. 2010. A new efficient synthesis of GR24 and dimethyl A-ring analogues, germinating agents for seeds of the parasitic weeds *Striga and Orobanche* spp; Tetrahedron 66(35): 7198-7203. (A new synthetic method for GR24 and for its slightly less active dimethyl analogue.)

Heller, K. 2010. 'Flax specialists' - weed species extinct in Poland? Plant Breeding and Seed Science 61: 35-40. (Observations over the period 1967-2008 did not show the occurrence of *Cuscuta epilinum*.)

Hooper, A.M., Tsanuo, M.K., Chamberlain, K., Tittcomb, K., Scholes, J., Hassanali, A., Khan, Z.R. and Pickett, J.A. 2010. Isoschaftoside, a C-glycosylflavonoid from *Desmodium uncinatum* root exudate, is an allelochemical against the development of *Striga*. Phytochemistry 71(8/9): 904-908. (Confirming isoschaftoside to be the main compound in the most potent fraction inhibiting growth of germinated *S. hermonthica* radicles. Also its occurrence in *Passiflora incarnata*.)

Hosseini, A. 2009. (Investigation the affection rate of oak trees to mistletoe, *Loranthus europaeus*, in forests of Zagross area: (a case study of southern slope of Manesht mountain in Ilam province.) (in Persian) Iranian Journal of Forest and Range Protection Research 7(1): 26-35. (*L. europaeus* infested 25% of oak trees and apparently contributed to die back of branches.)

Hsiao ShuChuan, Huang WeiTing and Lin MawSun. 2010. Genetic diversity of *Balanophora fungosa* and its conservation in Taiwan. Botanical Studies 51(2): 217-222. (Inter-simple sequence repeats (ISSR) were used to address levels of genetic diversity

among populations of this species from the Hengchum peninsula and Orchid Island in Taiwan. All populations showed a Dice similarity value above 0.78, however, populations from the two regions clustered separately, indicating some genetic diversification that correlates with inflorescence colour.)

Huang PanHui, Yu WenBin, Yang JunBo, Wang Hong and Lu Lu. 2010. Isolation and characterization of 13 microsatellite loci from *Pedicularis rex* (lousewort). HortScience 45(7): 1129-1131. (*P. rex* is endemic to the Himalayas and of horticultural interest. The study contributes to further investigation of the population genetics, introduction, and acclimatization of *P. rex* and its congeners.)

Huber, R., Eisenbraun, J., Miletzki, B., Adler, M., Scheer, R., Klein, R. and Gleiter, C.H. 2010. Pharmacokinetics of natural mistletoe lectins after subcutaneous injection. European Journal of Clinical Pharmacology 66(8): 889-897.

Ibarra-Alvarado, C., Rojas, A., Mendoza, S., Bah, M., Gutiérrez, D.M., Hernández-Sandoval, L. and Martínez, M. 2010. Vasoactive and antioxidant activities of plants used in Mexican traditional medicine for the treatment of cardiovascular diseases. Pharmaceutical Biology 487: 732-739. (*Psittacanthus calyculatus* had the highest vasorelaxant effect among the 7 species studied, supporting its traditional use.)

Ibrahim, H.M., Alhadi, F.A., Khafagi, A.A. and Al-Gifri, A.N. 2009. Notes on the flora of Yemen. 1: Morphological and anatomical studies on *Cuscuta planiflora* Tenore (Cuscutacea) collected from Jabal An-Nabi Shu'ayb, Sanaá, Yemen, with the reference of its phytocographical distribution. University of Aden Journal of Natural and Applied Sciences 13(3): 357-364. (Hosts of *C. planiflora* include *Thymus laevigatus*, *Hypoestes forsskalii* and *Pterocephalus frutescens.*)

ICRISAT. 2009. Annual Report - ICRISAT 2009. Food security and diversification in the drylands. Annual Report - ICRISAT 2009. Food security and diversification in the drylands, 57 pp. (Confirming that ICRISAT's mission continues to include the development of *Striga*-resistant varieties of sorghum.)

Ihsan Ilahi, Zafar Iqbal and Shafiq-ur-Rehman. 2010. *Cistanche tubulosa* (Schenk) R. Wight an important medicinal plant occurring in sand dunes of Karak, N.W.F.P. Pakistan Journal of Botany 42(1): 537-547. (Reporting the new occurrence of *C. tubulosa* in the district, parasitising *Capparis decidua*, *Calligonum polygonoides*, *Calotropis procera* and *Tamarix indica*.)

Ito, S., Kitahata, N., Umehara, M., Hanada, A, Kato, A., Ueno, K., Mashiguchi, K., Kyozuka, J., Yoneyama, K., Yamaguchi, S. and Asami, T. 2010. A new lead chemical for strigolactone biosynthesis inhibitors. In: Yamaguchi, S. and Kyozuka, J. (eds) Plant and Cell Physiology 51(7): 1143-1150. (A triazole-type chemical, TIS13 [2,2-dimethyl-7-phenoxy-4-(1*H*-1,2,4-triazol-1-yl)heptan-3-ol] induced outgrowth of second tiller buds of rice and is shown to reduce strigolactone levels in both roots and root exudates.)

ITTO. 2010. Tropical Timber Market Report, 1st-15th June 2010. Tropical Timber Market Report 15(11): 19 pp. (Including a report on *Santalum album* in India.)

Jamil, M., Charnikhova, T., Verstappen, F. and Bouwmeester, H. 2010. Carotenoid inhibitors reduce strigolactone production and *Striga hermonthica* infection in rice. In: Landrum, J.T., Wang, X.D. and Wurtzel, E.T. (eds). Archives of Biochemistry and Biophysics 504(1) 123-131. (Reviewing the potential for the use of carotenoid synthesis inhibitors, including fluridone, norflurazon, clomazone and amitrole, to reduce strigolactone exudation, for research and practical purposes.)

Jordaan, J.J. 2010. The proposed colonisation sequence of woody species in the Sourish Mixed Bushveld of the Limpopo province, South Africa. African Journal of Range & Forage Science 27(2): 105-108. (Noting *Ximwenia caffra* (Olacaceae) among early colonisers.)

Karačic´, A., Kohnic´, A., Đikic´, M., Gadžo, D. and Karic´, L. 2010. Distribution, biology and control of hemp broomrape (*Orobanche ramosa* L.). Herbologia 11(1): 1-10. (Reviewing the occurrence of *O. ramosa* in Herzegovina, mainly on tomato, and suggesting phytosanitary measures cultural control, host-plant resistance, biological and chemical control.)

Karadžic´, D. and Lazarev, V. 2005. (The most significant parasite and saprophyte fungi on mistletoe (*Viscum album* L.) and possibilities of their usage in bio-control.) (in Serbian) Glasnik Šumarskog Fakulteta, Univerziteta u Banjoj Luci 3: 35-49. (Referring to the 'large damage' caused to fir by *V. album* in Serbia and the possibilities for *Botryosphaeria dothidea*, *Gibberidia visci*, *Nectria cinnabarina* and *Sphaeropsis visci* as components of integrated control.)

Khan, M.A., Tahseen Sharif, Mushtaq Ahmad, Muhammad Zafar and Tareen, R.B. 2009. Anatomical characterization of parasitic plants of Pakistan. Pakistan Journal of Botany 41(6): 2661-2669. (Studies on *Cuscuta reflexa*, *Orobanche aegyptiaca*, *Korthalsella opuntia*, *Viscum album* and *V. cruciatum*, observing generally weak phloem development, phloem connection only in *C. reflexa*,

the presence of terminal sclereids in *V. cruciatum* and brachysclereids in *K. opuntia*.)

Kim BohKyung, Choi MiJin, Park KunYoung and Cho EunJu 2010. Protective effects of Korean mistletoe lectin on radical-induced oxidative stress. Biological & Pharmaceutical Bulletin 33(7): 1152-1158. (Confirming that extracts from *Viscum album* ssp. *coloratum* have protective effects against oxidative damage induced by free radicals.)

Kienle, G.S. and Kiene, H. 2010. Influence of *Viscum album* L (European mistletoe) extracts on quality of life in cancer patients: a systematic review of controlled clinical studies. Integrative Cancer Therapies 99(2): 142-157. (Reviewing 26 published studies and noting 22 of these reported benefits to quality of life from *V. album* preparations (often applied in conjunction with chemotherapy, radiotherapy, or surgery) including improvements in coping, fatigue, sleep, exhaustion, energy, nausea, vomiting, appetite, depression, anxiety, ability to work, and emotional and functional well-being in general. Recommending further exploration of benefits re fatigue.)

Kim HyunIl, Xie XiaoNan, Kim HanSung, Chun JaeChul, Yoneyama, K., Nomura, T., Takeuchi, Y. and Yoneyama, K. 2010. Structure-activity relationship of naturally occurring strigolactones in *Orobanche minor* seed germination stimulation. Journal of Pesticide Science 35(3): 344-347. (Of 11 strigolactones assayed, the 3 most active were monohydroxy-substituted orobanchol, 2′-epiorobanchol, and sorgomol.)

Kırmızı, S., Güleryüz, G., Arslan, H. and Sakar, F.S. 2010. Effects of moist chilling, gibberellic acid, and scarification on seed dormancy in the rare endemic *Pedicularis olympica* (Scrophulariaceae). Turkish Journal of Botany 34(3): 225-232. (Germination of *P. olympica*, a rare endemic in Turkey was stimulated by GA and by scarification but not by moist chilling.)

Klooster, M.R. and Culley, T.M. 2010. Population genetic structure of the mycoheterotroph *Monotropa hypopitys* L. (Ericaceae) and differentiation between red and yellow color forms. International Journal of Plant Sciences 171(2): 167-174.

Koch, M., Bugni, T.S., Sondossi, M., Ireland, C.M. and Barrows, L.R. 2010. Exocarpic acid inhibits mycolic acid biosynthesis in *Mycobacterium tuberculosis.* Planta Medica 76(15): 1678-1682. (Exocarpic acid extracted from *Exocarpos latifolius* (Santalaceae).)

Konczak, I., Zabaras, D., Dunstan, M. and Aguas, P. 2010. Antioxidant capacity and hydrophilic phytochemicals in commercially grown native Australian fruits. Food Chemistry 123(4): 1048-1054. (*Santalum acuminatum* showed double the antioxidant activity of blueberry.)

Köse, B. and Erentürk, S. 2010. Drying characteristics of mistletoe (*Viscum album* L.) in convective and UV combined convective type dryers. Industrial Crops and Products 32(3): 394-399.

Kuo YuJen, Yang YuChing, Zhang LiJie, Wu MingDer, Kuo, L.M.Y., Kuo YuhChi, Hwang SyhYuan, Chou ChengJen, Lee KuoHsiung, Ho HsiuO and Kuo YaoHaur. 2010. Flavanone and diphenylpropane glycosides and glycosidic acyl esters from *Viscum articulatum*. Journal of Natural Products 73(2): 109-114. (Seven new compounds identified from *V. articulatum*, several with either anti-oxidant or other potentially useful properties.)

Kuriakose, S., Thankappan, X., Joe, H. and Venkataraman, V. 2010. Detection and quantification of adulteration in sandalwood oil through near infrared spectroscopy. Analyst 135(10): 2676-2681. (Near infra red spectroscopy used successfully for detection of contaminants in sandalwood (*Santalum*) oil.)

Kwaga, Y.M., Olufajo, O.O., Tanimu, B., Shebayan, J.A.Y. and Lagoke, S.T.O. 2010. Effect of herbicide seed treatment on the reaction of groundnut (*Arachis hypogaea* L.) to *Alectra vogelii* (Benth). American-Eurasian Journal of Agricultural and Environmental Science 7(6): 623-627. (Soaking seeds of groundnut in iamzaquin at 0.27 g a.i./l allowed full emergence of *A. vogelii* but increased crop yield, perhaps by delaying attack? Cinosulfuran was not selective.)

Kwaga, Y.M., Olufajo, O.O., Tanimu, B., Shebayan, J.A.Y. and Lagoke, S.T.O. 2010. The reaction of groundnut (*Arachis hypogaea* L.) to *Alectra* parasitism, as influenced by nitrogen and phosphorus fertilization at Samaru, Nigeria. American-Eurasian Journal of Agricultural and Environmental Science 7(6): 628-633. (Emergence of *A. vogelii* was reduced by 25 and 50 kg N/ha but only 50 kg/ha increased crop yield. Yield was also increased by 44 kg P/ha.)

Landrum, J.T., Wang, X.D. and Wurtzel, E.T. (eds). 2010. Special Issue: Carotenoids. Archives of Biochemistry and Biophysics 504(1): 1-168. (This issue of 21 papers discusses the dietary effects, contents and functions of carotenoids in animals and plants. Relevant papers are noted elsewhere in this section.)

Lebrun, J.P. and Stork, A.L. 2010. Tropical African flowering plants: ecology and distribution. Volume 5: Buxaceae - Simaroubaceae. Conservatoire et Jardin Botaniques de Genève pp 1-415. (Including information on ecology and distribution of Olacaceae, Opiliaceae, Loranthaceae, Viscaceae, Santalaceae, Hydnoraceae, Rafflesiaceae (Apodanthaceae) and Balanophoraceae (including Cynomoriaceae).)

Leena Sharma and Sitaram Khandelwal. 2010. Weeds of Rajasthan and their ethno-botanical importance. Studies on Ethno-Medicine 4(2): 75-79. (Including information on a *Cuscuta* sp.)

Liang YangJing, Sang Bai, Shen XuJi, Lan Wei, Wang ShiXiang and XiaoHui. 2010. (Effects of sandalwood on pharmacokinetics of gallic acid and protocatechuic acid in *Choeros pondiatis* fruit.) (in Chinese) Academic Journal of Second Military Medical University 31(8): 870-873. (Apparently indicating that when feeding rats, adding sandalwood to extracts of *C. pondiatus* enhanced the absorption of phenolic compounds from the fruit.)

Liebel, H.T., Bidartondo, M.I., Preiss, K., Segreto, R., Stöckel, M., Rodda, M. and Gebauer, G. 2010. C and N stable isotope signatures reveal constraints to nutritional modes in orchids from the Mediterranean and Macaronesia. American Journal of Botany 97(6): 903-912. (Suggesting that partial or full mycoheterotrophy in the neottioid orchids is associated with low light habitats.)

Liira, J. and Kohv, K. 2010. Stand characteristics and biodiversity indicators along the productivity gradient in boreal forests: defining a critical set of indicators for the monitoring of habitat nature quality. Plant Biosystems 144(1): 211-220. (*Melampyrum pratensis* noted as an indicator of disturbance in Estonian forests of Scots pine and Norway spruce.)

López-Ráez, J.A., Kohlen, W., Charnikhova, T.,Mulder, P., Undas, A.K., Sergeant, M.J., Verstappen, F., Bugg, T.D.H., Thompson, A.J., Ruyter-Spira, C. and Bouwmeester, H. 2010. Does abscisic acid affect strigolactone biosynthesis? New Phytologist 187(2): 343-354. (Yes. The results show a correlation between ABA levels and strigolactone production, and suggest a role for ABA in the regulation of strigolactone biosynthesis.)

Lushaj, B.M., Tabaku, V., Bounous, G. and Beccaro, G.L. 2010. Conversion of old, abandoned chestnut forest into simple coppice and from simple coppice forest into orchards in Tropoja, Albania. Acta Horticulturae 866: 251-258. (Conversion helped to restore the health of chestnut trees suffering from a range of problems including 'yellow mistletoe', presumably *Loranthus europaeus*.)

Lyu SuYun and Park WonBong. 2010. Mistletoe lectin transport by M-cells in follicle-associated epithelium (FAE) and IL-12 secretion in dendritic cells situated below FAE in vitro. Archives of Pharmacal Research 33(9): 1433-1441 (Showing faster transport of lectin isolated from *Viscum album* var.*coloratum* across FAE than across Caco-2 monolyaer cells - of interest in improving absorption of lectins orally.)

*McNeal, J.R. Kuehl, J.V., Boore, J.L., Leebens-Mack, J. and de Pamphilis, C.W. 2009. Parallel loss of plastid introns and their maturase in the genus *Cuscuta*. PLoS ONE: e5982. (http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0005982) (Compares *matK* loss in lineages of *Cuscuta* and *Epifagus* to dissect the role of *matK* and understand the unusual circumstances under which this gene can be lost.)

Machua, J., Kamondo, B., Mwangi, L., Gitehi, G. and Chahilu, O., 2010. Propagation of *Osyris lanceolata* (East African Sandalwood). In: Muchiri, M.N., Kamondo, B., Ochieng, D., Tuwei, P. and Wanjiku, J. Recent advances in forestry research for environmental conservation, improved livelihood and economic development. Proceedings of the 4th KEFRI Scientific Conference, KEFR Headquarters, Muguga, Kenya, 6 to 9 October 2008: 207-218. (Studies of propagation of the endangered *O. lanceolata* concluded air layering and/or tissue culture may be needed as seed propagation and cuttings are not satisfactory.)

March, W.A. and Watson, D.M. 2010. The contribution of mistletoes to nutrient returns: evidence for a critical role in nutrient cycling. Austral Ecology 35(7): 713-721. (The return of all elements increased with infection of *Eucalyptus blakelyi*, *E. dwyeri*, and *E. dealbata* by *Amyema miquelii*. because of the combined effect of enrichment in mistletoe tissues and high rates of mistletoe litterfall. Annual returns of N and P in leaf litter increased by a factor of 1.65 and 3 respectively, with the greatest increase being for K by a factor of 43 in spring.)

Markowski, R. and Olszewski, T.S., 2009. Endangered and threatened halophytes of the Pomorze Gdan´skie region (N Poland). In: Mirek, Z. and Nikel, A. (eds) Rare, relict and endangered plants and fungi in Poland, 2009: 313-319. (Listing *Odontites litoralis* among endangered species occurring at less than 10 sites in the region.)

Marquardt, E.S. and Pennings, S.C. 2010. Constraints on host use by a parasitic plant. Oecologia 164(1): 177-184. (Discussing the reasons why *Cuscuta indecora* parasitizes certain species in the glasshouse, but rarely in the wild, due to mismatches in phenology, or plant height (*C. indecora* prefers tall plants), or because they over-winter on certain perennials and preferentially continue to grow on those.)

Marques, O.M., Sakakibara, A.M., Santana, M.J.S., Carvalho, A.J.de A. and Coutinho, M.L. 2009. (Species of Membracoidea (Insecta: Hemiptera) associated with the mistletoe *Struthanthus marginatus* (Desr.) Blume (Loranthaceae) in Cruz das Almas, Bahia.) (in Portuguese) Magistra 21(3):

219-221. (12 spp. of Membracoidea identified, 6 being new to Bahia State.)

Mayzlish-Gati, E., LekKala, S.P., Resnick, N., Wininger, S., Chaitali Bhattacharya, Lemcoff, J.H., Kapulnik, Y. and Hinanit Koltai. 2010. Strigolactones are positive regulators of light-harvesting genes in tomato. Journal of Experimental Botany 61(11): 3129-3136. (Results suggest that GR24 treatment interferes with the root's response to IAA treatment and that strigolactones are potentially positive regulators of light harvesting in plants.)

Mehrvarz, S.S., Torabi, A. and Aghabeigi, F. 2010. Notes on the genus *Orobanche* (Orobanchaceae) in Iran. Iranian Journal of Botany 16(1): 107-113. (39 species are described including *O. owerini*, recorded for the first time in Iran.)

Menkir, A., Chikoye, D. and Lum, F. 2010. Incorporating an herbicide resistance gene into tropical maize with inherent polygenic resistance to control *Striga hermonthica* (Del.) Benth. Plant Breeding 129(4): 385-392. (Reporting the incorporation of imidazolinone-resistance genes into maize lines with known *Striga* resistance. In addition to their use with herbicide seed dressings (with excellent results), they could be used periodically without herbicide to reduce the risk of build-up of herbicide resistance in the *Striga*.)

Merckx, V., Stöckel, M., Fleischmann, A., Bruns, T.D. and Gebauer, G. 2010.. ^{15}N and ^{13}C natural abundance of two mycoheterotrophic and a putative partially mycoheterotrophic species associated with arbuscular mycorrhizal fungi. New Phytologist 188(2): 590-596. (Studies involved *Dictyostega orobanchoides*, *Burmannia capitata* (Burmanniaceae) and *Voyria aphylla* (Gentianaceae).)

Mill, R.R. 2010. New taxa and lectotypifications of *Pedicularis* (Orobanchaceae) required for the Flora of Pakistan. Edinburgh Journal of Botany 67(2): 185-187. (Describing several new Series and species of *Pedicularis*.)

Mohamed, A.H., Housley, T.L. and Ejeta, G. 2010. An *in vitro* technique for studying specific *Striga* resistance mechanisms in sorghum. African Journal of Agricultural Research 5(14): 1868-1875. (Describing an 'Extended Agar Gel Assay (EAGA) by which different mechanisms of *Striga* resistance can be identified, including reduced germination stimulant, germination inhibitors, reduced haustorial initiation factor, and hypersensitive reaction.)

Mohammad Azmathulla, Syed Bilal, Malay Baidya and Kumar, B.N.S. 2010. Effect of *Santalum album* Linn. on memory enhancing activity on mice. Journal of Chemical and Pharmaceutical Sciences 3(3): 172-177.

Mota, J.F., Lahora, A.,Pérez-García, F.J., Garrido-Becerra, J.A., Posadas, L., Martínez-Hernández, F., Medina-Cazorla, J.M. and Mendoza-Fernández, A.J. 2009. Three new records for the flora of the province of Almeria (Southeastern Iberia, Spain). Anales de Biología 31: 57-58. (Confirming the occurrence of *Orobanche ballotae*.)

Morel, A. 2010. (Dieback and the presence of mistletoe in the fir Livradois.) (in French) Forêt-Entreprise 193: 61-64. (Dieback of *Abies alba* was correlated with altitude and age. Not clear if presence of *Viscum album* was contributing, but recommendations made for its management.)

Moscatiello, R., Squartini, A., Mariani, P. and Navazio, L. 2010. Flavonoid-induced calcium signalling in *Rhizobium leguminosarum* bv. *viciae*. Phytologist 188(3): 814-823. (Strigolactones, were not perceived by rhizobia through Ca^{2+} variations.)

Motomura, H., Selosse, M.A., Martos, F., Kagawa, A. and Yukawa, T. 2010. Mycoheterotrophy evolved from mixotrophic ancestors: evidence in *Cymbidium* (Orchidaceae). Annals of Botany 106(4): 573-581. (While the achlorophyllous *C. macrorhizon* and *C. aberrans* are full mycoheterotrophs, the green *C. lancifolium* and *C. goeringii* show intermediate characters – 'mixotrophy' – suggesting evolution via mixotrophy.)

Munodawafa, T., Chagonda, L.S., Viol, I., Muchuweti, M. and Moyo, S.R. 2010. Total phenolic content and antioxidant activity of some Zimbabwean traditional medicinal plants. In: Govil, J.N. and Singh, V.K. (eds) Drug plants III: 363-373. (Phenolic content was relatively high in *Ximenia caffra* (Olacaceae) but there was poor correlation between phenolic content and antioxidant activity.)

Mwang'ingo, P.L., Kibodya, G. and Mng'ong'o, A.R. 2010. Oil yield and quality variation between sexes in *Osyris lanceolata* (African sandalwood) and its value as a fodder plant in Tanzania. Southern Forests: a Journal of Forest Science 72(2): 69-74. (Concluding that the supposed superiority of female trees in oil yield is not true, but there is large variability between trees. Fodder value of the foliage is adequate.)

Najafi, S., Nejad, B.S., Deokule, S.S. and Estakhr, J. 2010. Phytochemical screening of *Bidaria khandalense* (Sant.) *Loranthus capitellatus* Wall., *Viscum articulatum* Burm. F. and *Vitex negundo* Linn. Journal of Pharmaceutical Biological and Chemical Sciences 1(3): 388-393. (Claiming that analyses confirm the usefulness *L. capitellatus* and *V. articulatum* in traditional medicine in Iran.)

Ndukwe, N.A., Jenmi, F.O, Okiei, W.O. and Alo, B.I. 2009. Comparative study of percentage yield of pulp from various Nigerian wood species using the kraft process. African Journal of Environmental Science

and Technology 3(1): 021-025. (Including data on *Strombosia pustulata* (Olacaceae).)

Nipun Dashora, Richa Agrawal, Vijay Sodde, Prabhu, K S. and Lobo, R. 2010. Pharmacognostical evaluation of *Dendrophthoe falcata*. Journal of Pharmacy Research 3(5): 971-974.

Obati, G.O., Karachi, M. and Nyagah, D.M. 2009. The prevalence of epiphytic parasites (mistletoes) on trees in Egerton University. In: Muchiri, M.N., Kamondo, B., Ochieng, D., Tuwei, P. and Wanjiku, J. Recent advances in forestry research for environmental conservation, improved livelihood and economic development. Proceedings of the 4th KEFRI Scientific Conference, KEFRI Headquarters, Muguga, Kenya, 6 to 9 October 2008: 92-98. (*Schinus molle*, *Fraxinus pennyslvanica* and *Acacia mearnsii* were the most infested by mistletoes, and *Polyscias fulva*, *Croton megalocarpus* and *Spathodea campanulata* the least. Not clear if individual parasites were identified.)

Ofori, J., Brentuo, B., Mensah, M., Mohammed, A.I. and Boamah-Tawiah, R. 2009. Properties of 10 Ghanaian high density lesser-used-species of importance to bridge construction - Part 1: green moisture content, basic density and shrinkage characteristics. Ghana Journal of Forestry 25: 67-77. (Timber from *Strombosia glaucescens* (Olacaceae) showed moderate shrinkage during drying and would not be ideal for bridge construction.)

Ofori, J., Mohammed, A.I., Brentuo, B., Mensah, M. and Boamah-Tawiah, R. 2009. Properties of 10 Ghanaian high density lesser-used-species of importance to bridge construction - Part 2: mechanical strength properties. Ghana Journal of Forestry 25: 78-92. (*Strombosia glaucescens* was third strongest of the 10 species tested.)

Ogbonnanya, A.E., Mounmbegna, E.P. and Monago, C.C. 2010. Effect of ethanolic extract of mistletoe (*Viscum album* L.) leaves on paracetamol-induced hepatotoxicity in rats. Journal of Pharmacy Research 3(8): 1888-1891. (Confirming that an ethanolic extract of *V. album* leaves has an ameliorating effect on paracetamol-induced hepatotoxicity.)

Omoigui, L.O., Kamara, A.Y., Massawe, F.S., Ishiyaku, M.F., Boukar, O., Alabi, S.O. and Ekeleme, F. 2007. Evaluation of cowpea genotypes for their reactions to *Striga gesnerioides* in the dry savanna of northeast Nigeria. In: Ahmed, K.Z.; African Crop Science Society, El-Minia, Egypt, 8th African Crop Science Society Conference, El-Minia, Egypt, 27-31 October 2007: 273-278. (Discussing genetic variation in cowpea and its exploitation for breeding resistance to *S. gesnerioides*.)

Ooko, E.A.O. 2009. Evaluation of anti-microbial activity of *Osyris lanceolata* (East African Sandalwood). In: Muchiri, M.N., Kamondo, B., Ochieng, D., Tuwei, P. and Wanjiku, J. (eds) Recent advances in forestry research for environmental conservation, improved livelihood and economic development. Proceedings of the 4th KEFRI Scientific Conference, KEFRI Headquarters, Muguga, Kenya, 6 to 9 October 2008: 166-171. (Investigating the antibacterial activity of extracts of *O. lanceolata,* which is used traditionally to treat gastrointestinal and dermatological disorders in Kenya.).

Osadebe, P.O., Omeje, E.O., Nworu, S.C., Esimone, C.O., Uzor, P.F., David, E.K. and Uzoma, J.U. 2010. Antidiabetic principles of *Loranthus micranthus* Linn. parasitic on *Persea americana*. Asian Pacific Journal of Tropical Medicine,3(8): 619-623. (Concluding that the weakly acidic fraction of an extract from the Nigerian mistletoe *L. micranthus* (=?*Tapinanthus globiferus*) has potent antidiabetic activity.) **(NB** *Loranthus. micranthus* does NOT equate to *Oleostylis micranthus* as previously suggested in this newsletter – your editor failed to check that the latter is a strictly temperate sp. from Australasia. The authors are seeking to clarify its proper nomenclature.)

Osadebe, P.O., Omeje, E.O., Umeyor, C.E. and Awaad, A.S. 2010. Extracts of *Loranthus micranthus* (Linn.) upregulates cellular and humoral immune responses in mice. In: Govil, J.N. and Singh, V.K. (eds) Drug plants I: 465-478. (Results support the use of traditional use of extracts of '*L. micranthus*' in the treatment and management of immunodeficiency diseases. See above for comment on the identity of this mistletoe.)

Oveisi, M., Yousefi, A.R. and Gonzalez-Andujar, J.L. 2010. Spatial distribution and temporal stability of crenate broomrape (*Orobanche crenata* Forsk) in faba bean (*Vicia faba* L.): a long-term study at two localities. Crop Protection 29(7): 717-720. (Use of Spatial Analysis with Distance Indices (SDAIE) suggested distribution of *O. crenata* tended to be aggregated, indicating potential for economy in herbicide use.)

Öztürk, L. and Demïrkan, H. 2010. (The effects of some plants and their leaves in soil on *Phelipanche* spp. (syn: *Orobanche* spp.) in potato field.) (in Turkish) Ege Üniversitesi Ziraat Fakültesi Dergisi 47(2): 105-112. (A pot experiment (not field) showing that large additions of fresh faba bean, vetch or oleander leaves reduced infestation of potato by *Phelipanche/Orobanche* sp.)

Page, T., Potrawiak, A., Berry, A., Tate, H., Tungon, J. and Tabi, M. 2009. Production of sandalwood (*Santalum austrocaledonicum*) for improved smallholder incomes in Vanuatu.. In: Leakey, R.R.B. and Cornelius, J.P. (eds) Forests, Trees and Livelihoods 19(3): 299-316. (Describing a

programme for increasing the cultivation of *Santalum austrocaledonicum* for heartwood in Vanuatu, using new selcted material.)

Page, T., Southwell, I., Russell, M., Tate, H., Tungon, J., Sam, C., Dickinson, G., Robson, K. and Leakey, R.R.B. 2010. Geographic and phenotypic variation in heartwood and essential-oil characters in natural populations of *Santalum austrocaledonicum* in Vanuatu. Chemistry & Biodiversity 7(8): 1990-2006. (Showing no correlation between heartwood colour and oil quality. See also item by same authors in Haustorium 49.)

Pandey Shivanand, Meshya Nilam and Viral, D. 2010. Herbs play an important role in the field of cosmetics. International Journal of PharmTech Research 2(2): 632-639. (With reference to *Santalum album*.)

Park HongJai, Hong JuHo, Kwon HyungJoon, Kim YoungChan, Lee KwanHee, Kim JongBae and Song, S.K. 2010. TLR4-mediated activation of mouse macrophages by Korean mistletoe lectin-C (KML-C). Biochemical and Biophysical Research Communications 396(3): 721-725. (Exploring the mechanism by which *Viscum album* lectin (KML-C) activates systemic and mucosal immune cells to release cytokines including TNF-α, which induces immunity against viruses and cancer cells.)

Partzsch, M. 2010. Germination biology of eight short-living ruderal and segetal species. Hercynia 43(1): 149-166. (Seeds of *Odontites vulgaris* remained dormant after a first winter and show long term persistence.)

Pattanayak, S.P. and Mazumder, P.M. 2010. Phytochemical screening and safety evaluation of hydroalcoholic extract of *Dendrophthoe falcata* Ettingsh: summary of acute and subacute toxicological data. Der Pharmacia Lettre 2(5): 127-138. (The extract of *D. falcata* tested had no serious side effects in rats.)

Peršoh, D., Melcher, M., Flessa, F. and Rambold, G. 2010. First fungal community analyses of endophytic ascomycetes associated with *Viscum album* ssp. *austriacum* and its host *Pinus sylvestris*. Fungal Biology 114(7): 585-596. (Discussing the relative abundance of 208 endophytic fungi in *V. album* and in *P. sylvestris*. Similarities were greatest in older tissues, suggesting a decline in defence mechanisms.)

Pettengill, J.B. and Neel, M.C. 2010. An evaluation of candidate plant DNA barcodes and assignment methods in diagnosing 29 species in the genus *Agalinis* (Orobanchaceae). American Journal of Botany 97(8): 1391-1406. (The barcoding method for determining taxonomic identity was put to test in the genus *Agalinus*. The *psbA-trnH* and *trnT-trnL* barcodes provided useful data.)

Pickett, J.A., Hamilton, M.L., Hooper, A.M., Khan, Z.R. and Midega, C.A.O. 2010. Companion cropping to manage parasitic plants. Annual Review of Phytopathology 48: 161-177. (A general review with particular reference to the use of *Desmodium* spp. for control of *Striga*.)

Plakhine, D. and Joel, D.M. 2010. Ecophysiological consideration of *Orobanche cumana* germination. Helia 33(52): 13-18. (Showing that a conditioning phase is not essential for stimulation of *O. cumana* germination by GR24 or Nijmegen-1, germination levels being similar after 14 days, regardless of conditioning period.)

Qasem, J.R. 2010. Parasitic flowering plants on cultivated plants in Jordan - the present status and management. Pakistan Journal of Weed Science Research 16(2): 227-239. (Reviewing the occurrence, importance, and local control methods of *Orobanche, Cistanche, Cuscuta, Osyris, Thesium, Cynomorium, Viscum* and *Loranthus* spp. in Jordan.)

Rahmatullah, M., Sultan, S., Toma, T.T., Sayeda-a-Safa, L., Chowdhury, M.H., Haque, W.M., Annay, M.E.A. and Jahan, R. 2010. Effect of *Cuscuta reflexa* stem and *Calotropis procera* leaf extracts on glucose tolerance in glucose-induced hyperglycemic rats and mice. African Journal of Traditional, Complementary and Alternative Medicines 7(2): 109-112. (Extracts of *C. reflexa* demonstrated significant oral hypoglycemic activity in glucose-loaded rats, supporting its traditional use for diabetes in Bangladesh.)

Rasingam, L., Lakshminarashimhan, P. and Diwakar, P.G. 2010. Rediscovery of *Ginalloa andamanica* Kurz (Angiosperms: Viscaceae) - an endemic and threatened species from Little Andaman Island, India. Journal of Threatened Taxa 2(9): 1158-1159. (*G. andamanica* rediscovered after 136 years. Host not mentioned.)

Reddy, C.S., Chiranjibi Pattanaik and Biswal, A.K. 2009. *Crotalaria angulata* Miller and *Taxillus bracteatus* (Wall.) Tieghem - new records to the flora of Orissa. Journal of the Bombay Natural History Society 106(2): 224-225.

Rigling, A., Eilmann, B., Koechli, R. and Dobbertin, M. 2010. Mistletoe-induced crown degradation in Scots pine in a xeric environment. Tree Physiology 30(7): 845-852. (Concluding that *Viscum album* ssp. *austriacum* increases the risk of drought-induced mortality of its host when growing in a xeric environment.)

Rodríguez-Ojeda, M.J., Pérez-Vich, B, Alonso, L.C. and Fernández-Escobar, J. 2010. The influence of flowering plant isolation on seed production and seed quality in *Orobanche cumana*. Weed Research

(Oxford) 50(6): 517-518. (Bagging *C. cumana* inflorescccences does not prevent seed set, but seed quality is higher with bags allowing light and ventilation.)

Rugină, D., Vicaș, S., Petran, M., Pintea, A., Bunea, A. and Socaciu, C. 2010. Preliminary research regarding the antitumor effects of mistletoe on A2780 cells. Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Animal Science and Biotechnologies 67(1/2): 429-436. (Results indicate that the phenolic acids from *Viscum album* induce cell death by apoptosis in human tumor ovarian cell line, A2780.)

Ruth, M., Didier, D.S., Marie, O.J., Laurier, E.O.N., Joseph, B.I., Akoa, A. and Bilong, B. 2010. Contribution of tree ants towards the low production of fruits in *Phragmanthera capitata* (Sprengel) S. Balle (Loranthaceae). Journal of Cell and Animal Biology 4(6): 96-102. (Ants feeding on the floral nectaries of *P. capitata* growing on cocoa, citrus and guava in Cameroon contribute to low fruit production and even cause death of the plants.)

Sanjib Bhattacharya and Bodhisattva Roy. 2010. Preliminary investigation on antipyretic activity of *Cuscuta reflexa* in rats. Journal of Advanced Pharmaceutical Technology and Research (JAPTR) 1(1): 83-87. (Extracts of *C. reflexa* showed antipyretic activity, lowering temperature, though not quite as active as paracetamol.)

Sandler, H.A. 2010. Managing *Cuscuta gronovii* (Swamp Dodder) in cranberry requires an integrated approach. Sustainability 2(2): 660-683. (A general review of the problem indicating the need for a combination of chemical and cultural approaches, supported by an understanding of its biology.).

Sandler, H.A. and Mason, J. 2010. Flooding to manage dodder (*Cuscuta gronovii*) and broad-leaved weed species in cranberry: an innovative use of a traditional strategy. Renewable Agriculture and Food Systems 25(4): 257-262. (Suggesting some benefit from short-term flooding for general weed control but marginal benefits in control of *C. gronovii*.)

Šaric´-Kundalic´, B., Dobeš, C., Klatte-Asselmeyer, V. and Saukel, J. 2010. Ethnobotanical study on medicinal use of wild and cultivated plants in middle, south and west Bosnia and Herzegovina. Journal of Ethnopharmacology 131(1): 33-55. (Noting the use of *Euphrasia* spp.)

Sasanuma, I. and Hirakawa, G. 2010. Purification and characterization of a β-glucosidase from the root parasitic plant *Orobanche minor* Sm. Bioscience, Biotechnology and Biochemistry 74(3): 646-648.

Sevastre, B., Olah, N.K., Prodan, I., Manalachioaie, R., Marcus, I. and Hanganu, D. 2010. Comparison of antitumor effect in two *Viscum album* L. extracts. Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Veterinary Medicine 67(1): 270-276. (In tests on Ehrlich Ascitic Carcinoma (EAC) alcoholic tincture, and glycerine macerate from *V. album* provided an anticancer effect stimulating the immune mechanisms and inhibiting tumor cell proliferation.)

Sharma, J.V.C., Malleswari, G., Rao, J.V., Muralibalaram, V. and Rachcha Sangeetha. 2010. Antimicrobial and anthelmintic activity of *Cansjera rheedii* root extract. International Journal of Chemical Sciences 8(2): 1091-1095. (Indicating anthelmintic and anti-bacterial activities (v. *Bacillus subtilis*) in extracts from *C. rheedii* (Opiliaceae).)

Shavvon, R.S. and Mehrvarz, S.S. 2010. Pollen and seed morphology of the genus *Cistanche* (Orobanchaceae) in Iran. Biologia (Bratislava) 65(4): 615-620. (Detailed morphological descriptions of pollen and seed are given for each of six *Cistanche* species.)

Shi YiMin, Yao SiDe, Jia ZhongJian, Lin NianYun and Zheng RongLiang. 2011. Dietary phytophenols act as scavengers of reducing radicals. Food Chemistry 124(4): 1322-1327. (Recording the activity of a range of phytophenols isolated from *Pedicularis* spp. in China.)

Siu HoiLing and Ko KamMing 2010. Herba Cistanche extract enhances mitochondrial glutathione status and respiration in rat hearts, with possible induction of uncoupling proteins. Pharmaceutical Biology 48(5): 512-517. (Confirming the effects of extracts of *Cistanche deserticola* in enhancing mitochondrial ATP generation and protecting against myocardial ischemia/reperfusion (I/R) injury *ex vivo* in rats.)

Sjögren, H., Shepherd, K.D. and Karlsson, A. 2010. Effects of improved fallow with *Sesbania sesban* on maize productivity and *Striga hermonthica* infestation in western Kenya. Journal of Forestry Research 21(3): 379-386. (Short-term (6 months) fallow with *S. sesban* provided a modest increase in maize yields.)

Škoric´, D. Păcureanu-Joiţa, M. and Sava, E. 2010. Sunflower breeding for resistance to broomrape (*Orobanche cumana* Wallr.). Analele Institutului Naţional de Cercetare-Dezvoltare Agricolă Fundulea 78: 63-79. (A useful review noting that there are dominant genes for resistance to *O. cumana* races A-F. New virulence has now appeared in Romania, Russia, Turkey, Spain, and perhaps in Ukraine but two new restorer lines have been identified with resistance to the new race(s). Molecular markers have proved useful in identifying the new races).

Siva, R. 2010. Plant dyes. In: Singh, B.P. (ed.) Industrial crops and uses. CABI Wallingford, UK: 349-357. (Including reference to *Loranthus pentapetalus* (= *Helixanthera parasitica*).)

Sneha Anarthe, Ram Jadhav, Sanjay Surana, Sanjay Chaudhari and Bhalke, R.D. 2010. Pharmacognostic standardisation and physico-chemical evaluations of stems of hemiparasite *Dendrophthoe falcata* Linn. Research Journal of Pharmaceutical Biological and Chemical Sciences 1(2): 187-192. (Chemo-microscopy of *D. falcata* revealed the presence of lignin, starch, proteins and calcium oxalate crystals.)

Solomon Melaku, Teferi Aregawi and Lisanework Nigatu. 2010 Chemical composition, in vitro dry matter digestibility and in sacco degradability of selected browse species used as animal feeds under semi-arid conditions in Northern Ethiopia. Agroforestry Systems 80(2): 173-184. (*Ximenia americana* (Olacaceae) not among species most suitable for animal feed.)

Soro, T.Y., Traofe, F. and Zirihi, G.N. 2010. Study of analgesic activity, antipyretic and anti-inflammatory effect of aqueous extract of *Ximenia americana* (linne) (olacaceae). Médecine d'Afrique Noire 57(4): 223-236. (The results justify the use of *X. americana* (Olacaceae) as a traditional cure for pain, fever and inflammation in West Africa.).

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Yoneyama, K. 2010. Studies on the host recognition mechanism of root parasitic plants. Journal of Pesticide Science 35(3): 348-350. (Reviewing the role of strigolactones in the germination of *Striga* and *Orobanche* spp. and recording the isolation of 10 new active molecules.)

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*Yuichiro Tsuchiya, Danielle Vidaurre, Shigeo Toh, Atsushi Hanada, Eiji Nambara, Yuji Kamiya, Shinjiro Yamaguchi and Peter McCourt. 2010. A small-molecule screen identifies new functions for the plant hormone strigolactone. Nature Chemical Biology 6: 741–749. (http://www.nature.com/nchembio/journal/v6/n10/full/nchembio.435.html) (See item 'Discovery offers hope of saving sub-Saharan crops from devastating parasites.' under Press Releases above.)

Zhang, X.Y., Lu, Q., Sniezko, R.A., Song, R.Q., Man, G., Shaw, C.G. and Geils, B.W. 2010. Blister rusts in China: hosts, pathogens, and management. Forest Pathology 40(3/4): 369-381. (Noting that, as well as *Ribes*, *Pedicularis* spp. act as alternate hosts of the *Cronartium* rust fungi, serious pathogens of *Pinus armandi* and other *Pinus* spp. in section Strobus.)

Zhang ZhiHong, Li ChunQi and Li JianHua. 2009. Phylogenetic placement of *Cynomorium* in Rosales inferred from sequences of the inverted repeat region of the chloroplast genome. Journal of Systematics and Evolution 47(4): 297-304. (Previous molecular phylogenetic work placed *Cynomorium sanguinea* either in Sapindales (mitochondrial matR and nuclear 18S rDNA) or Saxifragales (mitochondrial atp1 and cox1). This study obtained sequences of the plastid inverted repeat from *C. songaricum* and parsimony and Bayesian analyses placed the holoparasite in Rosales. Further study is needed to determine the phylogenetic position of this parasite and elucidate the influence of horizontal gene transfer and contamination.)

Zhu, M., Tan, N., Zhu, H., Zeng, G., He, W., Yu, B. and Chen, X. 2010. Anti-sports anaemia effects of verbascoside and martynoside in mice. International Journal of Sports Medicine 31(8): 537-541. (Verbascoside and martynoside, isolated from *Pedicularis dolichocymba* have the potential of antagonizing sports anaemia, perhaps by preventing 'RBC' (red blood cells?) from free radical damage.)

Ziegler, R. and Grossarth-Maticek, R. 2010. Individual patient data meta-analysis of survival and psychosomatic self-regulation from published prospective controlled cohort studies for long-term therapy of breast cancer patients with a mistletoe preparation (Iscador). Evidence-based Complementary and Alternative Medicine 7(2): 157-166. (The analyzed studies show that therapy with the *Viscum album* preparation Iscador may prolong overall survival and improve psychosomatic self-regulation of breast cancer patients.)

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