HAUSTORIUM

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CONTENTS

MESSAGE FROM THE IPPS PRESIDENT

Dear IPPS members,

I hope you all had a very enjoyable Christmas break.

In my last message I talked about some of the changes we are making to the IPPS website and structure of the Executive Committee, including the election of a New Member at Large to help Chris Parker with the production of Haustorium and Susann Wicke with the new website.

Firstly, I would like to thank Luiza Teixeira-Costa and Evgenia Dor for their interest in this position. The vote was very close but Luiza has been elected as the New Member at Large.

Luiza is currently a Postdoctoral Fellow at Department of Organismic & Evolutionary Biology, Harvard University Herbaria. Luiza's research in parasitic plant biology encompasses a broad diversity of plants, from mistletoes, to the cryptic Rafflesiaceae, and the widely known *Cuscuta*. Using a variety of methods, from plant morphology and physiology, to phylogenetic analyses, she investigates haustorium development and evolution across the different clades among which parasitic plants have evolved. She is also interested in host-plant specificity in different parasites, trying to understand what mechanisms could govern the process of host selection. As a new Member at Large beginning this year, Luiza hopes to help the IPPS in elaborating and improving the Haustorium newsletter.

Secondly, Harro Bouwmeester has been working very hard on the design and production of the new IPPS website with Susann and the website manager. I have recently seen the website and it is looking very impressive. The website is at an advanced stage of development and will be available very soon. Look out for a message from Harro in the next week or two!

Finally, there are two bids to host the next World Congress on Parastic plants (WCPP-16) in 2021. The first is from Hanan Eizenberg who proposes to hold the Congress in Jerusalem, Israel. The second is from Steven Runo and Damaris Odeny who propose Nairobi, Kenya as the venue for the Congress. Both bids are in the final stages of preparation and I will shortly contact everyone with details of the bids and organise a Google Poll so that everyone can vote for the venue for the 2021 Congress.

I wish everyone a very happy and successful Year.
Best wishes
Julie Scholes

MEETING REPORT

IUFRO World Congress 2019 – Technical Session - Complex interactions of mistletoe, ecosystems, and people. Curitiba, Brazil. 29 September – 5 October, 2019.

The IUFRO 7.02.11, Parasitic Flowering Plants in Forests technical working group, had a poster session, oral session and field trip at the World Congress of the International Union of Forest Research Organizations (IUFRO) in Curitiba, Brazil 29 September - 5 October, 2019 attended by scientists from Australia, Brazil, USA, Nigeria, Chile and Ukraine (Crimea, but now in Czech Republic).

Perhaps the iconic mistletoe of this congress should be *Struthanthus martianus*, which was common all over Curitiba (Figure 1). This loranthaceous mistletoe establishes in the tree via bird dispersal, then can form very large shrubby plants perhaps due to its ability to 'walk' down the branch forming epicortical roots.

Luiza Teixeira (Harvard Herbarium), her students (University of São Paulo), as well as Rodrigo Fadini (Federal University of Western Pará, Brazil) participated from Brazil. Our field trip was led by Luiza and her students and focused on parks in Curitiba. We observed 6 species of mistletoe including Viscaceae (*Phoradendron*) and Loranthaceae (*Struthanthus,Tripodanthus*) and Santalaceae (*Eubrachion ambiguum*). Perhaps the highlight of the day was observing a *Euphonia* feeding on *Phoradendron dipterum* berries! What a sight to observe this spectacularly beautiful bird hopping/flying about the plant grabbing fruit.

Figure 1. *Struthanthus martianus*, with pendulous branches, in an urban tree in Curitiba, Brazil. Note the mistletoe now dominates the foliage of the canopy of this tree.

Figure 2. Field trip participants.

We also observed epiparasitism! A *P. dipterum* on a *Salix babylonica* (weeping willow) was parasitized by *Struthanthus martianus*! An excellent publication by the Universidade Federal do Rio Grande do Sul on Southern Brazilian Mistletoes (Dettke, G.A. and Waechter, J.L. - https://fieldguides.fieldmuseum.org/sites/default/files/rapid-color-guides-pdfs/493.pdf) is a great mistletoe reference for the region. The poster, oral session and field trip were very diverse and truly fit the theme of our session: Complex Interactions of Mistletoe, Ecosystems and People. The abstracts for all these talks will be published with the entire set of IUFRO abstracts.

Also a special issue of the journal Botany on mistletoes will include most of the following papers, and others. Due oputn in May.

Species observed:

Eubrachion ambiguum	Santalaceae
Struthanthus martianus	Loranthaceae
S. polyrhizus	Loranthaceae
S. uraguensis	Loranthaceae
Tripodanthus acutifolius	Loranthaceae
Phoradendron dipterum	Viscaceae

Relevant papers presented:

Francisco Fonturbel *et al.*- The cascade impacts of climate change could threaten key ecological interactions: insights from a keystone mistletoe

Ekeoba Matthew Isikhuemen *et al.*- The African Mistletoe: from noxious weed to cure-all medicine: a synthesis of experience from empirical and indigenous knowledge domains

Victor Sibinelli *et al.*- Comparative wood anatomy of Brazilian mistletoes genera of Loranthaceae

Luiza Teixeira-Costa *et al.*- Morphogenesis and evolution of mistletoes' haustoria

David Watson *et al.* - Urban mistletoe: The final frontier in ecological restoration?

Melinda Cook *et al.*- Mistletoe dispersing birds rely on spatial-memory and established search images to find fruiting mistletoes.

David Watson - Did mammals bring the first mistletoes into the tree-tops?

David Shaw *et al.*- The European mistletoe in Sonoma County California, USA

Yuliya Krasylenko *et al.* - Hosts and distribution range of juniper dwarf mistletoe (*Arceuthobium oxycedri*) in the Crimean Peninsula

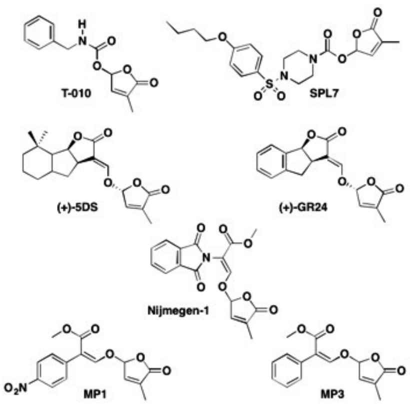
David Shaw.

LITERATURE HIGHLIGHT

New potential for control of *Striga* by synthetic strigolactones?

Suicidal germination–induction of seed germination in the absence of their hosts–has been regarded as a promising strategy for root parasitic weed management. Indeed, in the US, *S. asiatica* infestation has been mostly eradicated, but not completely, by inducing germination of the seeds by extensive ethylene gas fumigations (Eplee 1975; Tasker and Westwood 2012). This is the only one success story of suicidal germination in weedy root parasite management. Sadly it has proved less effective and in any case uneconomic for control of *S. hermonthica* in Africa (Ransom and Njoroge, 1991).

Recently, several 'novel' approaches to *Striga* control by suicidal germination have been reported. Herein I would like to summarize these recent approaches and discuss whether it is a reality or if more studies are needed to adopt this strategy in parasitic weed management. (refer to earlier work with GR24 and Nijmegen1 and problem of lability in soil?)



In 2016, Samejima *et al.* reported that application of a chemical stimulant T-010 (Kondo *et al*. 2007) at 1 kg ai /ha could effectively reduce *S. hermonthica* infection by 33% in sorghum field trials irrigated for the distribution of the applied chemical (Samejima *et al*. 2016). The research group led by Yukihiro Sugimoto (Kobe University) and A.G.T. Babiker (Sudan University of Science and Technology) also pointed out the importance of developing more potent stimulants, effective formulations, and application protocols.

In 2018, Uraguchi *et al.* developed a highly potent germination stimulant, sphynolactone-7 (SPL7), which is more active than synthetic strigolactone (SL) standard (+)-GR24 and as active as 5-deoxystrigol (5DS), the most active SL, in germination stimulation of *S. hermonthica* seeds (Bouwmeester 2018; Uraguchi *et al*. 2018). Although natural SLs so far characterized, and synthetic analogs including GR24, also induce arbuscular mycorrhizal (AM) fungi hyphal branching (and thus promote AM colonization) and inhibit shoot branching as a novel class of plant hormones, both typical SL activities, SPL7 is only weakly active on AM fungi and is inactive in shoot branching. Therefore, SPL7 can be applied as a suicidal germinator for *Striga* seeds without affecting AM colonization or plant growth and development. This is due to SPL7 being a highly specific ligand to the receptor ShHTL7 in *S. hermonthica*, and its affinities to D14, the receptor for SL as a plant hormone, and to unknown receptor(s) in AM fungi, seem to be low. In pot experiments, SPL7 at 100 pM applied a week before planting of maize could inhibit *S. hermonthica* infestation while GR24 required 10 nM for a similar effect. The research group at Nagoya University represented by Yuichiro Tsuchiya has started field trials in Kenya to assess if SPL7 can be applied as a suicidal germinator for *S. hermonthica* in maize.

The third group working on *Striga* control by suicidal germination is led by Salim Al-Babili (KAUST, Saudi Arabia) in collaboration with Tadao Asami (The University of Tokyo, Japan) and Binne Zwanenburg (Radboud University, The Netherlands), and the project is supported by The Bill & Melinda Gates Foundation. They have developed a new class of synthetic SLs, methyl phenlactonoates (Jamil *et al*. 2018), and selected MP1 and MP3 for further study. These compounds did not affect AM colonization (Kountche *et al*. 2018). They evaluated effectiveness of the phenlactonoates MP1 and MP3 along with the synthetic SL analog Nijmegen-1 (Nefkens *et al*. 1997), in rain-fed sorghum and pearl millet fields in Burkina Faso (Kountche *et al*. 2019). Treatment with these compounds resulted in up to 55–65% reduction of *Striga* emergence in these rain-fed fields, demonstrating that these synthetic SLs can reduce *Striga* infection through induction of suicidal germination in typical African small-holder farms.

These three groups have clearly demonstrated that suicidal germination is one of the promising strategies for parasitic weed management, especially for *Striga*. However, as Kountche *et al.* described in their recent paper, 50–60% reduction of *Striga* emergence may not be enough for *Striga* control because only a few seedlings per square meter may maintain the *Striga* seedbank. Therefore, to reduce *Striga* seedbank effectively, *Striga* seed germination should also be induced in the absence of host crops.

Suicidal germination strategy can be applied for other root parasitic weeds, broomrapes (*Orobanche* and *Phelipanche* spp.) and *Alectra* spp. Indeed, Zwanenburg *et al.* (2016) reported effectiveness of this strategy for *P. ramosa* control in tobacco. They pointed out that the timing of the wet conditioning period, the actual application of stimulants, and the planting of the crop are very critical. If the stimulants are applied at the incorrect time, they may promote parasitism due to the increased number of germinating parasite seeds. This may be one of reasons why this strategy has yet to be widely adopted in crops susceptible to root parasitic weeds. In addition, species-specific stimulants like SPL7 may need to be developed for each broomrape and *Alectra* species.

All plant species produce and release SLs, and therefore, suicidal germination occurs if there is other vegetation inthe field. In fact, cotton and groundnut have been planted as trap crops for *S. hermonthica* as they induce suicidal germination of *Striga* seeds. However, weedy parasites quickly attack their hosts when the host crops return to the infested field even after several decades. It is likely that at least some of weedy the parasitic species can distinguish SL profiles of preferable hosts from those of non-host plants, and their seeds may not respond well to SL profiles of non-hosts.

Accordingly, suicidal germination strategy should be combined with other methods including resistant cultivars, intercropping with non-hosts (Push-Pull), crop-rotation, and so on. To eradicate the parasite seedbank, suicidal germination should be induced in the absence of host crops and be continued for at least several cropping seasons.

There are some new options arising for chemical management of root parasitic weeds. For example, inhibitors of SL biosynthesis and perception can inhibit parasitism effectively (Yoneyama *et al*. 2019). Further studies are necessary to introduce these chemicals in the battles with root parasitic weeds in the field.

References:

Bouwmeester H (2018) Can witchweed be wiped out? Science 362 (6420):1248–1249. doi:10.1126/science.aau5445

Eplee RE (1975) Ethylene: A witchweed seed germination stimulant. Weed Sci 23 (5):433–436. doi:10.1017/S0043174500062822

Jamil M, Kountche BA, Haider I, Guo X, Ntui VO, Jia KP, Ali S, Hameed US, Nakamura H, Lyu Y, Jiang K, Hirabayashi K, Tanokura M, Arold ST, Asami T, Al-Babili S (2018) Methyl phenlactonoates are efficient strigolactone analogs with simple structure. J Exp Bot 69 (9):2319–2331. doi:10.1093/jxb/erx438

Kondo Y, Tadokoro E, Matsuura M, Iwasaki K, Sugimoto Y, Miyake H, Takikawa H, Sasaki M (2007) Synthesis and seed germination stimulating activity of some imino analogs of strigolactones. Bioscience, Biotechnology, and Biochemistry 71 (11):2781–2786. doi:10.1271/bbb.70398

Kountche BA, Jamil M, Yonli D, Nikiema MP, Blanco-Ania D, Asami T, Zwanenburg B, Al-Babili S (2019) Suicidal germination as a control strategy for *Striga hermonthica* (Benth.) in smallholder farms of sub-Saharan Africa. Plants, People, Planet 1 (2):107–118. doi:10.1002/ppp3.32

Kountche BA, Novero M, Jamil M, Asami T, Bonfante P, Al-Babili S (2018) Effect of the strigolactone analogs methyl phenlactonoates on spore germination and root colonization of arbuscular mycorrhizal fungi. Heliyon 4 (11):e00936. doi:10.1016/j.heliyon.2018.e00936

Nefkens GHL, Thuring JWJF, Beenakkers MFM, Zwanenburg B (1997) Synthesis of a phthaloylglycine-derived strigol analogue and its germination stimulatory activity toward seeds of the parasitic weeds *Striga hermonthica* and *Orobanche crenata*. J Agric Food Chem 45 (6):2273–2277. doi:10.1021/jf9604504

Ransom JK, Njoroge J (1991). Seasonal variation in ethylene-induced germination of *Striga hermonthica* in western Kenya. In: Weber HC, Forstreuter W (eds) Proceedings, 4th International Symposium on Parasitic Flowering Plants, Marburg, Germany, 1987, pp. 391-396.

Samejima H, Babiker AG, Takikawa H, Sasaki M, Sugimoto Y (2016) Practicality of the suicidal germination approach for controlling *Striga hermonthica*. Pest Manag Sci 72 (11):2035–2042. doi:10.1002/ps.4215

Tasker AV, Westwood JH (2012) The U.S. witchweed eradication effort turns 50: a retrospective and look-ahead on parasitic weed management. Weed Sci 60 (2):267–268. doi:10.1614/ws-d-12-00003.1

Uraguchi D, Kuwata K, Hijikata Y, Yamaguchi R, Imaizumi H, AM S, Rakers C, Mori N, Akiyama K, Irie S, McCourt P, Kinoshita T, Ooi T, Tsuchiya Y (2018) A femtomolar-range suicide germination stimulant for the parasitic plant *Striga hermonthica*. Science 362 (6420):1301–1305. doi:10.1126/science.aau5445

Yoneyama K, Xie X, Yoneyama K, Nomura T, Takahashi I, Asami T, Mori N, Akiyama K, Kusajima M, Nakashita H (2019) Regulation of biosynthesis, perception, and functions of strigolactones for promoting arbuscular mycorrhizal symbiosis and managing root parasitic weeds. Pest Manag Sci 75 (9):2353–2359. doi:10.1002/ps.5401

Zwanenburg B, Mwakaboko AS, Kannan C (2016) Suicidal germination for parasitic weed control. Pest Manag Sci 72 (11):2016–2025. doi:10.1002/ps.4222

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(Editors' Note: We would welcome comment on the prospects/difficulties in commercialisation of strigolactones for practical use. Registering new products for the market is notoriously expensive. Although there is little further research needed to establish efficacy, there are the costs of toxicological work which could be highly significant. What cost of product would be acceptable for the parasitic weed market? These issues have been discussed by Vurro *et al.* 2016. Strigolactones: how far is their commercial use for agricultural purposes?(https://onlinelibrary.wiley.com/doi/abs/10.1002/ps.4254). We would welcome comments on this important question.)

PROJECT UPDATE

Striga Smart Sorghum Solutions for Smallholders in East Africa (A new Global Challenges Research Fund project between NRI and Kenyatta University, funded by the Royal Society)

December 2019 marks the start of a new GCRF - Royal Society (UK) funded project entitled, part of an International Collaborations Award, granted to Jonne Rodenburg of the Natural Resources Institute (NRI), part of the University of Greenwich in the UK, and Steven Runo of the Kenyatta University in Kenya.

Sustainable intensification of sorghum production, an indispensable crop for millions of poor families, is key to ensuring food security and improving livelihoods in sub-Saharan Africa (SSA). Sorghum is relatively drought and heat tolerant and therefore a strategic crop for the continued production of food, fodder and biomass in a changing climate. Major production constrains to sorghum in SSA are the parasitic weeds of the *Striga* genus (*S. asiatica* and *S. hermonthica*) and poor soil fertility. These constraints are intertwined as crops seem more susceptible and sensitive to *Striga* infections when grown under nutrient-deficiencies. This could partly be due to reduced effectiveness of host plant resistance and tolerance, but much of this is still unknown. Understanding this interaction is essential as host plant resistance and tolerance and fertilisers are key elements of integrated *Striga* management. This project will explore these two elements and produce the knowledge, materials and tools for synergetic integration.

Jonne Rodenburg

PRESS AND OTHER REPORTS

Nuclear techniques help develop new sorghum lines resistant to the parasitic weed *Striga*

Farmers in Africa will soon benefit from new sorghum varieties resistant to *Striga* — one of the most devastating parasitic weeds that impact crop yields on the continent. Improved sorghum lines with resistance to *Striga* have been developed using gamma ray irradiation, with the support of the IAEA and the Food and Agriculture Organization of the United Nations (FAO). 'This important achievement is of great significance, especially as we prepare for the International Year of Plant Health 2020,' said Qu Liang, Director of the FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. 'For African farmers, the availability of *Striga*-resistant sorghum varieties will be a major breakthrough: it will improve livelihoods for rural communities and contribute to food security,' said Abdelbagi Ghanim, a plant breeder and geneticist at the Joint FAO/IAEA Division. Striga infestation is a scourge that continues to pose a huge challenge for crop productivity, reducing national and regional capacity for food production, he added. Striga is present in parts of Africa, Asia, and Australia, with the greatest crop losses in Africa's savannahs. FAO estimates that annual crop loss due to Striga across Africa exceeds US $7 billion, impacting over 300 million people. Up to 50 million hectares of crop land are Striga-infested, Ghanim said. 'Striga is a major biological constraint to cereal production in most of sub-

Saharan Africa and semi-arid tropical regions of Asia.' Crops such as sorghum, millet, maize and upland rice face the biggest threat from this parasitic weed.

The two most destructive *Striga* strains are *Striga hermonthica* and *Striga asiatica*, Ghanim said. To combat Striga, new varieties of sorghum have been developed using irradiation, in a technique known as plant mutation breeding 'Thanks to glass-house and field trials, we succeeded in the selection of improved lines, and we expect that new resistant varieties developed from these lines will be released to farmers within the next two years, in some of the participating countries,'

In plant breeding programmes, the primary challenge is to identify new and improved lines, with desired traits, before they can be developed into varieties that can be cultivated by farmers. The ongoing research and development using irradiation has identified such lines with proven resistance to *Striga,* and these are being developed into varieties that can be disseminated to farmers in the near term.

Phillipe Nikiema, a researcher at Burkina Faso's Environmental Institute of Agricultural Research points to the impressive difference between wild and newly developed sorghum mutants under artificial infestation with *Striga* seeds. (Photo: A. Ghanim/IAEA)

'I am so excited to see the power of nuclear technology applications for mutation breeding; I hope the varieties developed from the improved sorghum lines selected in this project will finally restore production of cereals in the heavily *Striga* infested areas in Africa,' said Phillipe Nikiema, a researcher at Burkina Faso's Environmental Institute of Agricultural Research and a participant of an IAEA *Striga* coordinated research project. The results originating from this project focus specifically on understanding and developing solutions for resistance to *Striga* in cereal crops, involving experts from twelve countries. 'The affected African countries, including my own, Burkina Faso, will benefit from new improved sorghum lines and varieties developed through this project. Results of the project will also help to understand the physiological and molecular bases of host-parasite interaction to enable the development of further solutions to restore cereals production and boost food security in Africa,' he added. '*Striga* threatens food security in rural areas where it has been expanding and taking over millions of hectares, including those owned by of poor farmers.' Experts are now analysing the induced resistance in different sorghum varieties to enable combining more than one defense mechanism and produce even more resistant sorghum varieties to restore production and ensure food security and the livelihoods of farmers.

Aabha Dixit, IAEA Office of Public Information and Communication
5 September, 2019

Helixanthera cylindrica – a mistletoe on mango in Kuala Trengganu, Malaysia

A visit to Cambodia near Sihanoukeville in May 2014, the writer spotted a colourful mistletoe on a mango plant which Dr Don Kirkup identified as *Helixanthera cylindrica* (HAUSTORIUM 65 July 2014 page 5). The writer has not been seen *H. cylindrica* on mango plant in many places on west coast of Peninsular Malaysia. The common mistletoes found growing on mango plants in west coast areas are *Dendrophthoe pentandra* and *Scurrula ferruginea.*

Recently (last week of July 2019), the writer saw the same mistletoe on many mango plants in Kuala Trengganu (GPS Coordinates: 5.3296 degree N, 103.1370 degree E), on the east coast of Peninsular Malaysia. See pictures of *H. cylindrica* growing on mango branch (Fig 1) and a close up view of red flower (Fig 2) taken in Kuala Trengganu.

Fig 1. *H. cylindrica* growing on mango branch

Fig 2. Close up view of a flower and bud of *H. cylindrica*

Gait-Fee Chung,
31 July 2019.

The Banded Matchflower

This is the 40th in an ongoing series that highlights the riches of Pigeon Valley, the urban nature reserve in the heart of Glenwood, Natal. The focus of this article will be on the Banded Matchflower, *Oncocalyx quinquenervius*

This striking flower is that of a seldom encountered mistletoe. A couple of years ago I was investigating a sewage leak on the northern fence of Pigeon Valley next to a large Natal Elm when I realised that the ground was covered in flowers different from the prevailing local mistletoe (*Erianthemum dregei*). Looking up, I could see large areas of the tree covered in mistletoe. Later I found evidence that there are small patches elsewhere in Pigeon Valley on other Natal Elms or Thorny Elms.

The riches of Pigeon Valley Nature Reserve explained by Glenwood resident and chair of the Friends of Pigeon Valley who undertake clearing of alien plants, keep records of bird and mammal sightings and alert management to any problems.

Crispin Hemson
October 27, 2019.

Grasspea and finger millet pre-breeding get a boost

Plant breeders need genetic diversity in order to improve the yield and nutritional quality of crops and adapt them to changing climatic conditions. But that diversity is limited in cultivated grasspea and finger millet. However, in recent years, pre-breeders working on the Crop Trust's Crop Wild Relatives Project have expanded that diversity by tapping into wild and ancient domesticated forms of the two crops.

This new project, funded by the Templeton World Charity Foundation, Inc., will allow pre-breeders to continue their work and ultimately contribute to food security, human health, income for rural poor, while protecting the environment.

Ridding grasspea of toxins
'Grasspea is a nutritious crop which is heat- and drought-tolerant and often survives when other crops fail, thus gaining a reputation as a 'famine crop',' said Shiv Agrawal, a legume breeder with the International Center for Agricultural Research in the Dry Areas (ICARDA), who will spearhead the work on grasspea in the new project. The problem with the crop is that it contains a toxin that can cause paralysis if people eat too much of it as a sole food source. By mapping the genome sequence of both cultivated grasspea and its closest wild relatives, Shiv's team can accelerate the pace of breeding by 'tagging' those genes in the wild species which he wishes to transfer to the cultivated crop.

Developing a *Striga*-resistant finger millet
Finger millet is also a highly nutritious, drought-tolerant crop, but one that still doesn't get the research attention it deserves. 'We have the potential to significantly increase yields in East Africa, where finger millet is an important subsistence crop for small-scale farmers, particularly women,' said Damaris Odeny, a molecular geneticist with the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) in Nairobi, who led the Crop Wild Relatives Project finger millet pre-breeding work.

Finger millet yields are stagnating in part due to a sap-sucking plant parasite known as *Striga* and blast disease. Damaris's national partners in Kenya have succeeded in developing crosses between wild relatives of finger millet and its cultivated varieties that show promise for *Striga* and blast resistance, as well as tolerance to drought. Several superior crosses have already been identified and crossed again with varieties preferred by farmers in the country. Some of these are currently undergoing adaptation trials and will subsequently be released in Kenya for use by farmers.

'The Templeton-Crop Trust project will now help us make this newly developed breeding material available to other countries in East Africa,' said Damaris. 'Our objective is to develop successful and well-integrated pre-breeding programs in Ethiopia, Uganda and Tanzania, as well as Kenya, so that we can capitalize on the rich genetic diversity that exists in these centers of finger millet diversity.'

International Center for Agricultural Research in the Dry Areas
6 October, 2019

New flowerpecker species described from Borneo

An international team of ornithologists, led by the Smithsonian Institutions National Museum of Natural History, has scientifically described a new species of flowerpecker from the island of Borneo. The species, which has been named Spectacled Flowerpecker, belongs to a family of small, fruit-eating passerines found throughout tropical southern Asia, Australia and nearby islands. Spectacled Flowerpecker resides in lowland forests and was first recorded in the Danum Valley of Sabah, in north-eastern Malaysian Borneo, in 2009.

Spectacled flowerpecker Photo Jacob Saucier

'This bird is totally unique,' said Dr Christopher Milensky, collections manager for the Division of Birds at the Smithsonians National Museum of Natural History. 'Its unlike anything else, and it is the latest example of the rich biodiversity that can be found in this region.' Ten years after it was initially discovered, in March 2019, Dr Milensky and his colleagues managed to capture a female of the species and examine it closely. They analysed its external features and compared its DNA to that of other flowerpeckers. Surprisingly, they found that Spectacled Flowerpecker is quite distinct and is not closely related to any other known flowerpecker species. 'It isn't related to any of the other flowerpeckers all that closely. Its a whole new species that distinctly stands out,' said Dr Jacob Saucier, also from the Smithsonians National Museum of Natural History.

The researchers also analysed the bird's diet and found that it eats the berries of mistletoe, a parasitic plant that grows high in the forest canopy. Through DNA analysis and close inspection of seeds from the birds gut, the team was able to identify the type of mistletoe that Spectacled Flowerpecker eats. 'We hope this discovery will bring attention to the unexplored diversity that remains in the forests of Borneo — and the importance of conserving these threatened ecosystems,' the team said. 'Protecting the regions natural resources from logging, palm plantations and other sources of deforestation is critical to preserve endemic species, as well as the homes and livelihoods of the islands indigenous people.' 'The knowledge and skills of the local people were essential in enabling our research team to access the wildlife preserve and animals for the study,' Dr Saucier said.

'The scientific name that we chose for Spectacled Flowerpecker, *Dicaeum dayakorum*, honours the Dayaks, the people who live in and are working to protect the islands forests.'

Saucier, J, *et al.* 2019. A distinctive new species of flowerpecker (Passeriformes: Dicaeidae) from Borneo. Zootaxa. 4826: (4. http://dx.doi.org/10.11646/zootaxa.4686.4.1)

Bird Guides
October 24th 2019.

Kissing under the mistletoe

It is believed the first people to become aware of mistletoe's romantic powers were the Druids who wandered Europe in the 1st Century A.D. They believed that 'mistletoe, taken in drink, will impart fecundity to all animals that are barren.' Druids would reportedly hang the plant over their doors for luck. Historians learned about mistletoe's romantic reputation through Pliny the Elder, one of the world's first known naturalists. He thought the Druids' beliefs about mistletoe were silly, but the reputation stuck thanks in part to a Norse myth.

The story involved Frigga, the goddess of love and marriage, who loved her son Baldur so much that she and Baldur's wife teamed up to make all the world's plants and animals to promise not to hurt him. Well, they got all the plants, except mistletoe. Loki, the god of mischief who Marvel fans will recognize as Thor's pesky brother, realized the mistake and made a spear out of mistletoe and killed Baldur. If it ended there, it wouldn't be a particularly sweet story, but in some versions of the tale, as Frigga cried over the loss of her son, her motherly tears turned into mistletoe berries. Those berries somehow brought Baldur back to life, so Frigga declared mistletoe to be a symbol of love. According to The Smithsonian magazine, 'Mistletoe would come to hang over our doors as a reminder to never forget. We kiss beneath it to remember what Baldur's wife and mother forgot.'

The *Striga* from 'The Witcher' – the monster & curse explained
(extract from item by Luke Alphonso)

(NB Now we know what we are up against!)

The Witcher series is a Polish and literary phenomenon written by Andrzej Sapkowski. Here's a little background; a *Striga*, from what we know, is a woman that's been cursed to transform into a horrid creature at night. From what we can also tell, this happens with corpses as well, as the main *Striga* we know of, Princess Adda, fell to the curse when she and her mother died during childbirth. Accordingly, *Striga* are known to be immense creatures, lopsided and horribly disfigured. Geralt describes the one that he fought as having a disproportionately large head on a short neck, and a 'tangled, curly halo of reddish hair.' The creature is shown to have immense, jagged teeth set in its maw, and long talons that can rend most flesh into chunks with one swipe.

Andy Chalk, PC Gamer
11November, 2019.

Plants in ancient Antalya sites to be taken under protection

Ancient cities in the southern province of Antalya, which host millions of tourists every year, constitute a living space for endemic plants. Within the scope of a project under the Civil Society Dialogue V Program and funded by the European Union, five endemic plants in five ancient cities along with the reliefs in archaeological remains - *Lathyrus phaselitanus* of the ancient city of Phaselis, *Alkanna macrophylla* of Perge, *Orobanche sideana* of Side, *Himantoglossum montis-tauri* of Aspendos and *Colchicum baytopiorum* of Termessos, which grow only in these areas in the world, will be taken under protection.

Turkey is home to 10,000 plant species and about one-third of them are endemic plant species. While 800 of these plants are in Antalya and 70-80 species of Antalya's endemic plants are in critical danger of extinction. The project, called 'Endemic Flowers, Ancient Cities from Apollo from Athena,' aims to protect these five endemic plants growing only in five ancient cities of Antalya and will continue for 15 months.
For the project, brochures prepared for the conservation of endemic species threatened by touristic visits and unconscious tourism activities are distributed to eco-tourism guides and seminars are organized on the subject. Also, the distribution of the species is modeled on a digital map, and seed transfers are made to the most suitable environments in the ancient cities depending on the threat factors.

Within the scope of the project, in cooperation with archaeologists who carry out archaeological studies in ancient cities, trainings are also provided for university students in these ancient cities. The project partner, Greece is doing the same work in four ancient cities in Athens. Researchers from both countries continue their dialogues with each other about their projects. Associate Professor Gökhan Deniz of Akdeniz University, who coordinates the project, said that they were now detecting the flora elements and endemic species growing in the five ancient cities in the region.

'We are working on visualization studies on the archaeological artifacts,' he said. Stating that first society should be informed about the endemic plants for their protection, Deniz said that the visitor factor came first in some regions among the threats against those endemic plants. He gave the example of the ancient city of Side, which is the only habitat for *Orobanche sideana* in the world, saying that the plant was affected by the high number of visitors and out-of-control activities.

Hurriyet Daily News
September 18, 2019

THESIS

Exploring biological control and transgenic weed management approaches against infestation by *Striga hermonthica* in maize.
Johnstone Omukhulu Neondo
PhD Jomo Kenyatta University Supervisors Dr. Amos Emitati Alakonya and Dr. Remmy Wekesa Kasili 2017.

Abstract (omitting some introduction)

The aim of this study was to simultaneously explore biocontrol options by bio-prospecting the effectiveness of culturable microbes against *S. hermonthica* as well as enhancing P availability to maize by genetic transformation of ecologically adapted maize genotypes with P efficient Purple Acid Phosphatase (PAP) genes from *Lupinus albus* (LaPAP) and *Medicago truncatula* (MtPAP). To explore the biocontrol frontier, bacterial and fungal isolates from *Striga* suppressive soils were assayed for their ability to produce extra-cellular enzymes and antibiotic compounds as well as their ability to induce *S. hermonthica* seed decay and later genotyped using 16S rRNA and 18S rRNA genes, respectively. In order to develop transgenic maize plants expressing target PAP genes, a regeneration protocol with an assortment of callus induction and callus maturation/shoot induction media were evaluated. Further, the transformability of target maize varieties was assessed via histochemical analysis of β-glucuronidase (GUS) reporter gene. Finally, *Agrobacterium tumefaciens*-mediated transformation of the maize varieties over-expressing PAP gene cassette was achieved and transgenic lines evaluated using *S. hermonthica*-host plant infection assays in vitro and in potted experiments. The morphometric analysis of bacterial and fungal descriptors identified bacterial isolates that displayed array of enzymatic and antibiosis properties and also that had ability to cause *Striga* seed decay. For instance isolate SM5ISS (KY041696) with 99% genetic affiliation to *Bacillus* recorded high antibiosis (8cm) and extra cellular enzymatic values (2.5±0.03) and also recorded the highest number of *S. hermonthica* page 16xvseed decay (45±0.23%). This bio-prospection study summarily identified candidate isolates that caused *S. hermonthica* seed decay. The regeneration study revealed that Namba nane, KSTP'94 and CML144 varieties recorded a regeneration frequency of 26.1±1.11%, 32.1±1.28% and 35.4±1.24%, respectively, while their corresponding GUS transformability efficiency values were 0.8±0.03%, 1.4±0.19% and 2.1±0.20%, respectively. Transformation of Namba nane with LaPAP and MtPAP gene construct recorded a transformation efficiency of 0.33±0.03% and 0.36±0.04%, respectively, while the corresponding values for LaPAP and MtPAP gene constructs in KSTP'94 were 0.69±0.05% and 0.37±0.03%,respectively. Transformation of CML144 with LaPAP and MtPAP gene construct recorded a transformation efficiency of 0.65±0.03% and 0.34±0.03%, respectively. These results demonstrated that the target maize germplasm was transformable. Over-expression of LaPAP and MtPAP in the selected maize genotypes resulted in low numbers of *S. hermonthica* colonizing transgenic maize in comparison to wild type maize. For instance, in Namba nane the average number of *Striga* plants colonizing individual wild maize plant in both rhizotron and bucket experiments were 9 and 4 while the corresponding numbers for LaPAP and MtPAP transgenic were 4, 1 and 5, 2, respectively. For KSTP'94 the average number of *Striga* plants colonizing individual wild maize plants in both rhizotron and bucket experiments were 4 and 3 while the corresponding numbers for LaPAP and MtPAP transgenic was 3, 1 and 3, 1, respectively. In the case of CML144 the average number of *Striga* plants colonizing individual wild maize plant in both rhizotron and bucket experiments were 12 and 7 while the corresponding numbers for LaPAP and MtPAP transgenic plants was 6, 2 and 8, 3,

respectively. Analysis of the ability of root exudate to induce *S. hermonthica*s seed germination was higher in wild type than transgenic maize. For instance, the average number of *Striga* seeds stimulated to germinate in Namba nane under treatments; wilt-type, LaPAP and MtPAP was 7, 4 and 6, respectively. In KSTP'94, the average number of *Striga* seeds stimulated to germinate in Namba nane under treatments; wild-type, LaPAP and MtPAP was 5, 2 and 3 respectively. Lastly, in CML144 the average number of *Striga* seeds stimulated to germinate in Namba nane under treatments; wild-type, LaPAP and MtPAP was 5, 2 and 3, respectively.

Summarily, this study identified microbes that were potent against *S. hermonthica* and proposes their use in reduction of *S. hermonthica* seed bank in infested soils. Further, it was demonstrated that indeed over-expression of PAPgenesin maize results in less *S. hermonthica* infestation. The use of the two approaches is therefore recommended in an integrated *S. hermonthica* management package that would be able to impede the parasite in infested and low P soils especially in western Kenya.

FORTHCOMING MEETING(S)

International Weed Science Congress on 21-26 June 2020 in Bangkok, Thailand. Go to: https://www.iwsc2020.com/old-home There will be a session on parasitic and invasive plants.

2nd World Congress on Plant Genomics and Plant Breeding, May 21-22, 2020, Berlin, Germany. There will be a session on Weed Science. Go to ; https://conferenceera.com/plant-genomics-plant-breeding-conference/

GENERAL WEB SITES

For individual web-site papers and reports see LITERATURE

* these websites may need copy and paste.

For information on the International Parasitic Plant Society, past issues of Haustorium, etc. see: http://www.parasiticplants.org/ (in the course of reconstruction)

: shttps://www.iwsc2020.com/old-home

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 new Frontiers Journal 'Advances in Parasitic Weed Research' see: http://journal.frontiersin.org/researchtopic/3938/advances-in-parasitic-weed-research

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

For a description of the PROMISE project (Promoting Root Microbes for Integrated *Striga* Eradication), see: http://promise.nioo.knaw.nl/en/about

*For PARASITE - Preparing African Rice Farmers Against Parasitic Weeds in a Changing Environment: see http://www.parasite-project.org/

For the Annotated Checklist of Host Plants of Orobanchaceae, see: http://www.farmalierganes.com/Flora/Angiospermae/Orobanchaceae/Host_Orobanchaceae_Checklist.htm

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

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

*For Access Agriculture (click on cereals for videos on *Striga*) see: http://www.accessagriculture.org/

For information on future Mistel in derTumortherapie Symposia see: http://www.mistelsymposium.de/deutsch/-mistelsymposien.aspx

For a compilation of literature on *Viscum album* prepared by Institute Hiscia in Arlesheim, Switzerland, see: http://www.vfk.ch/informationen/literatursuche (in German but can be searched by inserting author name).

For an excellent publication by the Universidade Federal do Rio Grande do Sul on Southern Brazilian Mistletoes (Dettke, G.A. and Waechter, J.L. 2013) see: https://fieldguides.fieldmuseum.org/sites/default/files/rapid-color-guides-pdfs/493.pdf)

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

For 6th Mistletoe Symposium, Germany, November 2015 see: http://www.sciencedirect.com/science/journal/09447113/22/supp/S1

LITERATURE

***indicates web-site reference only**
Items in bold selected for special interest
Items in blue relate to therapeutic uses of parasitic plants

Abdelhalim, T., Jannoura, R. and Joergensen, R.G. 2019. Mycorrhiza response and phosphorus acquisition efficiency of sorghum cultivars differing in strigolactone composition. Plant and Soil 437(12): 55-63. [Comparing two *Striga*-resistant varieties (orobanchol-secreting) and two susceptible (5-deoxystrigol-secreting) for their P-acquisition and mycorrhizal development. Strigolactone type did not significantly affect growth, but one of the orobanchol-secreting varieties, IS9380, showed high P acquisition and greatest root growth leaf area and shoot dry weight]

Akbar, I.Z., Dewi, F.R.P. and Setiawan, B. 2019. *In silico* interaction of the active compounds of *scurrula atropurpurea* with the RANK/RANKL/OPG system in diabetoporosis. Acta Informatica Medica 27(1): 8-11. [Studying the activity of 9 components of *S. atropurpurea* on diabetes-related osteoporosis in Indonesia. Conclusions not clear (to me) from the abstract.]

Akbulut, S., Karakose, M. and Özkan, Z.C. 2019. Traditional uses of some wild plants in Kale and Acıpayam provinces in Denizli. Kastamonu Üniversitesi Orman Fakültesi Dergisi 19(1): 72-81. [Reviewing the range plants used medicinally in this region of Turkey, and noting the newly recorded use of *Viscum album* ssp. *austriacum* as a vasodilatory drug.]

Akaogu, I.C., Badu-Apraku, B., Tongoona, P., Ceballos, H., Gracen, V., Offei, S.K. and Dzidzienyo, D. 2019. Inheritance of *Striga hermonthica* adaptive traits in an early-maturing white maize inbred line containing resistance genes from *Zea diploperennis*. Plant Breeding 138(5): 546-552. [Concluding that inbred TZdEI 352 could serve as invaluable parent for hybrid development in *Striga* endemic agro-ecologies of sub-Saharan Africa.]

Al-Fatimi, M. 2019. Ethnobotanical survey of medicinal plants in central Abyan governorate, Yemen. Journal of Ethnopharmacology 241: pp.111973. [Including reference to *Hydnora abyssinica* for treatment of stomach ulcers.]

Altay, V. 2019. Ecology of *Pinus sylvestris* L. forests - a case study from Istanbul (Turkey). Pakistan Journal of Botany 51(5): 1711-1718. [Noting the occurrence of *Osyris alba* in the shrub layer.]

Amer, A., Taha, H., Ammar, N., Salama, M. and El-Alfy, T. 2018. Applicability of different molecular markers techniques for genetic distinguish between two genera *Cressa* Linn. and *Cuscuta* Yunck. family Convolvulaceae. Pakistan Journal of Biological Sciences 21(4): 179-186. [Concluding that the SCoT molecular technique (PCR based DNA fingerprint) is superior for distinguishing the two genera.]

*Ammara Riaz and 10 others. 2018. Astragalin: a bioactive phytochemical with potential therapeutic activities. Advances in Pharmacological Sciences 2018: Article ID 9794625. (https://www.hindawi.com/journals/aps/2018/9794625/) [Discussing the activity of astragalin, a component in *Cuscuta chinensis,* and the need for further research on its potential.]

*Annor, B., Badu-Apraku, B., Nyadanu, D., Akromah, R. and Fakorede, M.A.B. 2019. Testcross performance and combining ability of early maturing maize inbreds under multiple-stress environments. Scientific Reports 9(1): 13809. (https://www.nature.com/articles/s41598-019-50345-3) [Four of the 205 inbreds studied had significant positive general combining ability effects each under low N and drought, and three under *Striga* for grain yield.]

Andiego, K.P., Dangasuk, O.G., Odee, D.W., Omondi, F.S., Otieno, D.F. and Balozi, B.K. 2019. Genetic diversity of endangered sandalwood (*Osyris lanceolata*) populations in Kenya using ISSR molecular markers. East African Agricultural and Forestry Journal 83(2): 80-93. [Showing that a Baringo population of *O. lanceolata* is genetically distinct from 2 other populations in Kenya, but that there was much variation within each and all require conservation after excessive exploitation for cosmetic and pharmaceutical uses.]

*Andres, J., Blomeier, T. and Zurbriggen, M. 2019. Synthetic switches and regulatory circuits in plants. Plant physiology 179(3): pp.01362.2018. (http://www.plantphysiol.org/content/179/3/862) [‘Reviewing theoretical-experimental approaches to the engineering of synthetic chemical- and light-regulated (optogenetic) switches for the targeted interrogation and control of cellular processes, including existing applications in the plant field.’

Including reference to strigolactones and parasitic plants.]

Armağan, M. 2018. *Pedicularis munzurdaghensis* (Orobanchaceae), a new species from Turkey. Phytotaxa 333(1): 124-130. [Describing *P. munzurdaghensi,* morphologically close to, *P. cadmea*, *P. arguteserrata*, and *P. anthemifolia,* occurring in rocky limestone in eastern Turkey.]

Azami-Sardooei, Z., Shahreyarinejad, S., Rouzkhosh, M. and Fekrat, F. 2018. The first report on feeding of *Oxycarenus hyalinipennis* and *Aphis fabae* on dodder *Cuscuta campestris* in Iran. Journal of Crop Protection 7(1): 121-124. [Reporting the occurrence of *O. hyalinipennis* (Hemiptera) feeding on capsules of *C. campestris* parasitising *Ziziphus spina-christi*; and *Aphis fabae*, causing severe damage to stems of *C. campestris* on *Dodonaea viscosa.*]

Badu-Apraku, B. and Akinwale, R.O. 2019. Biplot analysis of line × tester data of maize (*Zea mays* L.) inbred lines under stress and nonstress environments. Cereal Research Communications 47(3): 518-530. [Using a GGE biplot technique to identify tester lines TZEEI 13, TZEEI 21 and TZEEI 29 as the most efficient across stress environments (including *Striga* infestation).]

*Baena-Díaz, F., Ramírez-Barahona, S. and Ornelas, J.F. 2018. Hybridization and differential introgression associated with environmental shifts in a mistletoe species complex. Scientific Reports 8(1): 5591. (https://www.nature.com/articles/s41598-018-23707-6) [Microsatellites revealed a high level of admixture (introgression) between *Psittacanthus schiedianus* and *P. calyculatus* (Loranthaceae) because of gene flow following secondary contact in areas of sympatry in Oaxaca and allopatry in Chiapas.]

*Baghyalakshmi Kari, Sarala, K. Prabhakararao, K. and Reddy, D.D. 2019. *Orobanche* menace in crop plants: host resistance as a potential tool to control. Journal of Pharmacognosy and Phytochemistry 2019(SP2): 93-102. (http://www.phytojournal.com/archives/2019/vol8issue2S/PartC/SP-8-2-49-366.pdf) [A quite detailed review of the importance and biology of '*Orobanche*' spp. including their germination, and discussing the breeding of resistance in sunflower to *O. cumana*, in faba bean to *O. crenata*, in tobacco to *O. cernua* in tobacco, and in tomato to *Phelipanche* spp. in tomato, Also the potential for genetic engineering and gene silencing.]

Bahaa, E.S. and Abd El-Fatah. 2019. Inheritance of faba bean resistance to broomrape, genetic diversity and QTL mapping analysis. Molecular Biology Reports 2019(Oct 4): 1-22. (https://link.springer.com/article/10.1007%2Fs11033-019-05101-1#citeas) [Studying F1 and F2 generations from 6 *V. faba* parents, and finding population P5 x P6 (Assiut 125 x Romy 12) to be the most promising for selection for resisance to *Orobanche crenata* in Egypt.]

Bahadur, K.C.K. 2018. Current status, distribution pattern and associations of sandalwood (*Santalum album*) in Pyuthan district of Nepal. The Clarion 7(2): 1-11. [Reviewing the distribution of *S. album* in Nepal (not occurring over 1200 m) and discussing host species and management methods.]

Bai CuiLan, Wang QingHu, Xu YanHua, Han JunSheng and Bao YinPing. 2018. The isolation and structural elucidation of a new iridoid glycoside from *Cymbaria dahurica* L. Zeitschrift für Naturforschung. B, Chemical Sciences 73(6): 377-379. [Presumably of interest in relation to the medicinal uses of *C. dahurica* (Orobanchaceae), e.g in Mongolia.]

Bamba, B., Gueye, M., Ngom, D., Ka, S.L., Diop, B. and Kanfany, G. 2019. (Characterization of local practices of sanio millet [*Pennisetum glaucum* (L.) R. Br] in wet Sudanese zone in Senegal.) (in French) International Journal of Biological and Chemical Sciences 13(2): 1054-1063. [Noting that pearl millet is subject to damage by *Striga hermonthica* in Senegal]

Banerjee, A. and Stefanović, S. 2019. Caught in action: fine-scale plastome evolution in the parasitic plants of *Cuscuta* section *Ceratophorae* (Convolvulaceae). Plant Molecular Biology 100(6): 621-634. [Microsatellites revealed a high level of admixture (introgression) between *Psittacanthus schiedianus* and *P. calyculatus* (Loranthaceae) because of gene flow following secondary contact in areas of sympatry in Oaxaca and allopatry in Chiapas.]

Bàrberi, P. 2019. Ecological weed management in Sub-Saharan Africa: prospects and implications on other agroecosystem services. Advances in Agronomy 15: 219-264. [A review promoting the integration of available control methods for *Striga*.]

*Bari, V.K., Nassar, J.A., Kheredin, S.M., Gal-On, A., Ron, M., Britt, A., Steele, D., Yoder, J. and Aly, R. 2019. CRISPR/Cas9-mediated mutagenesis of CAROTENOID CLEAVAGE DIOXYGENASE 8 in tomato provides resistance against the parasitic weed *Phelipanche aegyptiaca.* Scientific Reports 9(1): 11438. (https://www.nature.com/articles/s41598-019-47893-z) [CRISPR/Cas9 used as an editing tool to alter a gene involved in carotenoid metabolism, leading to lower strigolactone production in tomato plants]

Bascos, E.M.A., Rodriguez, L.J.V., Duya, M.V., Fernando, E.S. and Ong, P.S. 2019. Philippine *Rafflesia*: emerging patterns in floral morphology and distribution. Flora (Jena) 257: 151409. [A key to Philipppine *Rafflesia* species, as was presented by Barcelona et al. in 2011, is presented that now includes the two new species *R. mixta* and *R. consueloae*.]

Bashar K.H.Al-Gburi1, Fadhil H.Al-Sahaf1, Del-Monte2, J.P., Fadhal A.Al-Fadhal1 and Akeel E.Mohammed. 2019. The effect of filaments and seeds on the virulence of *Cuscuta campestris* on eggplant. International Journal of Agricultural and Statistical Sciences 15(1): 79-82. [In an experiment in Iraq, seeds of *C. campetsris* did not germinate but 4g of 10cm lengths of stem infected eggplant.]

*Bell, D.M., Pabst, R.J. and Shaw, D.C. 2019. Tree growth declines and mortality were associated with a parasitic plant during warm and dry climatic conditions in a temperate coniferous forest ecosystem. Global Change Biology (**https://doi.org/10.1111/gcb.14834**) [[Studying the effects of *Arceuthobium tsugense* on the growth and mortality of large (ca. 50cm diameter) *Tsuga heterophylla* in a 500 year old coniferous forest in Washington State, USA over a period of 23 years, and noting that damaging effects of the parasite were greatly amplified by warm, dry conditions.]

Ben Attia, I., Zucca, P., Marincola, F.C., Piras, A., Rosa, A., Chaieb, M. and Rescigno, A. 2018. Chemical composition and antioxidant potential differences between *Cynomorium coccineum* L. growing in Italy and in Tunisia: effect of environmental stress. Diversity 10(3): 53. [Comparing the anti-oxidant qualities of *C. coccineum* from Tunisia and southern Italy and finding significant differences presumed due to differences in climate.]

Bılgen, B.B., Daneshvar, S., Evcı, G., Pekcan, V., Yılmaz, M.I and; Kaya, Y. 2018. Determination of high oleic type and broomrape resistant sunflower hybrids by DNA markers. EKIN, Journal of Crop Breeding and Genetics (4): 22-30. [Identifying SCAR markers (RTS28, RTS29, RTS40 and RTS41) and SSR markers (ORS1036 and ORS1040) as being linked to the *Or*5 gene, providing resistance to all five races (A-E) of *Orobanche cumana*.]

Bisht, A. Kumar, A, Gautam,. R.D. and Arya, R.K. 2019. Breeding of pearl millet (*Pennisetum glaucum* (L.) R. Br.). In: Al-Khayri, J.M. Jain, S.M. and Johnason, D.V. (Eds) Advances in Plant Breeding Strategies: Cereals, pp 165-221. [A comprehensive review including reference to *Striga*-resistance.]

Blanco-Ania, D., Mateman, J.J., Hýlová, A., Spíchal, L., Debie, L.M. and Zwanenburg, B. 2019. Hybrid-type strigolactone analogues derived from auxins. Pest Management Science 75(11): .3113-3121. [8 new compounds synthesised and tested for germination of *S. hermonthica, Orobanche minor* and *Phelipanche ramosa*. Those with with a natural monomethylated D-ring had appreciable to good activity towards the three species and were the most active, while derivatives with the trimethylated D-ring showed no activity and the dimethylated derivatives (2,4-dimethyl and 3,4-dimethyl) were slightly active, especially towards *P. ramosa*.]

Borowicz, V.A., Walder, M.R. and Armstrong, J.E. 2019. Coming undone: hemiparasite presence and effects in a prairie grassland diminish over time. Oecologia 190(3): 679-688. [A ten year experiment traced the effects of *Pedicularis canadensis* on the biodiversity of the associated vegetation, with and without the application of fertilizer.]

Borzouei, S., Sharifi, R. and Moarrefzadeh, N. 2019. Induction of systemic resistance in tomato against broomrape (*Phelipanche aegyptiaca*). Journal of Phytopathology 167(10): 567-575. [Concluding that it was possible to use a mixture of rhizobacteria including *Bacillus pumilus* INR7 and *Lysinibacillus boronitolerans* B124, and defence inducers such as biogenic volatiles as a promising approach in the management of *P. aegyptiaca*.]

Bouwmeester, H. 2018. Can witchweed be wiped out? Science (Washington) 362(6420): 1248-1249. [Referring to the paper by Uraguchi *et al.* (see below) and the discovery of highly potent

germination stimulants, and discussing the possibility of their use to eradicate parasitic weedss of the Orobanchaceae. See Literature Highlight above.]

Briache, F.Z. and 9 others. 2019. Field and controlled conditions screenings of some faba bean (*Vicia faba* L.) genotypes for resistance to the parasitic plant *Orobanche crenata* Forsk. and investigation of involved resistance mechanisms. Journal of Plant Diseases and Protection 126(3): 211-224. [Of 6 genotypes tested, Giza 843, Misr1, and Misr3 genotypes showed moderate resistance to *O. crenata* and 2-4-fold yield increase compared with the susceptible standards thanks to combinations of lower host root density, reduced attachment on host roots and delayed development of infection .]

Bromhead, L.J., Norman, A.R., Snowden, K.C., Janssen, B.J. and McErlean, C.S.P. 2018. Enantioselective total synthesis and biological evaluation of (-)-solanacol. Organic & Biomolecular Chemistry 16(30): 5500-5507. ['Results of seed germination are reported'. No detail in abstract.]

Brun, G., Thoiron, S.. Braem, L., Pouvreau, J.B., Montiel, G., Lechat, M.M., Simier, P., Gevaert, K., Goormachtig, S. and Delavault, P. 2019. CYP707As are effectors of karrikin and strigolactone signalling pathways in *Arabidopsis thaliana* and parasitic plants. Plant, Cell and Environment 42(9): 2612-2626. [In *Phelipanche ramosa*, strigolactone-induced germination was shown to require one of the CYP707A proteins involved in abscisic acid catabolism suggesting that the lack of host-independent germination in obligate parasites is associated with an exacerbated *CYP707A* induction and that CYP707As and WRKY33 are new players involved in a variety of strigolactone/karrikin responses.]

Buheliqianmu Yiming, Saifuding Abula, Chen XueKe, Huanguli Nuerbieke, Chen Kai and Adelijiang Wusiman. 2018. (Effect of polysaccharides extracted from *Orobanche caerulescens* on chicken lymphocyte proliferative ability in vitro.) (in Chinese) China Poultry 40(24): 20-24. [Polysaccharides from *O. caerulescens* had strong effects on the proliferation of splenic lymphocytes and peripheral blood T lymphocytes.]

Bulti Merga and Abdulatif Ahmed. 2019. A review on agricultural problems and their management in Ethiopia. Turkish Journal of Agriculture - Food Science and Technology 7(8): 1189-1202. [Noting that a considerable loss in growth and yield of many food and fodder crops are caused by *Striga hermonthica* and *Orobanche* spp. in Ethiopia.]

Busch, K.B. 2018. Respiration: life without Complex I. Current Biology 28(1): R616-R618. ['Eukaryotic life has developed a fascinating and highly optimized system for energy transduction: the mitochondrial respiratory chain. Typically composed of five core protein complexes, we now learn from two studies (see items by Senkler *et al.* and Maclean *et al.* – see below) that plant hemi-parasites of the *Viscum album* type cope without Complex I, the entry point of the classical respiratory system.']

Cala, A., Zorrilla, J.G., Rial, C., Molinillo, J.M.G., Varela, R.M. and Macías, F.A. 2019. Easy access to alkoxy, amino, carbamoyl, hydroxy, and thiol derivatives of sesquiterpene lactones and evaluation of their bioactivity on parasitic weeds. Journal of Agricultural and Food Chemistry 67(38): 10764-10773. [Outlining the methods for synthesis of a range of new sesquiterpene lactones and the 'significant' activity of some on germination of *Orobanche cumana* and *Phelipanche ramosa*.]

Camarero, J.J., González de Andrés, E., Sangüesa-Barreda, G., Rita, A. and Colangelo, M. 2019. Long- and short-term impacts of a defoliating moth plus mistletoe on tree growth, wood anatomy and water-use efficiency. Dendrochronologia 56; 125598. [Concluding that defoliation by nun moth (*Lymantria dispar*) disposed *Pinus sylvestris* to infection by *Viscum album* ssp. *austriacum*, the combination leading to severe reduction in tree growth (in Spain).]

Camel, V., Arizapana-Almonacid, M., Pyles, M., Galeano, E., Quispe-Melgar, H.R., Ninanya-Parra, Z., Ames-Martínez, F.N., Requena-Rojas, E. and Kessler, M. 2019. Using dendrochronology to trace the impact of the hemiparasite *Tristerix chodatianus* on Andean *Polylepis* trees. Plant Ecology 220(9): 873-886. [In the high Andean forests of Peru, analysis of wood anatomy was used to show that *T. chodatianus* causes a reduction in the vessel density, and an increase in the vessel diameter leading to vulnerability of the parasitized branches to embolisms and cavitation, thus leading to progressive death of the tree crown.]

Caraballo-Ortiz, M.A, and Acevedo-Rodríguez, P. 2019. Clarifying the identity of the enigmatic mistletoe *Cladocolea biflora* (Loranthaceae). Harvard Papers in Botany 24: 119-120. [Based on morphological assessment, the specimen from which *C. biflora* was described is not a mistletoe but instead the hemiparasitic tree *Schoepfia schreberi* (Schoepfiaceae). The taxonomic implications are discussed, and synonymizing *C. biflora* under *S. schreberi* is proposed.]

Cardoso, L.J.T., de Smidt, E. and Braga, J.M.A. 2018/ Reinterpretation of the nomenclatural type of *Archimedea pyramidalis* (Balanophoraceae) with new combination to *Lophophytum*. Phytotaxa 345(3): 279-285.[A reinterpretation of the nomenclatural type of *Archimedea pyramidalis* (Balanophoraceae) is presented that results in the synonymization of *Lophophytum leandrii*. This lectotype is designated and a new combination, *L. pyramidale*, is proposed.]

Cardoso, L.J.T. and Braga, J.M.A. 2018. Typifications and nomenclatural notes on Neotropical Balanophoraceae. Phytotaxa 340(3): 263-270. [Nomenclatural types for nine names of Neotropical Balanophoraceae are designated or clarified here, involving the genera *Helosis, Langsdorffia, Lathrophytum*, and *Scybalium*.]

Carmona Gallego, I., Murillo Serna, J.S., Rincón Barón, E.J. and Alzate Guarín, F.A. 2018. (Comparative leaf anatomy of *Gaiadendron punctatum* and *Tripodanthus belmirensis* (Loranthaceae).) (in Spanish) Acta Biológica Colombiana 23(1): 66-72. [A few leaf anatomical differences, such as idioblasts in *Tripodanthus*, were detected that would allow one to distinguish between these two species.]

Carneiro, L.T., André, C.B.D.S.,Takahasi, A. and Alves-dos-Santos, I. 2019. Interactions between oil-collecting bees and *Krameria grandiflora* (Krameriaceae) with emphasis on the role of specialized floral traits in the mutual fit. Arthropod - Plant Interactions 13(2): 213-226. [Elaiophores showed greater importance than the petals in attracting *Caenonomada* and *Centris* bees. But the petaloid petals seemed to function to some extent jointly with the sepals in pollinator attraction.]

Castillejo, M.A., Fernández-Aparicio, M. and Rubiales, D. 2019. Characterization of defense mechanisms to parasitic plants in the model *Medicago truncatula*. Chapter 5.2.3.1. in de Bruijn, F.J. (Ed.) The Model Legume *Medicago trunatula.* London, UK: Wiley. pp 378-383. (https://doi.org/10.1002/9781119409144.ch47) [Reviewing the use of *M. truncatula* as a model on which to study mechanisms to *Orobanche* and *Phelipanche* spp.]

Castillo-Sánchez, I.L. and Figueroa-Castro, D.M. 2019. Intra-inflorescence variation in reproductive traits of *Conopholis alpina* (Orobanchaceae): effect of flower maturation pattern and resource competition. Plant Ecology 220(7/8): 721-729. [Detailed study of numerous parameters of structural detail in the upper, middle and lower inflorescence showed reproductive traits had the highest values in the middle region of the inflorescence, which is also the first to reach maturity. The results provide strong support towards the existence of differential resource availability among regions within the inflorescence as an explanation to the pattern of intra-inflorescence variation detected.]

Chai YangYang, Kan LianBao and Zhao Min. 2019. Enzymatic extraction optimization, anti-HBV and antioxidant activities of polysaccharides from *Viscum coloratum* (Kom.) Nakai. International Journal of Biological Macromolecules 134: 588-594. [Describing extraction methods and suggesting that *V. coloratum* could be a good potential natural antiviral agent and antioxidant.]

Chen, X., Wicke, S., and 22 others. 2019. Comparative plastome analysis of root- and stem-feeding parasites of Santalales untangle the footprints of feeding mode and lifestyle transitions. Genome Biology and Evolution 12(1): 3663–3676. https://doi.org/10.1093/gbe/evz271. [Covers the trajectory of heterotrophy-related reduction of plastid genomes in different families of the sandalwood order. Phylogenomic-comparative methods reveal the series of genes losses across the order, elevations of subsitutions rates, and increasing biases of DNA composition. The study shows that the independent transitions to a mistletoe habit within Santalales coincides with an apparent parasitic specialization, pronounced as increased dependency on host photosynthates].

Chivandi, E., Moyo, D., Dangarembizi, R. and Erlwanger, K.H. 2018. Effects of dietary *Ximenia caffra* meal on nutrient intake, digestibility, nitrogen balance and growth performance in Sprague Dawley rats modelling monogastrics. Pakistan Journal of Biological Sciences 21(7): 314-322. [Concluding that *X. caffra* meal could be a substitute for soya bean meal, but may be toxic at high levels.]

*Choi InSu, Schwarz, E.N., Ruhlman, T.A., Khiyami, M.A., Sabir, J.S.,M.; Hajarah, N.H., Sabir, M.J., Rabah, S.O. and Jansen, R.K. 2019. Fluctuations in Fabaceae mitochondrial genome size and content are both ancient and recent. BMC Plant Biology 19(448): (25 October 2019). (https://link.springer.com/content/pdf/10.1186%2Fs12870-019-2064-8.pdf) [Four new complete mitochondrial genome sequences were generated for taxa in Cercidoideae, Detarioideae and Caesalpinioideae. The mimosoid clade of the latter has contributed via HGT to the mt genome of *Lophophytum* (Balanophoraceae). Surprisingly, its genome may consist of 87.5% of its mimosoid host.]

*Chun Su, Hai Liu, Wafula, E.K., Honaas, L., de Pamphilis, C.W. and Timko, M.P. 2019. SHR4z, a novel decoy effector from the haustorium of the parasitic weed *Striga gesnerioides,* suppresses host plant immunity. New Phytologist Dec 2019. (https://doi.org/10.1111/nph.16351) [New insights into how a parasitic weed can overcome host defenses by secreting specific proteins into the roots of resistant host cultivars.]

Clarke, C.R,.Timko, M.P., Yoder, J.I., Axtell, M.J. and Westwood, J.H. 2019. Molecular dialog between parasitic plants and their hosts. Annual Review of Phytopathology 57: 279-299. [Reviewing **the current knowledge of how parasitic plants (*Striga, Orobanche* and *Phelipanche* spp.) sense host plants, germinate, form haustoria, and suppress host plant immune responses, and whether parasitic plants fit within the current paradigms used to understand the molecular mechanisms of microbial plant–pathogen interactions. Also discussing challenges facing parasitic plant research and proposing the most urgent questions that need to be answered to advance our understanding of plant parasitism.]**

Cui HongLiang, Dong PanPan Chen Bin. 2019. Effect of total flavonoids of *Cuscuta chinensis* Lam. (Convolvulaceae) on oxidative stress injury in mouse testis and epididymis, and on serum levels of reproductive hormones in oligoasthenospermia mice model. Tropical Journal of Pharmaceutical Research 18(6): 1253-1258. [Results suggest that extracts of *C. chinensis* effectively improve sperm quality and reduce oxidative damage in testes and epididymis of mice with oligoasthenospermia via a mechanism involving the regulation of serum levels of reproductive hormones.]

Cui Ying, Li LingLing, Yang Shu, Wang HongLi, Feng Jing, Ma Kai and Han Deen. 2019. A UHPLC-Q-Exactive-Orbitrap-MS method for simultaneous determination of three flavonoids from parasitic loranthus and their pharmacokinetics in rat plasma. Tropical Journal of Pharmaceutical Research 18(10): 2175-2182. [Relating to a Chinese herbal preparation based on an unspecified '*Loranthus*'.]

Cusimano, N. and Renner, S.S. 2019. Sequential horizontal gene transfers from different hosts in a widespread Eurasian parasitic plant, *Cynomorium coccineum*. American Journal of Botany 106(5): 679-689. [Transfer of multiple genes from various host species to the widespread *Cynomorium coccineum* reveals a degree of host specialization and a directionality in the expansion of parasite's distribution range.]

da Silva, J.A.T., Kher, M.M., Soner, D. and Nataraj, M. 2019. Red sandalwood (*Pterocarpus santalinus* L. f.): biology, importance, propagation and micropropagation. Journal of Forestry Research 30(3): 745-754. (https://link.springer.com/article/10.1007/s11676-018-0714-6) [Reviewing the status of the endangered *P. santalinus* in India and China, valued for its red wood and fragrance.]

da Silva-Leite, K.E.S. and 10 others. 2018. *Ximenia americana* heteropolysaccharides ameliorate inflammation and visceral hypernociception in murine caerulein-induced acute pancreatitis: involvement of CB2 receptors. Biomedicine & Pharmacotherapy 106: 1317-1324. [Showing that the polysaccharides in *X. americana* contain heteropolysaccharides that inhibit inflammation and hypernociception in mice with caerulein-induced acute pancreaitis by a mechanism involving type 2 cannabinoid receptors.]

Dafaalah, A.B. 2019. Biology and physiology of witchweed (*Striga* spp.): a review. International Journal of Academic Multidiscilinary Research (IJAMR) 3(10): 42-51. [A general review.]

Dafaalah, A.B 2020.Variability and host specificity of *Striga hermonthica* (Del.) Benth. in response to in-situ root exudates of *sorghum bicolor* (L.) Moench. Journal of Research in Weed Science 3(2): 238-253. [Confirming that different populations of *S. hermonthica* in Sudan are specific either to sorghum or to millet. Among sorghum varieties, Abu-70 and Wad Ahmed were most susceptible while the least susceptible was Hakika.]

Danzeng, Zhang Li and Luo Jian. 2019. (Newly recorded species of angiosperm from Tibet.) (in Chinese) China. Acta Botanica Boreali-Occidentalia Sinica 39(8): 1509-1512. [Including *Pedicularis scolopax.*]

Das, T.K., Ghosh, S., Gupta, K., Sen, S., Behera, B. and Raj, R. 2020. The weed *Orobanche*: species distribution, diversity, biology and management. Journal of Research in Weed Science 3(2): 162-180. [A general review of the problems caused by *Orobanche* and *Phelipanche* spp. several species being damaging to crops in India.]

*Dasgupta, M.G., Ulaganathan, K., Dev, S.A. and Balakrishnan, S. 2019. Draft genome of *Santalum album* L. provides genomic resources for accelerated trait improvement. Tree Genetics and Genomes 15(3): 34. (https://link.springer.com/article/10.1007/s11295-019-1334-9) [‘The draft genome presented in this study has provided additional genomic resource for *S. album* for subsequent research in population diversity estimation and accelerated trait breeding in this species.’]

*Dawud, M.A. 2019. Striga resistance in cereal crops: recent progress and future prospects. A review. Global Journal of Science Frontier Research june 2017. (https://journalofscience.org/index.php/GJSFR/article/view/2007). [This review presents an overview of recent advances in research on *Striga* in cereals and potential prospects using a variety of genomic tools with a final aim of crop improvement.]

de Menezes, I.R.A. and 12 others, 2019. *Ximenia americana* L. enhances the antibiotic activity and inhibit the development of kinetoplastid parasites. Comparative Immunology, Microbiology & Infectious Diseases 64: 40-46. [‘The low cytotoxic and biological potential against *Staphylococcus aureus* open therapeutic perspectives against leishmaniosis and bacterial infections.]

Dieni, Z., Batieno, T.B.J., Barro, A., Zida, F.M.W.S., Tignegre, J.B.delaS. and Dzidzienyo, D. 2019. Diallel analysis of cowpea [*Vigna unguiculata* (L.) Walp.] for seed size, and resistance to *Alectra vogelii* Benth. International Journal of Biological and Chemical Sciences 13(3): 1496-1509. [Both additive and non-additive gene actions were operative for the investigated characters, seed size and resistance to *A. vogelii*. Additive gene effects were more important, resulting in high narrow sense heritability inferring that breeding progress can be achieved through backcross or single seed descent method.]

Dieni, Z. and 10 others. 2019. Farmers' perception of the parasitic weed *Alectra vogelii* Benth. and their cowpea varietal preferences in Burkina Faso. African Journal of Agricultural Research 14(31): 1390-1399. [*A. vogelii* causes up to 100% yield loss in some areas. Farmers' preferred traits where it occurs is for short-season cowpea varieties with large size, rough and white grain. However, erect varieties were selected in Koupela and Tenkodogo districts; prostrate varieties were preferred in Toussiana district. *Striga gesnerioides* also occurs.]

Drabo, I., Zangre, R.G., Danquah, E.Y,; Ofori, K., Witcombe, J.R. and Hash, C.T. 2019. Identifying farmers' preferences and constraints to pearl millet production in the Sahel and North-Sudan zones of Burkina Faso. Experimental Agriculture 55(5): 765-775. [A detailed survey noting that the major constraints for farmers include *Striga hermonthica*, second only to drought. Other important preferences in relation to e.g crop head type were also noted which all need to be considered in any breeding programme for *Striga* resistance.]

Dupau, P. 2018. Hydrogenation towards synthetic sandalwood odorants in fragrance industry. Helvetica Chimica Acta 101(12): e1800144.

Duriez, P. and 18 others. 2019. A receptor-like kinase enhances sunflower resistance to *Orobanche cumana*. Nature Plants 5(12)**:** 1211–1215. (https://doi.org/10.1038/s41477-019-0556-z) [Quantitative genetics and mapping in sunflower identified one resistance gene named HaOr7. It is a membrane receptor-like kinase that prevents attachment of *O. cumana* to the sunflower roots and confers resistance to race F.].

Dvorakova, M., Hylova, A., Soudek, P., Petrova, S. and Spichal, L. Vanek, T. 2019. Triazolide strigolactone mimics as potent selective germinators of parasitic plant *Phelipanche ramosa*. Pest Management Science 75(7): 2049-2056. [Triazolide

strigolactone mimics were highly active on *P. ramosa* but not on *Striga hermonthica*.]
Dyankova, S., Doneva, M., Solak, A. and Metodieva, P. 2018. Comparative analysis of extracts from some medicinal plants used in traditional Bulgarian medicine. Journal of Mountain Agriculture on the Balkans 21(3): 172-183. [Including *Viscum album*. The amount of extracted substances in the samples depends on the type of raw material and the ethanol concentration.]
*Elekofehinti, O.O., Kamdem, J.P., Saliu, T.P., Famusiwa, C.D., Boligon, A. and Rocha, J.B.T. 2019. (https://www.sciencedirect.com/science/article/pii/S0378874119307640?via%3Dihub) [Improvement of mitochondrial function by *Tapinanthus globifer* (A.Rich.) Tiegh. against hepatotoxic agent in isolated rat's liver mitochondria. Journal of Ethnopharmacology 242: pp.112026. [Compounds in *T. globifer* enhance mitochondrial redox signaling and possess mitochondrial function improving potential, thereby, providing scientific basis for its use in traditional medicine for the management of liver disease.]
Elsayed, A.K., Matsuo, K., Kim WangGyu, Uechi, N., Yukawa, J., Gyoutoku, N. and Tokuda, M. 2018. A new *Asphondylia* species (Diptera: Cecidomyiidae) and a eulophid wasp (Hymenoptera) inducing similar galls on leaf buds of *Schoepfia jasminodora* (Schoepfiaceae), with reference to their ecological traits and a description of the new gall midge. Entomological Science 21(3): 324-339. [A detailed study of the gall midge *A. tojoi* and of a hymenopteran *Ceratoneura* sp. each causing similar galls on *S. jasminodora*.]
Emam, R.A. 2018. Influence of chemicals and mechanical control methods on parasite dodder (*Cuscuta planiflora*) controlling in clover (*Trifolium alexandrinum* L.) crops. Journal of Plant Protection and Pathology, Mansoura Univ. 9(10): 691-695. [Optimum treatment for control of *C. planiflora* in *T. alexandrinum* in Egypt was pendimethalin 500 ml/fedan 7 days after sowing.]
Emİnağaoğlu, Ö., Beğen, H.A. and Aksu, G. 2018. (The flora of Karadağ (Yusufeli, Artvin-Turkey).) (in Turkish) Artvin Çoruh Üniversitesi Orman Fakültesi Dergisi 19(1): 93-113. [Including 9 spp. of Orobanchaceae - *Pedicularis wilhelmsian, P. pontica, Rhinanthus serotinus subsp. aestivalis, Rhynchocorys elephas R. stricta, Lathraea squamaria, Orobanche sp.,Euphrasia pectinata and Bungea trifida.*]
Endharti, A.T., Sulastri, E., Umanailo, R., Yunialce, Nurseta, T. and Handono, K. 2018. Mango mistletoe *Dendrophthoe pentandra* leaf extract acts synergistically with 5-Fluorouracil to induce apoptosis and increase p21 expression in human cervical adenocarcinoma HeLa cells by reducing survivin expression. Journal of Applied Pharmaceutical Science 8(7): 10-15. [This study indicates that the combination of a *D. pentandra* extract with 5-fluoracil has a synergistic effect to enhance apoptosis and p21 expressions by decreasing of survivin in HeLa cells.]
Espinoza-Zúñiga, P., Ramírez-Dávila, J.F., Cibrián-Tovar, D., Villanueva-Morales, A., Cibrián-Llanderal, V.D., Figueroa-Figueroa, D.K. and Rivera-Martínez, R. 2019. (Modeling the spatial distribution of true mistletoe (Santalales: Loranthaceae) in the green areas of Tlalpan, Mexico Delegation.) (in Spanish) Bosque 40(1): 17-28. [Describing the complex factors affecting the distribution of *Cladocolea loniceroides* occurring on hosts *Populus tremuloides, Populus alba, Ulmus parvifolia, Fraxinus uhdei* and *Schinus terebinthifolia. Struthanthus interruptus* and *Phoradendron velutinum* also occurred.]
Essem, F., Ohlson, E.W., Asare, A.T. and Timko, M.P. 2019. Genetic markers linked to *Striga gesnerioides* resistance for the improvement of Ghanaian cowpea (*Vigna unguiculata*) cultivars. Plant Breeding 138(5): 599-604. [Identifying the markers in cowpea linked to resistance to the Ghana race of *S. gesnerioides*.]
Ezuruike, U.F., Chieli, E. and Prieto, J.M. 2019. In vitro modulation of glibenclamide transport by P-glycoprotein inhibitory antidiabetic African plant extracts. Planta Medica 85(11/12) 987-996. [Including mention of *Ximenia americana* and *Cassytha filiformis*, of interest as anti-diabetic treatments in Nigeria.]
Fan XiaoLi, Chen Yue, Li Li, Wang Yang, Zhang Yi, Lu Shan, Zhu DanYang and Sheng MeiXiao. 2019. Efficacy of Chinese herb Cistanche Yishen granules in treatment of tinnitus for patients with chronic nephritis. Journal of Cellular Biochemistry 120(4): 5505-5509. [Tinnitus loudness and annoyance were significantly decreased after treatment with Cistanche Yishen (perhaps *C. deserticola*).]
Fang YanYan, Liu Jian, Wan Lei, Xin Ling, Dong WenZhe and Wen JianTing. 2019. Chinese herbs for Pi invigorating, dampness resolving, Shen benefiting, and

collaterals dredging treated 323 ankylosing spondylitis patients: a cohort study. Chinese Journal of Integrated Traditional and Western Medicine 39(5): 553-556. [*Taxillus chinensis* could reduce the occurrence of endpoint events in ankylosing spondylitis patients.]

Farrokhi, Z., Alizadeh, H. and Alizadeh, H. 2019. Developmental patterns of enzyme activity, gene expression, and sugar content in sucrose metabolism of two broomrape species. Plant Physiology and Biochemistry 142: 8-14. [Pre and post emergence states of both Egyptian and branched broomrape species were analyzed for their metabolism, providing new perspectives for management strategies.]

Farrokhi, Z., Alizadeh, H., Alizadeh, H. and Mehrizi, F.A. 2019. Host-induced silencing of some important genes involved in osmoregulation of parasitic plant *Phelipanche aegyptiaca.* Molecular Biotechnology 61(12): 929-937. [Indication of three host genes in tomato plants that can be targeted for the development of resistance against parasitic weeds.]

Fathin, A.N. and Ratnaningrum, Y.W.N. 2018. The differences in floral structures of three sandalwood variants in one of Gunung Sewu (Indonesia) population, and their consequences on visitor diversity and visitation rate. Biodiversitas: Journal of Biological Diversity 19(3): 1097-1101. [Describing 3 sandalwood landraces varying in flower colour (‘yellow big flower’ YBF; ‘red big flower’ RBF; and ‘red small flower’ RSF.) YBF was visited more by coleopterans and hemipterans, while both RBF and RSF were visited more by hymenopterans. The dipterans and lepidopterans visited both yellow and red flowers at a similar rate. The bigger flowers of RBF and YBF received more visits than RSF.]

Felenda, J.E., Gruber, K., Pacifico, S., Turek, C., Beckmann, C. and Stintzing, F.C. 2019. (Investigations of willow mistletoe on various human tumor cell lines in vitro.) (in German) Zeitschrift für Phytotherapie 40(3): 112-119. [Noting that neuro-epithelial tumor cells and bronchial carcinoma cells showed a good response to *Viscum album*.]

Franco-Maass, S., Arredondo-Ayala, G.M., Cruz-Balderas, Y. and Endara-Agramont, A. 2019. The use of dye plants in a Mazahua community in central Mexico. Economic Botany 73(1): 13-27. [Referring to the use of unspecified *Cuscuta* species as a source of dye.]

French, K.E., Harvey, J. and McCullagh, J.S.O. 2018. Targeted and untargeted metabolic profiling of wild grassland plants identifies antibiotic and anthelmintic compounds targeting pathogen physiology, metabolism and reproduction. Scientific Reports 8(1): 1695. [Recording the compounds benzoic acid, myricetin, p-coumaric acid, rhamnetin, and rosmarinic acid, having antimicrobial/anthelmintic properties in a range of species including *Rhinanthus minor*.]

Frezza, C. and 14 others. 2019. *Pedicularis* L. genus: systematics, botany, phytochemistry, chemotaxonomy, ethnopharmacology, and other. Plants 8(9): 306. [A comprehensive review of the genus, with particular emphasis on phytochemistry and ethnopharmacology.]

Fu YanWei, Dou XiaoWen, Zhang Lei, Qin Jiaan, Yang MeiHua and Luo JiaoYang. 2019. A comprehensive analysis of 201 pesticides for different herbal species-ready application using gas chromatography-tandem mass spectrometry coupled with QuEChERs. Journal of Chromatography, B 1125: 121730. (https://www.sciencedirect.com/science/article/abs/pii/S1570023219307111) [Describing a procedure for detecting pesticide residues in herbal medicines? Including reference to ‘Cuscutae Semen’.]

Fujioka, H., Samejima, H., Mizutani, M., Okamoto, M. and Sugimoto, Y. 2019. How does *Striga hermonthica* bewitch its hosts? Plant Signaling and Behaviour 14(7): pp.1605810. [Suggesting that the phytohormone abscisic acid in the rhizosphere could, at least in part, contribute to the bewitching effects, disrupt host immunity and promote commencement of parasitism.]

Gamar, Y.A., Bakhit, O.A., Murdi, H.G. and Adam, E.M. 2018. Assessment of *Striga* resistance in wild relatives of sorghum under field conditions. Journal of Agricultural Sciences, Belgrade 63(4): 367-377. (http://www.doiserbia.nb.rs/img/doi/1450-8109/2018/1450-81091804367G.pdf) [Comparing 55 lines of wild sorghum (*S. bicolor* ssp. *verticilliflorum* and *S. bicolor* ssp. *drummondii*) and finding apparently significant differences in *Striga* emergence, mostly lower than SRN-39, but numbers very low?]

Gasura, E., Setimela, P., Mabasa, S., Rwafa, R., Kageler, S. and Nyakurwa, C. 2019.

Response of IITA maize inbred lines bred for *Striga hermonthica* resistance to *Striga asiatica* and associated resistance mechanisms in southern Africa. Euphytica 215(10): 151. [Identifying a number of the IITA-selected *Striga*-resistant lines with potential value for breeding maize with resistance to *S. asiatica* in Zimbabwe.]

Gea-Izquierdo, G., Férriz, M., García-Garrido, S., Aguín, O., Elvira-Recuenco, M., Hernandez-Escribano, L., Martin-Benito, D. and Raposo, R. 2019. Synergistic abiotic and biotic stressors explain widespread decline of *Pinus pinaster* in a mixed forest. Science of the Total Environment 685: 963-975. [Concluding that drought stress, and hence less dense foliage, predisposed *P. pinaster* to infection by *Viscum album* and the combination was leading to serious decline (in Spain).]

Gebauer, R., Albrechtová, P., Plichta, R. and Volařík, D. 2019. The comparative xylem structure and function of petioles and twigs of mistletoe *Loranthus europaeus* and its host *Quercus pubescence*. Trees: Structure and Function 33(3): 933-942. [A detailed study of the conductive tissue in twigs and petioles of *L. europaeus* and its host. Those of the parasite are notably narrower, yet specific hydraulic conductivities were similar in both species.]

Gholamreza Mohammadi. 2019. Can soil microorganisms reduce broomrape (*Orobanche* spp.) infestation in cropping systems? In: Vivek Kumar *et al.* (Eds) Microbiome in Plant Health and Disease: Challenges and Opportunities. Springer. pp. 385-402. [A general review of *Orobanche* and *Phelipanche* spp. and the potential for their biocontol by microorganisms.]

Goldwasser, Y., Rabinovitz, O., Hayut, E., Kuzikaro, H., Sibony, M. and Rubin, B. 2019. Selective and effective control of field dodder (*Cuscuta campestris*) in chickpea with granular pendimethalin. Weed Technology 33(4): 586-594. [Confirming that granular pendimethalin provides excellent control of *C. campestris* at a half dose without damage to chickpea, leading to higher crop yield than the recommended dose (doses not specified in the abstract).]

Goyet, V., Wada, S., Cui, S.,Wakatake, T., Shriasu, K., Montiel, G., Simier,, P. and Yoshida, S. 2019. Haustorium inducing factors for parasitic Orobanchaceae. Frontiers in Plant Science (29 August 2019). (https://doi.org/10.3389/fpls.2019.01056) [Reviewing available information on haustorium-inducing factors for parasitic weeds including quinones and phenolics and noting the additional activity of the cytokinins.]

Hagos Kidane and Tsehaie Berhane. 2018. (User guideline on *Orobanche* resisant faba bean varieties.) (in Tigrinya) Technical Guideline No. 1. Alamata Research Center, Tigray, Ethiopia. 20 pp. [Noting that in ten years since *O. crenata* became a problem in parts of Tigray, Ethiopia, there has been up to 99% loss of the faba bean crop. It had previously been a major and important faba bean producing area. The manual describes that a resistant variety Hashenge has enabled farmers to produce 2.7 t/ha. It also provides basic information on its cultivation and on the biology of *O. crenata* . With thanks to Dr Fasil Reda for providing translation.]

Han XiaoXu and 9 others. 2019. Protective effects of Astragalin on spermatogenesis in streptozotocin-induced diabetes in male mice by improving antioxidant activity and inhibiting inflammation. Biomedicine & Pharmacotherapy 110: 561-570. [Concluding that astragalin from *Cuscuta chinensis* is a potential beneficial agent to protect diabetic-induced spermatogenic dysfunction in male mice by increasing antioxidant activities and inhibiting inflammation.]

Hargreaves, A.L. and Eckert, C.G. 2019. Local adaptation primes cold-edge populations for range expansion but not warming-induced range shifts. Ecology Letters 22 (1): 78-88. [Based on studies with *Rhinanthus minor* in Canada. [Authors have used *Rhinanthus minor* populations to test two contrasting predictions concerning the parasite's distribution range under scenarios influenced by climate change]

Hashemi, Z., Ebrahimzadeh, M.A. and Khalili, M. 2019. Sun protection factor, total phenol, flavonoid contents and antioxidant activity of medicinal plants from Iran. Tropical Journal of Pharmaceutical Research 18(7): 1443-1448. [Finding significant antioxidant activuty in extracts of *Orobanche orientalis*.]

Hayat, S., Wang, K., Liu, B., Wng, Y., Chen, F., Li, P., Hayat K. and Yonqing Ma. 2020. A two-year simulated crop rotation confirmed the differential infestation of broomrape species in China is associated with crop-based biostimulants. Agronomy 10(1): article18. [Sunflower in Xinjiang Uygur region of China is being increasingly infested by *Phelipanche* *aegyptiaca*. The rotational crops wheat, sugar beet and pepper fail to stimulate germination of *P. aegyptiaca* while they do stimulate *Orobanche cumana* – hence the failure or this parasite to build up here.]

He TianZhu, Xin Yu, Song Yan, Wang WeiNan and Sui DianJun. 2019. (Protective effects of S*alvia miltiorrhiza-santalum album* extracts against mice myocardial ischemia injury induced by isoprenaline.) (in Chinese) Journal of Jilin Agricultural University 41(2): 192-198. [*S. album* was mainly effective as an oxidant, but acted synergistically with *Salvia miltiorrhiza* in the treatment of myocardial ischemia.]

Høeg, H.I., Henningsmoen, K.E. and Sørensen, R. 2019. (Late-glacial and Holocene vegetation development in southeastern Norway presented in a 14C-dated standard pollen diagram.) (in Norwegian) Blyttia 77(2): 103-115. [Recording the presence of *Viscum album* in mixed *Quercus/Tilia/Fraxinus* forest from 7,600 years ago.]

*Hwang WooYeon, Kang MiHyun, Lee SeulKi, Yeom JiSu and Jung MinHyung. 2019. Prolonged stabilization of platinum-refractory ovarian cancer in a single patient undergoing long-term mistletoe extract treatment: case report. Medicine (Baltimore) 98(8) e14536. (https://www.ncbi.nlm.nih.gov/pubmed/30813160) [Results suggest that mistletoe extract (presumably from *Viscum album* ssp. *coloratum*) can produce favorable outcomes in patients with platinum-refractory ovarian cancer.]

Hýlová, A., Pospíšil, T., Spíchal, L., Mateman, J.J., Blanco-Ania, D. and Zwanenburg, B. 2019. New hybrid type strigolactone mimics derived from plant growth regulator auxin. Conference paper : New Biotechnology 48: 76-82. [Auxins were coupled with the butenolide D-ring, with or without an extra methyl group in the vicinal C2 or C3 positions. Those without the methyl groups showed good activity and it is suggested could be of value for stimulating suicidal germination if the field.]

Jadika, T., Kankolongo, M., Tshizembe, M., Banga, M.B. and Bongali, B. 2018. (Evaluation of maize varieties (*Zea mays* L.) for their striga resistance or tolerance in the province of Kasaï Oriental in R.D Congo.) (in French) Journal of Applied Biosciences 130: 13213-13219. [A rare report of *Striga hermonthica* as a problem in Congo. Identifying maize varieties TZE-Y-DTC4 STR C5, TZE-Y-DTC4 STR C4 and KATOKI WA LUKASA as having useful degrees of resistance or tolerance.]

Jia JianXin, Yan XuSheng, Song Wei, Fang Xin, Cai ZhiPing, Huo DongSheng, Wang He and Yang ZhanJun. 2018. The protective mechanism underlying phenylethanoid glycosides (PHG) actions on synaptic plasticity in rat Alzheimers disease model induced by beta amyloid 1-42. Journal of Toxicology and Environmental Health. Part A 81(21): 1098-1107. [Data suggest that the protective effects of PHG on synaptic plasticity may involve inhibition of cytotoxicity-mediated by Aβ-1-42 administration and reduction of oxidant stress.]

Jiang ZhiHui, Zhou Bo, Li XinPing, Kirby, G.M. and Zhang XiaoYing. 2018. Echinacoside increases sperm quantity in rats by targeting the hypothalamic androgen receptor. Scientific Reports 8(1) 3839. [Results demonstrate that echinacoside (from *Cistanche* spp.) blocks androgen receptor activity in the hypothalamus to increase the quantity of sperm and protect against oligoasthenospermia in rats.]

Johnson, N.R.and Axtell, M.J. 2019. Small RNA warfare: exploring origins and function of trans-species microRNAs from the parasitic plant *Cuscuta.* Current Opinion in Plant Biology 50: 76-81. [Showing that an unspecified *Cuscuta* sp. exchanges diverse macromolecules with its hosts. Also that *trans*-species microRNAs from *Cuscuta* regulate host genes. The genes encoding these microRNAs could originate from horizontal-gene transfer events. Extracellular vesicles are one possible mechanism for how *trans*-species microRNAs are delivered to the host.]

Jokinen, J.I. and Irving, L.J. 2019. Effects of light level and nitrogen supply on the red clover-*Orobanche minor* host-parasite interaction. Plants 8(6): 146. [Parasitism by *O. minor* caused reductions in host leaf mass, area, photosynthetic rates and shoot N concentration, but did not affect starch accumulation.]

Jueya, S., Mony, R. and Djieto-Lordon, C. 2019. Ants associated to Loranthaceae in an agroecosystem based on cocoa trees in Nkolbisson (Yaounde: Cameroon). Journal of Agricultural Science (Toronto) 11(8): 90-99. [*Tetramorium acculeatum* found to be the dominant ant species on both *Phragmanthera capitata* (mainly on cocoa) and *Tapinanthus preussii* on *Dacryodesedulis* and other forest tree species. 34 other ant species were also identified. They forage during the mistletoes' flowering and fruiting and 'participate in the flowers fall'.]

Jung SeHui, Kim JaeHyun, Eum JuneYong, Choe JungWon, Kim HakHyun, Kee Yun, Lee KooYeon. 2019. Velutin, an aglycone extracted from Korean mistletoe, with improved inhibitory activity against melanin biosynthesis. Molecules 24(14): 2549. [Confirming that the natural compound velutin, extracted from *Viscum album coloratum* improved the efficacy of melanin biosynthesis inhibition with little toxicity.]

Kamara, A.Y., Ewansiha, S.U. and Tofa, A.I. 2019. Yield, N uptake and N utilization of early maturing, drought and *Striga*-tolerant maize varieties under low N conditions. Communications in Soil Science and Plant Analysis 50(4): 373-387. [Finding that *Striga*-tolerant maize varieties bred for drought resistance also had good tolerance of low N conditions.]

Kawada, K., Takahashi, I., Arai, M., Sasaki, Y., Asami, T., Yajima, S. and Ito, S. 2019. Synthesis and biological evaluation of novel triazole derivatives as strigolactone biosynthesis inhibitors. 2019. Journal of Agricultural and Food Chemistry 67(22): 6143-6149. [Synthesis of new and more effective triazole derivates that inhibit strigolactone biosynthesis in rice and *Arabidopsis*.]

Khaled, A.A.A., El-Menofy, E.M., Nessem, A.A. and Elhaak, M.A. 2019. The allelopathy potential and glyphosate influence on anatomical features of Egyptian clover plant (*Trifolium alexandrinum* L.) infested with dodder weed (*Cuscuta campestris* L.). Fresenius Environmental Bulletin 28(2A): 1273-1280. [Recording benefits to *T. alexendrinum* from treatments of glyphosate with and without extracts of *Amaranthus* sp. or rice to reduce infestation by *Cuscuta campestris*. No yield info in abstract.]

Khodaie, L., Delzar, A. and Nazemiyeh, H. 2019. Biological activities and phytochemical study of *Pedicularis wilhelmsiana* Fisch ex. from Iran. Iranian Journal of Pharmaceutical Research 18(1): 339-347. [Identifying a range of metabolites in *P. wilhelmsiana* which could explain its antibiotic properties.]

Khound, N.J. and Bharali, R.K. 2018. Biosorption of fluoride from aqueous medium by Indian sandalwood (*Santalum album*) leaf powder. Journal of Environmental Chemical Engineering 6(2): 1726-1735. [Results indicated that *S. album* leaf powder might be an effective adsorbent for treatment of water contaminated with fluoride.]

Kim ChulWoo, An ChanHoon, Lee HyunSeok, Yi JaeSeon, Cheong EunJu, Lim SangHyun and Kim HeeYeon. 2019. Proximate and mineral components of *Viscum album* var. *coloratum* grown on eight different host tree species. Journal of Forestry Research 30(4): 1245-1253. [Reporting differing components in Korean mistletoe *V. album* ssp. *coloratum,* according to host plant of the parasite, which included *Prunus mandshurica* and *Chaenomeles sinensis*.]

Kim, H.T.;,Shin ChangHo, Sun Hang and Kim JooHwan. 2018. Sequencing of the plastome in the leafless green mycoheterotroph *Cymbidium macrorhizon* helps us to understand an early stage of fully mycoheterotrophic plastome structure. Plant Systematics and Evolution 304(2): 245-258. [Plastome of four species of the mycoheterotroph orchid genus *Cymbidium* have been sequenced and compared, suggesting no direct evidence of functionality loss in photosynthesis related genes]

.Kirilova, I., Hristeva, T., Bozhinova, R., Denev, I., Docheva, M. and Yonchev, Y. 2018. Molecular detection of beneficial hyphal soil-born microorganisms in different soil types in areas infested with parasitic broomrapes - *Orobanche cumana* Wallr. and *Phelipanche ramosa* L. in Bulgaria. Journal of BioScience and Biotechnology 7(2/3): 63-71. [The soils at numerous sites infested by *O. cumana* or *P. ramosa* were found by molecular detection to be populated most commonly by *Glomus intraradices* and *G. mosseae*. Five *Streptomyces* spp.were also identified, namely *S. ambofaciens, S. aureocirculatus, S. carnosus, S. fasciculatus* and *S. griseorubens*. Other genera included *Penicillium, Trichoderma, Fusarium* and *Mucor.* The results could contribute to a new strategy for using beneficial hyphal microorganisms to control parasitic weeds.]

Kitis, Y.E., Grenz, J.H. and , J. 2019. Effects of some cereal root exudates on germination of broomrapes (*Orobanche* spp. and *Phelipanche* spp.) Mediterranean Agricultural Sciences 32(2): 145-150. [A range of cereal species were tested for their ability to stimulate *Orobanche crenata, O. cumana* and *Phelipanche ramsoa*. Maize (var. Amadeo) was the most active and *P. ramosa* the most sensitive to stimulation. Oat was also quitea ctive on *P. ramosa*, while wheat, barley, rye, rice, sorghum and pearl millet (single varieties in each case.) were least effective.]

Kleszken, E., Laslo, V. and Vicaş, S.I. 2019. Spectrophotometric quantification of green pigments and total carotenoids from mistletoe grown on different host trees. Natural Resources and Sustainable Development 9(1): 27-33. [Showing significant variations in chlorophyll and carotenoids in *Viscum album* growing on 4 hosts, apricot, hawthorn, willow and *Rubus*, and between spring and winter, in Romania.]

*Konarska, A. and Chmiellewski, P. 2019. Taxonomic traits in the microstructure of flowers of parasitic *Orobanche picridis* with particular emphasis on secretory structures. Protoplasma 2019: 1-19 (https://doi.org/10.1007/s00709-019-01438-3) [A very detailed study of the sepals, petals, stamens and pistils and the ultra-structure of nectaries and glandular trichomes of *O. picridis* in Poland. Also identifying the metabolites including polyphenols, lipids, polysaccharides and alkaloids.]

***Kountche, B.A., Novero, M., Muhammad Jamil, Asami, T., Bonfante, P. and Al-Babili. S. 2018. Effect of the strigolactone analogs methyl phenlactonoates on spore germination and root colonization of arbuscular mycorrhizal fungi. Heliyon 4(11): e00936. (https://www.sciencedirect.com/science/article/pii/S2405844018326616) [New phenolactonates , MP1 and MP3 shown to inhibit germination of mycorrhizal spores but encourage root colonization by fugal hyphae more than GR24, hence promising for field use to trigger suicidal germination.]**

Lallemand, F.;,Martin-Magniette, M.L., Gilard, F., Gakière, B., Launay-Avon, A., Delannoy, É. and Selosse, M.A. 2019. In situ transcriptomic and metabolomic study of the loss of photosynthesis in the leaves of mixotrophic plants exploiting fungi. Plant Journal 98(5): 826-841. [Rather than decisive metabolic innovations, it is suggested that the evolution towards mycoheterotrophy in orchids is more likely to be reliant on the versatility of plant metabolism and an ability to exploit fungal organic resources, especially amino acids, to replace missing photosynthates.]

*Lázaro-González, A., Hódar, J.A. and Zamora, R. 2019. Mistletoe generates non-trophic and trait-mediated indirect interactions through a shared host of herbivore consumers. Ecosphere 10(3): e02564. (https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.2564) [Concluding from studies involving three other parasites of *Pinis nigra* (a sap-sucker and two folivores) that overall, *Viscum album* ssp. *austriacum* generates non-trophic interaction linkages in the forest able to modify community structure by becoming a nexus of the entire herbivore community of the pine canopy.]

Le ChiToan, Liu Bing, Barrett, R.L., Lu LiMin, Wen Jun and Chen ZhiDuan. 2018. Phylogeny and a new tribal classification of Opiliaceae (Santalales) based on molecular and morphological evidence. Journal of Systematics and Evolution 56(1): 56-66. [This molecular phylogenetic study recovered essentially the same relationships as already published previously (Su et al. 2015). 24 morphological characters were mapped onto this tree, a new tribal classification was proposed, and a key to all genera was provided.]

Lee, D.J., Burridge, A.J., Page, T., Huth, J.R. and Thompson, N. 2019. Domestication of northern sandalwood (*Santalum lanceolatum,* Santalaceae) for indigenous forestry on the Cape York Peninsula. Australian Forestry 82(No.Suppl. 1): 14-22. [Exploring the potential for developing an industry based on *S. lanceolatum* in conjunction with the indigenous people in the far north of Queensland, Australia.]

Lee ShiouYih, Dhilia Udie Lamasudin and Rozi Mohamed. 2019. Rapid detection of several endangered agarwood-producing Aquilaria species and their potential adulterants using plant DNA barcodes coupled with high-resolution melting (Bar-HRM) analysis. Holzforschung 73(5): 435-444. [Noting *Santalum album* among several species as a potential adulterant detected by DNA barcoding with high-resolution melting analysis.]

Lee YunGyoo, Jung INa, Koo DongHoe, Kang DuYoung, Oh TaeYoon, Oh SukJoong and Lee SeungSei. 2019. Efficacy and safety of *Viscum album* extract (Helixor-M) to treat malignant pleural effusion in patients with lung cancer. Supportive Care in Cancer 27(5): 1945-1949. [Concluding that a pleurodesis with *V. album* extract was an effective and tolerable procedure for controlling malignant pleural effusions in lung cancer patients.]

Lepší, M. and Lepší, P. 2018. (Records of interesting and new plants in the South Bohemian flora XXIV.) (in Czech) Sborník Jihočeského Muzea v Českých Budějovicích, Přírodní Vědy 58: 5-26. [Species recorded include *Orobanche minor, Lathraea squamaria* and *Thesium alpinum*.]

Li EnLiang, Mao YunLing, Zhou Jiang, Liu YongGuo, Chang EnFu, Li Ya, Li YongPeng and Jing YueBo. 2019. (Physical-chemical properties of different growing media and its effects on seedling emergency percentage of *Melientha longistaminea*.) (in Chinese) Journal of West China Forestry Science 48(3): 127-132. [Describing the optimal ratio of coffee compost, forest compost and forest humus for the germknation and establishment of *M. longistaminata* (Opiliaceae).]

Li JuanJuan, Yang Chong, Liu Hui, Cao MengTing, Yan GuiJun, Si Ping, Zhou WeiJun and Xu Ling. 2019. 5-aminolevolinic acid enhances sunflower resistance to *Orobanche cumana* (broomrape). Industrial Crops and Products 140: 111467. [5-aminolevolinic acid enhanced sunflower resistance to *O. cumana* by promoting antioxidant defence systems, reducing ROS levels, decreasing cellular damage and regulating the expressions of stress related genes.]

Li WenJun, Su ZhiHao, Li AiRong, Guan KaiYun and Feng Ying. 2019. Isolation and characterization of 18 microsatellites for the invasive native *Pedicularis kansuensis* (Orobanchaceae). Grassland Science 65(2): 135-138. [Synthesis of new and more effective triazole derivates that inhibit strigolactone biosynthesis in rice and *Arabidopsis*.]

*Li Xi, Feng Tao, Randle, C. and Schneeweiss, G.M. 2019. Phylogenetic relationships in Orobanchaceae inferred from low-copy nuclear genes: consolidation of major clades and identification of a novel position of the non-photosynthetic *Orobanche* clade sister to all other parasitic Orobanchaceae. Frontiers in Plant Science 10(July): 902. (https://www.frontiersin.org/articles/10.3389/fpls.2019.00902/full) [56 taxa (in 30 genera) were analyzed using nuclear ITS, PHYA, PHYB, chloroplast matK and rps2, three low-copy nuclear genes and two pentatricopeptide repeat genes. There was considerable incongruence between the newly and previously generated markers. Unlike previous studies where the *Cymbaria-Siphonostegia* clade was sister to all parasites in the family, this study places this clade internally with the hemiparasites. This shift in position then places the Orobanche clade as sister to the remaining members of Orobanchaceae.]

Li Ya, Li EnLiang, Mao YunLing, Zhou Jiang, Liu YongGuo, Chang EnFu, Li YongPeng and Jing YueBo. 2019. (Effects of growing media on seedling performance of *Melientha longistaminea*.) (in Chinese) Journal of Northeast Forestry University 47(3): 8-11. [*M. longistaminea* (= *Champereia manillana*) (Opiliaceae) is valued as a food and as a medicine in E. Asia. Identifying the optimum combinations of coffee husk, humus and forest soil for its growth.]

Li Yang, Peng Ying, Ma Ping, Wang MengYue, Peng ChongSheng, Tu PengFei and Li XiaoBo. 2019. *In vitro* and *in vivo* metabolism of *Cistanche tubulosa* extract in normal and chronic unpredictable stress-induced depressive rats. Journal of Chromatography, B 1125: 121728, (https://www.sciencedirect.com/science/article/abs/pii/S1570023218318324) ['The results of this study laid the foundation for understanding the metabolic process and therapeutic mechanism of *C. tubulosa*'s antidepressant property.']

*Li Yang and 9 others. 2018. Antidepressant-like effects of *Cistanche tubulosa* extract on chronic unpredictable stress rats through restoration of gut microbiota homeostasis. Frontiers in Pharmacology 9 (August): 967. (https://www.frontiersin.org/articles/10.3389/fphar.2018.00967/full)

Li YongPeng, Jing YueBo, Mao JiHua, Li RongBo and Li SunLing. 2019. (Root hemiparasitic characteristics of *Malania oleifera*.) (in Chinese) Journal of West China Forestry Science 48(4): 1-6. [*M. oleifera)* (Olacaceae), an endangered endemic in China, can survive without a host but grows poorly. Showing that *Chlorophytum comosum* is a suitable host on which it can grow more vigorously.]

*Li ZiYan, Zhang ChunHong, Ren GuanYao, Yang Min, Zhu ShouDong and Li MinHui. 2019. Ecological modeling of *Cistanche deserticola* Y.C. Ma in Alxa, China. Scientific Reports 9(1): 13134. (https://www.nature.com/articles/s41598-019-48397-6.pdf) [Determining the climatic and soil characteristics optimal for the content of the most important composition of *C. deserticola* for medicinal use.]

Licona-Vera, Y. ,Ortiz-Rodriguez, A.E., Vásquez-Aguilar, A.A. and Ornelas, J.F. 2018. Lay mistletoes on the Yucatán Peninsula: post-glacial expansion and genetic differentiation of *Psittacanthus mayanus* (Loranthaceae). Botanical Journal of the Linnean Society 186(3): 334-360. [Phylogeographical analysis of a mistletoe species highlights the influence of Pleistocene events in shaping genetic variation in Neotropical lowland forest, providing opportunities for further investigation of the evolution of Mexican biodiversity].

Lindman, L.Y., Remm, J., Meister, H. and Tammaru, T. 2018. Host plant and habitat preference of the endangered *Euphydryas maturna* (Lepidoptera: Nymphalidae): evidence from northern Europe. Ecological Entomology 43(1): 102-113. [This butterfly species is threatened due to the disease threat to its main host, *Fraxinus excelsior.* Confirming that this butterfly may lay eggs on *Melampyrum pratense* but that this host may be less important in Estonia than in Finland.]

Lio, F.X.S. and Dewi, M.P.S. 2018. Karst vegetation in the natural habitat of sandalwood (*Santalum album*) at various altitude places in Timor Island, Indonesia. Biodiversitas: Journal of Biological Diversity 19(5): 1703-1713. [Surveying the natural vegetation in the main areas of growth of *S. album* in South Central Timor.]

Liu Bing, Chi Toan Le, Barrett, R.L., Nickrent, D.L., Chen ZhiDuan, Lu LiMin and Vidal-Russell, R. 2018. Historical biogeography of Loranthaceae (Santalales): diversification agrees with emergence of tropical forests and radiation of songbirds. Molecular Phylogenetics and Evolution 124: 199-212. [Nuclear and chloroplast gene data were used to address divergence times and ancestral area reconstruction for Loranthaceae whose crown group originated in Australasian Gondwana during the Paleocene to early Eocene (53–66 Ma). Aerial parasitism evolved from root parasitsm ca. 50 Ma during the Eocene climatic optimum. Subsequently, Loranthaceae were widespread in Australasia and South America; the African and European members being derived later from Asiatic lineages. The burst of diversification of Loranthaceae can be correlated with climatic optima that coincide with the dominance of tropical forests and the rapid radiation of many bird families.]

Liu Jing, Yang Yang, Wei HaiYan, Zhang QuanZhong, Zhang XuHui, Zhang XiaoYan and Gu Wei. 2019. Assessing habitat suitability of parasitic plant *Cistanche deserticola* in Northwest China under future climate scenarios. Forests 10(9): 823. [Studying the climatic factors affecting the distribution of *C. deserticola* and its main host *Haloxylon ammodendron*.]

Liu WenJing, Song QingQing, Yan Yu, Liu Yao, Li Peng, Wang YiTao, Tu PengFei, Song YueLin and Li Jun. 2018. Integrated approach for confidence-enhanced quantitative analysis of herbal medicines, *Cistanche salsa* as a case. Journal of Chromatography, A 1561: 56-66.

Liu ZhongXuan, Liu XueFeng, Dong AiRong, Deng ShiLin and Ling Ma. 2019. First report of *Seimatosporium falcatum* causing branch and leaf spots of *Viscum coloratum* in China. Journal of Plant Diseases and Protection 126(3): 265-267.

Lobulu, J., Shimelis, H., Laing, M. and Mushongi, A.A. 2019. Maize production constraints, traits preference and current *Striga* control options in western Tanzania: farmers' consultation and implications for breeding. Acta Agriculturæ Scandinavica, Section B - Soil & Plant Science 69(8): 734-746. [Noting that 93% of farmers in the surveyed areas name *Striga* as a major constraint, either *S hermonthica* or *S. asiatica* or both, yet there are few effective control methods in use. Recommending that crop breeding for *Striga* resistance should take into consideration the full range of the farmers' requirements including drought and insect resistance.]

Lonardi, S. and 22 others. 2019. The genome of cowpea (*Vigna unguiculata* [L.] Walp.). Plant Journal 98(5): 767-782. [A comprehensive description of the genome of *V. unguucilata*, noting the identification of an inversion of 4.2 Mb among landraces and cultivars, which includes a gene that has been associated in other plants with interactions with the parasitic weed *Striga gesnerioides*.]

Lopez, L., Bellis, E.S., Wafula, E., Hearne, S.J., Honaas, L., Ralph, P.E., Timko, M.P., Unachukwu, N., de Pamphilis, C.W. and Lasky, J.R. 2019. Transcriptomics of host-specific interactions in natural populations of the parasitic plant purple witchweed (*Striga hermonthica*). Weed Science 67(4) 397-411. [Despite low levels of host-based genome-wide differentiation in *S. hermonthica* infesting sorghum and maize in Nigeria, a set of parasite transcripts were identified specifically associated with each host. Parasite genes in several different functional categories implicated as important in host-parasite interactions differed in expression level and allele on different hosts, including genes involved in nutrient transport, defense and pathogenesis, and plant hormone response.]

López-Ortega, M., Pérez-Rodríguez, P., Pérez-Staples, D. and Díaz-Fleischer, F. 2019. Patterns of oviposition and feeding in the monophagous fly *Anastrepha spatulata* (Diptera: Tephritidae) on its larval host plant *Schoepfia schreberi*. Environmental Entomology 48(5): 1178-1186. [Results indicate that female *A. spatulata* use different foraging tactics during the fruiting season and confirm that, in this case, the host plant *S. schreberi* (Schopfiaceae/Olacaceae) is not the center of activity.

Lukacova, Z., Svubova, R., Janikovicova, S., Volajova, Z. and Lux, A. 2019. Tobacco plants (*Nicotiana benthamiana*) were influenced by silicon and were not infected by dodder (*Cuscuta europaea*). Plant Physiology and Biochemistry 139: 179-190. [Silicon applied as a seed priming, applied to the soil, or to the foliage almost completely prevented *C. europaea* infestation on tobacco, presumably due to changes in cell wall properties in epidermis and cortex. Tobacco growth was enhanced in some seed priming and soil treatments but reduced in foliar treatments.]

Luo YaTing, Qiu QiWei and Cui XianLiang. 2019. (Effects of light quality and seed size on fourteen species of plants in Puer region.) (in Chinese) Guangxi Zhiwu / Guihaia 39(7): 959-966. [The germination percentage of *Osyris quadripartita* was highest and fastest in white or red light and least in blue light or dark.]

Maclean, A.E., Hertle, A.P., Ligas, J., Bock, R., Balk, J. and Meyer, E.H. 2018. Absence of complex I is associated with diminished respiratory chain function in European mistletoe. Current Biology 28(10): 1614-1619. [Showing that oxidative phosphorylation in *Viscum album*, is highly diminished. Complex I activity and protein subunits of complex I could not be detected. The levels of complex IV and ATP synthase were at least 5-fold lower than in a non-parasitic plant whereas alternative dehydrogenases and oxidases were higher in abundance.]

Malaník, M., Daňková, I., Pokorná, M., Gazdová, M. and Šmejkal, K. 20-19. Iridoid aglycones from the underground parts of *Lathraea squamaria*. Biochemical Systematics and Ecology 86: 103928.

Mamudu, A.Y., Baiyeri, K.P. and Echezona, B.C. 2019. Effect of cropping system, seed treatment and planting date on *Striga hermonthica* infestation and growth and yield of sorghum. African Journal of Agricultural Research 14(29): 1254-1261. [The results from trials in Nigeria showed that *S. hermonthica* emergence was significantly delayed in sorghum variety ICSV1002, sorghum intercropped with soyabean and sorghum soaked with 66 g/L *Parkia* concentrate compared to other treatments.]

Mandrone, M., Bonvicini, F., Lianza, M., Sanna, C., Maxia, A., Gentilomi, G.A. and Poli, F. 2019. Sardinian plants with antimicrobial potential. Biological screening with multivariate data treatment of thirty-six extracts. Industrial Crops and Products 137: 557-565. [*Cytinus hyocistis* among several species showing 'remarkable inhibitory activity towards bacterial strains from clinical specimens and presenting different antibiotic-resistance profiles.']

Manyasi, C.N., Ochieno, D.M.W., Muyekho, F.N., Muoma, J.V.O., Pamela, M.M. and Naluyange, V. 2018. Soil maize cultivar-related challenges on *Striga hermonthica* infested fields in Western Kenya. Journal of Plant Studies 7(2): 41-48. [Lowest *Striga* numbers and highest yields were associated with white-seed commercial variety Duma, and with DAP + CAN fertilizer. Water hyacinth compost containing Effective Microbes^{TM} (HEM) allowed high *Striga* emergence but gave higher yields than cattle manure.]

Mapunda, E.P. and Mligo, C. 2019. Nutritional content and antioxidant properties of edible indigenous wild fruits from Miombo woodlands in Tanzania. International Journal of Biological and Chemical Sciences 13(2): 849-860. [Concluding that the local fruits studied, including those from *Ximenia caffra* could be be used as valuable sources of nutrients and vital natural antioxidant to human diets.]

Martinčová, M., Kaštier, P., Krasylenko, Y.A., Gajdoš, P., Čertík, M., Matušíková, I. and Blehová, A. 2019. Species-specific differences in architecture and chemical composition of dodder seeds. Flora (Jena) 256: 61-68. [Showing that *Cuscuta europaea* and *C. monogyna* each have special endosperm architecture and different seed coat thickness.

Histochemical staining also revealed peculiar storage compounds composition and localisation in seeds. Starch deposits occurred directly beneath *C. europaea* testa, while only in the embryo in *C. monogyna*.]

Masi, M., Fernández-Aparicio, M., Zatout, R., Boari, A., Cimmino, A. and Evidente, A. 2019. Inuloxin E, a new seco-eudesmanolide isolated from *Dittrichia viscosa*, stimulating *Orobanche cumana* seed germination. Molecules 19: 3479. (https://www.mdpi.com/.../pdf) [Both inuloxins D and E induced germination of *O. cumana*, but were inactive on *O. minor* and *Phelipanche ramosa*. The germination activity of some hemisynthetic esters of inuloxin D was also investigated.]

*Mathiasen, R.L. 2019. Susceptibility of red fir and white fir to fir dwarf mistletoe (*Arceuthobium abietinum*) in California. Forest Pathology 49(3): e12516 (https://doi.org/10.1111/efp.12516). [A careful study confirming that the forms of *A. abietinum* f. sp. *magnificae* and *concoloris* are highly specific to red fir and white fir respectively.]

Mathiasen, R.L. 2019. Susceptibility of Coulter pine (*Pinus coulteri*) to western dwarf mistletoe (*Arceuthobium campylopodum*) in southern California. Forest Pathology 49(5): e12543. (The results indicate that Coulter pine should be classified as a principal host of *A. campylopodum* and not as a secondary host as previously reported.]

Mbasani-Mansi, J., Briache, F.Z., Ennami, M., Gaboun, F., Benbrahim, N., Triqui, Z.E.A. and Mentag, R. 2019. Resistance of Moroccan lentil genotypes to *Orobanche crenata* infestation. Journal of Crop Improvement 33(3): 306-326. [Among 17 genotypes, VO8 was the most susceptible and LR9 and VO8 were the most resistant, but how resistant, not clear from abstract.]

Mehanna, E.T., El-Sayed, N.M., Ibrahim, A.K., Ahmed, S.A. and Abo-Elmatty, D.M. 2018. Isolated compounds from *Cuscuta pedicellata* ameliorate oxidative stress and upregulate expression of some energy regulatory genes in high fat diet induced obesity in rats. Biomedicine & Pharmacotherapy 108: 1253-1258. [The study suggests a beneficial role of *C. pedicellata* in reducing insulin resistance, oxidative stress and enhancing energy expenditure.]

Mellado, A., Hobby, A., Lázaro-González, A. and Watson, D.M. 2019. Hemiparasites drive heterogeneity in litter arthropods: implications for woodland insectivorous birds. Austral Ecology 44(5): 777-785. [Suggesting that unspecified mistletoe in Spain (presumably *Viscum album*) results in changes in the litter and its arthropod complex which can favour insectivorous birds.]

Menke, K., Schwermer, M., Schramm, A. and Zuzak, T.J. 2019. Preclinical evaluation of antitumoral and cytotoxic properties of *Viscum album* Fraxini extract on pediatric tumor cells. Planta Medica 85(14/15): 1150-1159. [Concluding that the extract of *V. album* 'abnobaVISCUM Fraxini' 'might be a potential remedy for the supportive treatment of neuroblastoma.']

Menkir, A. and Meseka, S. 2019. Genetic improvement in resistance to *Striga* in tropical maize hybrids. Crop Science, 59(6): 2484-2497. (https://dl.sciencesocieties.org/publications/cs/abstracts/59/6/2484) [Reviewing the performance of maize hybrids from before the 1990s and since the 1990s when breeding for polygenic resisance to *S. hermonthica* had resulted in 64% higher yields, 61% less *Striga*.]

Merchaoui, H., Ben Mansour, R., Oueslati, M., Medini, F., Hanana, M. and Ksouri, R. 2019. A comparative evaluation of total polyphenolic content and antioxidant potential of thirty medicinal halophytes from the Mediterranean region. Journal of Agricultural Science and Technology 21(6): 1433-1446. [Noting a particularly high content of polyphenols and anti-oxidants in *Cynomoriumcoccineum*.]

*Misra, V.A., Wafula, E.K., Wang Yu, de Pamphilis, C.W. and Timko, M.P. 2019. Genome-wide identification of MST, SUT and SWEET family sugar transporters in root parasitic angiosperms and analysis of their expression during host parasitism. BMC Plant Biology 19(196): (14 May 2019). (https://bmcplantbiol.biomedcentral.com/articles/10.1186/s12870-019-1786-y) [Identify potential targets to further investigations of the nutrient transport process in three parasitic weed plants.]

Mohankumar, A., Kalaiselvi, D., Levenson, C., Shanmugam, G., Thiruppathi, G., Nivitha, S. and Sundararaj, P. 2019. Antioxidant and stress modulatory efficacy of essential oil extracted from plantation-grown *Santalum album* L. Industrial Crops and Products 140: 111623.

Mohapatra, S.R., Bhol, N. and Nayak, R.K. 2019. Standardization of nursery media and sowing time for germination of sandalwood

(*Santalum album* L.) seed. Indian Forester 145(8): 752-756. [Describing results from 8 different sowing media, with seeds with and without seed coats.]

Moniodis, J., Renton, M., Jones, C.G., Barbour, E.L. and Byrne, M. 2018. Genetic and environmental parameters show associations with essential oil composition in West Australian sandalwood (*Santalum spicatum*). Australian Journal of Botany 66(1): 48-58.

Moon JeongMin, Chung YounJee, Chae Boah, Kang HeeJin, Cho HyunHee, Kim JangHeub and Kim MeeRan. 2018. Effect of mistletoe on endometrial stromal cell survival and vascular endothelial growth factor expression in patients with endometriosis. International Journal of Medical Sciences (Sydney) 15(13): 1530-1536. [Concluding that extracts of mistletoe have anti-angiogenic activity on endometrial stromal cells and thus have potential for the treatment of endometriosis. Extraordinarily, the full paper makes no attempt to identify the species, but references suggest it was referring to *Viscum album*.]

Moradzadeh, M., Hosseini, A., Rakhshandeh, H., Aghaei, A. and Sadeghnia, H.R. 2018. *Cuscuta campestris* induces apoptosis by increasing reactive oxygen species generation in human leukemic cells. Avicenna Journal of Phytomedicine (AJP) 8(3): 237-245.

Morimoto, M. 2019. Chemical defense against insects in *Heterotheca subaxillaris* and three Orobanchaceae species using exudates from trichomes. Pest Management Science 75(9): 2474-2481. [Glandular trichomes of *Parentucellia viscosa* showed insect antifeedant activity. Non-biologically active secondary metabolites produced by *P. latifolia* and *Bellardia trixago* were presumed to act as physical defenses due to their viscosity.]

Mrema, E., Shimelis, H. and Laing, M.D. 2019. Combining ability of yield and yield components among *Fusarium oxysporum* f.sp. *strigae* compatible and *Striga*-resistant sorghum genotypes. Acta Agriculturae Scandinavica, Section B - Soil & Plant Science Oct 2019. (DOI: 10.1080/09064710.2019.1674915) [100 hybrid sorghum lines evaluated in Tanzania in *Striga*- infested situations with and without *F. oxysporum* inoculation, identifying families with potential as genetic resources for breeding and integrated *Striga* management.]

Muhammad Qaiser and Anjum Perveen. 2019. Pollen morphology of the genus *Pedicularis* L. Orobanchaceae from Pakistan and Kashmir and its taxonomic implications. Pakistan Journal of Botany 51(5): 1809-1818. [On the basis of exine ornamentation four distinct pollen types viz., *P. albida*-type, *P. oederi*-type, *P. bicornuta*-type, and *Pedicularis roylei*-type were recognized but little correlation was found between the infrageneric classification and the pollen type.]

Muniyandi Kasipandi, Ayyapan Manikandan, Sreeja, P.S., Thamburaj Suman, Sathyanarayanan Saikumar, Sivaraj Dhivya and Thangaraj Parimelazhagan. 2019. Effects of *in vitro* simulated gastrointestinal digestion on the antioxidant, α-glucosidase and α-amylase inhibitory activities of water-soluble polysaccharides from *Opilia amentacea* roxb fruit. LWT - Food Science and Technology 111: 774-781. [Concluding that the bioactive potential of *O. amentacea* (used as a traditional medicine in West Africa) as an antioxidant and antihyperglycemic, which could be considered as a promising candidate for functional foods.]

Murage, A.W., Pittchar, J.O., Midega, C.A.O., Onyango, C.O., Pickett, J.A. and Khan, Z.R. 2019. Gender appropriateness of field days in knowledge generation and adoption of push-pull technology in eastern Africa. East African Agricultural and Forestry Journal 83(4): 289-306. [Concluding that women were more receptive than men to training in the push-pull technique for control of *Striga*.]

Nabiabad, H.S.. Amini, M. and Kianersi, F. 2019. *Ipomoea batatas*: papain propeptide inhibits cysteine protease in main plant parasites and enhances resistance of transgenic tomato to parasites. Physiology and Molecular Biology of Plants 25(4): 933-943. [Transgenic tomato containing an inhibitory propeptide derived from sweet potato and some other sources were found to be relatively resistant to *Orobanche cernua* and *Cuscuta chinensis* due to defective haustorial connections.]

Ng, F.S P. 2019. Is *Rafflesia* an angiosperm? Journal of Tropical Forest Science 31(3): 286-297. [This sad paper attempts to make the case that *Rafflesia* is not an angiosperm by comparing various morphological features (androecium, gynoecium, fruit, seed) to “typical” flowering plants and then, given their unusual nature, stating that those features are not homologous. All of this flies in the face of molecular and developmental work that clearly shows Rafflesiaceae is part of Malpigiales. Some of that literature is cited but apparently discounted.]

Nge, F.J., Ranathunge, K., Kotula, L., Cawthray, G.R. and Lambers, H. 2019. Strong host specificity of a root hemi-parasite (*Santalum acuminatum*) limits its local distribution: beggars can be choosers. Plant and Soil 437(1/2): 159-177. [*S. acuminatum* showed much stronger growth in association with *Acacia saligna* than with 17 other potential hosts.]

Nisha Singh and Nishith Dharaiya. 2019. Feeding patterns of Indian Giant Flying Squirrel (*Petaurista philippensis,* Elliot 1839) with reference to seasonal variation in Central Gujarat, India. Journal of Forestry Research 30(5): 1959-1965. [Identifying *Dendrophthoe falcata* as a secondary food source for *P. philippensis*.]

Nsor, C.A., Godsoe, W. and Chapman, H.M. 2019. Promiscuous pollinators - evidence from an Afromontane sunbird-plant pollen transport network. Biotropica 51(4): 538-548. [Noting the dependence of *Globimetula braunii* on sunbirds for pollination.]

Olsen, S. and Krause, K. 2019. A rapid preparation procedure for laser microdissection-mediated harvest of plant tissues for gene expression analysis. Plant Methods 15(88): (02 August 2019). (https://plantmethods.biomedcentral.com/articles/10.1186/s13007-019-0471-3) [*Cuscuta reflexa* growing on its compatible host plant *Pelargonium zonale* were sectioned using a vibratome and dried on glass slides at 4°C before laser microdissection. The expression levels of two parasite genes previously found to be highly expressed during host plant infection were shown to differ individually between specific regions of the infection site. By drying plant sections under low pressure to reduce the dehydration the induced expression of two wound-related genes during preparation was avoided.]

Osathanunkul, M. 2019. eDNA-based monitoring of parasitic plant (*Sapria himalayana*). Scientific Reports 9(9161):1-5. [Environmental DNA (eDNA) was used to monitor for the presence of this rare *Sapria* species from soil samples. Species specific primers and qPCR was used and *Sapria* DNA was detected in all sites where the parasite was known to occur and none of the sites where it was not known. This technique could have use in conservation management.]

Ouattara, Z.A., Sangaré, N., Mamyrbekova-Bekro, A.J., Békro, Y.A., Tomi, P., Paoli, M., Bighelli, A. and Tomi, F. 2018. Composition and chemical variability of essential oils isolated from aerial parts of *Cassytha filiformis* from Côte d'Ivoire. Natural Product Communications 13(2): 217-218. [Determining various compounds in *C. filiformis*, mainly sesquiterpenes.]

Ozturk, M., Coskuner, K.A., Usta, Y., Serdar, B. and Bilgili, E. 2019. The effect of mistletoe (*Viscum album*) on branch wood and needle anatomy of Scots pine (*Pinus sylvestris*). IAWA Journal 40(2): 352-365. [*V. album* ssp. *austriacum* caused major reductios in the double wall thickness, lumen area, tangential lumen area and radial lumen area of the tracheids in the wood and a decrease in vascular area in the needles.]

*Pan Da, Schönswetter, P., Moser, T., Vitek, E. and Schneeweiss, G.M. 2019. Ancestral remnants or peripheral segregates? Phylogenetic relationships of two narrowly endemic *Euphrasia* species (Orobanchaceae) from the eastern European Alps. AoB Plants 11(2) plz007. (https://academic.oup.com/aobpla/article/11/2/plz007/5345136) [The diploid autogamous species *Euphrasia inopinata* and *E. sinuata* are morphologically similar to allopolyploid *E. minima*. ITS and AFLP analysis, however, shows they are peripheral segregates of the widespread diploid allogamous *E. alpina*.]

Park InKyu, Song JunHo, Yang SungYu, Kim WookJin, Choi GoYa and Moon ByeongCheol. 2019. *Cuscuta* species identification based on the morphology of reproductive organs and complete chloroplast genome sequences. International Journal of Molecular Sciences 20(11): 2726. (https://www.mdpi.com/1422-0067/20/11/2726/htm) [Dried seeds from some *Cuscuta* species are used in Korean traditional medicine, hence means to distinguish *C. japonica* from *C. chinesis* morphologically is given. The complete plastome sequences of these species is also given and compared to other dodder plastomes.]

Parul Bhargava, Ravindra, N. and Gyan Singh. 2018. A modified and improved protocol development for *in vitro* clonal propagation of *Santalum album* L. from internodal explants. Tropical Plant Research 5(2): 193-199.

Patel, B.P. and Singh, P.K. 2018. *Viscum articulatum* Burm. f.: a review on its phytochemistry, pharmacology and traditional uses.Journal of Pharmacy and Pharmacology 70(2): 159-177. [Reviewing the traditional uses of *V. articulatum* in Chinerse and Ayurvedic medicine against hypertension, ulcer, epilepsy, inflammation, wound nephrotoxicity. Major bioactive phytochemicals include oleanolic acid, betulinic acid, eriodictyol, naringenin, β-amyrin acetate and visartisides,]

Pelzer, F. and Tröger, W. 2018. Complementary treatment with mistletoe extracts during chemotherapy: safety, neutropenia, fever, and quality of life assessed in a randomized study. Journal of Alternative and Complementary Medicine 24(9/10): 954-961. [Confirming that extracts of *Viscum album* used in conjunction with chemotherapy had no adverse effects and alleviated some of the symptoms from the chemotherapy.]

Phiri, C.K., Kabambe, V.H,; Bokosi, J. and Mumba, P. 2019. Screening of *Alectra vogelii* ecotypes on legume and non-legume crop species in Malawi. South African Journal of Plant and Soil 36(2): 137-142. [*A. vogelii* parasitized mainly soybean, groundnut, *Phaseolus* bean, Bambara nut and cowpea. Emergence of the parasite differed somewhat on Bambara nuts, pigeon pea and flax, according to the source of the *A. vogelii* seed. Green gram, chickpea, quinoa and sunflower were resistant.]

Pointurier, O., Gibot-Leclerc , S., Le Corre, V., Reibvel, C., Strbik. F. and Colbach, N. 2019. Intraspecific seasonal variation of dormancy and mortality of *Phelipanche ramosa* seeds. Weed Research 59(6):407-418. [Samples of *O. ramosa* from a rapeseed host and from hemp were buried 30cm deep and sampled at 6 week intervals over 2 years. When retrieved and tested with GR24 they showed variation in germination over the season with maximum around the time of crop sowing and least towards harvest time. Spontaneous germination (without stimulant) was high for samples from hemp but very low for those from rapeseed. Viability declined by ony 4-7% per year.]

Pompermaier, L., Schwaiger, S., Mawunu, M., Lautenschlaeger, T. and Stuppner, H. 2019. Development and validation of a UHPLC-DAD method for the quantitative analysis of major dihydrochalcone glucosides from *Thonningia sanguinea* VAHL. Planta Medica 85(11/12): 911-916. [Confirming high contents of dihydrochalcone glucosides, including the two bioactive constituents thonningianin A and B, presumed to be responsible for the antidiabetic use of *T. sanguinea* in Angola.]

Potapov, G.S. and Kolosova, Yu.S. 2018. Distribution and habitat preference of *Bombus (Kallobombus) soroeensis* (Fabricius, 1777) on the territory of Arkhangelsk Region. Arctic Environmental Research 18(2): 66-70. [Recording *B. soroeensis* on *Rhinanthus minor*.]

Priyanka Chauhan, Mamta Sharma, Radha and Sunil Puri. 2019. Phytochemical screening of *Acorus calamus* Linn. and *Cuscuta reflexa* Roxb. Annals of Agri Bio Research 24(1): 33-35. [Finding a wide range of constituents which could have medicinal use but nothing specific.]

Punia, S.S., Yadav, D.B., Vinod Maun, Manjeet and Todarmal Punia. 2019. Biology and large scale demonstration for management of *Orobanche aegyptiaca* in mustard. Indian Journal of Weed Science 51(3): 266-269. [Confirming that glyphosate at 25 and 50 g/ha could give substantial control of *O. aegyptiaca* but no indication of safety in abstract.]

Purohit, C.S. 2019. A note on some rare plants of Rajasthan reported from Todgarh-Raoli Wildlife Sanctuary. International Journal of Forest Usufructs Management 20: 36-45. [Including taxonomic description, distribution and economic importance of *Dendrophthoe falcata*.]

Qasem, J.R. 2019. Branched broomrape (*Orobanche ramosa* L.) control in tomato (*Lycopersicon esculentum* Mill.) by trap crops and other plant species in rotation. Crop Protection 120: 75-83 . [44 species tested as trap crops to reduce *O. ramosa* in glasshouse-grown tomatoes. *Ecballium elaterium* reduced *O. ramosa* by 56% and improved crop dry weight by 126%. From the average of two experiments, high tomato growth and best parasite control (73% reduction) were obtained after *Vigna sinensis*.]

Qasem, J.R. 2019. Weed seed dormancy: the ecophysiology and survival strategies. In: Dormancy and Germination. DOI: 10.5772/intechopen.88015 [Including quite detailed sections on germination of stimulants, and inhibitors, of parasitic weeds *Striga, Orobanche* etc.]

Qu, X.-J., Fan, S.-J., Wicke, S., and Yi T. S.2019. Plastome reduction in the only parasitic gymnosperm *Parasitaxus* is due to losses of photosynthesis but not housekeeping genes and apparently involves the secondary gain of a large inverted repeat.. Genome Biology and Evolution 11(10): 2789–96. https://doi.org/10.1093/gbe/evz187. [Provides DNA sequence data for *Parasitaxus* and shows that the trajectory of heterotrophy-related reduction of its plastid differs from known patterns of parasitic flowering plants]

Rabiu, A. 2018. Use of cassia (*Cassia obtusifolia*) green manure and nitrogen rates for striga (*Striga hermonthica* Del Benth) management in sorghum (*Sorghum bicolor* (L) Moench) in Sudan savanna, Nigeria. International Journal for Research in Applied Science and Engineering Technology 6(8): 401-407. [Comparing 0, 40 and 80 kg N/ha with and without two levels of *C. obtusifolia* green manure. Highest yields and least *S. hermonthica* recorded at 80 kg N. Green manure apparently gave little benefit but abstract not clear.]

Rakhshanda Akhtar and Anwar Shahzad. 2019. Morphology and ontogeny of directly differentiating shoot buds and somatic embryos in *Santalum album* L. Journal of Forestry Research 30(4): 1179-1189. [Describing suitable culture media for the regeneration of differentiating shoot buds and somatic embryos in *S. album.*]

Ravazzolo, L., Trevisan, S., Manoli, A., Boutet-Mercey, S., Perreau, F. and Quaggiotti, S. 21209. The control of zealactone biosynthesis and exudation is involved in the response to nitrogen in maize root. Plant and Cell Physiology 60(9): 2100-2112. [Showing that the inhibition of zealactone production observed in response to nitrate and ammonium would contribute to the regulation of lateral root development as well as to increased germination of *Phelipanche ramosa.*]

*Rehberg, N. and 9 others. 2019. 3-*O*-Methyl-alkylgallates inhibit fatty acid desaturation in *Mycobacterium tuberculosis*. Antimicrobial Agents and Chemotherapy 63(9): pp.e00136. [Confirming moderate bactericidal effect of 3-*O*-methyl-butylgallate from '*Loranthus micranthus*' (= *Englerina gabonensis* = *L. micrantherus*) against *M. tuberculosis* acting synergistically with isoniazid leading to sterilization in liquid culture.]

*Rezanejad, A., Ravanbakhsh, H. and Kartoolinejad, D. 2019. (Relationship between abundance/infection intensity of dwarf mistletoe (*Arceuthobium oxycedri* (DC.) M. Bieb.) and qualitative and quantitative characteristics of the host tree, physiographic conditions, and soil erosion.) (in Persian) Iranian Journal of Forest and Poplar Research 27(1): Pe64-Pe75. (http://ijfpr.areeo.ac.ir/article_119182_8394a04181f05104138d8e2f505acada.pdf) [Results suggest that *Juniperus excelsa* with broader canopy, higher collar diameter, and taller height are more prone to parasitism by *A. oxycedri* in Iran.]

Řezanka, T., Kolouchová, I., Nedbalová, L. and Sigler, K. 2018. Enantiomeric separation of triacylglycerols containing very long chain fatty acids. Journal of Chromatography, A 1557: 9-19. [Describing the extraction and identification of TAGs from various sources including from *Ximenia americana* and discussing possible biosynthetic pathways.]

Ricco, M. V. And 10 others. 2019. Establishment of callus-cultures of the Argentinean mistletoe, *Ligaria cuneifolia* (R. et P.) Tiegh (Loranthaceae) and screening of their polyphenolic content. Plant Cell, Tissue and Organ Culture 138(1): 167-180. [Confirming the presence of quercetin glycosides and phenolic acids in the methanolic extracts of *L. cuneifolia* and the callus obtained from embryo culture. *L. cuneifolia* extracts are claimed to have hypolipemic, antioxidant, antibacterial, and immunomodulatory effects.]

Rim ChaiHong, Koun SooNil, Park HaeChul, Lee Suk and Kim ChulYong. 2019. Radioprotective effects of mistletoe extract in zebrafish embryos in vivo. International Journal of Radiation Biology 95(8): 1150-1159. [Concluding that 'Abnoba Viscum Q' (an extract from *Viscum album* on oak?) might be a new candidate radioprotectant to enhance cancer radiotherapy efficacy.]

Rowntree, J.K. and Craig, H. 2019. The contrasting roles of host species diversity and parasite population genetic diversity in the infection dynamics of a keystone parasitic plant. Journal of Ecology (Oxford) 107(1): 23-33. [Finding a strong effect of host plant species diversity on the establishment of *Rhinanthus minor,* with establishment considerably lower in a high species diversity treatment. Genetic diversity appeared to promote establishment of the parasite in the high species diversity treatment, and also facilitated longer term fitness in the low species diversity treatment. Grass relative

biomass decreased and legume relative biomass increasing when the parasite was present.]

Sabino, W.O., Alves-dos-Santos, I. and da Silva, C.I. 2019. Versatility of the trophic niche of *Centris* (*Paracentris*) *burgdorfi* (Apidae, Centridini). Arthropod - Plant Interactions 13(2): 227-237. [Identifying 41 species pollinated by *C. burgdorfi* including *Krameria* spp.]

Sánchez-Flores, Ó.Á., Carapia-Ruiz, V.E., García-Martínez, O. and Castillo-Gutiérrez, A. 2018. (First record for Mexico of the *Aleurothrixus myrtacei* Bondar, 1923 (Hemiptera: Aleyrodidae), their hosts and distribution.) (in Spanish) Acta Zoologica Mexicana 34: e3411192. (http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0065-17372018000100207&lng=en&nrm=iso&tlng=es) [First record of *A. myrtaceae* for Mexico; also for its host *Phoradendron macrophyllum*.]

Sanni, O., Erukainure, O.L., Oyebode, O.A., Koorbanally, N.A. and Islam, M.S. 2018. Concentrated hot water-infusion of *Phragmanthera incana* improves muscle glucose uptake, inhibits carbohydrate digesting enzymes and abates Fe2+-induced oxidative stress in hepatic tissues. Biomedicine & Pharmacotherapy 108: 417-423. [The results suggest that the observed antidiabetic and antioxidative potentials of *P. incana* could be attributed to 2-methoxythiazole; l-cysteine ; nicotinic acid ; S-methyl-l-cysteine; isoquinoline, 1-methyl-; and 1H-indole-2,3-dione,5-methyl, supporting folkloric medicinal use of this plant in southern Africa.]

Sardesai, M.M., Gaikwad, S.P and Yadav, S.R. 2019. *Viscum sahyadricum* (Viscaceae), a new species from the Western Ghats of India. Edinburgh Journal of Botany 76(3): 369-376. [This new species is described, illustrated, and compared to similar *Viscum* species.]

Saucier, J, Milensky, C M, Caraballo-Ortiz, M A, Ragai, R, Faridah Dahlan, N & Edwards, D P. 2019. A distinctive new species of flowerpecker (Passeriformes: Dicaeidae) from Borneo. *Zootaxa.* 4826(4). [see Press report above.]

Scharenberg, F., Stegemann, T., Çiçek, S.S. and Zidorn, C. 2019. Sequestration of pyridine alkaloids anabasine and nicotine from *Nicotiana* (Solanaceae) by *Orobanche ramosa* (Orobanchaceae). Biochemical Systematics and Ecology. 86: 103908. [*O. ramosa* is not able to synthesize pyridine alkaloids anabasine and nicotine itself. The present study proves the sequestration of pyridine alkaloids by *O. ramosa* from four investigated *Nicotiana* host species, including tobacco.].

Scheiterle, L., Häring, V., Birner, R. and Bosch, C. 2019. Soil, *Striga,* or subsidies? Determinants of maize productivity in northern Ghana. Agricultural Economics 50(4): 479-494. [Exploring the reasons for the relative failure of the fertilizer subsidy programme in Ghana, and the need for investment in capacity building and extension services to address the site-specific problems through comprehensive soil fertility management techniques and weed control. Promoting soil carbon management, minimum mechanical stress, crop rotation, and permanent soil cover should be further investigated as options for the region.]

Seiler, G.J. 2019. Genetic resources of the sunflower crop wild relatives for resistance to sunflower broomrape. Helia (https://doi.org/10.1515/helia-2019-0012) [Noting that resistance to *Orobanche cumana* has been reported in 7 annual and 32 perennial wild sunflower relatives and referring to the USDA National Plant Germplasm System collection of 2,519 accessions from 14 annual and 39 perennial species; but not clear from the abstract whether or how that collection is being used.]

Senkler, J., Rugen, N., Eubel, H., Hegermann, J. and Braun, H.P. 2018. Absence of complex I implicates rearrangement of the respiratory chain in European mistletoe. Current Biology 28(10): 1606-1613. [Results demonstrate that, in the context of parasitism, multicellular life can cope with lack of one of the OXPHOS complexes and give new insights into the life strategy of *Viscum album* and other mistletoe species.]

Seran, Y.N., Sudarto, Hakim, L. and Arisoesilaningsih, E. 2018. Sandalwood (*Santalum album*) growth and farming success strengthen its natural conservation in the Timor Island, Indonesia. Biodiversitas: Journal of Biological Diversity 19(4): 1586-1592. [Studying *S. album* across Timor and identifying those districts with the highest quality and noting that farmers had a significant role in strengthening sandalwood conservation in their districts as shown by their successful farming and tree growth quality that was similar to that in the forest.]

Shalini, K.S., Omita Yengkhom, Subramani, P.A. and Michael, R.D. 2019. Polysaccharide fraction from the Indian

mistletoe, *Dendrophthoe falcata* (L.f.) Ettingsh enhances innate immunity and disease resistance in *Oreochromis niloticus* (Linn.). Fish & Shellfish Immunology 88: 407-414. [A polysaccharide extract from *D. falcata* fed to Nile tilapia provided substantial protection against the bacterium *Aeromonas hydrophila*, apparently via an immunostimulatory action.]

Shameem, S.A., Khan, K.Z., Waza, A.A. and Ganai, B.A. 2018. Phytochemical components and antioxidant properties of *Viscum album* growing on *Populus alba* host tree. International Journal of Research in BioSciences 7(2): 1-9. [Identifying numerous components of extracts from *V. album* and confirming that the methanolic extract of the parasite infesting *Polulus alba* had strong antioxidant properties.]

Shankar, M.and Devakumar, A.S. 2018. Effect of pre-sowing treatments on seed germination and seedling qualities of sandalwood (*Santalum album* L.). Mysore Journal of Agricultural Sciences 52(4): 732-737. [Finding that GA_3 500 ppm for 24 hours is the best pre-sowing treatment to obtain maximum planting material.]

*Shao MingHui, Dai Wei, Yuan SiWen, Lu Yan, Chen DaoFeng and Wang Qi. 2018. Iridoids from *Pedicularis verticillata* and their anti-complementary activity. Chemistry & Biodiversity 15(6): e1800033. [Three new iridoids named as pediverticilatasin A-C isolated from *P. veticillata*. Compounds A and C are plausible candidates for developing potent anti-complementary agents.]

Shayanowako, A.T., Laing, M., Shimelis, H. and Mwadzingeni, L. 2018. Resistance breeding and biocontrol of *Striga asiatica* (L.) Kuntze in maize: a review. Acta Agriculturæ Scandinavica, Section B - Soil & Plant Science 68(2): 110-120. [A review of *Striga* control techniques with emphasis on the *S. asiatica* problem in southern Africa, emphasising the potential of combining resistance breeding and partial resistance with *Fusarium oxysporum* ssp. *strigae*.]

Shen Liang and 9 others, 2019. Parasitic relationship of *Cistanche deserticola* and host-plant *Haloxylon ammodendron* based on genetic variation of host. Chinese Herbal Medicines 11(3): 267-274. [Confirming wide genetic diversity in 98 populations of *H. ammodendron* and the order of affinity of different populations was given, which were primers for discovering high affinity germplasms. Those from in Iner Mongolia showed greatest parasitism by *C. desertcola*.]

*Shimizu, K. and Aoki, K. 2019. Development of parasitic organs of a stem holoparasitic plant in genus *Cuscuta*. Frontiers in Plant Science 12(19: 1435. (https://www.frontiersin.org/articles/10.3389/fpls.2019.01435/full) [A detailed consideration of the factors and processes involved in the development of the holdfast and haustorium. Also the role of the host receptor in the control of the compatibility between host and parasite, and the role of plant-to-plant transfer of long-distance signals.]

Shivaprakash and Hiremath, S.M. 2018. Studies on wild edible fruit yielding plants used by local communities in Dakshina Kannada District, Karnataka (India). International Journal of Forest Usufructs Management 19: 24-31. [Including reference to the use of *Scleropyrum* spp. (Santalaceae) for cooking oil.]

Song Hui, Li WenLan, Sun XiangMing, Hu Yang, Ding JingXin, Ji YuBin and Wang JingYa. 2019. Estrogenic activity of glycosides from *Cistanche deserticola* as an estrogen receptors adjuvant in vitro. Pharmacognosy Magazine 15(65): 693-697.

Sotero-García, A.I., Arteaga-Reyes, T.T., Martínez-Campos, A.R. and Bunge-Vivier, V. 2018. (Local knowledge of *Arceuthobium* genus in a Natural Protected Area of the centre of Mexico.) (in Spanish) Boletín Latinoamericano y del Caribe de Plantas Medicinales y Aromáticas 17(2): 120-129. [Noting that *A. vaginatum* and *A. globosum* are recorded locally. They are not generally recognised as being damaging for the forest but are used for making toys(?) and ink, and medicinally for respiratory and nervous complaints.]

Souza Neto Júnior, J.deC., Estevão, L.R.deM., Ferraz, A.A., Simões, R.S., Vieira, M.G.F. and Evêncio Neto, J. 2019. Ointment of *Ximenes americana* promotes acceleration of wound healing in rats. Acta Cirurgica Brasileira 34(3): e201900307. [Concluding that the topical action of a cream based on *X. americana* shows angiogenic effects and improves the replacement of collagen, suggesting its use for the development of a herbal remedy in the treatment of cutaneous wound healing.]

Suetsugu, K. 2018. Independent recruitment of a novel seed dispersal system by camel crickets in achlorophyllous plants. New Phytologist 217(2): 828-835. [Confirming that camel crickets are the main means of seed dispersal in *Phacellanthus tubiflorus* (Orobanchaceae), associated with the occurrence of this species in dense forest vegetation where wind dispersal would be inefficient.]

Sullivan, E.R., Barker, C., Powell, I. and Ashton, P.A. 2019. Genetic diversity and connectivity in fragmented populations of *Rhinanthus minor* in two regions with contrasting land-use. Biodiversity and Conservation 28(12): 3159-3181. [Finding little difference in the genetic diversity within populations of *R. minor* from extensively managed upland and intensively managed lowland but recommending that conservation strategies should aim to maintain large populations in meadows to enhance genetic diversity.]

Sultan, A., Tate, J.A., de Lange, P.J., Glenny, D., Ladley, J.J., Heenan, P. and Robertson, A.W. 2018. Host range, host specificity, regional host preferences and genetic variability of *Korthalsella* Tiegh. (Viscaceae) mistletoes in New Zealand. New Zealand Journal of Botany 56(2): 127-162. [Describing in detail the host ranges and distribution of *K. salicornioides, K. clavata* and *K. lindsayi* in New Zealand. *K. salicornioides* is the most widespread and also the most host specific, mainly on *Leptospermum scoarium.* The others are less host specific but *K. clavata* occurs mostly on *Coprosma propinqua* and *K. lindsayi* mostly on *Melicope simplex*.]

*Sun GuiLing and 13 others. 208. Large-scale gene losses underlie the genome evolution of parasitic plant *Cuscuta australis.* Nature Communications 9(7): 2683. (https://www.nature.com/articles/s41467-018-04721-8) [The complete nuclear genome of this dodder reveals that, like in plastomes, genes are lost, i.e. 11.7% fewer orthologs than in autotrophic plants. Gene expression data suggest that formation of the haustorium mostly requires genes involved in root development.]

Sundararaj, R., Wilson, J.J. and Vimala, D. 2019. Stem borers of Indian sandalwood (*Santalum album* Linn.) in Karnataka, India. Journal of the Indian Academy of Wood Science 16(1): 31-35. [Several species of stem borers are recorded from *S. album*.]

Suwannarach, N., Kumla, J. and Lumyong, S. 2018. *Spissiomyces endophytica* (Dothideomycetes, Ascomycota), a new endophytic fungus from Thailand. Phytotaxa 333(2): 219-227. [A new species isolated from *Balanophore fungosa* in Lampang Province, Thailand.]

Světlíková, P., Hájek, T. and Těšitel, J. 2018. A hemiparasite in the forest understorey: photosynthetic performance and carbon balance of *Melampyrum pratense*. Plant Biology 20(1): 50-58. [The results point to potgenetic resources of the sunflower crop wild relatives entially high importance of heterotrophic carbon acquisition in *M. pratense*, which could be of at least comparable importance as in other mixotrophic plants growing in forests. It is remarkable that despite apparent evolutionary pressure towards improved carbon acquisition from the host, *M. pratense* retains efficient photosynthesis and high transpiration, the ecophysiological traits typical of related root hemiparasites in the Orobanchaceae.]

Szmidla, H., Tkaczyk, M., Plewa, R., Tarwacki, G. and Sierota, Z. 2019. Impact of common mistletoe (*Viscum album* L.) on Scots pine forests - a call for action. Forests 10(10): 847. [*V. album* has been causing increasing damage to Scots pine in recent years and is now estimated to infest over 70,000 ha of forest in Poland. The paper reviews its impact on tree breeding traits and raw material losses as well as current options for its prevention and eradication.]

Tai, B.H, and 10 others. 2019. Three new constituents from the parasitic plant *Balanophora laxiflora*. Natural Product Communications 14:1-6. [The new compounds included an iridoid, a rare natural occurring 1-hydroxy-1,3-diarylpropan-2-one glucoside, and an aryltetralin lignan glucoside. The isolated compounds weakly inhibited both NO production and COX-2 mRNA expression in RAW264.7 macrophages.]

Thorogood, C. 2019. *Hydnora*: the strangest plant in the world? Plants, People, Planet 1(1): 5-7. [A wonderfully detailed description of the genus and its 8 species; their evolution and life history, reproductive history, beautifully illustrated with photos and his own superb drawings. This item was included in Haustorium 75 but is repeated, given this new, more accessible publication.]

Tian Shuo, Miao MingSan, Li XiuMin, Bai Ming, Wu YanYi and Wei ZhenZhen. 2019. Study on neuroendocrine-immune function of Phenylethanoid Glycosides of Desertliving *Cistanche* herb in perimenopausal rat model. Journal of Ethnopharmacology 238: 111884. (https://www.sciencedirect.com/science/art icle/pii/S0378874118329428) [Claiming that each dose of phenylethanoid glycosides of 'desertliving *Cistanche* '(*C. deserticola*?) could 'counteract the disorder of sex hormone in perimenopausal model rats, correct the imbalance of oestrogen and androgen receptor levels, enhance and restore the effect of uterus and the nerve cells of hypothalamic, and improve immune function.']

Tsegu Ereso. 2019. The role of *Faidherbia albida* tree species in Parkland Agroforestry and its management in Ethiopia. Journal of Horticulture and Forestry 11(3): 42-47. [Promoting use of the *F. albida* tree in an agroforestry system to reduce the problem of *Striga hermonthica* on degrtaded soils in Ethiopia. *F. albida* serves as a fodder for livestock and a source of nectar for honey.]

Tuğlu, M.İ., Aydemİr, I., Sönmez, P.K., Buran, T. and Mete, M. 2018. The effects of medicinal plants on cancer cell lines and efficacy of experimental animal model. International Journal of Secondary Metabolite 5(1): 49-59. [Extracts of several plants including *Viscum album* reduced antioxidative damage and inhibited apoptosis.]

Uraguchi, D. and 13 others. 2018. A femtomolar-range suicide germination stimulant for the parasitic plant *Striga hermonthica*. Science (Washington) 362(6420): 1301-1305. [A further description and discussion of the discovery of sphynolactone-7 and its potential for control of *Striga* and other parasitic weeds by suicidal germination. See Literature Highlight above Koichi.]

Usman, I., Daniya, E. and Kolo, M.G.M. 2018. *Aeschynomene histrix* (joint vetch) fallow and nitrogen fertilizer effects on *Striga hermonthica* infestation and maize (*Zea mays*) productivity in southern Guinea savanna of Nigeria. Agro-Science 17(3): 1-6. [Recording benefits from fallowing with *A. histrix* fallow (compared with natural fallow) and from N in reduction of *S. hermonthica* and improved crop yield. Apparently no comparison with continuous cropping and no economic analysis (e.g *A. histrix* fallow had to be weeded).]

Van Halder, I., Castagneyrol, B., Ordóñez, C., Bravo, F., del Río, M., Perrot, L. and Jactel, H. 2029. Tree diversity reduces pine infestation by mistletoe. Forest Ecology and Management 449: 17470. [Comparing the occurrence of *V. album* ssp. *austriacum* in *Pinus sylvestris* and in *P. pinaster*. Occurrence was higher in taller trees, but was also less in mixed than in pure stands, perhaps because of difference in dispersal of seed by birds.]

Wahid, H.A., Barozai, M.Y.K. and Muhammad Din. 2019. Identification and characterization of dwarf mistletoe responding genes in Ziarat juniper tree (*Juniperus excelsa* M.Bieb) through suppression subtractive hybridization and deep sequencing. Trees: Structure and Function 33(4): 1027-1039. [Identifying 985 genes differentally expressed in shoots of *J. excelsa*, infected and non-infected by *Archeuthobium oxycedri* in Pakistan. The responding genes are observed to be involved stress, transcription factor, signaling pathway and structural proteins. The results will be useful in preparing the juniper trees against dwarf mistletoe and other stresses.]

*Wakabayashi, T. and 10 others. 2019. Direct conversion of carlactonoic acid to orobanchol by cytochrome P450 CYP722C in strigolactone biosynthesis. *Science Advances 5(12):* eaax9067. (https://advances.sciencemag.org/content/5/12/eaax9067.full) [Luiza?)

Wang Han, Snapp, S.S., Fisher, M. and Viens, F. 2019. A Bayesian analysis of longitudinal farm surveys in Central Malawi reveals yield determinants and site-specific management strategies. PLoS ONE 14(8): e0219296. (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0219296) [*Striga asiatica* infestation was the factor most consistently associated with lower yields in Central Malawi, and concluding that enhancing nitrogen fertility will lead to higher maize yields. To improve plant nitrogen status, fertilizer was effective at higher productivity sites, whereas soil carbon and organic inputs were important at marginal sites.]

Waweru, D.N., Kuria, E.K.Bradley, J.M., Scholes, J.D. and Runo, S. 2019. Tissue culture protocols for the obligate parasitic plant *Striga hermonthica* and implications for host-parasite co-cultivation. Plant Cell, Tissue and Organ Culture 138(2): 247-256. [Finding the best auxin and cytokinin concentrations to be: 10.7 µM naphthaleneacetic acid (NAA) and 2.2 µM 6-benzylaminopurine (BAP) for embryogenic regeneration and 1.1-4.4 µM BAP without NAA for shoot multiplication. Callus generated from seedling shoot and leaf tissue but not from seedling radicles. The techniques described in this study will enhance further understanding of *Striga*-host interactions.]

Wei Wei and 9 others. 2019. Echinacoside alleviates hypoxic-ischemic brain injury in neonatal rat by enhancing antioxidant capacity and inhibiting apoptosis. Neurochemical Research 44(7): 1582-1592.

Wieczorek, A., Lysek-Gladysinska, M., Krol, T., Kordos, K., Kosińska, K., Atanasov, A.G., Strzalkowska, N., Jozwik, A. 2019. Biochemical and morphological changes in mouse liver induced by mistletoe toxins. Food and Chemical Toxicology 129: 229-238. [Microscopic examinations revealed that hepatocyte mitochondria were enlarged and increased in number, whereas the surface of the rough endoplasmic reticulum was decreased significantly.]

Wijesekera, R.O.B. 2019. Sandalwood: king of the fragrance empire. LINK Natural Products Digest 15(1): 2-7. [A wide-ranging review of the botany, distribution and uses of *Santalum album* in Sri Lanka and elsewhere.]

Wu AiPing, Zhong Wen, Yuan JinRui, Qi LiangYu, Chen FaLin, Liang YunShan., He FeiFei and Wang YanHong. 2019. The factors affecting a native obligate parasite, *Cuscuta australis*, in selecting an exotic weed, *Humulus scandens*, as its host. Scientific Reports 9(1): 511. [Concluding that *C. australis* may be useful for biological control of *H. scandens* where it is dominant, but would also damage native species in a mixed vegetation.]

*Xia Zhi, Wen Jun and Gao ZhiMing. 2019. Does the enigmatic *Wightia* belong to Paulowniaceae (Lamiales)? Frontiers in Plant Science 10(April): pp.528. (https://www.frontiersin.org/articles/10.3389/fpls.2019.00528/full) [The familial placement of Wightia has been controversial, including near *Paulownia* (Paulowniaceae) and *Brandesia* (Orobanchaceae). Nuclear ITS data suggest a sister relationship to *Paulownia*, thus it may represent a hybrid between early lineages of Phrymaceae and Paulowniaceae.]

*Xu YuQun and 11 others. 2018. Structural analysis of HTL and D14 proteins reveals the basis for ligand selectivity in *Striga*. Nature Communications 9(9): 3947. (https://www.nature.com/articles/s41467-018-06452-2) [Analysis of karrin and strigolactone perception mediators provide insight into how these hormones are perceived by *Striga hermonthica*.]

Yan HaiFeng and 11 others. 2018. Selection and validation of novel RT-qPCR reference genes under hormonal stimuli and in different tissues of *Santalum album.* Scientific Reports 8(1): 17511. [The results should improve the accuracy of RT-qPCR analysis and benefit *S. album* functional in different tissues and under hormone stimuli in the future.]

Yang BeiFen, Zhang Xue, Zagorchev, L., Li JunMin, Frey, B. and Li MaiHe. 2019. Parasitism changes rhizospheric soil microbial communities of invasive *Alternanthera philoxeroides*, benefitting the growth of neighboring plants. Applied Soil Ecology 143: 1-9. [*Cuscuta australis* parasitism increased alpha-diversity and changed the composition of both bacterial and fungal community in the rhizosphere of *A. philoxeroides.* Soil microflora from parasitised *A. philoxeroides* reduced growth of unparasitised *A. philoxeroides* but increased growth of *Trifolium repens*.]

Yang Liu, Yang GuanSong, Ma HaiYing, Wang YueHua and Shen ShiKang. 2018. Phylogenetic placement of *Yunnanopilia* (Opiliaceae) inferred from molecular and morphological data. Journal of Systematics and Evolution 56(1): 48-55. [The authors conducted a molecular analysis and compared the morphology of this taxon with *Melientha suavis* and *Champereia manillana*. Molecular data place all Yunnanopilia accessions in a clade with *Melientha*. The authors considered the morphological differences to be sufficient to recognize a new genus, however, the idea that it is simply another species of *Melientha* was not entertained.]

Yao RuiFeng; andChen Li; Xie DaoXin. 2018. Irreversible strigolactone recognition: a non-canonical mechanism for hormone perception. Current Opinion in Plant Biology 45(A): 155-161. [[Review that discuses recent advances in the newly described irreversible mechanism for strigolactone perception.]

Yapa, S.S., Mohotti, A.J., Seneviratne, M.A.P.K., Peiris, B.L. and Tennakoon, K.U. 2018. Prevalence of mistletoes in fruit and timber trees in the wet and intermediate zone of Sri Lanka. Tropical Agricultural Research 29(4): 330-340. [*Dendrophthoe falcata* , *D. neilgherrensis*, *Scurrulla cordifolia*, *Viscum articulatum*, *Taxillus incanus*, and *V. orientale* were the mistletoes species infested in fruit trees; while *D. falcata*, *D. neilgherrensis*, *S. cordifolia*, *S. parasitica*, *V. articulatum* and *V. orientale* were found in timber species.

D. falcata was the most predominant parasitic plant in both fruit and timber trees. *Mangifera indica* and *Albizia* were the most susceptible host fruit and timber species, respectively.]

Yao RuiFeng, Li JiaYang and Xie DaoXin. 2018. Recent advances in molecular basis for strigolactone action. Science China Life Sciences 61(3): 277-284. [A brief review, including reference to parasitic weeds.]

Yi ChunXia, Hong ZhengShan, Tan LiuPing, Li WanTing, Zeng ChunHui and Yang Ke. 2019. (Experimental study on anti-inflammation effects of *Taxillus chinensis.*) (in Chinese) Journal of Pharmaceutical Research 38(2): 70-73. Extracts oif *T. chinensis* have obvious inhibitory effect on inflammation at different stages in mice, without affecting the weight of immune organs after continuous administration.]

*Yoshida, S, 42 others. 2019. Genome sequence of *Striga asiatica* provides insight into the evolution of plant parasitism. Current Biology 29:3041-3052.e3044. [This draft genome sequence has 34,577 predicted protein-coding genes. A family of strigolactone receptors has expanded, suggesting a molecular basis for the evolution of broad host range among *Striga* species. Genes involved in lateral root development in non-parasitic plants are coordinately induced during haustorium development in *Striga.* HGT of host genes into Striga were seen as well as retrotransposons.]

***Yoshimura, M, Fonne-Pfister, R., Screpanti, C., Heremann, K., Dieckmann, M., Quinodoz, P and de Mesmaeker, A. 2019. Total synthesis and biological evaluation of heliolactone. Helvetica Oct 2019:em1900211. (https://onlinelibrary.wiley.com/toc/15222675/2019/102/11) [Assessing heliolactone for a variety of expected strigolactone activities, including germination of *Orobanche cumana*, for which it proved more active than GR24.]**

Yu BinBin; Brunel, C., Yang BeiFen, Li JunMin and Lu HongFei. 2019. Parasitism by *Cuscuta australis* affects the rhizospheric soil bacterial communities of *Trifolium repens* L. Acta Agriculturæ Scandinavica, Section B - Soil & Plant Science 69(8): 649-656. [Parasitism of *T. repens* by *C. australis* significantly decreased the relative abundance of the bacterial phylum Nitrospirae, while it significantly increased that of Verrucomicrobia . It decreased the relative abundance of 10 bacterial genera, while it significantly increased those of nine genera. The Chao 1 indexes of the rhizospheric soil bacterial community of parasitised *T. repens* were significantly lower than those of non-parasitised *T. repens*.]

Yoshida, S. and Shirasu, K. 2018. Host recognition and infection mechanism by parasitic Orobanchaceae plants. Japanese Journal of Phytpathology 84(2): 267-274. [This review focuses on the interaction between the parasites, *Orobanche* and *Phelipanche* spp. and their hosts.]

Yuniwati, C., Ramli, N., Purwita, E., Yusnaini, Y., Nurdahliana, N., Miko, A., Liana, I., Andriani, A. and Maharani, M. 2018. Molecular docking for active compounds of *Scurrula atropurpurea* as anti-inflammatory candidate in endometriosis. Acta Informatica Medica 26(4): 254-257. [Concluding that rutin is the active ingredient in *S. atropurpurea* which could be used as an alternative inhibitor of inflamation in endometriosis.]

Zeng Hui, Huang LuLin, Zhou LiShuang, Wang PeiPei, Chen Xia and Ding Kan. 2019. A galactoglucan isolated from of *Cistanche deserticola* Y. C. Ma. and its bioactivity on intestinal bacteria strains. Carbohydrate Polymers 223: 115038. [Results suggest that a neutral polysaccharide from *C. deserticola* might help to maintain intestinal homeostasis and regulate gut bacteria.]

Zhang Lin, Li GuangJie, Dong GangQiang, Wang Meng, Di DongWei, Kronzucker, H.J. and Shi WeiMing. 2019. Characterization and comparison of nitrate fluxes in *Tamarix ramosissima* and cotton roots under simulated drought conditions. Tree Physiology 39(4): 628-640. [A detailed study of the reaction of *T. ramosissima* to drought stress, with and without parasitisation by *Cistanche tubulosa.*]

Zhang ShiLei, Ma Long, Zhao Jun, You ShuPing, Ma XiaoTing, Ye XiaoYan and Liu Tao. 2019. The phenylethanol glycoside liposome inhibits PDGF-induced HSC activation via regulation of the FAK/PI3K/Akt signaling pathway. Molecules 24(18): 3282. [Providing new insights into the application of phenylethanol glychosides from *Cistanche tubulosa* for treatment of liver fibrosis.]

Zhang XiangQian, Li YuXia, Zhu JianBo, Xiao XingHui, Chen JianQuan, Guo XinYong, Zhang Xu and Zhang Yao. 2019. (Analysis of genetic diversity of *Cistanche deserticola* in Gurbantunggut Desert.) (in

Chinese) Genomics and Applied Biology 38(8): 3675-3680. [Studies have shown that *C. deserticola* is high in polymorphic loci, and there was more gene communication among different populations. The genetic variation among different populations was not obvious,]

Zhao Bin, Lian Jun, Wang DanYang, Li QuanXiao, Feng ShuangShuang, Li JinYao and Zhang AiLian. 2019. Evaluation of aqueous extracts of *Cistanche deserticola* as a polysaccharide adjuvant for seasonal influenza vaccine in young adult mice. Immunology Letters 213: 1-8. [The addition of an aqueous extract of *C. deserticola* enhanced immunogenicity to seasonal influenza vaccine by the induction of HI antibody generation, more rapid humoral immune responses, and a balanced Th1-/Th2-type response, effective T-cell responses,]

Zhao ShengYang, Ke Mang, Huang Ting, Hong Tao, Yu HongYuan and Zhang XianJun. 2019. *Viscum album* extract suppresses cell proliferation and induces apoptosis in bladder cancer cells. Tropical Journal of Pharmaceutical Research 18(8): 1711-1717. [Concluding that a *V. album* extract exerts anti-proliferation and pro-apoptosis effects on bladder cancer cells. These abilities suggest that it is a promising agent in bladder cancer treatment.]

Zheng HongNan Su YuTing, Sun Yang, Tang TianLe, Zhang Di, He XueFeng and Wang JianBo. 2019. Echinacoside alleviates hypobaric hypoxia-induced memory impairment in C57 mice. Phytotherapy Research 33(4): 1150-1160. [Results indicate that echinacoside from *Cistnache salsa* could prevent hypobaric hypoxia-induced memory impairment, which is associated with the antioxidant effect of echinacoside in the hippocampus.]

*Zhichao Xiong, Jiangyan Tian, Peng Xue, Xumu Zhang and Hui Lv. 2020. Enantioselective synthesis of chiral multicyclic γ-lactones *via* dynamic kinetic resolution of racemic γ-keto carboxylic acids. Organic Chemistry Frontiers (https://www.researchgate.net/publication/337489258_Enantioselective_synthesis_of_chiral_multicyclic_g-lactones_via_dynamic_kinetic_resolution_of_racemic_g-keto_carboxylic_acids) [New synthesis method that provides highly efficient apporach to obtaining multicyclic γ-lactones.]

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