HAUSTORIUM

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CONTENTS

MESSAGE FROM THE IPPS PRESIDENT (Julie holes)…….……,…... 2

AMSTERDAM CONGRESS - The 15th World Congress on Parasitic Plants, 30 June – 5 July 2019, Amsterdam, the Netherlands ……..2

MEETING REPORT
The 18th European Weed Research Society Symposium, Ljubljana, Slovenia, 17 to 21 June 2018…….3

ESSAY
Hit parasitic weeds hard with HIGS: they possibly *can* be transgenically controlled. (Jonathan Gressel)…4

LITERATURE HIGHLIGHT
New *Cuscuta* interactions and genomes revealed. (Jim Westwood)……7

***'VISCUM ALBUM'* IN WEST AFRICA……...8**

PRESS REPORTS
Blackcaps wintering in Cambridge help spread mistletoe……..9
Plant Palette: this parasite promotes kissing at the holidays……9
How Maine's red spruce forests are fighting for survival……....10
Declining native mistletoe discovered in Upper Hutt taken to Zealandia for preservation ……....10
Ahead of Ugadi, the curious case of the disappearing neem trees in Hyderabad……...11
Mistletoe feared extinct found on Little Cayman……..11
MSU professors team up with African scientists to combat *Striga*……..…12
New striga resistant seeds boon for farmers……..12
Kamuli COA asks Parliament to ban the smoking of *Striga*……...12
High-protein corn also resistant to parasitic weed……....13
The flower that must not be named……....…14

HAUSTORIUM SUPPLEMENT……..15

THESIS - Ecology and Systematics of *Thonningia sanguinea* Vahl. (Balanophoraceae) in Southern Nigeria. Oligie Imarhiagbe ……..15

FORTHCOMING MEETINGS:
International Conference on Legume Genetics and Genomics, May 13-17, 2019 - Dijon, France……16
The 15th World Congress on Parasitic Plants, 30 June – 5 July 2019, Amsterdam, the Netherlands.….16

GENERAL WEBSITES……..……..……16

LITERATURE……....…17
.
End Notes……..……. ……,…….39

PRESIDENT'S MESSAGE

Dear IPPS members,

First, I would like to thank both Harro Bouwmeester and Philippe Simier for offering to host the next Parasitic Plant Congress in Amsterdam and Nantes respectively. I would also like to thank everyone who took part in the Doodle Poll to select the venue. Over 100 members voted showing the enthusiasm and support for the Parasitic Plant Congress and the excellent bids put forward by Harro and Philippe. The vote was extremely close but Amsterdam was selected as the next venue. As you will see below the dates for the next Congress are **30th June - 5th July 2019.** Harro has provided a description of the venue, the cost of registration and options for accommodation. Further information will become available via a Congress website later in the year. **Please put the dates in your diary!**

Second, according to the schedule of elections to the IPPS Executive committee we are expected to elect a new Editor and Treasurer this year. Further details will be sent in a separate e-mail to all members of the society and I would like to encourage everyone to participate in the nomination and election process.

Finally, I hope everyone is having a good summer and that your parasitic plant research is going well!

With very best wishes

Julie
Julie Scholes, IPPS President
(j.scholes@sheffield.ac.uk)

AMSTERDAM CONGRESS

The 15th World Congress on Parasitic Plants, 30 June – 5 July 2019, Amsterdam, the Netherlands

On behalf of the International Parasitic Plant Society (IPPS), we invite you to the 15th World Congress on Parasitic Plants (WCPP15) to be held from Sunday June 30 (arrival and registration) until Friday July 5 (morning departure) 2019 in Amsterdam, the Netherlands. This meeting is organized by The University of Amsterdam in collaboration with the IPPS and the Working Group on Parasitic Weeds of European Weed Research Society (EWRS). WCPP15 will continue the long tradition of regular meetings of experts on parasitic plants from all over the world that started in 1973 in Malta. With these meetings we stimulate the exchange of information and ideas among researchers from around the world and working on a wide spectrum of disciplines and perspectives around the common theme of plant parasitism. Conference sessions will be designed to find common interests and create synergy among the different disciplines. They will include presentations on cutting edge parasitic plants research and will cover weedy and non-weedy species, management technologies, genomics, molecular biology, physiology and evolution of parasitic plants. We are looking forward to meeting researchers from all over the world for an exciting and varied scientific program. In addition to an engaging scientific program, there will be time for social events including a visit to beautiful Amsterdam. We hope you will attend the 15th World Congress on Parasitic Plants and mark the date in your calendar. On behalf of the Organizing Committee, and the IPPS and the EWRS Working Group on Parasitic Weeds, we are looking forward to meeting you in Amsterdam.

Local organising committee
Harro Bouwmeester, Teun Munnik, Laura Wind, Benjamin Thiombano, Mehran Rahimi, Jos Raaijmakers, Aimee Walmsley

Venue
The meeting will be held in Casa (https://hotelcasa.nl/), a hotel/conference centre with which the University of Amsterdam has a contract for reduced rates. All requirements for a scientific meeting, as well as optimal interaction between the participants are available under one roof: a meeting room, room for posters, a restaurant for dinner, a bar as well as comfortable hotel rooms. Casa is located close to one of the main train stations of Amsterdam (Amsterdam Amstel) and other public transport (bus and metro), about 13 minutes from the wonderful, historic, city centre (bus or metro) and about 30 min from Schiphol (by train) one of the major European airports that can be easily reached from all over the world. Consider spending some more time in Amsterdam before or after the meeting, as it is a fantastic city to visit. With its canals, its typical centuries-old houses, its museums, including the world-famous Van Gogh museum and Rijksmuseum, it is a must see (see for example https://www.iamsterdam.com/en/see-and-do/things-to-do/top-20-things-to-do-in-amsterdam).

Cost of the meeting
The registration fee will be approximately 570 euro - this includes coffee, tea, lunch and dinner, the conference dinner and a half-day excursion. The registration fee also includes two year's membership of the International Parasitic Plant Society (60 euro). Registration will open September 2018. Rooms at Casa are available at a (discount) rate of 149 euro per night (5 nights = 745 euros). Rooms can be shared thus making the venue affordable for young scientists also. Alternatively, plentiful accommodation can be found in Amsterdam including youth hostels and AirBNB.

Harro Bouwmeester.

MEETING REPORT

The 18th European Weed Research Society Symposium, Ljubljana, Slovenia, 17 to 21 June 2018.

The 18th EWRS Symposium took place in Ljubljana (Slovenia) from 17 to 21 June 2018, at the GR-Ljubljana Exhibition and Convention Centre, organized by the Agricultural Institute of Slovenia (AIS). Over 260 participants from 40 countries attended this important symposium, submitting 240 scientific abstracts.

The programme was organized into 13 sessions with 76 oral presentations, 12 working group meetings, a poster section and a pre-symposium workshop. Although it was not possible to organize a whole session on parasitic weeds, because a more integrated programme was preferred, the subject proved to be still important among the scientific interests of the society.

Thus, fourteen abstracts having 'parasitic weeds' as main subject were submitted to the Symposium and accepted in five different sessions (see below), six of them as oral presentations (# 76, 174, 176, 178, 210, 270 in the list below).

Most of the abstracts had *Phelipanche* and *Orobanche* species as the parasitic weed subject, and *P. ramosa* was the preferred species. Different weed management practices for their control were reported, such as chemical on sunflower (71), integrated in tomato (210) or otherwise against *P. ramosa* (270, 278, 290). Other studies contributed to characterize the resistance of sunflower to its parasite (174), or to understand the interactions between host and parasite in carrot (182), or between soil fertility and *Striga* parasitism (176), or to decipher the differences between obligate and facultative parasites (178). Other studies focused on physiological properties of the parasitism, by considering the macromolecules translocated to the parasite from the host (191), or observing *in vitro* the germination of *Striga hermonthica* (187) or the synergy of stimulants, or by comparing hybrid populations of the parasite (196). Another abstract (76) considered a new methodology useful for the detection of the parasite in the field.

The Symposium was very intense, well organized, scientifically interesting and fruitfully interactive.

Chemical Weed Management
71. P. Vahamidis *et al.* - Sunflower broomrape occurrence under the use of Clearfield ExpressSun and technologies.

New Technologies
76. R. Lati *et al.* - 3D Morphological Crop Analysis - A New Methodology for Detection of Broomrape Parasitism.

Weed Biology
174. D. Sisou *et al.* - Characterization of resistance to sunflower broomrape (*Orobanche cumana* W.) in sunflower (*Helianthus annuus* L.).
176. J. Rodenburg and L. Bastiaans – Are *Striga* spp. and low soil fertility, two sides of the same coin?
178. L. Bastiaans, A. *et al.* - Facultative or obligate parasitism - does it make a difference?
182. S. Emran - Metabolic and biochemical aspects of interaction between species of carrots to root parasite *Orobanche*.
187. Y. Krasylenko *et al.* - Purple witchweed (*Striga hermonthica* (Delile) Benth.) in vitro germination and visualization of its cytoskeleton.
191. S. Marzouk and R. Aly - Translocation of macromolecules from tomato host plant to the parasitic weed *Phelipanche aegyptiaca*.
195. D. Plakhin *etal.* - Synergism in the germination stimulation of *Orobanche* and its effect on host specificity.
196. D. Plakhin *et al.* – Characterisation of a diverse hybrid population of *Phelipanche ramosa* and *P. aegyptiaca*.

Integrated Weed Management
210. H. Eizenberg *et al.* - Egyptian broomrape (*Phelipanche aegyptiaca*) control in processing tomato: a review.

Biologically Inspired Weed Management

270. E. Dor *et al* - Amino acid overproduction confers resistance to plants against *Phelipanche* and *Orobanche* spp.
278. S. Gibot-Leclerc *et al.* - Biocontrol against the root parasitic plant species *Phelipanche ramosa*, branched broomrape of tobacco.
290. A. Boari *et al.* - Effectiveness of a natural fertilizer in controlling the parasitic weed *Phelipanche ramosa*.

Maurizio Vurro.

ESSAY

Hit parasitic weeds hard with HIGS: they possibly *can* be transgenically controlled

Introduction

It was demonstrated in pioneering work over a decade ago, that transgenic plants could be engineered to produce double stranded RNA molecules that when entering a pest replicate themselves using the pest's machinery while disseminating throughout the pest in a virus like manner. The double stranded RNA is processed in the pest into short usually 21-24 nucleotide long pieces. If these pieces are specially encoded to interact with pest mRNA, they interfere with pest mRNA function. Thus, the final processing product of the double stranded RNA is termed interference RNA (RNAi) and the interference it causes is termed Host-Induced Gene Silencing (HIGS). HIGS was first demonstrated to work two decades ago with nematode specific RNAi constructs, significantly inhibiting the development of the nematodes that attacked the transgenic plants (Huang *et al.* 2006). This major breakthrough was heralded as the new way to develop transgenic crops that could be thus rendered resistant to pests of all sorts. This could potentially augment or supplant pesticides (except for herbicides used on free-living weeds), as well as the need to genetically engineer crops with protein toxins such as Bt for insect control.

This realization that one could have an '*in seedo'* technology, any technology in or on the seed that obviates the need for an external input and where pest control is at no cost to the farmer except for seeds, caused many to try it. The results for the most part were 'promising', i.e. good enough for academic publication in a respectable journal. Recent reviews describe these endeavours to use HIGS against insects (Zotti *et al*. 2018), viruses (Tomar *et al*. 2018), and fungal pathogens (Sharma *et al*. 2018). One's first worry with HIGS was that the RNAi made by the host will not get to its target in the pest. Indeed, some insect families seem to be impervious to the effects of crop engineered RNAi's that are active in silencing of related families (Cooper *et al*. 2018). An RNAi ingested when a pest attacks a crop must be able to arrive intact at the target without being degraded. It was initially not known whether RNAi could travel from a crop into a parasitic weed. Over the past few years elegant experiments with parasitic plants have demonstrated that RNA can move both from host to parasite and parasite to host, and be expressed at the target (see recent excellent review by Westwood and Kim 2017), and RNA from the parasite can also negatively affect the host (Shahid *et al.* 2018). There were partial successes showing that *Phelipanche aegyptiaca* (Aly *et al.* 2009), as well as *Cuscuta pentagona* (Alakonya *et al*. 2012), could be suppressed by RNAi emanating from hosts, but unfortunately not to an extent that is sufficient to be of interest to a farmer. Only preliminary results were reported of a larger experiment with maize engineered with 13 RNAi constructs, each designed to interact with single sites on mRNA encoding key one of five key *Striga asiatica* metabolic enzymes (de Framond *et al*. 2007). The results were negative except for some slowing of *Striga* growth. Most RNAi researchers lost interest and went on to other things for nearly a decade.

A parallel system to HIGS where a virus is used instead of the crop plant to induce gene silencing has been used to vector RNAi into parasitic weeds (Dubey *et al*. 2017; Kirigia *et al*. 2014). While VIGS is an excellent system for studying general functional genomics of the parasitic weeds, it is the genes that are highly expressed during infection that are of interest in our context. Even if one were to be able to completely suppress a parasite with VIGS in the laboratory, it would not be a viable system for use with underground parasitic weeds in the field, except in the cases where a host-virus that lacks noticeable pathogenicity translocates and replicates in the parasite (Gal-On *et al*. 2009), and can possibly be used to vector RNAi.

In the past two years there have been significant advances leading to >99% suppression of genes in some cases e.g. (Gressel and Polturak 2018; Power *et al*. 2017; Sharma *et al*. 2018; Tomar *et al*. 2018). This has come from a better understanding of how to make more robust HIGS RNAi constructs, as well as the availability of better paradigms for the choice of pest-gene mRNAs to suppress. These successes could not have been possible without advances in gene isolation and sequencing as well as whole organism gene sequencing together with advances in bioinformatics. This confluence of new and needed information is now available for major parasitic weeds and their crop hosts. The possibility of having crops robustly resistant to parasitic weeds is probably well within our grasp in a relatively short

time period. This article with the suggestions below is only being written because the author has been retired for more than a decade. Under other circumstances, he himself would instead be following the suggestions below with students and colleagues. The suggestions are extrapolated from what has been learned about how best to use RNAi in other crop/pest systems. This article is written because the author would like others to follow this up, expand and refine the protocols, and release the world from the demon of parasitic weeds.

Choosing the target genes – genes the parasite expresses during attack

The initial attempts to use RNAi against parasitic weeds targeted major metabolic genes (Aly *et al*. 2009; de Framond *et al*. 2007). In retrospect, this may have been a mistake. They may not be heavily expressed during attack, and also, if inhibition is not complete, the parasite might be able to eke through. Those researchers had no choice and did what they could at that time. They were able to fish out the major metabolic genes from host and parasite using consensus sequences, and then finding stretches in the parasite sequences that were different from those of the host so that the RNAi would not cause a 'self-goal' in the host. It may have been a mistake to use a promoter from a leaf attacking virus in the maize/*Striga* attempt, with little evidence that it is expressed in maize roots (de Framond *et al*. 2007).

We now have available almost complete reference genomes for at least one crop attacked by *Striga, Orobanche/Phelipanche* as well as *Cuscuta* species. A draft quality *Cuscuta campestris* reference genome has been published (Shahid *et al*. 2018). According to J. H. Westwood (pers. comn.), there is a better genome posted of *Cuscuta australis* (Sun et al. 2018), and the reference genomes of *Striga asiatica* and *Orobanche cumana* are close to being published. These will allow a much better approach to choosing parasite specific genes to target. It is advised to choose sequenced parasite/host pairs, where parasite attack can be facilitated in an axenic system in order to eliminate transcripts emanating from crop- or parasite-associated microorganisms. It is not clear whether this has been done in previous transcriptomic analyses with parasitic weeds. The attack site - host and parasite together - should be excised at various stages after attachment and penetration, and the pieces subjected to expression profiling (transcriptomics). In the past, parasite tissue was either cut away from the host (Ranjan *et al*. 2014). or laser micro-dissected (Honaas *et al.* 2013), which as discussed below, may not have been necessary. The mRNAs being expressed at various stages of attack are transformed back to DNA using reverse transcriptase enzymes, which like so many molecular biology procedures, is performed with readily available commercial kits coupled with quantitative PCR (qRT-PCR), and the most amplified pieces are then subjected to sequencing. Assembling the transcriptome in a useful manner may require the assistance of a bioinformatician. There have been transcriptomic analyses of *Cuscuta pentagona* (Ranjan *et al*. 2014), but not using qRT-PCR, and thus all the transcripts are given equal weight, which does not tell us which are more likely to be the most important. A qRT-PCR analysis of housekeeping genes in *Striga hermonthica* has been published to serve as a reference (Fernandez-Aparicio *et al*. 2013). The concept of doing so was to have genes for normalization qRT-PCR during attack. A transcriptomics analysis of *Striga hermonthica* and *Phelipanche aegytiaca* gene sequences that are specifically expressed at various stages after host-parasite has also been published (Yang *et al*. 2015). Thus, it is now possible to qRT-PCR mRNA from both host and parasite at the point of contact and then compare the sequences of those mRNAs that are specifically expressed at the point of contact to the known sequences of the host and other non-parasitic plants using standard software. It is thus easy to ascertain which genes are highly expressed in the host, and which in the parasite at the time of parasite attack. The subjects of interest here are those only specifically expressed after there is a host parasite junction. If the parasite genes expressed at various stage of attack are RNAi silenced, attack should be aborted. An advantage to this approach is that one need not know the function of the genes being expressed, just that they are specifically expressed by the parasite during attack, presumably for an important function needed at that time.

The knowledge of the genes being highly expressed in the attacked host may also be of interest, not for their function per se, but for their promoters. These might be the best promoters to use to express the double stranded RNA, as well as for consideration in the future for upregulating host resistance genes, for another level of protection from attack.

Using multi-target constructs

The early attempts to suppress parasitic weeds (as well as other pests) all used constructs producing a single RNAi sequence targeting a single site on the mRNA targeted. We now know that this is insufficient to get the level of control needed. Even if it were, a single wobble base mutation in the 21-24 nucleotide sequence targeted would significantly destabilize the binding by the RNAi without affecting the amino-acid sequence of the targeted enzyme, at least partially obviating the silencing effect of the RNAi. Thus, pest resistance would be quick to evolve to RNAi, probably more quickly

than mutations conferring target-site resistance to pesticides, where wobble base changes cannot confer resistance.

The recent success with crop/pest pairs are all with constructs containing many RNAi encoding sequences. They encode sequences targeting many sites on one mRNA and/or many different mRNAs. Whether these suppressive effects are additive or synergistic is immaterial, suppression is often as complete as can be measured. This is not completely a wild shot-gun approach, as each RNAi is aimed specifically at a target. There is no great problem in putting many RNAi encoding sequences in a transformation construct, as they are quite short, tens can be included. Follow-up experiments show that for some unknown reasons, some of the RNAi sequences do not work, and some do (Power *et al.* 2017). More the reason for large numbers of RNAi encoding sequences, each under the control of a different promoter chosen to be active in the tissues and cells where needed.

Discussion and Conclusions

Regulatory issues

HIGS constructs do not encode for proteins, eliminating toxicological issues from the regulatory hoops that must be undertaken for transgenic crops that synthesize novel proteins. If the promoters used restrict expression to only tissues that are parasitized, there will not even be novel RNAi in edible part of the plant. A recent economic analysis of the actual costs of developing and registering a crop when it is a 'public good' (as in this case) and is done by the public sector come up with numbers more than two orders of magnitude less costly than industry claims (Schiek *et al*. 2016).

Resistance issues

In a situation where multiple targets are affected, it is hard to evolve target-site resistance, even if based on innocuous mutations in wobble bases. This does not mean that some other type of resistance may eventually evolve, and further thought will then be required on how to overcome it. As a pre-emptive starter, it would not be advisable to abandon the successful herbicide resistance (Ransom *et al*. 2012) and biocontrol (Nzioki *et al*. 2016) approaches to controlling parasitic weeds, but to integrate the RNAi approach into a system where all approaches are rotated.

Concluding challenge

The RNAi approach would have the lowest parasite-control economic input requirement for the grower, of all methodologies currently available. The evidence from other pest/crop systems. as well as with parasitic weeds, suggests that such an approach will succeed. As discussed above, much of the preparatory work has already been done. The time is ripe. Go for it – I wish I were in a position where I could.

References

Alakonya A, Kumar R, Koenig D, Kimura S, Townsley B, Runo S, Garces HM, Kang J, Yanez A, David-Schwartz R, Machuka J, Sinha N (2012) Interspecific RNA interference of SHOOT MERISTEMLESS-like disrupts *Cuscuta pentagona* plant parasitism. Plant Cell 24 (7):3153-3166.

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

Cooper AMW, Silver K, Ji Z, Park Y, Zhu KY (2018) Molecular mechanisms influencing efficiency of RNA interference in insects. Pest Management Science https://doi.org/10.1002/ps.5126:in press

de Framond A, Rich PJ, McMillan J, Ejeta G (2007) Effects on *Striga* parasitism of transgenic maize armed with RNAi constructs targetting *S. asiatica* genes. In: Ejeta G, Gressel J (eds) Integrating new technologies for *Striga* control: Towards ending the witch-hunt. World Scientific, Singapore, pp 185-196.

Dubey NK, Eizenberg H, Leibman D, Wolf D, Edelstein M, Abu-Nassar J, Marzouk S, Gal-On A, Aly R (2017) Enhanced host-parasite resistance based on down-regulation of *Phelipanche aegyptiaca* target genes is likely by mobile small RNA. Frontiers in Plant Science 8:article 1574. doi:10.3389/fpls.2017.01574

Fernandez-Aparicio M, Huang K, Wafula EK, Honaas LA, Wickett NJ, Timko MP, dePamphilis CW, Yoder JI, Westwood JH (2013) Application of qRT-PCR and RNA-Seq analysis for the identification of housekeeping genes useful for normalization of gene expression values during *Striga hermonthica* development. Molecular Biology Reports 40 (4):3395-3407.

Gal-On A, Naglis A, Leibman D, Ziadna H, Kathiravan K, Papayiannis L, Holdengreber V, Guenoune-Gelbert D, Lapidot M, Aly R (2009) Broomrape can acquire viruses from its hosts. Phytopathology 99 (11):1321-1329.

Gressel J, Polturak G (2018) Suppressing aflatoxin biosynthesis is not a breakthrough

if not useful. Pest Management Science 74 (1):17-21.
Honaas LA, Wafula EK, Yang ZZ, Der JP, Wickett NJ, Altman NS, Taylor CG, Yoder JI, Timko MP, Westwood JH, Depamphilis CW (2013) Functional genomics of a generalist parasitic plant: Laser microdissection of host-parasite interface reveals host-specific patterns of parasite gene expression. BMC Plant Biology 13:article 9.
Huang G, Allen R, Davis EL, Baum TJ, Hussey RS (2006) Engineering broad root-knot resistance in transgenic plants by RNAi silencing of a conserved and essential root-knot nematode parasitism gene. Proceedings of the National Academy of Science USA 103:14302-14306.
Kirigia D, Runo S, Alakonya A (2014) A virus-induced gene silencing (VIGS) system for functional genomics in the parasitic plant *Striga hermonthica*. Plant Methods 10:article 16.
Nzioki HS, Oyosi F, Morris CE, Kaya E, Pilgeram AL, Baker CS, Sands DC (2016) *Striga* biocontrol on a toothpick: A readily deployable and inexpensive method for smallholder rarmers. Frontiers in Plant Science 7:article 1121.
Power IL, Dang PM, Sobolev VS, Orner VA, Powell JL, Lamb MC, Arias RS (2017) Characterization of small RNA populations in non-transgenic and aflatoxin-reducing-transformed peanut. Plant Science 257:106-125.
Ranjan A, Ichihashi Y, Farhi M, Zumstein K, Townsley B, David-Schwartz R, Sinha NR (2014) De Novo assembly and characterization of the transcriptome of the parasitic weed dodder identifies genes associated with plant parasitism. Plant Physiology 166 (3):1186-1199.
Ransom J, Kanampiu F, Gressel J, De Groote H, Burnet M, Odhiambo G (2012) Herbicide applied to imidazolinone resistant-maize seed as a *Striga* control option for small-scale African farmers. Weed Science 60 (2):283-289.
Schiek B, Hareau G, Baguma Y, Medakker A, Douches D, Shotkoski F, Ghislain M (2016) Demystification of GM crop costs: releasing late blight resistant potato varieties as public goods in developing countries. International Journal of Biotechnology 14:112-131.
Shahid S, Kim G, Johnson NR, Wafula E, Wang F, Coruh C, Bernal-Galeano V, Phifer T, dePamphilis CW, Westwood JH, Axtell MJ (2018) MicroRNAs from the parasitic plant *Cuscuta campestris* target host messenger RNAs. Nature 553 (7686):82-85.
Sharma KK, Pothana A, Prasad K, Shah D, Kaur J, Bhatnagar D, Chen ZY, Raruang Y, Cary JW, Rajasekaran K, Kishan Sudini H, Bhatnagar-Mathur P (2018) Peanuts that keep aflatoxin at bay: a threshold that matters. Plant Biotechnology Journal 16 (5):1024-1033.
Sun G, Xu Y, Liu H, Sun T, Zhang J, Hettenhausen C, Shen G, Qi J, Qin J, Li I, Wang L, Chang W, Guo Z, Baldwin IT, Wu J (2018) Large-scale gene losses underlie the genome evolution of parasitic plant *Cuscuta australis*. bioRxiv doi: https://doi.org/10.1101/285593:https://www.biorxiv.org/content/early/2018/2004/2012/285593
Tomar G, Chakrabarti SK, Sharma NN, Jeevalatha A, Sundaresha S, Vyas K, Azmi W (2018) RNAi-based transgene conferred extreme resistance to the geminivirus causing apical leaf curl disease in potato. Plant Biotechnology Reports 12 (3):195-205.
Westwood JH, Kim G (2017) RNA mobility in parasitic plant - host interactions. RNA Biology 14 (4):450-455.
Yang ZZ, Wafula EK, Honaas LA, Zhang HT, Das M, Fernandez-Aparicio M, Huang K, Bandaranayake PCG, Wu B, Der JP, Clarke CR, Ralph PE, Landherr L, Altman NS, Timko MP, Yoder JI, Westwood JH, dePamphilis CW (2015) Comparative transcriptome analyses reveal core parasitism genes and suggest gene duplication and repurposing as sources of structural novelty. Molecular Biology and Evolution 32 (3):767-790.
Zotti M, dos Santos EA, Cagliari D, Christiaens O, Taning CNT, Smagghe G (2018) RNA interference technology in crop protection against arthropod pests, pathogens and nematodes. Pest Management Science 74 (6):1239-1250.

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LITERATURE HIGHLIGHT

New *Cuscuta* interactions and genomes revealed

The first half of 2018 has brought a breakthrough in parasitic plant genomes as three new papers have released *Cuscuta* genome data (Shahid *et al*., 2018; Sun *et al*., 2018; Vogel *et al*., 2018). This is a remarkable advance. Even knowing that other

parasitic plant genomes are in various stages of sequencing, assembly, and annotation, it is momentous to have these genomes revealed in such rapid succession. It is also perhaps surprising that the first thee parasitic plant genomes to be published are all *Cuscuta* species, with two dealing with *C. campestris* and one with *C. australis*.

The paper by Shahid *et al*. focuses on *C. campestris* and released a highly fragmented genome of this species as part of the supporting material for a study on small RNAs in parasite host interactions. The genomic sequences were used in identifying *Cuscuta* microRNAs (miRNAs) that are expressed in haustorial tissues in association with the host, *Arabidopsis thaliana*. The miRNAs appear to be mobile into host stems, where they result in production of small RNAs generated from the degradation of host target mRNAs. The parasite miRNAs have homology to host genes, so specifically bind to these targets to shut down their expression. Among the specific genes targeted for silencing are the sieve element occlusion protein SOER1 and three auxin receptors. Notably, parasites accumulated more biomass when grown on *Arabidopsis* hosts that were mutated in SOER1 or the auxin receptor AFB3. Taken together, these results make a strong case that *C. campestris* miRNAs function as trans-specific factors that facilitate parasitism. This is the first report of this type of interaction between parasitic plants.

Vogel *et al*. describe a more complete genome of *C. campestris*. For a parasitic plant, this species has a relatively compact genome, estimated at 556 Mbp per haploid genome, with a predicted 44,303 genes. Sun *et al*. report an even smaller genome for *C. australis*, estimating it at about half the size of *C. campestris* at 273 Mbp, with 19,671 predicted gene loci. Both papers describe insights from *Cuscuta* evolution, and although they ask slightly different questions, some common themes emerge. One of the more intriguing questions regarding parasite genomes is the extent to which the parasitic lifestyle has resulting in loss of unnecessary genes. This question can only be confidently addressed with a good quality genome in hand to provide certainty that genes are actually missing rather than just reduced in expression. For *C. campestris*, losses are reported for genes related to photosynthesis, metabolism, transport processes, and symbiotic interactions. This is similar to the situation in *C. australis*, in which lost genes relate to photosynthesis, chloroplast RNA processing, primary nutrient uptake from soil, and leaf and root development. All of these make sense for *Cuscuta*, which lacks functional leaves, roots and relies on host photosynthesis.

The genome papers diverge in other questions. Vogel *et al*. report evidence of 64 horizontal gene transfer events involving ancestral *C. campestris* acquisition of host genes. Sun *et al*. devote effort to analyzing regulation of gene expression, taking up the question of haustorium origin and concluding that haustoria in *C. australis* primarily use genes that are normally associated with root development in autotrophic species. These papers highlight the abundance of new data that is available and the types of questions that can be asked. Considering this along with a new aspect of parasitism involving RNAs as agents of cross-species gene silencing, these are indeed exciting times for parasitic plant research.

Shahid S, Kim G, Johnson NR, Wafula E, Wang F, Coruh C, Bernal-Galeano V, Phifer T, dePamphilis CW, Westwood JH, Axtell MJ (2018) MicroRNAs from the parasitic plant *Cuscuta campestris* target host messenger RNAs. Nature 553: 82

Sun G, Xu Y, Liu H, Sun T, Zhang J, Hettenhausen C, Shen G, Qi J, Qin Y, Li J, Wang L, Chang W, Guo Z, Baldwin IT, Wu J (2018) Large-scale gene losses underlie the genome evolution of parasitic plant Cuscuta australis. Nature Communications 9: 2683

Vogel A, Schwacke R, Denton AK, Usadel B, Hollmann J, Fischer K, Bolger A, Schmidt MHW, Bolger ME, Gundlach H, Mayer KFX, Weiss-Schneeweiss H, Temsch EM, Krause K (2018) Footprints of parasitism in the genome of the parasitic flowering plant Cuscuta campestris. Nature Communications 9: 2515

Jim Westwood, Virginia Tech, Blacksburg, VA 24061-0331, USA. westwood@vt.edu

***'VISCUM ALBUM'* IN WEST AFRICA**

We have recently identified a considerable number of papers in which medicinal value has been studied or attributed to '*Viscum album'* in West Africa (there are at least two in the Literature section below). As there is no reason to accept this identification as correct, as pointed out by Wahab *et al.*, 2010. (TLC phytochemical screening in some Nigerian Loranthaceae. Journal of Pharmacognosy and Phytotherapy 2(5): 64-70.), we have contacted the authors of 14 publications, requesting them to try and confirm which mistletoe species is really the subject of their study. So far there has been no response. If any other reader can throw light on this unfortunate situation, do please let us know.

PRESS REPORTS

‘Blackcaps wintering in Cambridge help spread mistletoe’

Image copyright Science Photo Library

A link between climate change, a migratory bird and an abundance of mistletoe in Cambridge has been found. A study of the city's natural history has discovered the plant is present in unexpectedly large quantities. Blackcaps which feed on mistletoe are staying in the city instead of migrating and are spreading its seeds.
NatHistCam studied a five-mile by five-mile (8km by 8km) square of the city, roughly centred on Mill Road Cemetery, and discovered unexpected amounts of the plant and also blackcaps wintering in the area. The Cambridge survey was designed to create a snapshot of the flora and fauna of the city.
Researchers said the mystery of why it has so much mistletoe has been answered. The bird usually flies off as winter approaches, but in recent years has stayed in the city as the weather has become warmer. While feeding on mistletoe the birds smear seeds on to trees which helps spread the plant, the survey group said.
Bob Jarman of the Cambridge Bird club, who is researching overwintering blackcaps, said: ‘The blackcaps are traditionally migratory birds who are here for the summer and then head to warmer climes for the winter.’ The RSPB said that since the 1960s, more of them had started to winter here because of climate change.
BBC News 25 December, 2017

Plant Palette: this parasite promotes kissing at the holidays

No one gives much thought to mistletoe beyond the Holidays.
How in the world did a plant parasite become associated with kisses and Christmas? There are lots of legends told about mistletoe, but the familiar association with Christmas has its roots in Europe. The ancient Druids used a golden sickle to cut mistletoe from their most-revered tree, the oak, as part of ceremonies celebrating fertility that included human sacrifice. The Druids also celebrated the winter solstice which may explain part of mistletoe’s association with Christmas-- but it’s a stretch.

Supposedly, a Norse myth explains mistletoe’s link to kissing. According to the myth, an arrow made from mistletoe killed Balder, son of Frigga, the goddess of love and beauty. The other gods resurrected Balder, and Frigga’s tears of joy formed the white berries produced by the common European mistletoe species, *Viscum album*. Legend says that the berries represent kisses bestowed by Frigga to people that meet under the mistletoe. Some say that a berry should be removed from the mistletoe for each kiss and that the mistletoe loses its "power" once all the berries are removed.
The name mistletoe comes from second-century Anglo-Saxon descriptions of the plants as ‘misteltan’, derived from the word ‘mistel’ meaning dung, and “tan” meaning twig. These early people associated the appearance of mistletoe with droppings from birds on tree branches. Not exactly the most romantic legend around, but they did think there was some magical process at hand that spontaneously generated the resulting mistletoe plants.

The French link mistletoe to Christmas through Christ’s crucifixion, using the fact that mistletoe is poisonous. According to a French legend, the original mistletoe plant grew on the tree that was made into the cross on which Jesus was crucified. This made the mistletoe cursed, causing it to be forever poisonous and a parasite, never allowed to grow independently on the ground.

Mistletoe may be poisonous, but at various times it has also been considered an aphrodisiac. Medically, it can be an abortifacient, meaning it will cause a miscarriage of pregnancy. Some writers suggest this is one reason mistletoe is linked with fertility, which in some cultures also meant uninhibited sexuality and promiscuity. In any case, ingestion of mistletoe is likely to cause severe cardiac, digestive, and neurological malfunction and death are likely. You’d be wise to search for aphrodisiacs elsewhere!
Another random fun fact: the mistletoe that started the kissing tradition according to European folklore is usually the species *Viscum album*. The mistletoe sold in the U.S. is an assortment of species from a different genus, *Phoradendron.* But regardless of the mistletoe species used, it really is an odd tradition when you stop to think about it!

Jennifer Schultz, Herald & Review, 29th December, 2017.

‘How Maine’s red spruce forests are fighting for survival’

Philip Kiefer ’18, a member of the podcasting student team that produces ‘The Bowdoin Commons’, has made an audio story about the honors project of his friend Hanna Baldecchi ’18, who is researching the Eastern dwarf mistletoe. This mistletoe is a tiny parasitic plant that lives on the branches of spruce trees, stealing nutrients from and slowly killing its hosts.

With his recorder, Kiefer accompanied biology major Hanna Baldecchi ’18 on one of her data-collecting trips to the Maine island of Isleboro this winter. Driving up the coast and walking through the woods, Baldecchi explained her research into the mystery of why the mistletoe is affecting red and white spruces differently. The red spruce appears to be better at protecting itself from the mistletoe’s threat, but scientists are not sure why.

‘She is looking at something really cool. She is studying a predator-prey relationship in the forests of Maine. But not like wolves and deer or anything,’ Kiefer remarks early in his podcast. ‘The predator she is looking at is a plant, mistletoe, and the prey is the forest itself. When Hanna looks at the trees she doesn’t see a peaceful place; instead she sees a bunch of plants fighting for their lives.’

In his podcast, Kiefer enlivens the fatal, and quiet, process of the mistletoe’s scourge on white spruce trees, and the curious way red spruces are managing to defend themselves from what should be a mortal enemy. Along with audio effects, and some funny back-and-forth between him and Baldecchi, he includes original music by Sam Kyzivat ’18.

For the associated podcast go to:http://community.bowdoin.edu/news/2018/04/how-maines-red-spruce-forests-are-fighting-for-survival/
Philip Kiefer, 24th April, 2018.

‘Declining native mistletoe discovered in Upper Hutt taken to Zealandia for preservation ‘

A declining native mistletoe has been found in Upper Hutt, New Zealand, and conservationists are hurrying to save it. The mistletoe, known as *Ileostylus micranthus*, was unexpectedly found growing on a tree planted by Greater Wellington Regional Council to provide cover and shade for other native plants. The only problem is the tree is dying, which means the mistletoe will also die, so a plan was hatched to move the shrub to Wellington's Zealandia ecosanctuary and nearby Otari-Wilton's Bush.

Members of Ngā Manu Nature Reserve, Otari-Wilton's Bush and Zealandia collected fruit from the mistletoe, before planting their seeds at Zealandia. The ‘host tree’, a lucerne planted next to State Highway 2 at River Rd, was not expected to survive until summer, so there was little time to act if the mistletoe was to be preserved.

Ileostylus micranths Photo Pieter Pelser

Hundreds of tiny fruit from the plants were taken from a tree they were growing on in Upper Hutt, with their seeds replanted at Zealandia. Zealandia conservation and research project leader Pascale Michel said while the plant species was not threatened, it was declining in Wellington. ‘We are on a bit of a rescue mission here to try to spread those plants throughout the Wellington region,’ Shanahan said.
‘They're quite ripe so it's a good time of the year to pick them. Usually birds will do that job, but

today it's us doing the job.' The bright orange fruit are a good source of food for birds and geckos.

Zealandia did not have the native species in its ecosanctuary, so it was hoping the propagation process would be successful. 'It has been a bit of a rushed process because of the host tree dying. We had planned to do this next year but decided to rush it a little bit this year to try and establish here at Zealandia. 'We'll most probably have another go next year as well.'

Zealandia manager of conservation and research Danielle Shanahan said the mistletoe plants played an important role in the ecosystem, as did all plants.
'In this case, the mistletoe is an excellent food source for birds and geckos, and they are another structural element in the ecosystem. It's a super-connected system.' Found in all parts of New Zealand and on Australia's Norfolk Island, the bushy, yellow-green shrub grows on other trees, producing clusters of tiny green flowers and orange fruit.

Damian George, 2nd May, 2018

'Ahead of Ugadi, the curious case of the disappearing neem trees in Hyderabad'

Ugadi is not far away, and the special pachadi that is prepared on the New Year's Day is something that most of us look forward to. However, one of the important ingredients of the recipe — the neem flower — is becoming increasingly hard to find. Once a common tree in households and road sides, the neem is fast disappearing from the landscape of Hyderabad. The neem flower, as a result, has become a rare commodity. Experts attribute the disappearance to a parasite called *Loranthus longiflorus* or honeysuckle mistletoe. The mistletoes anchor themselves onto the branches and suck water and nutrients directly. They engulf entire sections of the tree blocking the much-needed sunlight that is crucial for growth.

At the point of attachment, haustoria penetrate into the tissue of the host to absorb nutrients and water. The places at which the parasite is attached and where the haustoria penetrate often swell into tumours. When the tree is infested by the parasite, there will be a considerable reduction in the yield of fruit, and leaves wilt and show unhealthy green colour. Neem trees can be protected by removing the parasite in the early stages of its growth. Cutting the branch affected by *Loranthus* before it spreads to other branches will also help.

S Bachan Jeet Singh, The New Indian Express, 19th February, 2018.

'Mistletoe feared extinct found on Little Cayman'

Dendropemon caymanensis Photo Stuart Mailer

An extremely rare endemic mistletoe species, which had not been seen since 1991 and was feared extinct, has been found on Little Cayman, paving the way for the Department of Environment to undertake a thorough survey of the plant for its future protection. The Terrestrial Research Unit at the DoE has been looking for this plant for many years, and according to a report in the latest edition of the DoE's magazine, Flicker, the mysterious mistletoe species, *Dendropemon caymanensis,* was finally found quite by chance.

Stuart Mailer, the environmental programmes manager for the National Trust for the Cayman Islands, was on an altogether different mission in Little Cayman in January of this year, inspecting a network of trails that have recently been developed by a landowner on a large forested property on the island. Exploring what he said was a remote forest home to several rare plants and one of the places where the mistletoe was last seen, he spotted many 'amazing' plants and trees. But on higher ground, where the trees gave way to shrubs, he encountered several headache bushes, the primary host for the elusive *Dendropemon*.

According to Mailer, after some time, some scrambling around and careful concentration, he eventually spotted what he thought could be the elusive mistletoe, and after he and others in the party looked more closely, they were all reasonably convinced it was the mistletoe, even more so when they found more of the parasitic plant, which he was able to photograph close up

for the record. Comparisons of Mailer's pictures with George R. Proctor's description of the various mistletoe species recorded in Cayman in his seminal work about local plants, based on the shape of the leaves and the berries, it seemed that Mailer had rediscovered the rare mistletoe.

Following his discovery, he sent his photos to the DoE, which passed them on to other international experts, who confirmed the identification. The TRU then conducted an initial search and identified another seven locations in the area where the plant was growing. As a result, a new survey will soon be underway to ensure the plant is preserved and to help researchers understand more about this plant.

Cayman News, 6th June, 2018.

(NB This species was the subject of a note in Haustorium 65 reporting that a project had been established to try and re-find the species – which apparently proved unsuccessful.)

'MSU professors team up with African scientists to combat *Striga'*

Montana State University's department of plant biology hosted scientists from twelve African countries as part of the toothpick project in hopes of teaching them good agricultural practices to combat *Striga* or witch-weed in Africa. The team hopes to use these skills to combat the issues that the weed causes to millions of African farmers and improve their livelihood.

Christopher Suh a scientist, from Cameroon, was one of the twelve investigating these *Striga* solutions. '*Striga* being the number one parasite weed affecting the entire continent, so if we succeed, then we're going to improve the lives of 320 million people and give them a better future,' Suh explained.

The scientists are grateful for the university's willingness to help them improve farm life in Africa and hope for more universities around the world to open their doors to fight the problem.

Carson Vickroy - MTN News, 27th January, 2018

'New striga resistant seeds boon for farmers'

Maseno University (Kenya) scholars say they have developed maize and millet seed varieties capable of resisting the notorious striga weed, promising hope to farmers who routinely lose out to the herb. Lead scientist Mathew Dida said the new seeds have a natural adaptation to fight off the destructive weed. 'When you compare them with the normal seeds, ours have capacity to suppress the growth of the weed in maize plantations, for example,' said Prof Dida.

A farmer uproots striga weeds from his farm. file photo | nmg

The researcher said their 16-year study has produced maize varieties Maseno EH10, EH11 and EH14 and finger millet variety 60D which can tolerate the weed and mature faster. The weed is a common parasite in sub-Sahara African countries including Kenya. It thrives by siphoning nutrients and water from host plants such as maize, sorghum and rice, weakening the crops. The scientists said the varieties can cushion farmers against losses occasioned by the parasitic weed, assuring them of improved harvests. 'From the first day of planting to the harvest date takes about 120 days,' he said.
He said that the country suffers close to Sh6.7 billion losses as a result of the striga weed destruction.
Business Daily, 5th June 2018.

'Kamuli COA asks Parliament to ban the smoking of *Striga'*

The Kamuli (Uganda) district deputy Chief Administrative Officer (CAO), Godfrey Aduma has asked the MPs committee of Agriculture to ban the smoking of *Striga* among locals. This follows the increased use of the weed among the youth in Busoga region. According to Aduma, *Striga* is a deadly weed known to affect someone mentally when taken. Aduma told the legislators during their over sight role to assess the impact *Striga* weed has caused in Busoga region on Tuesday. He added that youth tend to dry *Striga*

leaves and purple flowers, combine it with tobacco for smoking hence intoxicating their brain, which explains the increased crimes in the region.

'*Striga* weeds are not on the list of banned narcotics in the country. 'Apparently, it is difficult to prosecute people practicing the vice. Therefore, we implore you to ensure that smoking *Striga* is an offence,' Aduma said. According to Aduma, over 60% of crimes committed in the region is done by youth who smoke *Striga*. 'Over 200 drugs related cases have been registered at Bugembe Police station since the beginning of the year,' he noted.

The Iganga district Senior Agricultural officer, Wilberforce Tibairira expressed fear that the weed may cause serious harm to the people's lives who are smoking it since it causes serious damage to its host crop before emerging from the soil, by producing harmful phytotoxins to the host crop. 'The host plant's nutrients are depleted and energy is spent supporting the parasitic plant (*Striga*). Damage is severe under conditions of low rainfall and poor soil fertility. 'explained Tibairira

'Consumption of the deadly weed is common in peri-urban areas including Kamuli, Iganga, Bugiri, Mayuge, Jinja, Luuka Kaliro districts he said the vice is rampant in Idudi, Busembatia, Bugembe Kasambira town councils among others.' The committee vice chairperson, Robert Migadde Ndugwa (Buvuma County MP, expressed fear that the youth may resort to planting the weed in hidden places, to avoid police. Meanwhile local governments in Busoga regions should agree to make and pass by-laws that prevent and control the smoking of the deadly weed ,' Migadde added.

Migadde said the committee will contact the Uganda National Crop Resources Research Institute-National Agricultural Research Organisation (NACRRI-NARO) to carry out experiments to get herbicides that control the *Striga* weed. The Bududa woman MP, Nalongo Justine Khainza cautioned the farmers against selling off their land to opportunists who are threatening to buy them off because of the *Striga* weed.
During their tour, the committee found over 200 acres of the maize, infested by the weed.

Sharon Muhwezi, the Uganda Government Relations analyst in charge of 'One Acre Fund,' a non-profit organisation serving smaller holders farmers in Busoga region said apparently there is no approved pesticides for controlling the weed, calling on Governments' intervention. Muhwezi said they offer farmers with a package of farming inputs including fertilisers, *Striga* maize resistant seeds, solar lights and harvest drying sheets. the package is equivalent to a loan of sh 250,000. The revolving loan payable back within one year after the farmers have harvested their yields. Muhwezi warned; '*Striga* seeds are very small and mainly spread through the use of contaminated seed and equipment, surface run-off, eroded soil, wind, animals and people.

'Uprooted *Striga* plants should be burned with fire to prevent spreads to other farms. Seeds may remain dormant in the soil for 15–20 years,' he said.

Paul Kiwuuwa, New Vision, 31st May 2018.

(NB We had some suspicions that this was an example of 'fake news' but we have now learnt from local sources that *Striga* leaves are indeed being smoked by youths in Eastern Uganda as a substitute for marijuana, since the latter has been banned. We would welcome any further comments on the veracity (or otherwise) of this story. Eds.)

'High-protein corn also resistant to parasitic weed'

The world produces more corn by weight than any other cereal crop. Corn, also known as maize, is a staple food in many countries. But farmers growing corn face many challenges, such as drought, diseases, and pests. For example, in sub-Saharan Africa, 20 to 80% of corn yields may be lost because of a semi-parasitic plant, *Striga*. In areas infested with *Striga*, farmers may even lose their entire crops.

Flowering witchweed (*Striga asiatica*) in a conventionally-ploughed maize field on sandy soils in Madziwa, Zimbabwe. Photo: Christian Thierfelder, CIMMYT

In a new study, researchers from southern Africa identified several varieties of corn resistant or tolerant to *Striga*. Importantly, these varieties also have improved nutritional content, particularly protein. The combination of *Striga* tolerance and improved nutrition is key. Farmers, as well as local populations, will benefit, says Peter Setimela, a study co-author. Setimela is a scientist at the International Maize and Wheat Improvement Centre in Harare, Zimbabwe.

Striga infestations can force small farmers in sub-Saharan and southern Africa to abandon their farms. *'Striga* is known to affect fields that have poor soil fertility. Its seeds can stay in the soil for more than 15 years,*'* says Setimela. *'*Many small farmers can't afford to buy chemicals to control *Striga*. They may also be unable to buy chemical fertilizers.*'* Having access to varieties of corn that can tolerate *Striga* will benefit these farmers. They will be able to continue farming and growing corn in areas with *Striga*. The improved nutritional content of these corn varieties will also help. The varieties have a wider variety of amino acids, the building blocks of protein.

*'*Typically, corn is poor in essential amino acids. Human and animal bodies can't make these amino acids. They have to be obtained from food,*'* says Setimela. *'*Lack of essential amino acids can impair growth and development. It can also weaken the immune system*'*. Many rural populations depend on corn as a staple food. *'*But these populations often have limited access to protein sources, such as eggs, meat, and dairy products,*'* says Setimela. *'*If varieties of corn can provide high-quality protein, these populations will benefit.*'* Setimela and colleagues tested both typical and high-protein varieties of corn for Striga resistance in the lab and field.

Controlled conditions, such as those in the laboratory, allow researchers to conduct tests that may not be possible in the field. But 'ultimately, crops will be grown in farmers' fields,' says Setimela. 'We ensured that the results from controlled environments also apply to field conditions.' Field experiments were carried out in three locations in Zimbabwe with diverse conditions. The researchers tested eight high-protein varieties and four typical varieties of maize. They measured several plant characteristics, including yield, height, vigor, and kernel weight. Researchers found four varieties of high-protein corn that also showed high levels of *Striga* tolerance and high yields.

'These varieties will provide options to farmers in areas with *Striga,*' says Setimela. 'They will improve food security and nutrition.'

EurekAlert, June 13, 2018, American Society of Agronomy

'The flower that must not be named'

Some know the plant as naked broomrape. Others know it as flowered cancer root. There's simply no way to talk about the beauty of *Orobanche uniflora* without raising a lot of eyebrows. The plant bears some of the least attractive common names in the plant kingdom: Some know it as naked broomrape. The alternate is no less unappealing: flowered cancer root. When you have to consider which of a plant's common names is least offensive, you know you are facing a plant with a publicity problem, a plant badly in need of an image makeover.

Photo: David Taft

Probing naked broomrape's common and Latin names rapidly leads down the rabbit hole of the arcane. The short version of the story is that *'*broomrape*'* is the partially translated 16th-century name of a genus of plants, *Genista*: European plants called brooms. Likewise, rapum is the partially translated Latin for a cluster of tuberlike roots. Naked, though unfortunately suggestive in this context, probably simply refers to the plant's leaflessness. Ferment these oral ingredients in the cask of time and the result is the hideous common name, naked broomrape. Though there are records of medieval medical uses of the plant as an astringent healer of *'*old green wounds', whatever uses cancer root once

had for treating that disease have been lost to time.

Myths aside, flowered cancer root is a singular, fascinating plant to study in the field. It is an uncommon plant found in a fairly ordinary habitat, but without leaves or perennial stems, it is visible only when it flowers, and generally where few think to search. Luckily, even in New York City, old, un-mown fields are not hard to find. Cancer root is a parasite of such common plants as goldenrods, asters, saxifrages and sedums, and though I have seen these plants blooming in Brooklyn and Queens, the fields of Staten Island and the Bronx have real potential. Superficially, cancer root appears like Indian pipe, a woodland dwelling saprophyte, a plant that feeds on decomposing plant matter. Though both plants are completely without chlorophyll, one-flowered cancer root grows in full sun, its *'haustoria'* (specialized roots) piercing the roots of its victims, and deriving nutrition from them, without the need to wrest it from the soil.

One flowered cancer root can be found in all of the lower 48 states of the continental United States, as well as in Alaska. Within a range this large, the flowers will vary in color. Our local cancer root flowers are particularly beautiful, held singly on pinkish, hairy, upright stems, they are white with a bright yellow throat, but completely covered with short purple hairs that outline the flower with a supernatural-looking halo. What is it that is so fascinating about parasites? Consider humanity's endless flirtation with vampires, leeches, even mistletoe. Parasites are iconic, sometimes medically valuable, sometimes even erotic. Perhaps we are drawn to their otherworldly lifestyles. Perhaps, deep down, we'd all like to try to live as malevolently as *Orobanche uniflora*.

Dave Taft, New York Times, 13th June, 2018.

HAUSTORIUM SUPPLEMENT

Two years ago, Chris Parker was invited to present a paper at the Strigolactone meeting in Nitra, Slovakia. He chose to discuss the history of parasitic plants and their control, with some admitted emphasis on his own involvement. This paper was not published but it is felt it could be of some interest to readers of Haustorium. Too long to include in the newsletter, it will be distributed as a Haustorium Supplement – Issue 74 - in the near future, and will also be available via the IPPS website.

THESIS

Ecology and Systematics of *Thonningia sanguinea* Vahl. (Balanophoraceae) in Southern Nigeria. Oligie Imarhiagbe. PhD Thesis. Department of Biological Science, Edo University Iyamho, Edo State, Nigeria. (Supervisor E.I. Aigbokhan, Department of Plant Biology and Biotechnology, University of Benin, Benin City, Nigeria.)

Summary:
Thonningia sanguinea Vahl (Balanophoraceae) is a rare cryptic obligate holoparasitic plant endemic to tropical Africa. Apart from its recognition as a root parasite of forest trees, knowledge of its biology in Nigeria is scanty. To bridge the knowledge gap, this study aimed to address its ecology and systematics in Southern Nigeria.

To delineate its presence and current distribution range, reconnaissance surveys were conducted across selected forested areas across Southern Nigeria comprising; National Parks (Okomu and Cross River), Forest Reserves (Ofosu, Oba hills, Idanre and IITA), Plantation forest (RRIN, Iyanomo) and other community managed secondary forests (Ehor-Nu-Wire, Okour, Okokhuo). Historical records of *T. sanguinea* from literature and herbaria together with folk taxonomy and ethnobotanical information from oral interviews of indigenous people from eleven ethnic groups in Nigeria (Bini, Efik, Ejagham, Etulo, Hausa, Igbo, Igala, Ijaw, Tiv, and Yoruba) were used to complement records of areas harbouring populations of *T. sanguinea*. Host identity was determined from soil excavation where direct host-parasite connections to an emerged parasite were apparent. Assessments of degree of infestation per location were determined from number of inflorescence connected to each host. Habitat characteristics were inferred from vegetation and soil types while phenology and insect visitation regimes were monitored by bi-weekly visits to selected *T. sanguinea* stands. Genetic variability and structure of *T. sanguinea* populations in southern Nigeria were evaluated using random amplified polymorphic DNA (RAPD) profile analysis of 15 randomly distributed *T. sanguinea* samples across its distribution range. DNA bands generated were analysed for similarities from which the genetic population structure and

phylogenetic relationship were inferred using PAST and GenALEx softwares.

The physical presence of *Thonningia* was observed in 25 locations but records from folk taxonomy suggest a wider distribution range. *T. sanguinea* showed a broad host range with special preference for native trees and members of the Euphorbiaceae and Urticaceae. Among the common hosts trees were: *Guarea cedrata* (Meliaceae), *Lophira alata* (Ochanaceae), *Musanga cecropiodes* (Urticaceae), *Myrianthus arboreus* (Urticaceae), and *Ricinodendron heudelotii* (Euphorbiaceae). Only *Hevea brasiliensis* and *Theobroma cacao* were of exotic origin. Phenologically, *T. sanguinea* flowers all year round with the peak during the raining season. Overall, incidence of female inflorescences surpassed male inflorescence by approximately a 2:1 ratio. Ants, *Technomyrmex* species, were the most common floral visitors, accounting for 55% frequency occurrence. Anatomically, the parasite-host interface was composed of a complex aggregate of composite bundles scattered within the haustorium matrix with no evidence of direct host-parasite vascular connectivity. Genetically, populations from Okuor forest were the most genetically diverse, while Cross River populations were most homogenous. Up to 82.3% variability could be explained by allelic variation within population. This demonstrates that *T. sanguinea* exhibits an out-crossing strategy which is expected in organisms with sexual breeding strategy. No IUCN red list category assessment is currently available for *T. sanguinea* but observations from this study suggest that *T. sanguinea* prefers disturbed areas in primary forests and potential threats from habitat (forest) destruction brought about by deforestation and incidence of bush fires are major concerns. The conservation status of *T. sanguinea* is therefore proposed to be Near Threatened (NT) category.

This study provides a comprehensive overview of the host and preference, habitat characteristics, phenology and some ecological interactions of *T. sanguinea* in Southern Nigeria. Its preference for disturbed areas of the forest, coupled with the fact that it is not found on all soil-types, especially those prone to leaching and erosion makes it a good bio-indicator for assessing the soil health status of a forest. *In situ* conservation *T. sanguinea* may be necessary.

FORTHCOMING MEETINGS

International Conference on Legume Genetics and Genomics, May 13-17, 2019 - Dijon, France. Contact ICLGG - C/O Vitagora - 67 rue des Godrans, 21000 DIJON. Tel.: +33 3 80 78 97 92. Email: conference@iclgg2019.com Includes a session on Biotic stress resistance.

The 15th World Congress on Parasitic Plants, 30 June – 5 July 2019, Amsterdam, the Netherlands (see above).

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/

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 Index of Orobanchaceae prepared by Óscar Sáchez Pedraja, Gerald Schneeweiss and others see: http://www.farmalierganes.com/Otrospdf/publica/Orobanchaceae%20Index.htm

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

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

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

For 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 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

Abdullah, M. and Sun IFang. 2017. Plant response to environmental gradient mediated by trait and through ontogeny on common tree species at two contrasting habitats in karst forest of Southern Taiwan. Biosaintifika: Journal of Biology & Biology Education 9(2): 332-344 . [*Chamereia manillana* (Opiliaceae) among the species studied.]

*Abu-Lafi, S., Makhamra, S., Rayan, I., Barriah, W., Nasser, A., Farkh, B.A. and Rayan, A. 2018. Sesamin from *Cuscuta palaestina* natural plant extracts: directions for new prospective applications. PLoS ONE 13(4): e0195707. (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0195707) [Identifying 18 components of an extract of *C. palaestina* including sesamin and two other phytosterols campesterol and stigmasterol, each having some record of value against cancer and confirming that sesamin originates in the parasite and is not derived from hosts.]

Abubakar, K., Yunus, A.T., Abubakar, M.R., Ugwah-Oguejiofor, J.C. and Muhammad, A.A. 2018. Antioxidant and antikindling effect of *Tapinanthus globiferus* growing on *Ficus glumosa* in pentylenetetrazole induced kindled rats. African Journal of Biotechnology 17(4): 73-80. [Results suggest that extracts of *T. globiferus* may possess bioactive compounds with anti-kindling and antioxidant effect which may support its traditional use in the management of epilepsy.]

Akaogu, I.C., Badu-Apraku, B., Adetimirin, V.O. 2017. Combining ability and performance of extra-early maturing yellow maize inbreds in hybrid combinations under drought and rain-fed conditions. Journal of Agricultural Science 155(10): 1520-1540. [The drought-resistant hybrids TZEEI 81 × TZEE1 79, TZEEI 100 × TZEEI 63 and TZEEI 64 × TZEEI 79 were the highest-yielding and most stable across environments. They are also resistant to *Striga hermonthica* and have the potential to contribute to food security and increased incomes in sub-Saharan Africa.]

Akhter, G., Khan, T.A. and Zafar, A. 2018. First report of *Orobanche cernua* parasitism on *Allium cepa* in Banda district of Uttar Pradesh, India. Journal of Crop Improvement 32(5): 681-689. [A first report of *O. cernua* attacking onion and causing severe damage.]

Akiyama, S., Thijsse, G., Esser, H.J. and Ohba, H. 2017. Siebold and Zuccarini's type specimens and original materials from Japan, Part 11. Angiosperms. Dicotyledoneae 10. Journal of Japanese Botany 92(5): 266-282 . [Including data on Orobanchaceae.]

Al-Fuhaid, N. 2018. Insecticidal activities of *Phyllanthus emblica*, *Prunus mahaleb*, *Cerasus mahaleb*, *Piper nigrum*, *Krameria lappacea* and *Phoenix dactylifera* on larvae *Trogoderma granarium* everts. International Journal of Agriculture and Forestry 8(2): 53-59. [*K. lappacea* proved to having useful potential as a repellant against *T. granarium* in stored wheat.]

Alamgeer, Niazi, S.G., Uttra, A.M., Qaiser, M.N. and Haseeb Ahsan. 2017. Appraisal of anti-arthritic and nephroprotective potential of *Cuscuta reflexa*. Pharmaceutical Biology 55(1): 792-798. [The results tend to support the traditional use of *C. reflexa* for anti-arthritic and nephroprotective purposes.]

Amico, G.C., Sasal, Y., Vidal-Russell, R., Aizen, M.A. and Morales, J.M. 2017. Consequences of disperser behaviour for seedling establishment of a mistletoe species. Austral Ecology 42(8): 900-907. [Concluding that the distribution and establishment of *Tristeryx corymbosus* in Argentina is very much dependant on the marsupial frugivore *Dromiciops gliroides.*]

Amini, M., Nabiabad, H.S. and Deljou, A. 2017. Host-synthesized cysteine protease-specific inhibitor disrupts *Cuscuta campestris* parasitism in tomato. Plant Biotechnology Reports 11(5):

289-298. [*C. campestris* is one of the most important pests of tomato causing severe losses in yield. The inhibitory propeptide segment of cuscutain (a pre-pro-protein produced by dodder) was transferred into tomato and effectively interrupted cuscutain enzyme activity and haustoria development at the endophytic stage and reduced *C. campetsris* vigour and fecundity.]

Andrade, C.G.C., da Silva, M.L., Torres, C.M.M.E., Ruschel, A.R.,da Silva, L.F., de Andrade, D.F.C. and Reis, L.P. 2017. (Diametric growth and time of passage of *Minquartia guianensis* after logging at Tapajós National Forest, Brazil.) (in Portuguese) Pesquisa Florestal Brasileira 37(91): 299-309. [*M. guianensis* (Olacaceae) is a valued timber. Resuts of a 31-year study suggested that trees with DBH ≤50 cm have potential to be managed, due to the growth stagnation presented in larger diameter classes.]

*Aragão, T.P., dos Prazeres, L.D.K.T. Brito, S.A., Rolim Neto, P.J., Rolim, L.A., Almeida, J.R.G.da S., Caldas, G.F.R. and Wanderley, A.G. 2018. Contribution of secondary metabolites to the gastroprotective effect of aqueous extract of *Ximenia americana* L. (Olacaceae) stem bark in rats. Molecules 23(1): 112. (http://www.mdpi.com/1420-3049/23/1/112/htm) [*X. americana* is used for wound healing and for the treatment of gastric disorders in Brazil. This study confirms that it has gastroprotective activity mediated in part by -SH, NO and antisecretory activity. This antiulcer action is initially correlated to its major constituents, procyanidins B and C and catechin/epicatechin.]

Aybeke, M. 2017. *Fusarium* infection causes phenolic accumulations and hormonal disorders in *Orobanche* spp. Indian Journal of Microbiology 57(4): 416-421. [It was concluded that *Fusarium oxysporum* causes heavy hormonal disorder, triggers only salicylic acid-mediated defence and induces intense accumulation of phenolic substances in an unidentified *Orobanche* species in Turkey.]

Bacieczko, W., Borcz, A. and Kaszycka, E. 2017. *Orobanche pallidiflora* Wimm. et Grabb. - specimens variability and plant communities - a case study of the abandoned meadow. Polish Journal of Natural Sciences 32(4): 671-679. [Including detailed measurements of 75 individual *O. pallidiflora* gowing in a 100 sq.m. area of a species-poor *Molinietalia* community dominated by *Cirsium oleraceum* and *C. arvense* in West Pomerania, Poland.]

Baiyegunhi, L.J.S., Hassan, M.B. and Ortmann, G.F. 2018. Impact of Integrated *Striga* Management (ISM) technology on maize productivity in northern Nigeria: A treatment effect approach. African Journal of Science, Technology, Innovation and Development 10: 335-344. [A survey from 2014 suggested that farmers adopting Integrated *Striga* Management (ISM) techniques achieved a 47% increase in maize yields. The ISM package apparently involves a combination of imroved variety, improved fertilizer and tied ridges?]

*Bao YaZhou Yao ZhaoQun, Cao XiaoLei, Peng JinFeng, Xu Ying, Chen MeiXiu and Zhao SiFeng. 2017. Transcriptome analysis of *Phelipanche aegyptiaca* seed germination mechanisms stimulated by fluridone, TIS108, and GR24. PLoS ONE 12(11): e0187539. (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0187539) [Deep RNA sequencing was used to learn more about the mechanisms by which TIS108 and fluridone stimulate the germination of unconditioned *P. aegyptiaca* seeds. The results showed that only 119 differentially expressed genes were identified in the conditioned treatment vs TIS108 (strigolactone inhibitor) treatment. It was suggested that TIS108 and fluridone (an inhibitor of carotenoid-biosynthesis) +GA_3 could be used to control *P. aegyptiaca* through suicidal germination.]

Barkman, T.J., Klooster, M.R., Gaddis, K.D., Franzone, B., Calhoun, S., Sugumaran Manickam, Vessabutr, S., Sasirat, S. and Davis, C.C. 2017. Reading between the vines: hosts as islands for extreme holoparasitic plants. American Journal of Botany 104(9): 1382-1389. [This is the second of two papers published this year on the population biology of *Rafflesia* (see also Pelser et al. 2017). Microsatellite markers were used to show that host vines can be infected by more than one *Rafflesia* individual, and that these are more closely related to each other than to other individuals in the population.]

Barkman, T.J., Repin, R. and Sugau, J.B. 2016. The parasitic plant families Loranthaceae and Viscaceae in Sabah, Malaysia. Sandakania 21: 131-169. [52 species of Loranthaceae and Viscaceae are recorded, including one new endemic *Macrosolen* sp. (not named in the abstract). *Helixanthera pulchra*, *Korthalsella japonica and Viscum scurruolideum* are recorded for the first time in Borneo.]

Bayram, Y., Özdemİr, I., Ateş, E., TomanovİÇ, Z., Bükün, B. and Mutlu, Ç. 2018. Secondary host changing between aphids (Hemiptera: Aphididae) and their parasitoids in wheat fields of Southeast Anatolian region. Munis Entomology & Zoology 13(1): 309-317. [Mentioning the occurrence of unspecified aphid species on unspecified *Orobanche* species in Turkey.]

Belay, F. 2018. Breeding sorghum for *Striga* resistance: A review. Journal of Natural Sciences Research 8(5): 1-8. [A general review.]

Biegel, U., Stratmann, N., Knauf, Y., Ruess, K., Reif, M. and Wehrend, A. 2017. (Postsurgical adjuvant treatment with mistletoe extract (*Viscum album* ssp. *album*) in canine mammary tumors.) (in German) Complementary Medicine Research 24(6): 349-357. [Results suggest a lower though non-significant tumour-related death risk after postsurgical *V. album* therapy in female dogs suffering from canine mammary adenocarcinomas. The therapy was well tolerated by the patients.]

Bigagli, E., Cinci, L., D'Ambrosio, M. and Luceri, C. 2017. Pharmacological activities of an eye drop containing *Matricaria chamomilla* and *Euphrasia officinalis* extracts in UVB-induced oxidative stress and inflammation of human corneal cells. Journal of Photochemistry and Photobiology. B, Biology 173: 618-625. [The findings suggest that an eye drop containing *M. chamomilla* and *E. officinalis* extracts exerts positive effects against UVB induced oxidative stress and inflammation and may be useful in protecting corneal epithelial cells from UVB exposure.]

Boddey, R. M., Fosu, M., Atakora, W.K., Miranda, C.H.B., Boddey, L.H., Guimaraes, A.P. and Ahiabor, B.D.K. 2017. Cowpea (*Vigna unguiculata*) crops in Africa can respond to inoculation with rhizobium. Experimental Agriculture 53(4): 578-587. [Noting that where cowpea in Mozambique was infested by *Alectra vogelii*, inoculation with a Brazilian strain of *Rhizobium,* substantial yield increases were recorded, but not clear from the abstract whether *Alectra* was affected.]

Bodungen, U. von, Ruess, K., Reif, M. and Biegel, U. 2017. Combination therapy with radiation and adjuvant mistletoe extract (*Viscum album* L.) for the treatment of oral malignant melanoma in dogs: a retrospective study. Complementary Medicine Research 24(6): 358-363. [Results suggest that *V. album* extract is safe and seems to improve the survival time in dogs after radiation therapy for oral melanoma. However, the compared groups were small and a study with a larger population should be of interest.]

*Bolin, J.F., Lupton, D. and Musselman, L.J. 2018. *Hydnora arabica* (Aristolochiaceae), a new species from the Arabian Peninsula and a key to *Hydnora*. Phytotaxa 338. (https://biotaxa.org/Phytotaxa/article/view/phytotaxa.338.1.8) [Detailed morphological studies indicate that this taxon, previously called *H. africana*, is distinct. A key to the eight species of *Hydnora* is provided.]

Boydston, R.A. and Anderson, T.L. 2017. Field dodder (*Cuscuta pentagona*) control with flumioxazin. Weed Technology 31(6): 847-851. [The performance of flumioxazin 0.14 kg/ha in controlling '*Cuscuta pentagona'* (= *C. campestris*?) was equivalent to the standard pendimethalin at 2- 4 kg/ha up to 4 weeks from application but somewhat less effective on later germinating parasite.]

Brand, J.E. and Norris, L.J. 2017. Variation in oil content and tree size between six geographically separate *Santalum spicatum* families, established near Narrogin, Western Australia. Australian Forestry 80(5): 294-298. [Discussing the variation in various parameters between 6 'families' of *S. spicatum*, presumably from different sites.]

Brun, G., Braem, L., Thoiron, S., Gevaert, K,, Goormachtig, S. and Delavault, P. 2018. Seed germination in parasitic plants: what insights can we expect from strigolactone research? Journal of Experimental Botany 69(9): 2265-2280. [The germination process of parasitic plants has probably undergone numerous selective pressure events in the course of evolution, in that the perception of host-derived molecules (such as strigolactones) is a necessary condition for seeds to germinate. In this review, the authors illustrate to what extent conclusions from research into strigolactones could be applied to better understand the biology of parasitic plants.]

Bruschi, P., Urso, V., Solazzo, D., Tonini, M. and Signorini, M.A. 2017. Traditional knowledge on ethno-veterinary and fodder plants in South Angola: an ethnobotanic field survey in Mopane woodlands in Bibala, Namibe province. Journal of Agriculture and Environment for International Development 111(1): 105-121. [*Ximenia americana* among the ten most commonly used species, for respiratory tract problems.]

Bulíř, P. 2017. Extent of infection by *Viscum album* L. and changes in its occurrence on ornamental woody species in the locality of Lednice (Czech Republic). Folia Horticulturae 29(2): 123-134. [*V. album* recorded in over 1300 trees, comprising 42 species, mainly in *Acer campestre, A platanoides, A. pseudoplatanus, Crataegus monogyna, Robinia pseudoacacia, Tilia cordata* and *T. platyphyllos, T. cordata* being the most seriously affected. The number of host species had increased by 18 over a 20-year period, and included *Aesculus* × *marylandica*, *Fraxinus biltmoreana*, *Magnolia hypoleuca* × *tripetala* and *Malus* × *moerlandsii,* perhaps for the first time.]

Bulut, G., Bozkurt, M.Z. and Tuzlacı, E. 2017. The preliminary ethnobotanical study of medicinal

plants in Uşak (Turkey). Marmara Pharmaceutical Journal 21(2): 305-310. (Including reference to the use of *Viscum album* ssp. *album* for treatment of diabetes and in hypertension.]

Bulut, G., Haznedaroğlu, M.Z., Doğan, A., Koyu, H. and Tuzlacı, E. 2017. An ethnobotanical study of medicinal plants in Acipayam (Denizli-Turkey). Journal of Herbal Medicine 10: 64-81. [Also referring to *Viscum album* being among the more imporatnt plants used in tradiional medicine.]

Burckhardt, D., Díaz, F. and Queiroz, D.L. 2017. Four new neotropical *Trioza* species associated with Loranthaceae (Santalales) and comments on mistletoe inhabiting psyllids (Hemiptera, Psylloidea). Alpine Entomology 1: 91-108. [Two of the new species occurring in Brazil and Chile are monophagous on *Struthanthus uraguensis* and *Tripodanthus acutifolius* respectively. A third is narrowly oligophagous on a *Tristerix* sp. Host plant and biogeographical patterns of mistletoe feeding psyllids around the world are briefly discussed.]

Bürzle, B., Schickhoff, U., Schwab, N., Oldeland, J., Müller, M., Böhner, J., Chaudhary, R.P., Scholten, T. and Dickoré, W.B. 2017. Phytosociology and ecology of treeline ecotone vegetation in Rolwaling Himal, Nepal. Phytocoenologia 47(2): 197-220. [Including reference to a *Pedicularis* cf. *microcalyx-Rhododendron anthopogon* community.]

Çetİn, E.S., Tetİker, H., Çelİk, Ö.İ., Yılmaz, N. and Ciğercİ, I.H. 2017. Methotrexate-induced nephrotoxicity in rats: protective effect of mistletoe (*Viscum album* L.) extract. Complementary Medicine Research 24(6): 364-370. [The study demonstrated that a *V. album* preparation 'Helixor' markedly reduced the induced acute oxidative stress and nephrotoxicity in rats through its antioxidant and anti-inflammatory properties.]

Chai, A.L., Li, P.L., Guo, W.T., Li, B.J. and Aisimutuola, P. 2018. First report of *Fusarium acuminatum* wilt in the broomrape parasite of processing tomato in China. Plant Disease 102 (3): 676-677. [*F. acuminatum* (also referred to as *Gibberella acuminata* in the astract) reported infecting *Phelipanche aegyptiaca* on tomato in Xinjiang Province.]

Chen Jie, Ma YongQing and Xue QuanHong. 2018. (Use of microorganisms in controlling parasitic root weed *Orobanche* spp.) (in Chineae) Zhongguo Shengtai Nongye Xuebao / Chinese Journal of Eco-Agriculture 26(1): 49-56. [*Streptomyces amissocaesilis* controlled *O. cumana* in pot experiments, while *S. pactum* proved effective in both pot and field experiments against *Phelipanche aegyptiaca* resulting in increased yield of tomato.]

Chen ZhuLin and Wang XueFeng. 2018. (Classification of sandalwood trunk area damaged by *Zeuzera coffeae* Nietner in complex background.) (in Chinese) Journal of Beijing Forestry University 40(1): 74-82. [The paper provides a new classification method for sandalwood trunk regions attacked by coffee carpenter moth *Z. coffeae,* by digital image processing and providing a method for early identification and damage rate calculation from insect pests.]

*Cheng Dan, Murtaza, G., Ma SuYa, Li Lingling, Li XinJie, Tian FangZe, Zheng JunChao and Lu Yi. 2017. In silico prediction of the anti-depression mechanism of a herbal formula (Tiansi Liquid) containing *Morinda officinalis* and *Cuscuta chinensis*. Molecules 22(10): 1614. (http://www.mdpi.com/1420-3049/22/10/1614/htm) [Results support the use of *M. officinalis* and *C. chinesis* in the treatment of depression but the mechanism of action is uncertain.]

Chepchirchir, R.T., Macharia, I., Murage, A.W., Midega, C.A.O. and Khan, Z.R. 2017. Impact assessment of push-pull pest management on incomes, productivity and poverty among smallholder households in eastern Uganda. Food Security 9(6): 1359-1372. [A survey of 560 farms in several districts of Uganda found a good correlation between maize yields and prosperity level, and the degree of adoption of push-pull technology involving the use of *Desmodium* spp. for reduction of maize stalk borer and *Striga hermonthica* infestation. Conversely, the risk of being below the poverty line was reduced from 48% to 28%.]

Ciobanu, V.G., Visan, A.L. Paun, A. and Bogdanof, G. 2017. Experimental research regarding magnetic separation of seeds after their surface conditions using two moistening liquids.16th International Scientific Conference 'Engineering for Rural Development', Jelgava, Latvia, 24 - 26 May 2017: 1000-1005. [Discussing the magnetic separation of seeds of *Cuscuta* from crop seed and proposing improvement by variation of the drum speed and the use of wetting agents for better adhesion of the iron powder.]

Colbach, N., Bockstaller, C., Colas, F., Gibot-Leclerc, S., Moreau, D., Pointurier, O. and Villerd, J. 2017. Assessing broomrape risk due to weeds in cropping systems with an indicator linked to a simulation model. Ecological Indicators 82: 280-292. [Parasite risk depended on crop rotation, sowing and harvest dates, tillage, herbicides and mechanical weeding. Early summer-emerging weed species increased parasite risk. No other notable correlations were found, indicating that parasite risk results from a

weed community of interacting species, and not simply from individual weed species. An advice table was built to summarize and explain the effects of crop management practices on weed-mediated parasite risk.]

Colwell, A.E.L., Watson, K.C. and Schneider, A.C. 2017. A new species of *Aphyllon* (Orobanchaceae) parasitic on *Galium* in the Western USA. Madroño 64(3): 99-107. [Describing *A. epigalium* distinguished by its host preference for *Galium*, by having 2-4 yellow flowers per stem, and pedicels longer than the stem. Two subspecies are described, differing from one another in flower size, corolla lobe shape, host preference, geographic range, and nuclear and plastid genetic markers.]

Cui, S., Wada, S., Tobimatsu, Y., Takeda, Y., Saucet, S.B., Takano, T., Umezawa, T., Shirasu, K. and Yoshida, S. 2018. Host lignin composition affects haustorium induction in the parasitic plants *Phtheirospermum japonicum* and *Striga hermonthica.* New Phytologist 218(2): 710-723. [The complex and elegant communication between host and parasite has received a great deal of study recently. This work reports that high concentrations of lignin polymers induced haustorium formation. Treatment with laccase, a lignin degradation enzyme, promoted haustorium formation at low concentrations.]

Czenze, Z.J. and Thurley, T. 2018. Weather and demographics affect *Dactylanthus* flower visitation by New Zealand lesser short-tailed bats. New Zealand Journal of Ecology 42(1): 80-84. [Studying the pattern of visits by the bat *Mystacina tuberculatai* pollinating the threatened holoparasitic 'wood rose' *Dactylanthuis taylorii* and finding that the majority of visits are by males and juveniles on warm nights,]

da Silva, F.P. and Fadini, R.F. 2017. Observational and experimental evaluation of hemiparasite resistance in trees in the urban afforestation of Santarém, Pará, Brazil. Acta Amazonica 47(4): 311-319. [*Passovia theloneura* was the most abundant mistletoe, parasitizing 59 individuals, while *Oryctanthus florulentus* was found on only 3 trees. The most abundant host and that most affected by *P. theloneura* was mango. Seed placement studies showed that the native *Handoanthus serratifolius* is relatively resistant.]

da Silva-Leite, K.E.S., Assreuy, A.M.S., Mendonça, L.F., Damasceno, L.E.A., de Queiroz, M.G.R., Mourão, P.A.S., Pires, A.F. and Pereira, M.G. 2017. Polysaccharide rich fractions from barks of *Ximenia americana* inhibit peripheral inflammatory nociception in mice: antinociceptive effect of *Ximenia americana* polysaccharide rich fractions . Revista Brasileira de Farmacognosia 27(3): 339-345. [Concluding that the polysaccharide rich fractions of *X. americana* bark inhibit peripheral inflammatory nociception and are well tolerated by animals.]

Dai WenKui, Kadiori, E.L., Wang QingFeng and Yang ChunFeng. 2017. Pollen limitation, plasticity in floral traits, and mixed mating system in an alpine plant *Pedicularis siphonantha* (Orobanchaceae) from different altitudes. Journal of Systematics and Evolution 55(3): 192-199. [Studying variation in the success of pollination by bumble bee and seed set in populations of *P. siphonantha* associated with differing flower morphology and longevity of flowering at differing elevations in Wuhan, China.]

Dang Ngoc Quang and 11 others. 2018. Balanochalcone, a new chalcone from *Balanophora laxiflora* Hemsl. Natural Product Research 32(7): 767-772. [9 compounds identified in an extract from *B. laxiflora* in Vietnam including several with anti-cancer properties.]

Dénou, A., Koudouvo, K., Togola, A., Haïdara, M., Dembélé, S.M., Ballo, F.N., Sanogo, R., Diallo, D. and Gbeassor, M. 2017. (Traditional knowledge on antimalarial plants having analgesic properties, used in Bamako District (Mali).) (in French) Journal of Applied Biosciences 112: 10985-10995. [Among 54 species studied, *Cassytha filiformis* is noted to be threatened due to over-use for traditional medicinal purposes.]

*Dimitrijevic, A and Horn, R. 2018. Sunflower hybrid breeding: from markers to genomic selection. Frontiers in Plant Science 17 January 2018. (https://www.frontiersin.org/articles/10.3389/fpls.2017.02238/full) [Advances in technologies and the availability of the sunflower genome sequence made novel approaches on the whole genome level possible, such as production of large amounts of SNP markers for high density maps and candidate gene based association studies. Genomic selection and integrative approaches can successfully address complex quantitative traits in sunflower and will help to speed up sunflower breeding programs in the future.]

Duquesnel, J.A., Maschinski, J., McElderry, R., Gann, G.D., Bradley, K. and Cowan, E. 2017. Sequential augmentation reveals life history and suitable conditions for colonization of the rare mahogany mistletoe in south Florida. Restoration Ecology 25(4): 516-523. [To enhance populations of *Phoradendron rubrum*, sowing fresh seeds in dry periods from introduced versus wild plants onto small

diameter trees (<20 cm dbh) that had branch diameters 15-20 mm resulted in the greatest colonization success. But development is slow! - 100 days to germinate, 1.6 years for cotyledon emergence, and over 4.7 years to produce fruits.]

*Dzotam, J.K. and Kuete, V. 2017. Antibacterial and antibiotic-modifying activity of methanol extracts from six Cameroonian food plants against multidrug-resistant enteric bacteria. BioMed Research International 2017: ID 1583510. (https://www.hindawi.com/journals/bmri/2017/1583510/) [Extracts from *Coula edulis* (Olacaceae) were particularly active against *E. coli*.]

Ekawa, M. and Aoki, K. 2017. Phloem-conducting cells in haustoria of the root-parasitic plant *Phelipanche aegyptiaca* retain nuclei and are not mature sieve elements. Plants 6(4): 60. [Phloem-type cells in the haustoria of *P. aegyptiaca* contained nuclei but not callose-rich sieve plates, indicating that phloem-conducting cells in haustoria differ from conventional sieve elements. Further genetic study suggested that the formation of plasmodesmata with large size exclusion limits is independent of nuclear degradation and callose deposition.]

El-Refaey, R., Rashwan, E. and Ramadan, E. 2017. Effect of dodder weed (*Cuscuta epilinum* L.) control on straw, seed and fiber yields of three varieties of flax "*Linum usitatissimum* L.". In: Kovačević, D. (ed.) VIII International Scientific Agriculture Symposium, "Agrosym 2017", Jahorina, Bosnia and Herzegovina, October 2017. Book of Proceedings 2017: 221-231. [In field trials in Egypt, *C. epilinum* was selectively controlled in flax by clethodim and/or metsulam, also benzoic acid, applied 30 days after sowing and yields of stem and seed were significantly increased. Not clear whether control of other weeds might have contributed to the benefits. Hand weeding was slightly superior to the herbicide treatments.]

*Eligio-García, L., Pontifez-Pablo, E., Pérez-Gutiérrez, S. and Jiménez-Cardoso, E. 2017. Antigiardial effect of kramecyne in experimental giardiasis. Evidence-based Complementary and Alternative Medicine 2017: ID 6832789. (https://www.hindawi.com/journals/ecam/2017/6832789/) [Kramecyne, an anti-inflammatory compound isolated from methanolic extract of *Krameria cytisoides*, does not present toxicity to Mongolian gerbils even at doses of 5,000 mg/kg and provided satisfactory control of *Giardia intestinalis*.]

*Endharti, A.T. and Permana, S. 2017. Extract from mango mistletoes *Dendrophthoe pentandra* ameliorates TNBS-induced colitis by regulating CD4+ T cells in mesenteric lymph nodes. BMC Complementary and Alternative Medicine 17: 468. (https://bmccomplementalternmed.biomedcentral.com/track/pdf/10.1186/s12906-017-1973-z) [The results of studies in Indonesia suggest that extracts of *D. pentandra* have good activity in reversing the induced colitis in mice.]

Erenturk, S. and Korkut, Ö. 2018. Effectiveness of activated mistalea (*Viscum album* L.) as a heterogeneous catalyst for biodiesel partial hydrogenation. Renewable Energy 117: 374-379. [Even a small amount of activated *V. album* showed high catalytic activity for the partial hydrogenation reaction and can be recommended as a potential catalyst for the process.]

Fadini, R.F., Fischer, E., Castro, S.J., Araujo, A.C., Ornelas, J.F. and de Souza, P.R. 2018. Bat and bee pollination in *Psittacanthus* mistletoes, a genus regarded as exclusively hummingbird-pollinated. Ecology 99(5): 1239-1241. [Field studies in Brazil confirm that unlike other *Psittacanthus* spp., *P. acinarius* and *P. eucalyptifolius* are polllinated by the bats *Glossophaga soricana* and *Phyllostomus disclor* and by the several bee species, respictively.]

Fikriani, W.D., Mulyaningsih, T. and Aryanti, E. 2017. Study of mistletoe in Joben Resort forest Mount Rinjani Lombok. Biosaintifika: Journal of Biology & Biology Education 9(2): 304-310. [Recording *Amyema cuernosensis, A. tristis, A. enneantha, Macrosolen retusus* and *Scurrula atropurpurea* on 23 hosts species, the commonest being *Ficus septica*. *S. atropurpurea* the most aggressive.]

Fondevilla, S., Flores, F., Emeran, A.E., Kharrat, M. and Rubiales, D. 2017. High productivity of dry pea genotypes resistant to crenate broomrape in Mediterranean environments. Agronomy for Sustainable Development 37(6): 61. [Studying yhe levels and stability of partial resistance in dry pea varieties to *Orobanche crenata* across Spain, Tunisia and Egypt. Identifying lines J26 and J26-2 as having the widest and most stable resistance. J3 showed a different pattern across environments. Egypt was best for selecting high reistance.]

Frailey, D.C., Chaluvadi, S.R., Vaughn, J.N., Coatney, C.G. and Bennetzen, J.L. 2018. Gene loss and genome rearrangement in the plastids of five hemiparasites in the family Orobanchaceae. BMC Plant Biology 18(30). (https://bmcplantbiol.biomedcentral.com/track/pdf/10.1186/s12870-018-1249-x) [*Aureolaria virginica* had the most similar genome content to the non-parasitic *Lindenbergia philippensis* while *Buchnera americana, Striga

***hermonthica, S. aspera* and *S. forbesii* all had enlargements of their plastomes (chloroplast genomes), primarily caused by expansion within the large inverted repeats (IRs) that are a standard plastome feature.]**

Franke, A.C., van den Brand, G.J., Vanlauwe, B. and Giller, K.E. 2018. Sustainable intensification through rotations with grain legumes in sub-Saharan Africa: a review. Agriculture, Ecosystems & Environment 261: 172-185. [Reviewing 44 publications reporting comparisons of continuous cereal with a cereal/legume rotation, finding an overall benefit of 0.49 ton grain yield/ha, greatest in maize, less in sorghum or millet. Residual effects were greater after soyabean and groundnut than after cowpea. Other aspects ae discussed.]

Fu WenGui, Yan ZhiQiang, Zhai ShaoQin, Zhu MaiXun, Zheng Hua and Sun XingZhong. 2017. Study of *Cuscuta chinensis* Lam. in Nuhuang Fuzheng Oral Liquid by Thin Layer Chromatography. Medicinal Plants 8(5): 6-10.

*Gaisberger, H.and 20 others. 2017. Spatially explicit multi-threat assessment of food tree species in Burkina Faso: a fine-scale approach. PLoS ONE 12(9) e0184457. (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0184457) [Assessing the threats to *Ximenia americana* and 15 other food tree species of overexploitation, overgrazing, fire, cotton production, mining and climate change. For *X. americana* the main threats are climate change, cotton production, fire and over-exploitation.]

Gbadamosi, I.T., Raji, L.A., Oyagbemi, A.A. and Omobowale, T.O. 2017. Hypolipidemic effects of *Olax subscorpioidea* Oliv. root extract in experimental rat model. African Journal of Biomedical Research 20(3): 293-299. [This result suggests that an ethanol extract of *O. subscorpioidea* at 200 and 400 mg/kg bw possesses hypolipidemic effects on diet induced hyperlipidemic rats.]

Ghantous, K.M. and Sandler, H.A. 2017. Evaluations of pre- and postemergence herbicides for dodder management in cranberry. In: Olmstead, J.W. (ed.) Acta Horticulturae 1180: 379-386. [Eight herbicides screened in greenhouse trials for activity against *Cuscuta gronovii*. Of these flumioxazin is being further tested in the field for selectivity pre-emergence in cranberry and imazethapyr post-emergence.]

Gisca, I., Joita-Pacureanu, M., Clapco, S. and Duca, M. 2017. Influence of broomrape on some productivity indices of sunflower. Lucrări Științifice, Universitatea de Stiinte Agricole Și Medicină Veterinară "Ion Ionescu de la Brad" Iași, Seria Agronomie 60(2): 97-102. [Many parameters studied in sunflower infected with *O. cumana*, the most significant being be the head diameter and seeds per head.]

Gong PengFei, Zhao QingSheng and Zhao Bing. 2017. (Study on ultrasonic-vacuum drying dynamics of *Cistanche deserticola* slices.) (in Chinese) Food Research and Development 38(9): 10-13.

Goyet, V., Billard, E., Pouvreau, J.B., Lechat, M.M., Pelletier, S., Bahut, M., Monteau, F., Spíchal, L., Delavault, P., Montiel, G. and Simier, P. 2017. Haustorium initiation in the obligate parasitic plant *Phelipanche ramosa* involves a host-exudated cytokinin signal. Journal of Experimental Botany 68(20): 5539-5552. [Root exudates from *Brassica napus* triggered the expression of cytokinin-responsive genes during early haustorium development in germinated seeds, and bio-guided UPLC-ESI(+)-/MS/MS analysis showed that these exudates contain a cytokinin with dihydrozeatin characteristics. The results suggest that cytokinins from host roots play a major role in haustorium formation and aggressiveness in *P. ramosa*.]

*Griebel, A., Watson, D. and Pendall, E. 2018. Mistletoe, friend and foe: synthesizing ecosystem implications of mistletoe infection. Environmental Research Letters 12(11): pp.115012. (http://iopscience.iop.org/article/10.1088/1748-9326/aa8fff/pdf) [Providing a detailed discussion of the relative beneficial and adverse effects of mistletoes in ecosytems in the light of climate change.]

Guerra, T.J., Pizo, M.A. and Silva, W.R. 2018. Host specificity and aggregation for a widespread mistletoe in Campo Rupestre vegetation. Flora (Jena) 238: 148-154. [*Psittacanthus robustus* occurred on 8 hosts species but mainly on *Vochysiathyrsoides, Oualea cordata, Trembleya laniflora* and *Miconia ferruginata* and especially in taller host trees within rocky outcrop patches in *campo rupestre* in Brazil. Results of the survey are discussed in relation to plant-plant, bird-plant and fire-plant that might shape infection dynamics of this widespread species.]

Guo FangBin, Wang SiHai, Wang Juan, Zhu Feng, Chen ZhongHua and Yuan XiaoLong. 2018. (Fruit yield and characters of wild *Malania oleifera*, a rare plant species in southwest China.) (in Chinese) Guangxi Zhiwu / Guihaia 38(12): 57-64. [Studies on *Malania oleifers* (Olacaceae) across southeast Yunnan and west Guangxi, confirm abundant phenotypic diversity, which can provide various sources of excellent character selection for oriented cultivation and exploitation for conservation and as a source of nervonic acid.]

Haakonsson, J and Mailer, S. 2018. *Dendropemon caymanensis'* rediscovery. Flicker 36: 6-8. [See Press Report above.]

Haan, N.L., Bakker, J.D. and Bowers, M.D. 2018. Hemiparasites can transmit indirect effects from their host plants to herbivores. Ecology 99(2): 399-410. [Showing that the host on which *Castilleja levisecta* was growing influenced the size and leaf N of the parasite, and this in turn influenced the size and success of the lepidopteran herbivore *Euphydryas editha*.]

Hailu, G., Khan, Z.R., Pittchar, J.O. and Ochatum, N. 2017. Impact of field days on farmers' knowledge and intent to adopt push pull technology in Uganda. International Journal of Agricultural Extension 5(3): 31-143. [In a survey of 849 farmers over 75% cited push-pull technology as effective in controlling *Striga hermonthica* and stemborer, improving both soil fertility and yields of cereals, providing quality fodder. Adoption of the technique depended on farmers seeing the technique on demonstration plots rather than just being told about it.]

Hailu, G., Pttchar, J.O., Khan, Z. and Ochatum, N. 2017. Perceived preference of radio as agricultural information source among smallholder farmers in Uganda. International Journal of Agriultural Extension 5(3): 119-130. [A survey establishing the wide variety of preferred radio stations and times of listening.]

Halouzka, R., Tarkowski, P., Zwanenberg, B. and Zeljković, C.S. 2018. Stability of strigolactone analog GR24 toward nucleophiles. Pest Management Science 74(4): 896-904. [Stability of GR24 in the presence of different nucleophiles was examined. Results indicate that hydrolysis of GR24 proceeds via the Michael addition–elimination mechanism. This hydrolysis was found to occur rather rapidly in Tris-HCl and HEPES buffers and thus these buffers may be unsuitable for experiments with strigolactones. So far, hydrolysis experiments have been conducted at relatively high concentrations of strigolactones, in this case 33 mM, it may be useful to obtain data at biological concentrations at which strigolactones induce parasite seed germination – lower than µM levels.]

Harada, K. and 10 others. 2017. Enhanced production of nojirimycin via *Streptomyces ficellus* cultivation using marine broth and inhibitory activity of the culture for seeds of parasitic weeds. Journal of Pesticide Science 42(4): 166-171. [Describing techniques for enhancing the production of nojorimycin in a *S. ficellus* broth to the extent that it had activity equivalent to a 'standard solution' of nojorimycin for inhibiting the germination of *Orobanche minor, Striga hermonthica* and *S. gesnerioides*.]

Harmankaya, A. and Özcan, A. 2017. (Effect of different doses of mistletoe lectin-I on the levels of tumor necrosis factor-α, nitric oxide, total antioxidant and oxidant capacity in rabbits.) (in Turkish) Van Veterinary Journal 28(1): 41-45. [Mistletoe lectin-1 caused alterations in the levels of tumour necrosis factor and nitric oxide and showed an acute antioxidant effect.]

Heer, N., Klimmek, F., Zwahlen, C., Fischer, M., Hölzel, N., Klaus, V.H., Kleinebecker, T. , Prati, D. and Boch, S. 2018. Hemiparasite-density effects on grassland plant diversity, composition and biomass. Perspectives in Plant Ecology, Evolution and Systematics 32: 22-29. [Studying different levels of *Rhinanthus alectrophorus* in a grassland community. Species richness was greatest at 31% *R. alectrophorus* but yield reduced by 26%. At over 60% *Rhinanthus,* species richness was even lower than in its absence. Increased *Rhinanhtus* favoured smaller plant species.]

Hettenhausen, C. and 12 others. 2017. Stem parasitic plant *Cuscuta australis* (dodder) transfers herbivory-induced signals among plants. Proceedings of the National Academy of Sciences of the United States of America 114(32): E6703-E6709. (http://www.pnas.org/content/114/32/E6703) [An elegant study showing that *C. australis* can act as bridge between soyabean plants, effectively transferring signals which inhibit attack by *Spodoptera litura.* The link can be effective across several soyabean plants over at least 100 cm.]

Ho, A. and Costea, M. 2018. Diversity, evolution and taxonomic significance of fruit in *Cuscuta* (dodder, Convolvulaceae); the evolutionary advantages of indehiscence. Perspectives in Plant Ecology, Evolution and Systematics 32: 1-17. [The fruit of dodder is a capsule. Dodders are one of the few genera to have both dehiscent and indehiscent modes. The authors show that the indehiscent mode has evolved several times from the dehiscent mode. They also postulate the role of flotation in indehiscent fruits, especially in the widespread *C. gronovii*, a species of wetlands in North America.]

Holá, E.; Kocková, J.; Těšitel, J. 2017. DNA barcoding as a tool for identification of host association of root-hemiparasitic plants. Folia Geobotanica 52(2): 227-238. [Identification of DNA retrieved from host root fragments attached to haustoria showed that *Rhinanthus major* and *R. minor* were mainly parasitic on grasses and legumes, while *Melampyrum nemorosum* was mainly parasitic on Rosaceae and Asteraceae.]

Holbrook-Smith, D. and McCourt, P. 2018. Chemical screening for strigolactone receptor antagonists using *Arabidopsis thaliana*. Methods in Molecular Biology 1795: 117-126. [Antagonists for strigolactone receptors serve as potentially important tools in understanding mechanisms of strigolactone perception from both the perspective of host plants and of their parasites. This document describes the procedures required to use phenotypic screening approaches to uncover likely strigolactone receptor antagonists.]

Hozumi, A., Bera, S., Fujiwara, D., Obayashi, T., Yokoyama, R., Nishitani, K. and Aoki, K. 2017. Arabinogalactan proteins accumulate in the cell walls of searching hyphae of the stem parasitic plants, *Cuscuta campestris* and *Cuscuta japonica*. Plant and Cell Physiology 58(11): 1868-1877. [Results from studies with *C. campestris* on *Arabidopsis thaliana* and *C. japonica* on soyabean, suggest that arabinogalactan proteins are involved in hyphal elongation and adhesion to host cells and in the adhesion between the epidermal tissues of *Cuscuta* and its host.]

*Hu GaoSheng, Wu TianRan, Chang Yue, Zhan XinYi and Jia JingMing. 2018. Wound stress, an unheeded factor for echinacoside accumulation in *Cistanche deserticola* Y.C. Ma. Molecules 23(4): 893. (http://www.mdpi.com/1420-3049/23/4/893/htm) [Results suggest that the richest source of echinacoside is in the scales and that content may be enhanced by scarification of the scales by wind-blown sand.]

Ilic, B.S., Nikolic, D.M., Markovic, M.S. and Miladinovic, D.L. 2017. Essential oil of *Euphrasia tatarica*. Chemistry of Natural Compounds 53(6): 1179-1181. [From Serbia. No abstract.]

Iponga, D.M., Mikolo-Yobo, C., Lescuyer, G., Assoumou, F.M., Levang, P., Tieguhong, J.C. and Ngoye, A. 2018. The contribution of NTFP-gathering to rural people's livelihoods around two timber concessions in Gabon. Agroforestry Systems 92(1): 157-168. [Noting that *Coula edulis* (Olacaceae) is one of the most important non-timber forest products in Gabon, and proposing methods for its conservation.]

Ivić, D. 2018. (Branched broomrape (*Orobanche ramosa* L.) - increasing problem in tomato production in Istria.) (in Croatian) Glasilo Biljne Zaštite 18(3): 337-340. [Reporting the increasing problem of *O. ramosa* in tomato in Croatia.]

Jamil, M. and 15 others. 2018. Methyl phenlactonoates are efficient strigolactone analogs with simple structure. Journal of Experimental Botany 69(9): 2319-2331. [A novel class of strigolactone mimics, methyl phenolactonoates (MPs), was developed based on the structure of non-canonical strigolactone, methyl carlactonoate. MP1 was more active than GR24 in modulating *Arabidopsis* root architecture and inhibiting rice tillering but slightly less active in *Striga* seed germination. The substituents on the benzene ring in MPs affect these biological activities to different extents.]

Jasiczek, N., Giertych, M.J. and Suszka, J. 2017. (Influence of mistletoe (*Viscum album*) on the quality of Scots pine (*Pinus sylvestris*) seeds.) (in Polish) Sylwan 161(7): 558-564. [Confirming that *Viscum album* has a small but significant negative impact on the size of seeds and cones of *P. sylvestris* and reduces seedling vigour.]

Jebri, M., Ben Khalifa, M., Fakhfakh, H., Perez-Vich, B. and Velasco, L. 2018. Genetic diversity and race composition of sunflower broomrape populations from Tunisia. Phytopathologia 56(3): 421-430. [*O. cumana* was first seen in Tunisia in 2010. It is believed that the first invasion was by race E but subsequently race G has been detected and is threatening to spread.]

Jia JianXin, Yan XuSheng, Cai ZhiPing, Song Wei, Huo DongSheng, Zhang BaiFeng, Wang He and Yang ZhanJun. 2017. The effects of phenylethanoid glycosides, derived from *Herba cistanche*, on cognitive deficits and antioxidant activities in male SAMP8 mice. Journal of Toxicology and Environmental Health. Part A 80(22): 1180-1186. [Results suggest that the ability of PhG to ameliorate cognitive deficits in SAMP8 mice may be related to promotion in synaptic plasticity involving antioxidant processes.]

Jiang, N.,Ye, L.H.,Ye, L.,Yu, J.,Yang, Q.C.,Yuan, Q., Zhu, P.W. and Shao. Y. 2017. Effect of mistletoe combined with carboxymethyl cellulose on dry eye in postmenopausal women. International Jourrnal of Ophthalmology 10(11): 1669-1677. [The sutudy suggests that a *Viscum album* extract in combination with carboxymethyl cellulose ma relieve dry eye symptoms in post-menopausal women.]

Joita-Pacureanu, M., Rîșnoveanu, L., Anton, G.F., Popa, M., Bran, A., Sava, E. and Marin, V. 2017. The improvement of oil quality and resistance to broomrape in sunflower genotypes resistant to herbicides. Lucrări Științifice, Universitatea de Stiinte Agricole Și Medicină Veterinară "Ion Ionescu de la Brad" Iași, Seria Agronomie 60(2): 263-268. [A general review of the achievements of breeding for resistance to *O. cumana* in sunflower.]

Jung YoungHo, Lee JaeKeun, Lee SooIn, Lee SeungYeon, Jang RaeHa, Lee SeungHyeok, Cho

KyuTae and You YoungHan. 2017. (Host plant preference, parasitic site and risk possibility of *Cuscuta pentagona* Engelm, invasive plant in Korea.) (in Korean) Korean Journal of Environment and Ecology 31(3): 287-296. [Reporting the very wide host-range of *C. pentagona* (= *C. campestris*?) and noting particular susceptibility in the crop *Setaria italica* and the endangered endemic *Scrophularia.*]

Kakhaki, S.H.N., Montazeri, M. and Naseri, B. 2017. Biocontrol of broomrape using *Fusarium oxysporum* f. sp. *orthoceras* in tomato crops under field conditions. Biocontrol Science and Technology 27(12): 1435-1444. [In studies in Iran, high-concentration-root-dip inoculation of tomato with *F. oxysporum* decreased *Phelipanche aegyptiaca* biomass significantly by 58% and led to increased tomato yield. Good results were also obtained with sulfosulfuron, but details of the techniques not clear from abstract.]

Kaplan, Z. and 12 others. 2017. Distributions of vascular plants in the Czech Republic. Part 4. Preslia 89(2): 115-201. [Including notes and distribution maps for *Thesium alpinum, T. bavarum, T. dollineri, T. ebracteatum, T. linophyllum, T. pyrenaicum, T. ramosum* and *T. rostratum.*]

*Kaštier, P., Krasylenko, Y.A., Martinčová, M., Panteris, E, Šamaj, J. and Blehova, A. 2018. Cytoskeleton in the parasitic plant *Cuscuta* during germination and prehaustorium formation. Frontiers in Plant Science June 13: (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6018488/) [A detailed study of the cytoskeleton in *C. europaea* and *C. monogyna* suggested it is organised in a way similar to non-parasitic dicots while there are some peculiarities in the quickly senescing root and prehaustorium.]

Kim JinSeoub, Koppula, S., Yum MunJeong, Shin GwangMo, Chae YunJin, Hong SeokMin, Lee JaeDong and Song MinDong. 2017. Anti-fibrotic effects of *Cuscuta chinensis* with *in vitro* hepatic stellate cells and a thioacetamide-induced experimental rat model. Pharmaceutical Biology 55(1): 1909-1919. [Results support the potential use of *C. chinensis* in treatment of hepatofibrosis.]

Kim SoYoung, Kim KyungChan and Lee ChuHee. 2017. Mistletoe (*Viscum album*) extract targets Axl to suppress cell proliferation and overcome cisplatin- and erlotinib-resistance in non-small cell lung cancer cells. Phytomedicine 36: 183-193.

Klotoe, J.R., Koudouvo, K., Atégbo, J.M., Dandjesso, C., Dougnon, V., Loko, F., Gbeassor, M. and Dramane, K. 2018. Medicinal plants sold as anti-haemorrhagic in the Cotonou and Abomey-Calavi markets (Benin). International Journal of Biology 10(1): 17-23. [Recording that *Cassytha filiformis* is among the 3 most frequently used.]

Kobiv, Y. 2017. Response of rare alpine plant species to climate change in the Ukrainian Carpathians. Folia Geobotanica 52(2): 217-226. [Noting a decline in a range of species including *Pedicularis oederi*.]

*Koga, C., Mabasa, S., Mazarura, U., Banwa, T. and Garwe, D. 2017. Screening of tobacco genotypes for tolerance/resistance to *Striga gesnerioides* infestation in Zimbabwe. Advances in Crop Science Technology 6(1): 340. (https://www.omicsonline.org/open-access/screening-of-tobacco-genotypes-for-toleranceresistance-to-striga-gesnerioides-infestation-in-zimbabwe-2329-8863-1000340-98720.html) [Screening local varieties of tobacco showed most to be susceptible to *S. gesnerioides* but genotypes K RK66 and T74 each showed partial resistance due to low stimulant exudation.]

Konaté, L., Baffour, B.A. and Traoré, D. 2017. Combining ability and heterotic grouping of early maturing provitamin A maize inbreds across *Striga* infested and optimal growing environments. Journal of Agriculture and Environment for International Development 111(1): 157-173. [The development, deployment and production of stress tolerant provitamin A maize is crucial to the fight against vitamin A deficiency in sub-Saharan Africa where maize is a major staple food crop. Maize hybrids were evaluated for yielding and stability across environments, and for *Striga* infestation.]

Kountché, B.A., Al-Babili, S. and Haussmann, B.I.G. 2016. *Striga:* a persistent problem in millets. In: Das, I. and Padmaja, P (eds) Biotic Stress Resistance in millets. 173-203. [Reviewing the latest progress in developing resistance to *Striga* in millets.]

Krause, K., Johnsen, H.R., Pielach, A., Lund, L., Fischer, K. and Rose, J.K.C. 2018. Identification of tomato introgression lines with enhanced susceptibility or resistance to infection by parasitic giant dodder (*Cuscuta reflexa*). Physiologia Plantarum 162(2): 205-218. [Tomato, *Solanum lycopersicum* shows a hypersensitive response to *C. reflexa,* not shown by *S. pennellii,* even when grafted on to a tomato rootstock. Introgression lines involving both parents, however, show varied reaction, which could be valuable in tracing the genes involved.]

Kun-Peng Jia, Lina Baz and Salim Al-Babili. 2018. From carotenoids to strigolactones. Journal of Experimental Botany 69(9): 2189–2204. [Carotenogenesis is briefly described and an update on strigolactone biosynthesis is provided,

focusing on the substrate specificity and reactions catalyzed by the different biosynthetic enzymes.]

Kwolek, D., Denysenko-Bennett, M., Góralski, G., Cygan, M., Mizia, P., Piwowarczyk, R., Szklarczyk, M. and Joachimiak, A.J. 2017. The first evidence of a host-to-parasite mitochondrial gene transfer in Orobanchaceae. Acta Biologica Cracoviensia. Series Botanica 59(1): 13-22. [Presenting evidence for horizontal transfer of the mitochondrial *atp6* gene from an Asteraceae host into *Orobanche coerulescens*, also into 3 *Phelipanche* species.]

Lalsaga, W.J.A. and Drabo, I. 2017. (Evaluation of 15 genotypes of rain-fed cowpea [*Vigna unguiculata* (L.) Walp.] in northern and central-western Burkina Faso.) (in French) International Journal of Biological and Chemical Sciences 11(6): 2756-2763. [Identifying early maturing lines of cowpea Nafi, Gorom local, KVX-61-1 and Komcalle; and extra-early maturing lines C2-6-3, C2-18-2, C2-27-2, IT97K-499-35 and Yiis yande, all with immunity to the local, race 1 strain of *Striga gesnerioides* in Burkina Faso.]

Larrieu, L., Sajdak, G., Cabanettes, A. and Drénou, C. 2018. (Decline of fir pectin: influences of diameter, mistletoe and local conditions.) (in French) Forêt-Entreprise 2018(240): 6-15. [This study fails to establish a clear correlation between infection by *Viscum album* and a decline in pectin thought to be resposible for decline in the health of the host *Abies alba*.]

Lefnaer, S. 2017. (Floristic novelties from the Lower Austrian Weinviertel and Vienna north of the Danube.) (in German) Neilreichia 9: 133-142. [Including reference to *Odontites verna, Orobanche coerulescens, O. kochii* and *Thesium dollineri*.]

Lepší, M. and Lepší, P. 2017. (Records of interesting and new plants in the South Bohemian flora XXIII.) (in Czeck) Sborník Jihočeského Muzea v Českých Budějovicích, Přírodní Vědy 57: 5-33. [New records are noted for *Lathraea squamaria*.]

Li JinQing, Su ZhiPing, Chen YanPing, Qi WeiZhen, Qi JiaLin, Duan XiaoHui, He LiNa and Lu Min. 2017. (Analysis on pests' intercepted situation in imported renewable resources at Shandong port during 2006-2016.) (in Chinese) Journal of Food Safety and Quality 8(11): 4120-4124. [*Cuscuta australis* among the top 5 species intercepted.]

*Li Qing, Yang ShiHua, Li YongQiang, Xue XiaoFeng, Huang YongHua, Luo HengGuo, Zhang YiMing and Lu ZhiChao. 2018. Comparative evaluation of soluble and insoluble-bound phenolics and antioxidant activity of two Chinese mistletoes Molecules 23(2): 359. (http://www.mdpi.com/1420-3049/23/2/359/htm) [A study apparently involving a combination of *Viscum articulatum* and *V. liquidambaricolum* (one may have been hyper-parasitic on the other?) from hosts *Camellia assamica* and *Pyrus* identified 18 phenolics. From either host the *Viscum* spp. showed potential value as a source of anti-oxidants, but especially those growing on *Pyrus*.]

*Li Xi, Hao BaoHai, Pan Da and Schneeweiss, G.M. 2017. Marker development for phylogenomics: the case of Orobanchaceae, a plant family with contrasting nutritional modes. Frontiers in Plant Science 8(November): pp.1973. (https://www.frontiersin.org/articles/10.3389/fpls.2017.01973/full) [Studies on *Lindenbergia philippensis*, *Triphysaria versicolor*, *Striga hermonthica* and *Phelipanche aegyptiaca* A highly flexible bioinformatic pipeline, BaitsFinder, built to identify putative orthologous single copy genes (SCGs) and to construct bait sequences in a single workflow is presented. BaitsFinder was successfully used in a group of non-parasitic plants and is expected to be broadly applicable in groups where only transcriptomes or partial genome data of differing quality are available.]

Lim YaChee;,Rajabalaya, R. and David, S.R. 2017. A hidden treasure: the Borneo mistletoes. Pharmacognosy Reviews 11(22): 153-157. [Reviewing the antibacterial, anticancer, antiviral, antihypertensive, antioxidative, and cytotoxic effects. of locally common mistleltoes – *Scurrula ferruginea, Macrosolen cochinchinensis* and *Dendrophthoe curvata* – and discussing their pharmacological potential.]

Lin ChengWei, Lo ChiehWen, Tsai ChiaNi, Pan TingChun, Chen PinYin Yu MingJiun. 2018. *Aeginetia indica* decoction inhibits hepatitis C virus life cycle. International Journal of Molecular Sciences 19(1): 208. (http://www.mdpi.com/1422-0067/19/1/208/htm) [Among 6 decoctions studied, *A. indica* was the most active, inhibiting chronic hepatitis infection, translation, and replication. Mechanistically, it probably reduced replication via reducing NS5A phosphorylation at serine 235.]

Liu, B., Le, C.T., Barrette, R.L., Nickrent, D.L., Chen, Z., Lu, L. 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. [This phylogeographic study of the family showed that the crown group

originated in Australasian Gondwana during the Paleocene to early Eocene and aerial parasites evolved ca. 50 Ma. Diversification of Loranthaceae occurred during a climatic optimum period that coincides with the dominance of tropical forests and the rapid radiation of many bird families.]

Liu Chang, Li XiaoTian, Cheng RongRong, Han ZhuZhen, Yang Li, Song ZhongChen and Wang ZhengTao. 2018. Anti-oral common pathogenic bacterial active acetylenic acids from *Thesium chinense* Turcz. Journal of Natural Medicines 72(2): 433-438. [Analysis of *T. chinense,* commonly used as an oral anti-bacterial and anti-inflammatory herb, revealed a range of acetylenic acids, of which exocarpic acid was the most active against the oral pathogenic bacterial strains, *Porphyromonas gingivalis, Fusobacterium nucleatum* and *Streptococcus mutans*.]

*Liu YanYan, Taxipulati, T., Gong YanMing, Sui XiaoLin, Wang XueZhao, Parent, S.É., Hu YuKun, Guan KaiYun and Li AiRong. 2017. N-P fertilization inhibits growth of root hemiparasite *Pedicularis kansuensis* in natural grassland. Frontiers in Plant Science 8(December): 2088. (https://www.frontiersin.org/articles/10.3389/fpls.2017.02088/full) [Above-ground biomass of *P. kansuensis* was reduced to 12% and 1% by 30 and 90 kg urea/ha, respectively and to 39% by 100 kg P/ha as calcium phosphate. Grass growth was increased up to 3-fold. Weight of forbs was little changed but species richness was reduced by 50%.]

Long WeiGe, Li SuPing, An JiaCheng and Zhu ChangSan. 2017. (Analysis and evaluation of nutritional components in *Erythropalum scandens* Blume.) (in Chinese) Food Research and Development 38(24): 124-127. [Analysis suggests that *E. scandens* is rich in important amino acids and could be a valuable vegetable.]

Loydi, A., Eckstein, R.L., Gebauer, T., Ludewig, K., Otte, A., Reisdorff, C., Jenen, K..and Donath, T.W. 2018. Opposite effects of litter and hemiparasites on a dominant grass under different water regimes and competition levels. Plant Ecology 219(2): 133-144. [*Rhinanthus* spp. (*R. minor* or *R. alectrolophu*) reduced biomass of the grass *Schedonorus* (= *Festuca*) *arundinacea* while litter had the opposite effect. Contrary to expectation, litter did not compensate *Schedonorus* biomass when *Rhinanthus* was present.]

*Luna, M.L., Giudice, G.E., Grossi, M.A. and Gutiérrez, D.G. 2017. Development and morphology of the fruit and seed of the hemiparasite genus *Jodina* (Cervantesiaceae). Anales del Jardín Botánico de Madrid 74(1): e051. (http://rjb.revistas.csic.es/index.php/rjb/article/view/460/490) [The fruit (pseudodrupe) morphology of *Jodina* has been variously interpreted. This study corrects previous work by showing that the fleshy layer of the pericarp is formed from the nectary disk whereas the stony layer is of mesocarp origin. The ovular integument disintegrates during development thus the seed is naked and the resulting structure is a pyrene.]

Malek, J., del Moral, L., Fernández-Escobar, J., Pérez-Vich, B. and Velasco, L. 2017. Racial characterization and genetic diversity of sunflower broomrape populations from Northern Spain. Phytopathologia Mediterranea 56(1): 70-76. [Of the 6 main populations of *O. cumana* occurring in Castella y León, 3 were found to be race F and 3 probably race E. Their likely origins, from Guadalquivir Valley and Cuenca, are discussed.]

Malik, C.P. and Dheera Sanadhya. 2018. Advances in plant science research. Journal of Plant Science Research 34(1): 81-91. [Including reference to the recent research showing that microRNAs from *Cuscuta* spp. can transfer into the host and silence the expression of host genes.]

Marin, M., Toorop, P., Powell, A.A. and Laverack, G. 2017. Tetrazolium staining predicts germination of commercial seed lots of European native species differing in seed quality. Seed Science and Technology 45(1): 151-166. [Among 112 species tested, *Rhinanthus minor* was found to respond only to cold stratification.]

Marinov-Serafimov, P., Golubinova, I., Ilieva, A., Kalinova, S. and Yanev, M. 2017. Allelopathic activity of some parasitic weeds. Acta Agriculturae Serbica 22 (43): 89-101. [Confirming 'allelopathic' effects of aqueous extracts of *Cuscuta campestris, C. epithymum, Phelipanche ramosa* and *P. mutellii* on germination of lettuce. Doses tested from 0.4 to 13% w/v.]

Means, C. 2017. Christmas plants: hazards, history, and holiday dangers. Today's Veterinary Practice 7(6): 17-22. [Describing the clinical signs and treatment of poisoning of cats and dogs by a range of species including unspecified *Phoradendron* sp.]

Meher, S., Ali, I., Sami, A., Ismail, M., Naheed, N., Khan, S.A. and Ahmad, V.U. 2017. Screening of some medicinal plants for antibacterial activity against conjunctivitis. JAPS, Journal of Animal and Plant Sciences 27(6): 2069-2074. [*Santalum album* included in a wide range of species studied in Pakistan but apparently not among those showing useful activity.]

Mellado, A. and Zamora, R. 2017. Parasites structuring ecological communities: the mistletoe footprint in Mediterranean pine forests. Functional Ecology 31(11): 2167-2176. [Concluding that *V. album* exerts a strong and lasting impact on the structure and dynamics of *Pinus nigra* forest, with parasitized trees acting as centres for the establishment and growth of fleshy-fruited woody species, which, over the long term, promote vegetation shifts by limiting dominant pine trees and facilitating less represented fleshy-fruited shrubs.]

Mengistu, A.A., Ebabuye, Y., Tilahune, G and Gelaye, M. 2017. Determination of *Orobanche* spp. distribution and occurrence in North Gondar, Ethiopia. ABC Journal of Advanced Research 6(1): 25-30. [A survey of 'major pulse crops' noting up to 87% prevalence of *O. crenata,* but no crops named, and 12% prevalence in linseed. *Xanthium strumarium* also widely attacked. Some confusion with *O. minor* possible?]

Mesfin Abate, Temam Hussien, Bayu, W. and Fasil Reda. 2017. Screening of Ethiopian sorghum (*Sorghum bicolor*) landraces for their performance under *Striga hermonthica*-infested conditions. Plant Breeding 136(5): 652-662. [Among 49 lines tested, 'Birhan', 'Gubiye', Wolegie, Zegerie, Nechmashila I, Woftel, Tetron and Eyssa were identified as promising based on grain yield and *Striga*-related traits, while Jamyo, Bobie, Gedido, Mankebar and Zengada had moderate *Striga* numbers with low relative yield loss compared with susceptible checks. The most promising, Zegerie, Mankebar and Zengada, out-yielded the standard resistant checks 'Birhan' and 'Gubiye' under *Striga* infestation.]

*Miranda, C.H.B., Favaro, S.P., Carvalho, M.daC.S. and Cruz, I. 2017. (Susceptibility of Brazilian maize and rice cultivars to *Striga* sp. in Mozambique.) (in Portuguese) Documentos - Embrapa Agroenergia 2017(26): pp.32. (https://www.infoteca.cnptia.embrapa.br/infoteca/handle/doc/1085330) [Presenting information on the susceptibility of various Brazilian maize and rice cultivars cultivated in Mozambique, to *Striga asiatica*.]

Mohemed, N., Charnikhova, T., Fradin, E.F., Riensatra, J., Babiker, A.G.T. and Bouwmeester, H.J. 2018. Genetic variation in *Sorghum bicolor* strigolactones and their role in resistance against *Striga hermonthica*. Journal of Experimental Botany 69(9): 2415-2430. [Strigolactones, are analyzed in the root exudates of 36 sorghum genotypes and *S. hermonthica* germination and infection are assessed. This study shows that the strigolactone profile in the root exudate of sorghum has a large impact on the level of *Striga* infection.]

Moreno Moral, G., Sánchez Pedraja, Ó. and Piwowarczyk, R. 2017. Contributions to the knowledge of Cistanche (Orobanchaceae) in the Western Palearctic. Phyton (Horn) 57(1/2): 19-36. [*Cistanche* contains ca. 18 species distributed from China to Europe and northern Africa. This work discusses the taxonomy of five species found in the western Mediterranean region (*C. lutea, C. mauritanica, C. phelypaea, C. tinctoria* and *C. violacea*) and provides a key to these species.]

Mourão, F.A., Pinheiro, R.B.P., Jacobi, C.M. and Figueira, J.E.C. 2017. Resource-directed foraging of the Neotropical mistletoe *Struthanthus flexicaulis* (Loranthaceae). Plant Biology 19(4): 592-598. [Studying the vegetative spread of *S. flexicaulis* on its host *Mimosa calodendron*. Spread towards, and attachment, occurred to both live host branches and to inert netting but was stronger to the former.]

Mousavi, E.A., Kalantari, K.M., Nasibi, F. and Oloumi, H. 2018. Effects of carrageenan as elicitor to stimulate defense responses of basil against *Cuscuta campestris* Yunck. Acta Botanica Croatica 77(1): 62-69. [Three applications of carrageenan (an extract from the red seaweed, *Chondrus crispus*) before basil was exposed to *C. campestris* resulted in 26% reduction in the parasite and increased vigour of the basil, apparently associated with increased levels of PAL activity, phenols, antioxidant and lignin, associated with defence mechanisms.]

Mrema, E., Shimelis, H. and Laing, M. 2017. Genetic effect of *Striga* resistance in sorghum genotypes. Euphytica 213(12): 280. [Using crosses between 12 varieties of sorghum to study the relative importance of their agronomic characters in conjunction with the biocontrol agent *Fusarium oxysporum* for performance under *Striga* (*hermonthica*?) infestation in Tanzania and concluding that additive genes were predominantly responsible for the inheritance of *Striga* resistance.]

*Muhammad Ovais, Muhammad Ayaz, Khalil, A.T., Shah, S.A., Jan, M.S., Abida Raza, Muhammad Shahid and Shinwari, Z.K. 2018. HPLC-DAD finger printing, antioxidant, cholinesterase, and α-glucosidase inhibitory potentials of a novel plant *Olax nana*. BMC Complementary and Alternative Medicine 18(1). (https://bmccomplementalternmed.biomedcentral.com/track/pdf/10.1186/s12906-017-2057-9) [Phytochemical studies on *O. nana* indicate antioxidant and cholinesterase inhibitory effects deserving further study of their neuroprotective and anti-Alzheimer's potential.]

Mujezinović, O., Dautbašić, M., Mujčinović, A. and Zahirović, K. 2017. (Characteristics of mistletoe shrubs (*Viscum album* subsp. *austriacum* (Wiesb.) Vollmann (1914)) on black pine in Bosnia and Herzegovina.) (in Croatian) Šumarski List 141(9/10): 477-483. [Noting that *V. album* has relatively recently become more common and is causing significant damage and death of *Pinus nigra* and *P. sylvatica*.]

Nabloussi, A., Velasco, L. and Assissel, N. 2018. First report of sunflower broomrape, *Orobanche cumana* Wallr., in Morocco. Plant Disease 102(2): 457. [A serious infestation of *O. cumana* in Kenitra Province, Morocco most closely matches race G but is thought to be somewhat distinct and is proposed to be defined as race G_{KE}.]

Noryśkiewicz, A.M. and Noryśkiewicz, B. 2017. Remarks on pollen representation of mistletoe (*Viscum album* L.). Ecological Questions 26: 19-26. [Discussing the significance of the presence of fossil *V. album* pollen in Holocene deposits in Poland, concluding that even a single grain could represent a substantial local population of the mistletoe.]

Ocaña-Moral, S., Gutiérrez, N., Torres, A.M. and Madrid, E. 2017. Saturation mapping of regions determining resistance to *Ascochyta* blight and broomrape in faba bean using transcriptome-based SNP genotyping. TAG Theoretical and Applied Genetics 130(11): 2271-2282. [A study of SNP markers revealed two QTLs for *Orobanche crenata* resistance (*Oc7* and *Oc8*) , *Oc7* being located near to a QTL for *A. fabae* resistance suggested that these genomic regions might encode common resistance mechanisms and could be targets for selection strategies against both pathogens.]

Ogunmefun, O.T., Fasola, T.R., Saba, A.B., Oridupa, O.A. and Adarabioyo, M.I. 2017. Haematology and serum biochemistry of alloxaninduced diabetic rats administered with extracts of *Phragmanthera incana* (Schum.) Balle. African Journal of Pharmacy and Pharmacology 11(43): 545-553. [A detailed study of the biochemical effects of an extract of *P. incana* (from cola and cocoa hosts), concluding that, regardless of the host, it decreased blood glucose and cholesterol levels and also alleviated other complications of diabetes such as liver and kidney injury and may possess a hepatoprotective effect.]

Ohikhena, F.U., Wintola, O.A. and Afolayan, A.J. 2017. Proximate composition and mineral analysis of *Phragmanthera capitata* (Sprengel) Balle, a mistletoe growing on rubber tree. Research Journal of Botany 12(1): 23-31. [Conclusions from a study of the composition of leaves of *P. capitata* growing on rubber concluded that '*P. capitata* could serve as a source of essential nutrients which can go a long way in ameliorating most nutritional challenges and may contribute remarkably to the amount of nutrients in human.' However the presence of 'anti-nutrients' is also mentioned and a pinch of salt might be needed?]

Ologhobo, A.D., Adejumo, I.O., Owoeye, T. and Esther, A. 2017. Influence of mistletoe (*Viscum album*) leaf meal on growth performance, carcass characteristics and biochemical profile of broiler chickens. Food and Feed Research 44(2): 163-171. [Incorporation of a meal prepared from '*V. album*' ?? (growing on citrus in Nigeria) in the diet resulted in increases in alanine aminotransferase, urea and glucose, suggesting its potential in place of antibiotics.]

Omoigui, L.O., Kamara, A.Y., Ajeigbe, H.A., Akinwale, R.O., Timko, M.P., Oyekunle, M. and Bello, L.L. 2017. Performance of cowpea varieties under *Striga gesnerioides* (Willd.) Vatke infestation using biplot analysis. Euphytica 213(11): 244. [From a 3 year study over 3 sites in the dry savanna area of Nigeria, it was concluded that lines UAM09 1046-6-1 (V7), and UAM09 1046-6-2 (V8) gave best results over all sites.]

Patel, C.J., Gediya, K.M., Patel, H.K. and Patel, A R. 2017. Control of broomrape in Bidi tobacco by different management practices. Indian Journal of Weed Science 49(1): 67-69. [Methods to control *Orobanche ramosa* included herbicides glyphosate, isoproturon and pendimethalin applied 'at emergence of *Orobanche* with irrigation'. These provided partial control and some increase in yield, but were inferior to hand weeding.]

Pavlenko, E.V. and Petrova, S.E. 2017. (Anatomy of the roots of some northern hemiparasites (Orobanchaceae).) (in Russian) Turczaninowia 20(1): 107-117. [The root structure and haustorial formation were studied in *Bartsia alpina, Castillejaj lapponica, Pedicularis sceptrum-carolinum, P. lapponicus, Rhinanthus minor* ssp. *groenlandicus*. A main precondition providing the possibility of rapid haustorium development is the long life of the primary outermost tissue of the root. Formation of haustorial hairs is one of the earliest structural events and the division and elongation of cells in the outer tissues play a major role in the early stages of endophyte development. The parasitic life-style influences the inner structure of the vascular cylinder including the reduction of phloem conductive elements and the accumulation of large amounts of starch in the xylem. It was found that the haustoria can penetrate rhizomes **as** well as roots.]

Pelser, P.B., Nickrent, D.L., Gemmill, C.E.C. and Barcelona, J.F. 2017. Genetic diversity and structure in the Philippine *Rafflesia lagascae* complex (Rafflesiaceae) inform its taxonomic delimitation and conservation. Systematic Botany 42:543-553. [This is the first of two papers published this year on the population biology of *Rafflesia* (see also Barkman et al. 2017). Microsatellite data showed that even small populations harbour moderate levels of genetic diversity with low levels of inbreeding. Staminate and pistillate flowers of *R. lagascae* on the same host were genetically identical indicating the species is monoecious.]

Pelser, P.B., Nickrent, D.L. and Barcelona, J.F. 2018. A conservation genetic study of *Rafflesia speciosa* (Rafflesiaceae, Philippines): patterns of genetic diversity and differentiation within and between islands. Blumea 63:93-101. [Microsatellites were used to study nine populations present on Panay and Negros islands. None of the populations showed evidence of inbreeding. Negros populations had lower genetic diversity and were genetically differentiated from Panay, thus suggesting sea straits impose reproductive barriers. Conservation implications are discussed.]

Peralta, A.Cala, Milinillo, J.M.G., Fernández-Aparicio, M., Ayuso, J., Alvarez, J.A., Rubiales, D and Macias, F.A. 2018. Complexation of sesquiterpene lactones with cyclodextrins: synthesis and effects on their activities on parasitic weeds. Organic and Biomolecular Chemistry 15(31): 6500-6510. [Complexation with cyclodextrins of three sesquiterpene lactones including dehydrocostuslactone increased significantly their water solubilities and biological activities. Therefore, cyclodextrin complexation of bioactive compounds with rather low water solubility seems to be useful for applications in agrochemical design.]

Pereira, R.G., Cala, A., Fernández-Aparicio, M., Molinillo, J.M.G., Boaventura, M.A.D. and Macías, F.A. 2017. Gibberellic and kaurenoic hybrid strigolactone mimics for seed germination of parasitic weeds. Pest Management Science 73(12): 2529-2537. [It was shown that strigolactone mimics prepared by the addition of a D-ring to GA_3 and kaurenoic acid may be active as stimulants of germination of one or more of *Orobanche cumana, O. crenata*, *O. minor, Phelipanche ramosa, P. aegyptiaca* and *Striga hermonthica.* Some of the mimics are as active as GR24.]

Perronne, R., Gibot-Leclerc, S., Dessaint, F., Reibel, C. and le Corre, V. 2017. Is induction ability of seed germination of *Phelipanche ramosa* phylogenetically structured among hosts? A case study on Fabaceae species. Genetica 145(6): 481-489. [Germination of pathovars of *P. ramosa* from rapeseed and Fabaceae hosts was similar in response to 12 Fabaceae spp. Phylogenetically related species showed more similar rates of induction of seed germination than species drawn at random from a phylogenetic tree. *Lotus corniculata* induced somewhat higher germination that other species and may be of value as a catch crop.]

Pincovici, S., Cochavi, A., Karnieli, A., Ephrath, J and Rachmilevitch, S. 2018. Source-sink relations of sunflower plants as affected by a parasite modifies carbon allocations and leaf traits. Plant Science 207: 100-107. [Parasitism of sunflower by *Orobanche cumana* results in depletion of carbohydrates, leading to thinner leaves, as under shade. Control of *O. cumana* by imazapic restored normal leaf mesophyll structure and carbon asimilation rates.]

Piwowarczyk, R., Guzikowski, S., Góralski, G., Denysenko-Bennett, M., Kwolek, D. and Joachimiak, A.J. 2018. First report of dodder (*Cuscuta epithymum*) parasitizing hemiparasitic species of Santalaceae (*Thesium*) and Orobanchaceae (*Euphrasia*, *Melampyrum*, *Odontites*, *Orthantha*, and *Rhinanthus*) in Poland. Plant Disease 102(2): 456-457. [Reporting the observation *C. epithymum* parasitising, and weakening *T. linophyllon, O. serotina, Orthantha* (=*Odontites*) *lutea, M. arvense, E. stricta* and *R. glaber* at various sites in Poland.]

Piwowarczyk, R. and Kasińska, J. 2017. Petal epidermal micromorphology in holoparasitic Orobanchaceae and its significance for systematics and pollination ecology. Australian Systematic Botany 360(1): 48-63. [A detailed study of the microsculpture of nectar guides and landing platforms in the flowers of 39 species of holoparasitic and 6 species of hemiparasitic Orobanchaceae, identifying four major epidermal types - tabular rugose striate cells, areolate cells, papillose conical cells and lobular striate cells – and two main types of trichome, glandular and non-glandular.]

Piwowarczyk, R., Pedraja, O.S., Moral, G.M., Denysenko-Bennett, M., Goralski, G and Kwolek, D. 2018. *Orobanche javakhetica* (Orobanchaceae): a new species from the Caucasus (Armenia). Phytotaxa 336(2): 135-144. [*O. javakhetica* parasitizes *Lomelosia caucasica* (Dipsacaceae). Morphologically distinct but perhaps related to sub-section Curvatae.]

Posz, E. 2017. *Euphrasia corcontica* (Orobanchaceae) - is it really extinct? Annales Botanici Fennici 54(1/3): 131-134. [Recording the rediscovery of *E. corcontica* in the Karkonosze National Park, Poland and

elaborating its distinction from *E. minima* and *E. micrantha*.]

Pramod Kumar, Randhir Kumar and Ansari, S.A. 2017. Nitrate reductase and peroxidase activity in growth and productivity of *Santalum album* L. Tropical Plant Research 4(1): 90-94.

Preeti Kumari, Tiwari, S.K. and Choudhary, A.K. 2017. Host range, anatomy, biochemistry and impacts of *Cuscuta reflexa* Roxb.: a case study from the Betla National Park, Jharkhand, India. Tropical Plant Research 4(1): 95-102. [A survey recorded *C. reflexa* on 33 host species in 23 families. Effects on the host included a consistent increase in protein especially in *Ziziphus maritiana.* Effects on community structure are discussed.]

Ramezani, S., Najafi, H., Nourmohammadi, G. and Meighani, F. 2018. Control of dodder (*Cuscuta campestris*) weed through integrated weed management system for higher sugar beet yield. Crop Research 53(1/2): 68-75. [Reporting significant increase in sugar beet from combinations of seed-bed preparation, date of sowing and application of propyzamide herbicide.]

Ramírez-Barahona, S., González, C., González-Rodríguez, A. and Ornelas, J. F. 2017. The influence of climatic niche preferences on the population genetic structure of a mistletoe species complex. New Phytologist 214(4): 1751-1761. [Concluding that environmental predictors appeared to be more important than host preferences to explain genetic structure of *Psittacanthus schiedeanus* in Mexico, suggesting that the occurrence of the parasite is determined more by its own climatic niche than by host specificity.]

Randrianjafizanaka, M.T., Autfray, P., Andrianaivo, A.P., Ramonta, I.R. and Rodenburg, J. 2018. Combined effects of cover crops, mulch, zero-tillage and resistant varieties on *Striga asiatica* (L.) Kuntze in rice-maize rotation systems. Agriculture, Ecosystems & Environment 256: 23-33. [Describing the results of a complex 4-year trial in Madagascar based on conservation agriculture (CA) principles. The best rest results involved rice varieties NERICA-9 and NERICA-4 and *Stylosanthes guianensis* cover crop but even the combination of zero-tillage, crop residue mulching, cover crops and resistant rice varieties does not entirely prevent *S. asiatica* parasitism and seed bank increase. Concluding other methods still needed. No mention of rice yields.]

Ranoarisoa, M.P., Blanchart, E., Vom Brocke, K., Ramanantsoanirina, A., Sester, M., Plassard, C., Cournac, L. and Trap, J. 2017. Attractancy of bacterivorous nematodes to root-adhering soils differs according to rice cultivars. Rhizosphere 3(No.Part 1): 128-131. [Attractancy of soils from the rhizosphere of rice varieties was unrelated to their resistance to *Striga asiatica*.]

Ratnaningrum, Y.W.N., Indrioko, S., Faridah, E. and Syahbudin, A. 2017. Gene flow and selection evidence of sandalwood (*Santalum album*) under various population structures in Gunung Sewu (Java, Indonesia), and its effects on genetic differentiation. Biodiversitas: Journal of Biological Diversity 18(4): 1493-1505.

Rocha, D., Ashokan, P.K., Santhoshkumar, A.V., Anoop, E.V. and Sureshkumar, P. 2017. Anatomy and functional status of haustoria in field grown sandalwood tree (*Santalum album* L.). Current Science 113(1): 130-133. [Study with multiple hosts revealed that the extent of translocation from hosts to *S. album* varied from 28.9% (coconut+*Casuarina*+rubber as host) to 78.5% (*Casuarina*+rubber as hosts). Reverse translocation of ^{32}P from *S. album* to host was also observed. The study concludes that it is not necessary to plant the host along with the sandal as it is practiced presently. Noting that direct lumen-lumen xylem connections between *S. album* and host were absent.]

Ronald, M., Charles, M., Stanford, M. and Eddie, M. 2017. Predictions of the *Striga* scourge under new climate in Southern Africa: a perspective. Journal of Biological Sciences 17(5): 194-201. [Considering the effect of increased temperature on various factors influencing *Striga* spp. and concluding that infestations are likely to become worse in already affected areas and potentially move into new areas. Discussed primarily from a Southern Africa perspective, but apparently relevant to *S. hermonthica* as well as *S. asiatica*.]

Rozina, Mushtaq Ahmad, Muhammad Zafar, Muhammad Qasim and Sheikh Zainulabidin. 2017. Ethnomedicinal uses of plants for blood purification in district Swabi, Khyber Pakhtunkhwa, Pakistan. Journal of Rural Development and Agriculture 2(1): 41-56. [*Cuscuta reflexa* one of the most frequently cited plants for blood purification.]

Rubiales, D. 2018. Can we breed for durable resistance to broomrapes? Phytopathologia Mediterranea 57(1): 170−185. [Reviewing the current state of research in resistance breeding against *Orobanche* and *Phelipanche* spp, and incidentally emphasising the importance of avoiding human-driven seed dispersal.]

Runo, S, Kuria, E.K. 2018. Habits of a highly successful cereal killer, *Striga*. PLoS Pathogens 14(1): e1006731. (http://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1006731) [A review exploring seven particular characteristics of *Striga* as a parasite of great economic importance, suggesting reasons for its success

under the headings Diversity, Fecundity, Mobility, Coordinated, Dormancy, Manipulative and Mysterious! Also outlining emerging control options.]

Safina, S.A. 2017. Effect of ridge width and cropping system on productivity and land use efficiency in faba bean-flax intercrops. 2017. Egyptian Journal of Agronomy 39(3): 357-381. [Comparing two faba bean varieties at two row widths in conjunction with interplanting with flax. Results from Giza-843 were superior in yield and in terms of *Orobanche crenata* to those from Giza-2 and best with flax interplanted on 120 cm ridges.]

Salama, A., Popova, E., Jones, M.P., Shukla, M.R., Fisk, N.S. and Saxena, P.K. 2018. Cryopreservation of the critically endangered golden paintbrush (*Castilleja levisecta* Greenm.): from nature to cryobank to nature. In Vitro Cellular & Developmental Biology - Plant 54(1): 69-78. [Describing techniques for the successful cryopreservation of shoot tips and their 100% recovery, in Canada.]

Salifou, M., Tignegre, J.B.L.S., Tongoona, P., Offei, S., Ofori, K. and Danquah, E. 2017. Differential responses of 15 cowpea genotypes to three *Striga* hot spots in Niger. International Journal of Biological and Chemical Sciences 11(4): 1413-1423. [Screening of a range of cowpea varieties against *S. gesnerioides* suggest that other races occur, in addition to the predominant SG3. These include SG1 and what may be SG4Z or at least a more virulent form of SG3.]

Samejima, H. and Sugimoto, Y. 2018. Recent research progress in combatting root parasitic weeds. Biotechnology & Biotechnological Equipment 32(2): 221-240. [A wide range of potential control measures are usefully reviewed.]

Sandeep Chaudhary, Gupta, A.K., Samuel, C.O. and Upadhyaya, P.P. 2017. Use of plant products (extracts) as a natural fungicide against *Rhizoctonia solani* Kuhn. Asian Journal of Bio Science 12(2): 237-243. [The leaves of *Dendrophthoe falcata* had moderate activity against *R. solani*.]

Santos, M.O. and 10 others. 2017. The conservation of native priority medicinal plants in a Caatinga area in Ceará, northeastern Brazil. Anais da Academia Brasileira de Ciencias 89(4): 2675-2685. [*Ximenia americana* among 7 priority species for conservation.]

Scărlătescu, V., Vasile, D. and Dincă, L. 2017. Plant species from "Al. Beldie" Herbarium-*Orobanche* genre - short description. ProEnvironment 10(31): 191-198. [Noting 79 specimens of *Orobanche* spp. dating from 1824 in the Alexandru Beldie Herbarium in Romania. Species include *O. alba, O. caryophyllacea, O. coerulea* and *O. picridis*.]

Schad, F., Thronicke, A., Merkle, A., Matthes, H. and Steele, M.L. 2017. Immune-related and adverse drug reactions to low versus high initial doses of *Viscum album* L. in cancer patients. Phytomedicine 36: 54-58. [Over 1300 patients were given sub-cutaneous injections of a *V. album* product (unspecified in the abstract). A recommended low dose caused less than 1% adverse reaction. A higher dose caused a reaction in 20% of cases but these were always mild and often of a beneficial nature.]

Schad, F., Thronicke, A., Merkle, A., Steele, M.L., Kröz, M., Herbstreit, C. and Matthes, H. 2018. Implementation of an integrative oncological concept in the daily care of a German certified breast cancer center. Complementary Medicine Research 25(2): 85-91. [Concluding that integrated therapies involving *Viscum album* extracts have a satisfactory record but that further studies are required.]

*Schink, M. and Dehus, O. 2017. Effects of mistletoe products on pharmacokinetic drug turnover by inhibition and induction of cytochrome P450 activities. BMC Complementary and Alternative Medicine 17(52): No.521. (https://bmccomplementalternmed.biomedcentral.com/track/pdf/10.1186/s12906-017-2028-1) [The results suggested that 3 different products - Helixor® A, Helixor® M and Helixor® P prepared from *Viscum album* grown on *Picea* spp. apple trees and *Pinus* spp. respectively did not cause inhibition of nine major cytochrome P450 (CYP) isoenzymes in a test system using pooled human liver microsomes nor of five CYP isoforms in human hepatocytes cultivated in vitro.]

Schlemper, T.R., Leite, M.F.A.. Lucheta, A.R., Shimels, M., Bouwmeester, H.J., van Veen, J.A. and Kuramae, E.E. 2017. Rhizobacterial community structure differences among sorghum cultivars in different growth stages and soils. FEMS Microbiology Ecology 93(8): fix096. [Comparing the bacterial rhizosphere populations at 4 stages of 7 sorghum varieties in 2 soil types and showing that, in an 'abandoned' soil type, a *Striga*-resistant cultivar had significantly higher relative abundances of *Acidobacteria* BC-1, *Burkholderia, Cupriavidis, Acidovarax* and *Albidiferax* than other varieties.]

Schneider, A.C. and Moore, A.J. 2017. Parallel Pleistocene amphitropical disjunctions of a parasitic plant and its host. American Journal of Botany 104(11): 1745-1755. [The genus *Aphyllon* is parasitic on *Grindelia* (Asteraceae) and both genera are disjunct between North and

South America. Chronograms for both genera and their relatives were constructed (from ITS and ETS rDNA sequences) that were calibrated with a horizontal gene transfer event. *Aphyllon* dispersed twice from North to South America recently (0.4 Ma) whereas *Grindelia* had a single dispersal.]

Selvİ, E.K., Turumtay, H., Demİr, A. and Turumtay, E.A. 2018. Phytochemical profiling and evaluation of the hepatoprotective effect of *Cuscuta campestris* by high-performance liquid chromatography with diode array detection. Analytical Letters 51(10): 1464-1478. [The study suggested that isorhamnetin, kaempferol and quercetin were probably most responsible for the ant-cancer effects of *C. campestris* extracts.]

Shahid, S., G. Kim, N.R. Johnson, E. Wafula, F. Wang, C. Coruh, V. Bernal-Galeano, C.W. dePamphilis, J.H. Westwood and M.J. Axtell. 2018. MicroRNAs from the parasitic plant *Cuscuta campestris* target host messenger RNAs. Nature 553: 82–85. (DOI: 10.1038/nature25027) [Demonstrating that microRNAs from *C. campetsria* accumulate in the haustorial region and specifically degrade specific host mRNAs. Mutating host target genes influence parasite growth, suggesting that the microRNAs function to the advantage of the parasite. See 'Literature Highlight' above .]

Shettar, A.K., Sateesh, M.K., Kaliwal, B.B.and Vedamurthy, A.B. 2017. *In vitro* antidiabetic activities and GC-MS phytochemical analysis of *Ximenia americana* extracts. South African Journal of Botany 111: 202-211. [Results contribute to the confirmation of the anti-diabetic properties of an aqueous extract from the leaves of *X. americana*.]

Shimada, H., Urabe, Y., Okamoto, Y., Li Zheng, Kawase, A., Morikawa, T., Tu PengFei, Muraoka, O. and Iwaki, M. 2017. Major constituents of *Cistanche tubulosa*, echinacoside and acteoside, inhibit sodium-dependent glucose cotransporter 1-mediated glucose uptake by intestinal epithelial cells. Journal of Functional Foods 39: 91-95. [This study suggested that the inhibitory effects of echinacoside and acteoside on sodium-dependent glucose cotransporter-mediated glucose uptake contribute to suppression of increased postprandial blood glucose level.]

*Shimizu, K. and Aoki, K. 2018. Differentiation of vascular elements in haustoria of *Cuscuta japonica*. Plant Signaling and Behavior 13(3): e1445935. (https://www.tandfonline.com/doi/full/10.1080/15592324.2018.1445935?scroll=top&needAccess=true) [Concluding that the vascular differentiation process in haustoria of *C. japonica* differs from that in conventional vascular tissues, particularly in the 'impeded' enucleation of sieve elements.]

*Shin, H.W. and Lee, N.S. 2018. Understanding plastome evolution in hemiparasitic Santalales: Complete chloroplast genomes of three species, *Dendrotrophe varians, Helixanthera parasitica*, and *Macrosolen cochinchinensis*. PLOS ONE. July 5, 2018. (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0200293) [Complete chloroplast genomes were reported and compared to other published sequences. These genomes were slightly or not reduced in size compared with other hemiparasites. These (and all examined Santalales) have experienced functional loss of ndh genes.]

Smith, R.S., Shiel, R.S., Millward, D. Simkin, J.M. 2017. Effects of sheep stocking on the plant community and agricultural characteristics of upland *Anthoxanthum odoratum-Geranium sylvaticum* meadow in northern England. Grass and Forage Science 72(3): 502-515. [Results support suggestions that recent reductions in the nature value of these grasslands, and specifically the proportion of *Rhinanthus minor* might be due to high stocking densities persisting until later in the spring, carried out during a 1-year period with warmer temperatures.] Sochor, M., Egertova, Z., Hrones, M. and Dancak, M. 2018. Rediscovery of *Thismia neptunis* (Thismiaceae) after 151 years. Phytotaxa 340(1): 71-78. [Reporting the rediscovery of the mycoheterotroph *T. neptunis* from western Sarawak, Malaysia. This species has remarkable perianth lobes that are terminated by long, filiform, vertically oriented appendages. Detailed illustrations and photographs are provided.]

Solikin. 2017. Diversity of parasitic plants and their hosts in Kepala Jeri and Pemping agroforestry Batam Indonesia. Journal of Biological Researches / Berkala Penelitian Hayati 23(1): 45-52. [A survey showed *Cassytha filiformis* to be the commonest parasitic plant, followed by *Dendrophthoe pauciflora* each occurring on a relatively wide range of non-crop host species, while *Viscum stenocarpum* was rare and only occurred as a hyper-parasite on *D. pauciflora*.]

Souza, M.C., Scalon, M.C., Poschenrieder, C., Tolrà, R., Venâncio, T., Teixeira, S.P. and da Costa, F.B. 2018. Mechanisms of storage and detoxification of Al in two tropical mistletoes. Environmental and Experimental Botany 150: 37-45. [Concluding that *Passovia ovatus* and *Struthanthus polyanthus* growing on aluminium-accumulating trees tolerate high Al tissue levels

by allocating Al in phloem fibres and by its chelation with citrate.]

Striegler, U. 2017. (The Upper Miocene flora of the leaf-bearing Wischgrund clay and other outcrops of the same age on the Klettwitz Plateau (Lower Lusatia, Brandenburg, Germany)) (in German).Peckiana 12: 151 pp. [Species of Loranthaceae and Santalaceae among fossil leaves identified.]

Subasinghe, S.M.C.U.P., Samarasekara, S.C., Millaniyage, K.P. and Hettiarachchi, D.S. 2017. Heartwood assessment of natural *Santalum album* populations for agroforestry development in Sri Lanka. Agroforestry Systems 91(6): 1157-1164. [Studying the variation in oil content of *S. album* across Sri Lanka and identifying sources of high content.]

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. [Host breadth was documented for three endemic species of *Korthalsella: K. clavata, K. lindsayi*, and *K. salicornioides*. The first two are generalists (19 genera, 14 families) whereas *Leptospermum scoparium* is the primary host for the latter species. Shared cpDNA and ITS sequence types suggest hybridization between the first two species.]

Surabhi Gumber, Ashish Tewari and Beena Tewari. 2017. Loranthus (*Taxillus vestitus*) infestation in mixed oak forest sites in and around Nainital catchment of Central Himalayan region. Indian Forester 143(7): 671-675. [Surveying the occurrence of *T. vestitus* in *Quercus leucotrichophora, Q. floribunda, Q. lanata* and *Populus ciliata. Q. floribunda* had the highest infestations. Conifers were unaffected.]

TekİN, M., SarİD, D., Catal, M., Ikten, C., Smykal, P., Penmetsa, R.V., von Wettberg, E.J. and Toker, C. 2018. Eco-geographic distribution of *Cicer isauricum* P.H. Davis and threats to the species. Genetic Resources and Crop Evolution 65(1): 67-77. [Noting that the threats to *C. isauricum* include unspecified *Orobanche* species.]

Teppner, H. 2017. The first records of vibratory pollen-collection by bees. Phyton (Horn) 57(1/2): 129-135. [Tracing the first reliable literature on vibratory pollen collection (on *Senna alata*) to a paper by Lindman in 1902. Its occurrence on *Melampyrum pratense* was reported by Meidell in 1944.]

*Thronicke, A., Steele, M.L., Grah, C., Matthes, B. and Schad, F. 2017. Clinical safety of combined therapy of immune checkpoint inhibitors and *Viscum album* L. therapy in patients with advanced or metastatic cancer. BMC Complementary and Alternative Medicine 17(53): No.534. (https://bmccomplementalternmed.biomedcentral.com/track/pdf/10.1186/s12906-017-2045-0) [This preliminary study concluded that concomitant use of *V. album* therapy with the immune checkpoint inhibitors nivolumab (75%), ipilimumab (19%) or pembrolizumab (6%) did not result in increased 'adverse events, but a larger study is required.]

Tian Xiao, Guo Sen, He Kan, Roller, M., Yang MeiQi, Liu QingChao, Zhang Li, Ho ChiTang and Bai NaiSheng. 2018. Qualitative and quantitative analysis of chemical constituents of *Ptychopetalum olacoides* Benth. Natural Product Research 32(3): 354-357. [14 compounds identified in extracts of *P. olacoides* (Olacaceae) among which alkaloids were thought to be the most important.]

Tong ZeYu and Huang ShuangQuan. 2018. Safe sites of pollen placement: a conflict of interest between plants and bees? Oecologia 186(1): 163-171. [Looking at the various sites on a bee's body from which the bee can or cannot retrieve and utilise the pollen collected from 4 *Pedicularis* species (in China) and showing that the sites where most pollen was collected were favourable for both deposit on stigmas AND retrievable for the bee.]

Tsegay Gebreselassie, Atsbha Gebreslasie and Hintsa Meresa. 2018. Enhancing sorghum productivity through demonstration of integrated striga management technologies and its partial budget analysis in Tanqua-Abergelle district, Central Zone of Tigray, Ethiopia. African Journal of Plant Science 12(1): 17-23. [The application of integrated *Striga* management technologies, including sorghum variety (Gobiye), tied-ridging/moisture conservation, row planting and fertilizer application on 10 farms resulted in a significant increase in grain yield, a moderate reduction in straw yield and a 36% increase in economic return.]

Tsuchiya, Y., Yoshimura, M. and Hagihara, S. 2018. The dynamics of strigolactone perception in *Striga hermonthica*: a working hypothesis. Journal of Experimental Botany 69(9): 2281-2290. [Recent advances in strigolactone research in parasitic plants are reviewed. A conceptual framework for the unique *in planta* dynamics of strigolactone perception is uncovered through the use of fluorescent probes for strigolactone receptors.]

Turnau, K., Jędrzejczyk, R., Domka, A., Anielska, T. And Piwowarczyk R. 2018. Expansion of a holoparasitic plant, *Orobanche lutea* (Orobanchaceae), in post-industrial areas - a possible Zn effect. Science of the Total

Environment 639: 714-724. [Reporting the intriguing observation that *O. lutea* is particularly favoured when it occurs on *Medicago falcata* on industrial waste land contaminated with toxic metals (Zn, Cu and Pb). The parasite tends to lower the levels of metals in the host and increases its photosynthetic capacity , although reducing yield.]

Twyford, A.D. 2017. New insights into the population biology of endoparasitic Rafflesiaceae. American Journal of Botany 104:1433-1436. [A commentary discussing Pelser et al. (2017) and and Barkman et al. (2017) that examined *Rafflesia* population genetics in the Philippines and Malaysia, respectively.]

Valcheva, E., Popov, V., Zorovski, P., Golubinova, I., Marinov-Serafimov, P., Velcheva, I. and Petrova, S. 2018. Allelopathic effect of dodder on different varieties of lucerne and bird's foot-trefoil. Contemporary Agriculture 2018(1): 27-33. [Dried material of *Cuscuta epythimum* proved more inhibitory than fresh material to the germinations and growth of most varieties of lucerne and *Lotus corniculatus* but *Medicago sativa* var. multifoliolate and *L. corniculatus* var. Local population 1 and Local population 2 showed 'significant tolerance'. Relevance not clear?]

Vladović, D. and Mitić, B. 2017. Analysis of the family Orobanchaceae from Carl Studniczka's herbarium. Oltenia Journal for Studies in Natural Sciences 33(1): 59-64. [Cataloguing 127 herbarium specimens held in the Natural History Museum in Split, Croatia, collected mainly in Europe, but some in N. America. The paper can be accessed at: http://biozoojournals.ro/oscsn/cont/33_1/oscsn_v33n1_art-08_Vladovic.pdf]

***Vogel, A., Schwacke, R., Denton, A.K., Usadel, B., Hollman, J., Fischer, K., Bolger, A., Schmidt, M. H-W., Bolger, M.E., Gundlach, H., Mayer, K.F.X. Weiss-Schneiweiss, Temsch, E.M. and Krause, K. 2018. Footprints of parasitism in the genome of the parasitic flowering plant *Cuscuta campestris.* Nature Communications 9: 2515. (https://www.nature.com/articles/s41467-018-04344-z) [Reporting the complete genome for *C. campestris,* noting the absence of many photosynthesis genes and those involved in absorbing nutrients from soil. Also concluding that there has been substantial horizontal transfer of genes from hosts. See also 'Literature Highlight' above.]**

*Voukeng, I.K., Beng, V.P. and Kuete, V. 2017. Multidrug resistant bacteria are sensitive to *Euphorbia prostrata* and six others Cameroonian medicinal plants extracts. BMC Research Notes 10: No.321. (https://bmcresnotes.biomedcentral.com/track/pdf/10.1186/s13104-017-2665-y) [Including reference to the wide range of activity of '*Viscum album*' but of no value in the absence of correct identification.]

*Wang DongFang, Wang HaiZhen and Gu Li. 2017. The antidepressant and cognitive improvement activities of the traditional Chinese herb *Cistanche*. Evidence-based Complementary and Alternative Medicine 2017: ID 3925903. (https://www.hindawi.com/journals/ecam/2017/3925903/) [The study confirmed the potential for a decoctioon of *C. deserticola* and *C. tubulosa* in treatment of depression.]

Wang GuoYan, Baskin, C.C., Baskin, J.M., Yang XueJun, Liu GuoFang, Zhang XinShi, Ye XueHua and Huang ZhenYing. 2017. Timing of seed germination in two alpine herbs on the southeastern Tibetan plateau: the role of seed dormancy and annual dormancy cycling in soil. Plant and Soil 421(1/2): 465-476. [Seeds of *Pedicularis fletcheri* showed dormancy when fresh but responded to cold stratification or GA_3.]

Wang XiangPing and Huang ShuangQuan. 2017. Interspecific and intraspecific variation in corolla tube length in *Pedicularis* species achieved by both cell anisotropy and division. Journal of Systematics and Evolution 55(3): 208-214. [Results showed that intraspecific variation in corolla tube length in *Pedicularis* species was largely attributable to changes in cell anisotropy, but the evolutionary innovation underlying the rapid radiation of *Pedicularis* corolla tubes was attributable to both cell division and cell expansion.]

*Wang XiaoMing, Wang JinFang, Guan HuanYu, Xu Rong, Luo XiaoMei, Su MeiFeng, Chang XiaoYan, Tan WenTing, Chen Jun and Shi Yue. 2017. Comparison of the chemical profiles and antioxidant activities of different parts of cultivated *Cistanche deserticola* using ultra performance liquid chromatography-quadrupole time-of-flight mass spectrometry and a 1,1-diphenyl-2-picrylhydrazyl-based assay. Molecules 22(11): 2011. (http://www.mdpi.com/1420-3049/22/11/2011/htm [Describing analytical techniques which established that the stems and 'discarded aerial parts' of *C. deserticola* were particularly rich in anti-oxidants.]

Wang YaJiao, Ji LiJing, Li QiuSheng, Chen LianFang, Xue GenShehg, Wang LianSheng and Kong LingXiao. 2017. (Control efficacy of microbial herbicide Br-2 against *Orobanche*

aegyptiaca.) (in Chinese) China Vegetables 2017(4): 65-68. [Noting the importance of *O. aegyptiaca* in tomato in northern China and the apparent success of the un-identified microbial agent 'Br-2' for its control when applied at 10 g per plant at time of transplanting.]

Wang, Yanting and Bouwmeester, H.J. 2018. Structural diversity in the strigolactones. Journal of Experimental Botany 69(9): 2219-2230. [This is a comprehensive review on structural diversity in the strigolactones in relation to their biosynthesis, biological relevance, and perception by receptors in plants and in other organisms. The distribution of strigolactones in different plant species listed in Table 1 is reliable and has eliminated ambiguous data. Please refer to this review for the distribution of strigolactones in the plant kingdom. This list shall be updated at least as often as annually.]

Wang Ye, Chen Lei, Bai Yun, Zhang Jun'e, Liu HongXia and Tian ChengMing. 2017. (Genetic diversity of *Arceuthobium sichuanense* revealed by ISSR markers.) (in Chinese) Acta Botanica Boreali-Occidentalia Sinica 37(11): 2153-2162. [Study of molecular markers from 100 specimens of *A. sicuanense* from 5 *Picea* species showed that they fell into 2 main groups according to host species, indicating that geographical isolation and host selection played an important part in the genetic diversity of *A. sichuanense*.]

*Wang XueNi and 11 others. 2017. Compounds from *Cynomorium songaricum* with estrogenic and androgenic activities suppress the oestrogen/androgen-induced BPH process. Evidence-based Complementary and Alternative Medicine 2017: ID 6438013. (https://www.hindawi.com/journals/ecam/2017/6438013/)

Wehn, S. and Rønningen, K. 2017. (The "ENGKALL" (= *Rhinanthus*) project: optimalised management of valuable hay meadows.) (in Norwegian) Blyttia 75(4): 209-216. [Studying the value of 'Traditional Ecological Knowledge' in the management of hay meadows and concluding that varying mowing time is preferable to any single fixed time, presumably for preserving populations of *Rhianthus* spp.]

*Wen-Bin Yu, Randle, C.P., Lu Lu, Hong Wang, Jun-Bo Yang, de Pamphilis, C.W., Corlett, R.T and DeZhu Li. 2018. The hemiparasitic plant *Phtheirospermum* (Orobanchaceae) is polyphyletic and contains cryptic species in the Hengduan Mountains of Southwest China. Frontiers in Plant Science 09 February 2018. (https://www.frontiersin.org/articles/10.3389/fpls.2018.00142/full) [Both nuclear and plastid data indicate *P. japonicum* is not part of the *Pterygiella/Phtheirospermum* clade. The authors discuss maintaining the name *P. japonicum* and transferring the remaining taxa to another genus.]

*Werthmann, P.G., Saltzwedel, G. and Kienle G.S. 2017. Minor regression and long-time survival (56 months) in a patient with malignant pleural mesothelioma under *Viscum album* and *Helleborus niger* extracts-a case report. Journal of Thoracic Research 9(12) e1064-e1070. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5757010/) [A rare case of an MPM patient not receiving any standard anticancer treatment but showing an extraordinary long survival and good performance status. It is presumed that the *V. album* and *H. niger* may have had an impact, deserving further investigation.]

Wiatrowska, B. 2017. (*Rafflesia arnoldii* - a plant with the largest flowers in the world.) (in Polish) Nauka Przyroda Technologie 11(4): 365-373. [A general review that is, for the most part, accurate but could have benefitted from accessing the now extensive literature on Philippine *Rafflesia*.]

Widener, L. and Fant, J.B. 2018. Genetic differentiation and diversity of two sympatric subspecies of *Castilleja affinis*; a comparison between the endangered serpentine endemic (spp. *neglecta*) and its widespread congener (ssp. *affinis*). Conservation Genetics 19(2): 365-381. [Confirming that there is little hybridisation btween the endangered *C. affinis* ssp. *neglecta* and the commoner ssp. *affinis* but more strenuous conservation efforts are needed.]

Wójciak-Kosior, M., Sowa, I., Pucek, K., Szymczak, G., Kocjan, R. and Luchowski, P. 2017. Evaluation of seasonal changes of triterpenic acid contents in *Viscum album* from different host trees. Pharmaceutical Biology 55(1): 1-4. [Content of oleanoic acid was lowest in spring and highest in summer but the differences were not great.]

Wolfe, A.D. 2018. *Hyobanche hanekomii* (Orobanchaceae), a new species from the Western Cape of South Africa. Phytotaxa 340(1): 93-97. [Once thought to be a hybrid between *H. atropurpurea* and *H. sanguinea*, this taxon was shown to be distinct based on morphometrics and AFLP markers.]

Wołkowycki, D. 2017. (Threatened, legally protected and rare vascular plants in upper and central parts of the Narew River Valley (NE Poland).) (in Polish) Fragmenta Floristica et Geobotanica Polonica 24(1): 99-118. [Including *Thesium ebracteatum*, 'under threat of extinction'.]

Xiao Yan, Tian DaiKe, Zhang Cheng, Xiang ZuHeng, Zhang DaiGui and Fu NaiFeng. 2017. (Provincial new records of eight species of spermatophytes in northwestern Hu'nan

Province.) (in Chinese) Journal of Plant Resources and Environment 26(4): 110-112. [*Taxillus caloreas* among new records.]

Xiao XingHui, Zhang XiangQian, Li GuiFang and Li YuXia. 2017. (Aqueous two-phase extraction of total flavonoids from *Cistanche deserticola* Y. C. Ma and the antioxidant activity of the extracts.) (in Chinese) Food Research and Development 38(16): 5-9. [Describing techniques for optimising the extraction of the active flavonoids from *C. deserticola*.]

*Xie WenYan, Adolf, J. and Melzig, M.F. 207. Identification of *Viscum album* L. miRNAs and prediction of their medicinal values.PLoS ONE .12(11): e0187776. (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0187776) [MicroRNAs (miRNAs) in *Viscum album* were sequenced. Human genes and pathways have been predicted as putative targets of novel miRNAs, and target genes involved in bioactive components synthesis in *V. album* were predicted.]

*Xie WenYan and Melzig, M.F. 2018. The stability of medicinal plant microRNAs in the herb preparation process. Molecules 23(4): 919. (http://www.mdpi.com/1420-3049/23/4/919/htm) [The study confirmed the stability of miRNAs derived during the prparation of various *Viscum album* preparations, suggesting the possibility of functionally intact medicinal plant miRNAs being introduced to mammals.]

Xue HaiYan, Jiao ChanYuan and Yao Jun. 2018. (Research progress on pharmacology of *Cynomorii herba*.) (in Chinese) Drugs and Clinic 33(3): 709-712. [Reviewing progress in the pharmacology of *Cistanche songaricum*, valued for its uses for invigorating the kidney, hypoxia tolerance, anti-fatigue, protecting liver, anti-osteoporosis, and protecting nervous system]

Yagi, S.M. and Yagi, A.I. 2018. Traditional medicinal plants used for the treatment of diabetes in the Sudan: a review. African Journal of Pharmacy and Pharmacology 12(3): 27-40. [33 plants have been documented for treatment of diabetes in Sudan. All reduced blood sugar levels **except** *Striga hermonthica*!]

*Yan Shuai, Yue YinZi, Wang XiaoPeng, Dong HongLi, Zhen ShuGuang, Wu BenSheng and Qian HaiHua. 2017. Aqueous extracts of *Herba Cistanche* promoted intestinal motility in loperamide-induced constipation rats by ameliorating the interstitial cells of Cajal. Evidence-based Complementary and Alternative Medicine 2017: ID 6236904. (https://www.hindawi.com/journals/ecam/2017/6236904/) [Confirming the potential of a combination of *C. deserticola* and *C. tubulosa* in the treatment of constipation.]

Yang, L., Yang, G-S., Ma, H-Y., Wang, Y-H. and Shen, S-K. 2018. Phylogenetic placement of *Yunnanopilia* (Opiliaceae) inferred from molecular and morphological data. Journal of Systematics and Evolution 56:48-55. [Morphological and molecular phylogenetic methods were employed to address the status of *Y. longistaminea*. The authors chose to recognize this taxon as a new genus, however, both types of data also support the original concept by Pierre and Li (1989) that this is another species of *Melientha*.]

YergİN-Ozkan, R. and Tepe, I. 2018. Emergence characteristics and germination physiology of smoothseed alfalfa dodder (*Cuscuta approximata* Bab.). Fresenius Environmental Bulletin 27(1): 104-109. [In a study in Turkey, seeds of *C. approximata* germinated between 10 and 30^0C following stratification at 2^0C. 50% germinated after 133 days. Maximum germination of 98% was obtained with 150 ppm gibberellic acid.]

Yousefabadi, V., Alebrahim, M.T., Tuobe, A., Zand, E. and Abdollahian-Noghabi, M. 2017. Effect of seedling transplantation and post-emergence herbicides application on field dodder (*Cuscuta campestris*) control in sugar beet. Romanian Agricultural Research 34: 377-384. [Confirming that transplanting rather than direct sowing greatly reduced infection by *C. campestris* and increased sugar beet yield by 150%.]

Yule, K.M. and Bronstein, J.L. 2018. Reproductive ecology of a parasitic plant differs by host species: vector interactions and the maintenance of host races. Oecologia 186(2): 471-482. [Differences in several factors (reproductive phenology, pollinator reward, pollinator community, etc.) between *Phoradendron californicum* parasitizing mesquite (*Prosopis*) and acacia (*Senegalia*) were observed, but host was not associated with greater reproductive success in the mistletoe.]

Yusuf, A. and Deepa, P. 2017. Influence of N nutrients on GS activity and putative ammonium transporter1;2 (*sa*AMT1;2) expression in sandal plants (*Santalum album* L.). Trees: Structure and Function 31(6): 1773-1784.

*Zhang AiLian, Yang XiuMei, Li QuanXiao, Yang Yu, Zhao Gan, Wang Bin and Wu DaoCheng. 2018. Immunostimulatory activity of water-extractable polysaccharides from *Cistanche deserticola* as a plant adjuvant *in vitro* and *in vivo*. PLoS ONE 13(1): e0191356. (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0191356) [The study suggests that polysaccharides of *C. deserticola* are a safe and effective vaccine adjuvant for eliciting both humoral immunity and cellular immunity by

activating dendritic cells via TLR4 signaling pathway.]

Zhang GuiFang, Yin LiShi, Zhang Chao and Luo HaiYan. 2017. Effect of *Cistanche deserticola* Ma extract on memory of aged mice. Tropical Journal of Pharmaceutical Research 16(8): 1903-1907. [The results show that *C. deserticola* improves memory function in mice, probably by increasing the activity of CAT and decreasing AChE activity.]

Zhang, J., Jia, R., Zhang, Y., Li, M., Zhou, H. and Zhao, J. 2018. First report of stem rot of sunflower broomrape (*Orobanche cumana*) caused by *Sclerotinia minor* jagger in Inner Mongolia, China. Plant Disease 102(3): 683.

Zlonis, K.J. and Gross, B.L. 2018. Genetic structure, diversity, and hybridization in populations of the rare arctic relict *Euphrasia hudsoniana* (Orobanchaceae) and its invasive congener *Euphrasia stricta*. Conservation Genetics 19(1): 43-55. [*E. hudsoniana* in Minnesota is at the southern edge of its range and is at risk from climate change and from hybridisation with the invasive *E. stricta.* Finding very little evidence of hybridisation but recommending further monitoring.]

Zoundji, G.C., Vodouhe, S.D., Okry, F., Bentley, J.W. and Tossou, R.C. 2018. Beyond striga management: learning videos enhanced farmers' knowledge on climate-smart agriculture in Mali. Sustainable Agriculture Research 7(1): 80-91. [Ten videos describing techniques for reducing *Striga hermonthica* in maize, sorghum and millet contributed to significantly increased yields in villages where they were shown. Videos on other topics may also have contributed. The paper is available at https://www.cabdirect.org/cabdirect/FullTextPDF/2018/20183083144.pdf

Zwanenburg, B. and Blanco-Ania, D. 2018. Strigolactones: new plant hormones in the spotlight. Journal of Experimental Botany 69(9): 2205–2218. [A historical review on stereochemical structures of natural strigolactones, structure-activity relationships, and designs and syntheses of strigolactone mimics. It may be better to use the terms of orobanchyl acetate (alectrol) for 4-*O*-acetyl orobanchol (alectrol) in Fig. 2 and 4-deoxyorobanchol for *ent*-2'-*epi*-(5)-deoxystrigol in Fig. 17. Carlactonic acid should be carlactonoic acid.]

HAUSTORIUM 73
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