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CONTENTS

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PRESIDENT'S MESSAGE

Dear IPPS members

I hope you are all keeping well and managing to continue your research in these difficult times.

As you will see, the new IPPS website is going from strength to strength, thanks to the efforts of Harro, Susann and Luiza. I would like to encourage everyone to look at and interact with the website, as it is continually updated with new information about members, the society, publications and news items. Two important news items I would like to bring to your attention are the venue for the 16th World Congress on Parasitic Plants and the current round of IPPS elections.

As outlined in the last issue of Haustorium, we had two excellent offers to host the 16th World Congress on Parasitic Plants, from Steven Runo and Damaris Odeny (Nairobi, Kenya) and Hannan and colleagues (Jerusalem, Israel). Both venues were very popular but the next meeting will be held in Nairobi, Kenya in July 2021, if conditions allow. The date of the congress will be reviewed towards the end of the year, if COVID-19 is still widespread.

It is also time for election of a new Vice President and Secretary. All the positions on the Executive Committee are four-year positions which are staggered so that different officers are elected every two years to provide continuity. However, the Vice President position is different as the Vice President will automatically become the next President of the Society, so it is an eight year commitment.

We have excellent candidates for both the Vice President and Secretary positions. For Vice President the candidates are Professor Markus Albert, Dr Steven Runo, Dr Jonne Rodenburg, Dr Satoko Yoshida and Dr Chris Thorogood. Candidates for Secretary of the society are: Professor Airong Li, Professor Ahmet Auludag and Dr Dr Mónica Fernández-Aparicio. Biographies of all the candidates are available on the IPPS website, so please have a look at these.

The link to the Election Google Poll for Vice President is (https://forms.gle/zRouFZvSbbxZw14g9) and for Secretary of the Society the link is (https://forms.gle/kjukWEqFuHQvTXfX6). Again, these links can also be accessed from the website. **Please note the closing date for both polls is Wednesday 12th August.**

I would like to take this opportunity to thank Maurizio Vurro (Secretary), Airong Li (Member at Large and Harro Bouwmeester (Vice President) for all the hard work they have done for the Society over the last four years.

Harro is now taking over as President, so this is my last President's message. It has been a great pleasure and an honour to serve as Vice President and President of this Society over the last eight years. I would like to thank everyone who has contributed to the society, including members of the Executive committee, organisers of the WCPP Congresses and members of the society. I feel that parasitic plant research is becoming more main stream with increasing numbers of young researchers interested in parasitic plants, which bodes well for the future of the Society. I look forward to maintaining links with the society and to meeting everyone at the next Congress in Nairobi, hopefully in 2021.

With very best wishes

Julie Scholes

IPPS President

INVITATION: GENERAL ASSEMBLY INTERNATIONAL PARASITIC PLANT SOCIETY 25 AUGUST 2020 3.00-4.30 pm cet (on-line)

Dear IPPS member,

We want to invite you to the first online General Assembly of the IPPS on Tuesday 25 August 2020 3.00-4.30 pm cet. As the Executive Committee, we have decided that it would be good to organize our General Assembly more regularly, as indicated on the IPPS Constitution. Therefore, we will organize an online General Assembly meeting every two years, alternated with the occurrence of in-person General Assembly meetings during the World Congress of Parasitic Plants (WCPP).

For our first online meeting this year, we would like to update you and get your opinion on a number of IPPS matters:

- The new IPPS website
- The new IPPS Executive Committee, results of the elections
- Changes to the Society's Constitution
- Membership and membership fee payment
- Installation IPPS Advisory Board

We hope to see all of you on Tuesday 25 August 2020 3.00-4.30 pm CET on https://uva-live.zoom.us/j/91346420541

The current IPPS Executive Committee (Julie Scholes, Harro Bouwmeester, Maurizio Vurro, Philippe Simier, Susann Wicke, Airong Li, Luiza Teixeira-Costa)

NB You can only attend the General Assembly if you are a member of the IPPS. All who attended the WCPP in Amsterdam are current members. However, we are inviting everyone who is interested in the IPPS to become a member free of charge until June 2021 (see Society news in Haustorium and at www.parasiticplants.org). If you would like to become a member, please send an email to secretary@parasiticplants.org.

FREE MEMBERSHIP OF THE INTERNATIONAL PARASITIC PLANT SOCIETY UNTIL JUNE 2021

Membership of the International Parasitic Plant Society (IPPS) is traditionally associated with participation in the World Congress on Parasitic Plants (WCPP), as the registration for these events includes the IPPS membership fee. Formally, this implies that only the attendants of the most recent WCPP are members of the IPPS. Taking advantage of recent changes in the IPPS Constitution and Executive Committee, we have decided to establish a more constant form of membership. Membership registration and fee payment will still be coupled to the WCPP, but members who do not attend the WCPP will be enabled to continue their membership by paying a membership fee via the IPPS website. To facilitate this transition, we are offering anyone who is interested in becoming a member of the IPPS free membership until June 2021.

In June 2021 we will have the next WCPP, in Nairobi, and you will be able to pay your membership fee either through your attendance at the WCPP or via the IPPS website. If you would like to become a member, please send an email to secretary@parasiticplants.org. You will receive an email inviting you to confirm your membership by logging in on the IPPS website member area. After doing so, we kindly ask you to update your member profile on the website with a short description of your scientific interest and a picture of yourself as well as an image representing your institution. Through the website member area, you can also post news and vacancies, access high-resolution pictures of parasitic plants, and communicate with other members.

I hope that many of you use this opportunity to become a member and support our society!

Julie Scholes, president of the IPPS

STUDENT PROJECT

Impact of soil microorganisms on the seedbank of the plant parasitic weed *Striga hermonthica.*

Getahun Mitiku (PhD candidate) and collaborators:
Department of Microbial Ecology, Netherlands Institute of Ecology, Netherlands
Ethiopian Institute of Agricultural Research, Ethiopia
Institute of Biology, Leiden University, Netherlands

Control of *S. hermonthica* remains challenging due to the enormous amounts of seeds produced per plant and high seed survival rates in soils. To date, few efforts have been made to explore the functional potential of the soil and sorghum root microbiome as a complementary strategy to reduce the *Striga* seedbank and *Striga* infections of the host plants. Hence, the overall aims of my PhD study are i) to investigate the importance of soil microbes in diminishing the *S. hermonthica* seedbank and ii) to unravel the relationship between soil physicochemical properties, soil microbiome composition, *Striga* seedbank and *Striga* incidence in sorghum-growing agroecological zones of Ethiopia.

The availability of fast, high-throughput and robust techniques for the *in-situ* detection and quantification of *Striga* seeds in agricultural soils is a crucial step for investigating the impact of edaphic factors on *Striga* seedbank dynamics. Hence, we developed a new qPCR-based detection and quantification of *Striga* seeds in agricultural field soils. The efficiency of the technique was also assessed in proof-of-principle experiment involving introduction of known numbers of *Striga* seeds in two *Striga*-free Dutch agricultural soils. By integrating density-based extraction, size-dependent sieving approach and DNA extraction, our results showed that very few *Striga* seeds could be recovered, detected and quantified. This new integrated detection method was also deployed for the detection and quantification of *Striga* seeds in a total of approximately 50 naturally infested soils from sorghum-growing areas of Ethiopia. Multivariate analyses were performed to establish the relationship between *Striga* incidence monitored in the field, *Striga* seedbank, soil physicochemical characteristics and microbial composition in the same areas of the country. We are currently investigating the survival rates of *Striga* seeds in these ±50 field soils with the goal to identify and characterize the microorganisms that trigger suicidal germination of *Striga* seeds or affect their viability in agricultural soils.

PROJECT UPDATES

PROMISE: promoting root microbes for integrated *Striga* eradication

The PROMISE project funded by the Bill & Melinda Gates Foundation aims to harness soil and root microbiomes to control *Striga* infection of sorghum and other crop species. To this end a multidisciplinary team with expertise in agronomy, microbiology, mycology, plant chemistry, plant development, molecular biology and bioinformatics were brought together to develop new complementary approaches to control this devastating parasitic weed.

Microbes can directly and indirectly interfere with the *Striga* life-cycle, either by deterring the parasite or by triggering processes that impair infection of the host roots (Masteling *et al.*, 2019). Direct modes of action include i) pathogenicity towards *Striga*, ii) antagonism via secondary metabolites or volatile organic compounds, and iii) interference with host-*Striga* signalling. Indirect modes of action by which microbes could suppress *Striga* include a) enhancement of nutrient (P, N) acquisition by the host, b) induced systemic resistance (ISR), and c) alteration of root exudation or root architecture (Masteling *et al.*, 2019). To date, most studies on microbe-mediated suppression of *Striga* and other root parasitic weeds have focused on the activities of single microbial species, mostly fungi and bacteria. In the PROMISE project, the ultimate goal is to design synthetic microbial communities (SynComs) or identify microbial metabolites that consistently suppress *Striga* infections or trigger suicidal germination of the *Striga* seed bank. The design of SynComs should involve microbes with complementary modes of action that act together or synergistically, and preferably at different stages of the parasite's life cycle. This reinforces the need to understand the taxonomic and functional diversity of the sorghum root microbiome and the dynamic changes in the microbiome during plant and parasite development as well as their interaction. Moreover, a microbiome-mediated strategy for *Striga* control should take into account how each microbial member of the consortium behaves across different soil conditions, how their activities are influenced by the genotypic diversity of the host and parasite as well as by other commonly used agricultural practices used to control *Striga* (e.g. crop rotation, trap/catch crop).

Figure 1: a sorghum field site in Ethiopia sampled in the PROMISE project to map the *Striga* seedbank and to characterize the soil and sorghum root microbiome (photo courtesy: Dr. Taye Tessema, EIAR).

In the past 2-3 years of the PROMISE project, we have developed a highly sensitive molecular detection method that allows accurate quantification of *Striga* seeds in field soils. This technique is now applied in the project to i) quantitatively map the geographic distribution of the *Striga* seedbank in soils from Ethiopia and other sub-Saharan countries, ii) assess the relation between *Striga* seedbank and incidence in sorghum fields across different agro-ecologies in Ethiopia, and iii) investigate the impact of existing and new (microbiome-based) approaches that target the *Striga* seedbank. To identify *Striga*-antagonistic microbes or microbial metabolites, we developed an automated computer vision tool for image analysis and high-through-put bioassays. To isolate potential members of a microbial SynCom, we determined the core and accessory root microbiome of sorghum. Defining the core microbiome allows us to target microorganisms and traits that are consistently associated with roots of different sorghum genotypes growing in soils from different agroecological zones. To identify specific microbial genera that interfere with the *Striga* life-cycle we are screening a well-characterized and sequenced bacterial culture collection representing multiple phyla, genera and species. We also established and characterized a large fungal isolate collection (approximately 4,000 isolates) from Ethiopian field soils, sorghum roots and *Striga* seeds. Several of these significantly interfere with *Striga* seed germination. Similarly, we established a large collection of P-solubilizing bacteria which are being tested for their abilities to affect the strigolactone-based signalling between host and parasite.

In the context of host-parasite signalling, we identified new putative mechanisms by which the root microbiome can exert a suppressive effect on *Striga* root infection by manipulation of the host (sorghum) physiology, host-*Striga* signalling and root cellular traits. These mechanisms are being further explored in the coming year. In this context, we also initiated collaborations with two other projects funded by the Bill & Melinda Gates Foundation, i.e. N2-Africa and ENSA. Together with team members of N2-Africa, experiments on *Striga* seed bank detection in selected Kenyan soils were initiated. For ENSA, experiments were conducted to evaluate the impact of specific plant genes on root microbiome assembly and *Striga* infection.

PROMISE consists of the following institutes and PI's:

- Ethiopian Institute of Agricultural Research (EIAR) – Dr. Taye Tessema
- University of California, Davis – Prof. Siobhan Brady
- University of Amsterdam – Prof. Harro Bouwmeester
- Westerdijk Fungal Biodiversity Institute – Prof. Pedro Crous
- AgBiome, Research Triangle Park, NC – Dr. Tracy Raines
- Netherlands Institute of Ecology – Prof. Jos Raaijmakers

For more detailed information on the team members, objectives and accomplishments, please visit the PROMISE website: https://www.promise.nioo.knaw.nl

Reference

Masteling, R., Lombard, L., De Boer, W., Raaijmakers, J. M., and Dini-Andreote, F. 2019. Harnessing the microbiome to control plant parasitic weeds. Current Opinion in Microbiology 49(June), 26-33. https://doi.org/10.1016/j.mib.2019.09.006

PARASITES OF PARASITES – THE TOOTHPICK PROJECT

Plant pathogens have been studied for their possible use in weed control. However, most pathogens of weeds are not useful in their wild form because they are not sufficiently host-specific and/or virulent enough. In short, they have evolved a sort of 'pathosymbiosis' or controlled coexistence with their host. A mere 40% damage isn't enough if they are to compete against chemical herbicides. Through our project, demonstrated in Kenya on *Striga*, we see that these barriers can be overcome.

Research out of the David Sands Lab at Montana State University has focused on the inhibitory effects of certain amino acids on the growth and development of specific plants. Pathogens that overproduce these chosen amino acids can be easily selected from a pool of spontaneous mutants. Such mutants can have increased pathogenicity to their target weed and enhanced field performance as biocontrol agents. Enhancement of biocontrol efficacy in pathogen–host systems can lead to obtaining biocontrol agents capable of producing inhibitory levels of selected amino acids *in situ*.

The target we chose was *Striga hermonthica*, which continues to be a major parasite ofmaize, sorghum, millet, rice and now wheat, grown by 40 million subsistence farmers in Sub-Saharan Africa. The pathogen should be endemic, and safe in its host specificity. It must be delivered to 'that last mile' all the way to subsistence farmers where they can see a solid return on their investment. To overcome these problems of cost, efficacy and safety we embarked on a decade long saga to develop a solution to the *Striga* problem.

The *Fusarium oxysporum* f.sp. *strigae* strains that we have selected are affordably delivered to the village level on a toothpick (hence the name The Toothpick Project) and then grown into a live, fresh inoculum by each farmer or as a group at the village level. In over 1000 paired-plot trials, crop yield has increased 42-56%. A social enterprise is now fully commercializing this innovation in Kenya, subject to completion of necessary regulation for a biocontrol product which should be completed shortly after 5 years, sadly interrupted by the COVID-19 outbreak. This should then serve as a scale-up model for *Striga* and other weeds beyond that one country.

In parallel to the Kenya enterprise, we are focusing on capacity-building in twelve other African countries by setting up and training a team of scientists from these countries. With cultivation by the Toothpick Project, bioherbicides are a growth industry primed for international collaboration, using the team's expertise to explore other methods of disbursement and distribution, expansion to other weeds, and commercialization innovations. Please visit www.toothpickproject.org for more information and to potentially get involved.

Dr. David Sands and Claire Baker

PROFILE

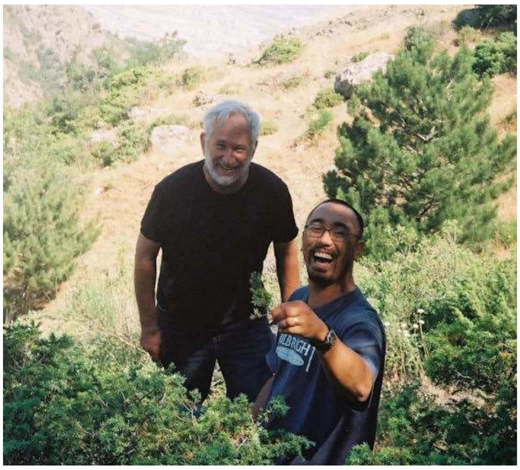
Archeuthobium oxi-cedri – juniper dwarf mistletoe

Archeuthobium oxy-cedri is the one European species of this vastly important and damaging genus. Like so many species in the genus, it has a narrow host specificity parasitizing just certain Cupressaceae, mainly juniper species, and most notably *Juniperus oxy-cedrus*, which is a source of cade oil, used in cosmetics and traditional medicine, but is otherwise relatively unimportant economically.

A. oxy-cedri is one of only three mistletoe species in Europe. As such, I had always wished to see it. I had always been familiar with *Viscum album* and had eventually seen *Loranthus europaeus* when on a camping holiday in Italy. The latter we had also seen during a field trip organised during the 10th Parasitic Plant Congress in Kusadasi, in 2009.

Before going to Turkey (for my first time) I had checked and found that *A.oxy-cedri* occurred on Mt Sypilos (Mt Spil) some 100km N. of Kusdasi. Having a few extra days there after the Congress I persuaded Lytton Musselman and Jay Bolin to join me on an expedition to find it. We hired a vehicle and set out having to ask our way several times but eventually winding our way up to an elevation of about 1000m.

Towards the end of the first day we had made several stops where we looked at junipers a number of times but without success. In the evening at our hotel overnight Lytton confessed that he had been guiding us to look at the wrong species of juniper. Hence the next morning we very soon found *J. oxy-cedrus* on a steep rocky slope infested quite heavily by *A. oxy-cedri.*



Eureka!! (photo Chris Parker)

This species is distributed from Spain and Morocco, to Lebanon and Syria, reaching Kurdistan in Iran, Iraq and the Caucasus mountains. Also the Himalayas in Pakistan, India, and China. *A. oxycedri* differs from the North American species in having junipers as host plants, and in its wide geographical distribution, mainly at moderate altitude, and in a relatively mild Mediterranean climate. It is greener than most *Arceuthobium* spp. but is still largely dependent on the host and has a debilitating effect.

In common with other *Arceuthobium* spp. *A. oxycedri* is dioecious, the male flowers 1.5-2 mm across, perianth mostly 3-merous. The mature fruit is about 3 mm long and 1.5-2 mm wide. Pollination appears to be predominantly due to insects, especially ants and flies, but may also occur by wind (Hawksworth and Wiens, 1996). In *A. oxycedri*, anthesis occurs mostly in September-October (August - September in China). Following fertilization of the 'ovule', the fruit matures 13 months later in October - November of the following year.

A. oxy-cedri on *J. oxy-cedrus* (photos Lytton Musselman)

No true seed is formed, as there is no testa, but the embryo is embedded in chlorophyllous endosperm, referred to as a seed for convenience, surrounded by viscin. The embryo is green, a few millimetres long, and has a meristematic radicular apex without a root cap. Dispersal of the seed is exceptional, involving a hydrostatic, explosive process which expels the seed at least 10 m (CABI, 2020). It is included in this Invasive Species Compendium due to its potential, if introduced, to damage North American species of economic value.

References:

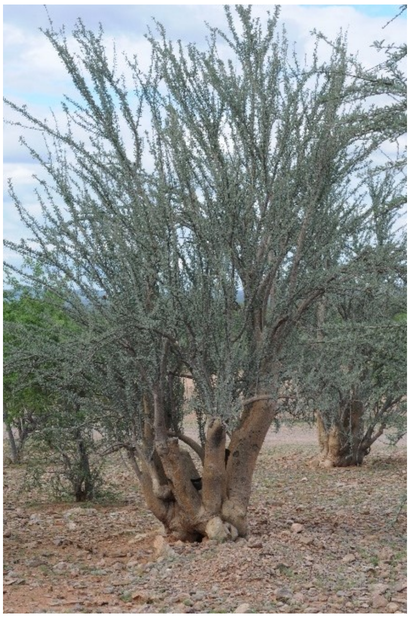
CABI, 2020. CABI Invasive Species Compendium (https://www.cabdirect.org/cabdirect/search/?searchtype=advance-search&q=).

Hawksworth, F.G. and Wiens, D. 1996. Dwarf Mistletoes: Biology, Pathology, and Systematics. Agricultural Handbook 709. USDA Forest Service. 410 pp.

Chris Parker – with warm thanks to Lytton and Jay for their companionship on this memorable trip, and for assistance in preparing this article.

OPEN SESAME

While conducting field work on *Hydnora* in northwestern Namibia we happened upon a population of a distinctive shrub, *Sesamothamnus guerichii* with the descriptive common name of Herero sesame bush. It grows almost exclusively in the region of the Herero peoples in Namibia and is in the same family, Pedaliaceae, as the familiar sesame plant, *Sesamum indica* the source of sesame seeds. What caught our eye was nothing familiar, however.



The shrub *Sesamothamnus guerichii* (photo Lytton Musselman)

At the base of the shrub we found what looked like *Orobanche* shoots. As we continued our search for *Hydnora* the next few days we came upon a few additional populations of *Sesamothamnus* and examined them for the parasite and found some just coming into flower. It obviously was not a species of *Orobanche* but rather in the genus *Alectra.* Host selection cannot be assumed by proximity of the parasite to a potential host as we have learned from decades of field work, but excavation showed a connection between roots.

Alectra orobanchoides (photo Lytton Musselman)

Plants were not mature so we had difficulty determining which species of the parasite it might be. A web search was not helpful nor was a search of herbarium specimens for potential helpful label data. In fact, there appear to be very few herbarium specimens of *S. guerichii*. However, Visser in his 1982 classic South African Parasitic Flowering Plants (page 156) notes *Sesamothamnus*, without giving the species, as a host for *Alectra orobanchoides*. Interestingly, he does not record the parasite in his distribution map for Namibia. He does, however, list sesame as a host though we have found no documentation of the parasite on this crop.

Alectra orobanchoides has the broadest host range reported in the genus and its presence in the region should be noted in the unlikely spread to an agronomic host.

Lytton John Musselman, Old Dominion University
Erica Maass, University of Namibia
Jay Bolin, Catawba College.

PRESS REPORTS

Some sorghum can 'hide' from witchweed

Sorghum crops in areas where the agricultural parasite striga, also known as witchweed, is common are more likely to have genetic adaptations to help them resist the parasite, researchers say. Witchweed, one of the greatest threats to food security in Africa, causes billions of dollars in crop losses annually and has a variety of hosts, including sorghum, the world's fifth most important cereal crop.

Changes to the LGS1 gene affect some of the crop's hormones, making it harder for parasites to find in the soil, at least in some regions. The changes, however, may come at a cost, affecting photosynthesis-related systems and perhaps growth.

The new study in the Proceedings of the National Academy of Sciences may eventually inform strategies for managing the parasite. 'We wanted to know if sorghum plants in areas with high parasite prevalence were locally adapted by having LGS1 mutations,' says Jesse Lasky, assistant professor of biology at Penn State and senior author of the paper. 'We often think about local adaptation of agricultural crops with regard to factors like temperature, drought, or salinity. For example, if plants in a particularly dry region were locally adapted to have genes associated with drought-tolerance, we could potentially breed plants with those genes to resist drought. We wanted to know if you could see this same kind of local adaptation to something biotic, like a parasite.'

Gail McCormick-Penn State.
February 12th, 2020

CRISPR replicates the mutations

The researchers modeled the prevalence of witchweed across Africa and compared the presence of LGS1 mutations thought to confer some resistance in sorghum. They found that these mutations were more common in areas with high parasite prevalence, suggesting that sorghum plants in those areas may locally adapt to deal with the parasite. 'The LGS1 mutations were widespread across Africa where parasites were most common, which suggests they are beneficial,' says first author Emily Bellis, postdoctoral researcher at Penn State at the time of the study and now an assistant professor of bioinformatics at Arkansas State University. 'But these mutations were not very common, and nearly absent outside of parasite-prone regions. This indicates that there may also be a cost, or tradeoff, to having these mutations.'

To better understand the effects of the LGS1 mutations, members of the research team at Corteva Agriscience used CRISPR-Cas9 gene-editing technology to replicate the mutations in the lab. The loss of LGS1 function did appear to confer resistance to witchweed in their experiments, as parasites had low or even zero germination rates, suggesting the parasites were not as successful at finding the crop to reproduce. But parasites collected from different geographic locations in Africa responded in different ways. ‘Germination of parasites from a population in West Africa was effectively shut down in both nutrient-rich and nutrient-poor conditions, but we still saw germination up to about 10% for a population in East Africa when nutrients were limited,’ Bellis says. ‘That is definitely an improvement, but there can be thousands of parasites in the soil, so even 10% germination can be problematic, especially in the smallholder farms where these crops are predominantly grown.’

Hiding from parasites:

Researchers know that LGS1 mutations affect strigolactone hormones that sorghum releases from its roots. Because the parasite uses these hormones to find sorghum, altering the hormones makes the plant mostly invisible to the parasite. But strigolactones are also important for communication with mycorrhizal fungi, which play an important role in the plant’s acquisition of nutrients. The new study shows that loss of LGS1 function in the modified plants also affects systems related to photosynthesis and subtly affects growth. ‘It may be that plants with LGS1 mutations are better at hiding from the parasites, but are less productive,’ Lasky says. ‘This potential tradeoff might explain the relatively low prevalence of these mutations in sorghum across Africa.’

The researchers also identified several mutations in other genes related to parasite prevalence, which might reflect local adaptation. The researchers plan to investigate these genes—some of which are involved in cell-wall strengthening, to see if they may also confer resistance to the parasite. ‘We eventually would like to look at other agriculturally important host plants of striga in Africa to ask similar questions,’ says Lasky. ‘If we do indeed see local adaptation to the parasite and find genes that confer resistance with few tradeoffs, we may be able to capitalize on that from a management perspective.’

The National Science Foundation, the Advanced Research Projects Agency-Energy, and the US Department of Energy funded the work.

Original study: DOI: 10.1073/pnas.1908707117
Additional researchers are from Penn State; Corteva Agriscience; Sorbonne Université in France; the Royal Botanic Gardens Kew in the United Kingdom; the University of Texas; Kansas State University; Uppsala University in Sweden; the University of Virginia; the International Crops Research Institute for the Semi-Arid Tropics in Mali; and Kenyatta University in Kenya.

Penn State

Unique centromere type discovered in the European dodder

The holocentric european dodder (*Cuscuta europaea*) entwines a nettle. Photo: Jiri Macas

Whenever the European dodder, *Cuscuta europaea*, is under scientific scrutiny, it usually is due to its lack of chloroplasts and its concomitant parasitic lifestyle. However, since the beginning of this year its chromosomes became the new centre of attention, when researchers discovered a new type of centromere inherent to *C. europaea*. Whilst the positioning of the centromeres on the chromosome is normally determined by the locations of CENH3 histones, the centromeres of *C. europaea* were positioned in some chromosomal regions also independently from the plant's occurrence of CENH3.

C. europaea is mainly known as a parasitic plant - instead of doing photosynthesis, it grows on other plants and lives off their products. In some cases, it even lives as an epiparasite, living off related plant species. When looking into the plants' cytogenetics, researchers from the Biology Centre of the Czech Academy of Sciences in Ceské Budejovice, in collaboration with researchers from the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), recently discovered that *C. europaea* showcases a unique kind of centromere.

The centromere is a region on a chromosome, at which the kinetochore assembles. This, in turn, guides the attachment of the microtubules of the spindle apparatus during the cellular processes mitosis and meiosis. In most eukaryotic species, the positioning of the centromere is determined by a centromere-specific histone H3 variant called CENH3, which also plays an essential role in the formation and function of kinetochores. Based on the distribution of centromeres on the chromosome, species are thought of as having either monocentric or holocentric centromere types. In monocentric species, CENH3 and thus centromere activity is confined to a single region per chromosome, whilst in holocentric species, both are found along the entire length of the chromosome.

In order to investigate traits associated with the transition from monocentric to holocentric chromosome organisation, researchers compare the phylogenetics of related species with differing centromere types. Species of the genus *Cuscuta* are already well documented. However, when investigating *C. europaea* as an additional representative holocentric species, the scientists came across unexpected discrepancies. Instead of creating the expected signals along the entire chromosome, in situ immunodetection patterns showed that CENH3 occurred in up to three distinct regions per chromosome. Later, super-resolution microscopy revealed that the centromeres still showed typical holocentric activity, apparently independent of the unusual CENH3 distribution, proving that a new type of centromere had been found.

To date, only few species showing no correlation between CENH3 and kinetochore functionality, mainly holocentric insects which are lacking CENH3 genes, have been found. But through the discovery of *C. europaea*'s unique centromere type, this short list has now been extended by one already rather exceptional parasitic plant, which will continue to inspire further research.

Leibniz Institute of Plant Genetics and Crop Plant Research

Action is needed to preserve a rare species of mistletoe in Dunedin's Town Belt, a botany student says.

University of Otago student Zoe Lunniss, who is nearing completion of her master's thesis, said change was needed to conserve the *Tupeia antarctica* species.

Tupeia antarctica Photo: Chris Ecroyd

It did not quite look like it should in the Dunedin Town Belt, because of possums grazing and a lack of light beneath the canopy, she said. Miss Lunniss has studied growths of the parasite on host trees and placed collars on the trees to hinder possum access. The mistletoe growths were still not fruiting, however. They were alive but not flourishing. Otago was once a stronghold for the species but the region was down to three populations, she said. The others were at Tavora Reserve, near Palmerston, and in the Catlins.

Miss Lunniss has a bachelor of science degree and has run experiments and examined *T. antarctica* closely for almost two years. One curious characteristic was that it grew on different hosts, depending on their location, she said. 'It's cool to have it here in the Town Belt. It's really rare. 'Something needs to happen now, for the conservation of the species.'

Grant Miller

(This species, endemic to New Zealand, will on occasion extend into beech forest where it has been found parasitic on red mistletoe (*Peraxilla tetrapetala*). Favoured indigenous hosts include *Pseudopanax arboreus*, *Carpodetus serratus*, *Nestegis cunninghamii*, *Pittosporum eugenoides*, *P. tenuifolium*, and *Coprosma* spp. At present the species has been recorded from 48 hosts (11 exotic) spread through 32 genera and 20 families (from de Lange *et al.* 1997, though this figure needs revision as since that time many more hosts have been reported. de Lange, P.J. 2020. *Tupeia antarctica* Fact Sheet. New Zealand Plant Conservation Network. https://www.nzpcn.org.nz/flora/species/tupeia-antarctica)

THESIS

Kaiser, Bettina, 2020. Dodder and Tomato - A plant-plant dialogue . Universität Tübingen. Supervisor: Dr Marcus Albert. http://hdl.handle.net/10900/97276

Plants of the genus *Cuscuta* or dodder belonging to the morning glory family (Convolvulaceae) are obligate parasitic plants, so-called holoparasites, meaning that they are fully host-dependent. Only few plants can successfully resist a dodder attack. The cultivated tomato (*Solanum lycopersicum*) however is among the resistant plants. It can successfully persist an attack of giant dodder (*Cuscuta reflexa*). In this work the perception system of tomato and its corresponding elicitor from giant dodder is investigated. Cultivated tomato has many wild relatives and is with most of them intercrossable, which gives researchers an excellent opportunity for genetic investigations. It shows a violent reaction when attacked by giant dodder. Thus the immune system of tomato is able to perceive a molecular pattern from giant dodder, whereas some wild tomatos cannot, which makes them susceptible. This unknown molecular pattern was characterized and an identification process began, and in addition the corresponding receptor was found. It was furthermore revealed how the findings of the interaction between dodder and tomato can be used for plant protection.

MEETING REPORT

Mistletoe in Tumour Therapy: Basic Research and Clinical Practice. 7th. Mistelsymposium, 7–9 November 2019, Europäisches Bildungszentrum Otzenhausen D-66620 Nonnweiler.

Lucie Schröder, *et al.* - Special features of cellular respiration in *Viscum album*.

Uwe Pfüller and Udo Schumache - Lectins, viscotoxins and low molecular weight active components of mistletoe plants.

Gero Leneweit *et al.* - Colloidal formulation of mistletoe extracts in a pharmaceutical flow process for targeted cancer therapy.

Tim Jäger *et al.*- Metabolic profiling as a tool for differentiating *Viscum album* ssp. album plants growing on various host trees.

Matthias Kröz *et al.* - Cancer-related Fatigue and Cancer-related Insomnia in breast cancer patients - clinic, diagnosis and evidenced-based therapies – an overview.

Marcus Reif *et al.* - Association between fatigue and laboratory parameters in a longitudinal randomizedcontrolled mistletoe trial in breast cancer patients.

Gunver S. Kienle - Current developments of clinical research on mistletoe therapy in cancer care.

Kathrin Wode *et al.* - Mistletoe therapy in primary and recurrent inoperable pancreatic cancer. A phase III
prospective, randomized, double blinded, multicenter, parallel group, placebo controlled clinical trial on overall survival and health-related quality of life (MISTRAL).

André-Michael Beer - Do world history and history of naturopathy influence the history of phytotherapy?

Sonja Schötterl et a. - Mistletoe lectin I reduces glioma cell motility by changing mainly the expression of
genes associated to TGF-β signaling.

Katrin Menke et al . - Preclinical investigation of interaction of mistletoe extract (*Viscum album* L.) with radio- and chemotherapy in pediatric tumor cell lines.

Eva Jüngel *et al.* - Preclinical studies on the significance of mistletoe preparations in the therapy of urological tumors.

Amy Marisa Zimmermann-Klemd *et al.* - Does Mistletoe Interact with Tumor Immune-Escape Mechanisms?

Catharina Delebinski *et al.*- Overview of viscumTT.

André-Michael Bee *et al.* - On-site Integrative Oncology: The Bochum/Hattinger Model.

Daniel Galun *et al.* - The impact of fever on overall survival after trans-catheter hepatic mistletoe therapy of patients with primary liver cancer.
Theo Dingermann - Checkpoint inhibitors: A starter.
Ulrike Weissenstein - *Viscum album* and Immunotherapy.
Harald Matthes - Reviews: Status of mistletoe therapy for breast and lung cancer.
Christian Grah *et al.* - First prospective study of a combined immune therapy of checkpoint inhibitors ± CTX plus *Viscum album* L. in non-small cell lung cancer (NSCLC) in UICC stage III B-IV B.
Burkhard Matthes *et al.* - Prolonged overall survival in patients with metastasized non-small cell lung carcinoma after combined treatment of chemotherapy and *Viscum album* L. versus chemotherapy alone, a cancer registry analysis.
Friedemann Schad *et al.* - Psychosocial, cognitive, and physical impact of Elaborate Consultation and Life Review in Female Patients with Non-Metastasized Breast Cancer.
Anja Thronicke *et al.* - Financial burden of all-stage lung and breast cancer patients as an early indicator for emotional and physical burden.
Harald Matthes - Psycho-oncology today: The same approach for all patients? Or an organ-specific approach?
Christian Grah - Psycho-oncological care in lung cancer: are there site-specific features?
Martin Flür *et al.* - A Single-Case Series on the Tolerability of Targeted Therapy and Concomitant Mistletoe Therapy in the Treatment of Oncological Patients
Karl Rüdiger Wiebelitz and André-Michael Beer - Intratumoral, intrapleural and intraperitoneal mistletoe therapy. Effects and adverse reactions.
Juergen J. Kuehn - *Viscum album* induces Systemic Inflammatory Response Syndrome by intravenous application - conditioning numeric cellular and humoral immune stimulation and clinical efficacy. A prospective observational study in advanced cancer patients.
Gil Bar-Sela - Intravenous application of mistletoe extract: review of the reported data and outline of a planned study with Iscador.
Alessandra Longhi *et al.* - Long term results in osteosarcoma patients treated with *Viscum album* Fermentatum P versus Etoposide as maintenance therapy after second relapse.
Frank Meyer- Sources of Integrative Medicine.
Marcus Reif *et al.* - Pain and use of analgesics in a randomized study of metastasized or locally advanced pancreatic carcinoma (MAPAC).
Thomas Ostermann *et al.* - A Systematic Review and Meta-Analysis on the Survival of Cancer Patients Treated with a Fermented *Viscum album* L. Extract (Iscador) – an Update of Findings.

FUTURE MEETINGS

16th World Congress on Parasitic plants - Nairobi, Kenya. July 2021 **(to be confirmed).**

Symposium on Holoparasites. Namibia, September 2022.

We are writing to inform you of plans to hold a symposium on holoparasites in Namibia in September 2022. The emphasis will be on African holoparasites but anyone working on holoparasitic angiosperms is welcome. This is a very preliminary announcement based on our recent meeting in Windhoek earlier this month but we wanted to gauge interest before further planning. The symposium will be sponsored by the University of Namibia, Old Dominion University, and Catawba College. A three-day meeting is planned with additional opportunity for field trips to see some of the most bizarre parasites in the world.

We are seeking funds to help subvent the cost of the meeting and it is anticipated that funds will also be available to support travel, especially students and African colleagues.

If you are interested and would like to receive additional announcements, please respond to Lytton Musselman at lmusselm@odu.edu Comments and suggestions are encouraged.

Jay F Bolin, Catawba College
Erika Maass, University of Namibia
Lytton J Musselman, Old Dominion University

Virtual Agbiol Conference 1-3 September 2020, Edirne, Turkey focusing on Agriculture, Biology and Life Sciences topics. For more information: http://agbiol.org/

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 Old Dominion University Haustorium site: see https://ww2.odu.edu/~lmusselm/haustorium/index.shtml

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 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 Toothpick Project – see https://www.toothpickproject.org/

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

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

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

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

*For information on future Mistel in derTumortherapie Symposia see: http://www.mistelsymposium.de/deutsch/-mistelsymposien.aspx (NB see above re 7th Symposium)

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

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

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

LITERATURE

***indicates web-site reference only**
Items in bold selected for special interest

*Abbasvand, E., Hassannejad, S., Zehtab-Salmasi, S. and Alizadeh-Salteh, S. 2020. Physiological and biochemical responses of basil to some allelopathic plant residues and dodder infestation. Acta Physiologiae Plantarum 42(1): 1. (https://link.springer.com/article/10.1007%2Fs11738-019-2990-y) [Studying the effects of three allelopathic plant residues, namely Syrian bean-caper (*Zygophyllum fabago*), *Calendula officinalis* , and *Datura stramonium* on two cultivars of sweet basil (*Ocimum basilicum* L.) plants infested by *Cuscuta campestris*. Concluding that *Z. fabago* residues could be used for controlling dodder infestation in basil plants, but quantities not stated in abstract.]

Abbes, Z., Trabelsi, I., Kharrat, M. and Amri, M. 2019. Intercropping with fenugreek (*Trigonella foenum-graecum*) enhanced seed yield and reduced *Orobanche foetida* infestation in faba bean (*Vicia faba*). Biological Agriculture & Horticulture 35(4): 238-247. [Confirming reduced infestation by *O. foetida* and increased yield of faba bean as a result of intercropping with fenugreek, presumably as result of allopathic effects but these not confirmed in this study.]

*Adewale, S.A., Badu-Apraku, B., Akinwale, R.O., Paterne, A.A., Gedil, M. and Garcia-Oliveira, A.L. 2020. Genome-wide association study of *Striga* resistance in early maturing white tropical maize inbred lines. BMC Plant Biology 20(203): (https://bmcplantbiol.biomedcentral.com/articles/10.1186/s12870-020-02360-00) [Reporting the identification of loci on chromosomes 9 and 10 of maize that are closely linked to *ZmCCD1* and *amt5* genes, respectively, apparently related to plant defence mechanisms against parasitism by *S. hermonthica.*]

Adriano Funez, L., Ribeiro-Nardes, W., Kossmann, T., Peroni, N. and Drechsler-Santos, E.R. 2019. *Prosopanche demogorgoni*: a new species of *Prosopanche* (Aristolochiaceae: Hydnoroideae) from southern Brazil. Phytotaxa .422(1): 93-100. [Describing *P. demogorgoni* which is similar to *P. bonacinae* but differs in having anthers

composed of 3-4 thecae, synandrium 5-6 × 3-4 mm and tepals 15-20 × 5-8 mm .]
Adu, G.B., Badu-Apraku, B., Akromah, R., Haruna, A., Amegbor, I.K. and Amadu, M.K. 2019. Grain yield and stability of early-maturing single-cross hybrids of maize across contrasting environments. Journal of Crop Improvement 33(6): 776-796. [150 hybrids were derived from 30 inbred parent and hybrids TZEI 3A × TZdEI 192, TZdEI 216 × TZEI 3A and TZEI 379 × TZdEI 272 were identified as high yielding and most stable across environments. With tolerance to both *Striga* and low-N these hybrids should be further tested on-farm for potential release in Ghana and other West African countries.]
*Alencar, J., de Sá Cordeiro, W.P.F., Staples, G. and Buril, M.T. 2019. (Convolvulaceae Juss. in the Sete Cidades National park, Piauí State, Brazil.) (in Portuguese) Hoehnea 46(4): No.4. (https://www.scielo.br/scielo.php?script=sci_arttext&pid=S2236-89062019000400202&tlng=pt) [Species recorded included *Cuscuta partita*.]
Aly, R., Bari, V.K., Londner, A., Nassar, J.A., Lati, R., Taha-Salaime, L. and Eizenberg, H. 2019. Development of specific molecular markers to distinguish and quantify broomrape species in a soil sample. European Journal of Plant Pathology 155(4): 1367-1371. [Specific molecular markers were developed to help locating and distinguishing between seed and/or tissue of broomrape species (*Phelipanche aegyptiaca*, *Orobanche cumana* and *O. crenata*) in the soil .]
Ančić, M., Pernar, R., Bajić, M., Krtalić, A., Seletković, A., Gajski, D. and Kolić, J. 2020. (Spectral signatures (endmembers) some of forest species in the Republic of Croatia.) (in Croatian) Å umarski List 144(3/4): 119-127. [Studying the spectral signatures of oak, beech, silver fir, Norway spruce, *Viscum album* ssp. *abietis* and *Loranthus europaeus*.]
Andrada, A.R., de los Ángeles Páez, V. , Caro, M.S. and Kumar, P. 2019. Meiotic irregularities associated to cytomixis in *Buddleja iresinoides* (Griseb.) Hosseus. (Buddlejaceae) and *Castilleja arvensis* Schltdl. & Cham. (Orobanchaceae). Caryologia 72(4): 41-50. [Describing, and discussing, the occurrence of cytomixis in *C. arvensis* in the Northwest Region of Argentina.]
Anton, F.G. and Rîşnoveanu, L. 2019. Using sunflower wild species to improve resistance of cultivated species to the parasite broomrape (*Orobanche cumana* Wallr.). Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series 49(1): 16-19. [Evaluating 24 populations, derived from crosses of 4 wild *Helianthus* species with cultivated sunflower. Resistant interspecific populations were derived from crosses with the annual species *Helianthus debilis* and the perennial species *H. maximiliani*. Tests of these interspecific populations indicate the possibility to obtain sources of resistance to broomrape populations present in Romania.]
Aoki, K., Fujiwara, D. and Shimizu, K. 2019. (Connecting vine: an interspecific plant connection established by a stem parasitic plant *Cuscuta*.) (in Japanese) Japanese Journal of Ecology 69(2): 99-107. [Title only. No abstract available.]
Araújo, A.A.R., Lemos, R.N.S., Araújo, J.R.G., Silva, P.R.R., França, S.M., Corsato, C.D.A., Mondego, J.M. and Lopes, G.daS. 2019. Bioecology of *Anastrepha alveata* Stone (Diptera: Tephritidae) associated with wild plum fruits *Ximenia americana* L. (Olacaceae). Australian Journal of Crop Science 13(6): 1025-1030. [A detailed study of the fruit fly *A. alveata*, its mating behaviour, and its life cycle which is closely tied to the fruiting season of its main host *X. americana*.]
Asare, E.K., Avicor, S.W., Dogbatse, J.A. and Anyomi, E.W. 2019. Occurrence of mistletoes on shea trees in northern Ghana. African Crop Science Journal 27(4): 679-686. [Recording *Tapinanthus bangwensis* and *Agelanthus dodoneifolius* on shea butternut trees, *A. dodoneifolius* being the more dominant.]
*Aybeke, M. 2020. *Aspergillus alliaceus* infection fatally shifts *Orobanche* hormones and phenolic metabolism. Brazilian Journal of Microbiology. (https://doi.org/10.1007/s42770-020-00283-4) [Concluding that *A. alliaceus* infection reduces the effect of defence hormones (jasmonic acid, ABA and salicylic acid) leading to slow death of *Orobanche* (not specified in abstract).]
Baine, Q. and Looney, C. 2019. Plant associations for three sawfly species (Hymenoptera, Tenthredinidae) in the Pacific Northwest. Journal of Hymenoptera Research 74: 27-33. [Recording eggs of *Rhogogaster lateraria* on *Castilleja* sp., which has no previously recorded sawfly associations.]
Baltazár, T., Varga, I. and Pejchal, M. 2019. (Investigation of relationship between dendrometric variables of infected host trees by European mistletoe (*Viscum album* L.) with dependence of infection intensity.) (in

Hungarian) Erdészettudományi Közlemények 29(1/2): 69-85. [A study involving *Viscum album* on *Acer*, *Crataegus*, *Juglans*, *Robinia* and *Tilia* spp. Establishing that as the infection intensity increases, the relationship between the height and DBH decreases proportionally. However, the exact modelling of this relationship is more complicated, because the negative effect of mistletoe may differ within host species.]

*Banasiak, J., Borghi, L., Stec, N., Martinoia, E. and Jasiński, M. 2020. The full-size ABCG transporter of *Medicago truncatula* is involved in strigolactone secretion, affecting arbuscular mycorrhiza. Frontiers in Plant Science 11(February) (https://www.frontiersin.org/articles/10.3389/fpls.2020.00018/full) [Showing that a mutant *M. trunculata* with excess ABCG expression increases arbuscular mycorriza and germination of *Phelipanche ramosa.*]

Banerjee, A. 2020. Inter-plant communication via parasitic bridging. Journal of Experimental Botany 71(3): 749-750. [Commenting on the paper by Li ShaLan *et al.* – see below.]

Banerjee, A. and Stefanović, S. 2019. Caught in action: fine-scale plastome evolution in the parasitic plants of *Cuscuta* section *Ceratophorae* (Convolvulaceae). Plant Molecular Biology 100(6): 621-634. [Complete plastome sequences reveals exactly which genes have been lost and pseudogenized in members of this section. Three species, *C. boldinghii, C. erosa*, and *C. strobilacea*, have the smallest plastomes and are holoparasites.]

Bayé-Niwah, C., Hamawa, Y., Loura, B.B., Fawa, G. and Mapongmetsem, P.M. 2019. (Production of litter and supply of bioelements from four local fruit species of the high Guinean savannas of Cameroon.) (in French) Journal of Animal and Plant Sciences (JAPS) 42(1): 7162-7174. [*Ximenia americana* was the richest species in bio elements with 2378.12 mg/100 g of dry matter. *X. americana* and *Parkia biglobosa* were the richest species in nutrient with 666 mg/100 g and 354 mg/100 g of dry matter respectively. These results show that these species of fruit trees produce a fertilizing foliar litter and their integration in agro systems could contribute to soil restoration.]

Bellis, E.S. and 17 others. 2020. Genomics of sorghum local adaptation to a parasitic plant. Proceedings of the National Academy of Science 117(8): 4243-4251. [Exploring the variations in gene *LGS1* (low germination stimulant 1) and finding their frequency greater in sorghum populations subject to high intensity of infestation by *Striga hermonthica*. See also Press Reports above.]

Bilgili, E., Coskuner, K.A., Baysal, I., Ozturk, M., Usta, Y., Eroglu, M. and Norton, D. 2020. The distribution of pine mistletoe (*Viscum album* ssp. *austriacum*) in Scots pine (*Pinus sylvestris*) forests: from stand to tree level. Scandinavian Journal of Forest Research 35(1/2): 20-28. [Surveying the occurrence of *V. album* ssp. *austriacum* in Scots pine in the Eastern Black Sea Region of Turkey, showing 46% of trees to be infected. The life span of pine mistletoe was about 24 years and biomass distribution gradually increased from lower to upper part of the crowns.]

Bokov, D.O. and 13 others. 2020. *Lathraea squamaria* L. (Orobanchaceae): a review of its botany, phytochemistry, traditional uses and pharmacology. Pharmacognosy Journal 12(3): 667-673. [*L. squamaria* is apparently used in antitumoral, biligenic, infertility-treatment and diuretic drugs in Russia. A range of chemical components are identified, with possible roles in their therapeutic effects.]

Borkowski, J., Machlańska, A., Dyki, B., Kowalczyk, W. and Felczyńska, A. 2018. (The influence of branched broomrape on growth and yielding of tomato 'Growdena F_1'.) (in Polish) Zeszyty Naukowe Instytutu Ogrodnictwa 26: 119-126. [An inconclusive study as the control plants (in pots) were affected by blossom-end rot.]

Brown, M.R., Frachon, N., Wong, E.L.Y., Metherell, C. and Twyford, A.D. 2020. Life history evolution, species differences, and phenotypic plasticity in hemiparasitic eyebrights (*Euphrasia*). American Journal of Botany 107(3): 456-465. [Describing the phenotypic variation and plasticity exhibited by *Euphrasia* species depending on host and environment, leading to the blurring of species differences and suggesting rapid evolution within the genus.]

Bunsick, M., and 11 others. 2020. *SMAX1*-dependent seed germination bypasses GA signalling in *Arabidopsis* and *Striga*. Nature Plants 6, 646–652. (https://www.nature.com/articles/s41477-020-0653-z) [GA acts as the dominant hormone for stimulation of non-parasitic plants by inhibiting a set of DELLA repressors. In parasitic plants strigolactone receptors circumvent the GA requirement. The receptors co-opt and enhance signalling through the

HYPOSENSITIVE TO LIGHT/KARRIKIN INSENSITIVE 2 (AtHTL/KAI2) pathway, which normally plays only a rudimentary role in *Arabidopsis* seed germination. tHTL/KAI2 negatively controls the SUPPRESSOR OF MAX2 1 (SMAX1) protein, and loss of *SMAX1* function allows germination in the presence of DELLA repressors. The data suggest that ligand-dependent inactivation of SMAX1 in *Striga* and *Arabidopsis* can bypass GA-dependent germination in these species.]

Bürger, M. and Chory, J. 2020. The many models of strigolactone signaling. Trends in Plant Science 25(4): 395-405. [Reviewing recent developments in the strigolactone field and the crystal structures that gave rise to various models of receptor activation. Also highlighting the increasing number of discovered molecules with activity in varying contexts.]

CAB International, Wallingford, UK. 2019. Managing *Striga* weed poster. Miscellaneous Leaflet, CABI, 1p. [Illustrating *S. hermonthica*, describing how it is spread, by wind, rain water, implements and contaminated crop seed; and how it may be controlled, by rotation, intercropping with legumes and using herbicide-resistant varieties Longe 7H-IR, NARO Maize 58-IR, NARO Maize 59-IR and NARO Maize 60-IR in combination with herbicide. Also by preventing seeding.]

Canelón, D.S., Niño, S.M., Dorr, L.J. and Caraballo-Ortiz, M.A. 2020. Two new species of *Dendrophthora* (Viscaceae) from the Venezuelan Andes. PhytoKeys 140: 1-10. [*D. apiculata* and *D. coronata* are described. Confined to subpáramo and páramo ecosystems of the Venezuelan Andes, they are at present, only known from Guaramacal National Park. Ecological aspects and possible taxonomic affinities are discussed.]

*Cao Bo and 11 others. 2020. Wetlands rise and fall: six endangered wetland species showed different patterns of habitat shift under future climate change. Science of the Total Environment 731(20 August 2020): 138518. (https://www.sciencedirect.com/science/article/pii/S0048969720320313?via%3Dihub) [Including predictions of the effects of climate change on the distribution of *Pedicularis longiflora* in China.]

Chedadi, T., Idrissi, O., Haddioui, A. and Elhansali, M. 2019. Evaluation of the spread of *Orobanche crenata* in carrot (*Daucus carota* L.). Indian Journal of Ecology 46(4): 792-795. [Noting a serious increase in infestation of carrot by *O. crenata* in carrots in Morocco to the extent of 80% of fields being infested with densities up to 110/m^2.]

Chen Jie, Ma YongQing, Guo ZhenGuo and Xue QuanHong. 2019. (Effect of *Penicillium griseofulvum* on control of *Orobanche aegyptiaca* and microorganisms in rhizosphere soils of tomato.) (in Chinese) Zhongguo Shengtai Nongye Xuebao / Chinese Journal of Eco-Agriculture 27(5): 766-773. [Results suggest that a cell-free extract of *P. griseofulvum* inhibited growth of *O. aegyptiaca* and full inoculum applied in pot experiments reduced parasite infestation by 76% and increased tomato fruit yield by 50%.]

*Chen Jie, Xue QuanHong, Ma YongQing, Chen LianFang and Tan XinYu. 2020. *Streptomyces pactum* may control *Phelipanche aegyptiaca* in tomato. Applied Soil Ecology 146: pp.103369. (https://www.sciencedirect.com/science/article/abs/pii/S0929139319302185?via%3Dihub) [From 88 actinobacterial strains, assayed for their effects on germination of *P. aegyptiaca* seeds, *Streptomyces pactum* Act12 was selected for detailed laboratory, greenhouse and field studies. A cell-free culture filtrate inhibited seed germination and germ tube elongation of *P. aegyptiaca* by 94% and 97%, respectively. In potted plants *S. pactum* reduced *P. aegyptiaca* emergence and dry weight by 86% and 55%, respectively and increased tomato biomass. In the field it decreased *P. aegyptiaca* emergence by 32% and increased tomato fruit yield by 57%.]

*Chen JingFang, Yu RunXian, Dai JinHong, Liu Ying and Zhou RenChao. 2020. The loss of photosynthesis pathway and genomic locations of the lost plastid genes in a holoparasitic plant *Aeginetia indica*. BMC Plant Biology 20(199): (https://bmcplantbiol.biomedcentral.com/articles/10.1186/s12870-020-02415-2) [The study suggests the loss of photosynthesis-related functions in *A. indica* in both the nuclear and plastid genomes. The lost plastid genes are transferred into its nuclear and/or mitochondrial genomes, and exist in very small fragments with no expression and are thus non-functional. The *A. indica* plastome also provides a resource for comparative studies on the repeated evolution of holoparasitism in Orobanchaceae.]

*Chen LanLan, Zhu ZaiBiao, Guo QiaoSheng, Guo Jun, Huang ZhiGang, Shi YongTao and Wen ZhenCui. 2020. Effects of one haustorium-inducing quinone DMBQ on growth and development of root hemiparasitic plant *Monochasma savatieri*. Ciência Rural 50(3): (https://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-84782020000300202&tlng=en) [Showing that DMBQ increased haustorium formation in *M. savaitieri* in the absence of a host; also increased density of planting. Of interest for the cultivation of this species as a traditional medicine in China.]

*Chesterfield R.J., Whitfield, J.H., Pouvreau, B., Da Cao, Beveridge, C.A. and Vickers C.E. 2020. Rational design of novel fluorescent enzyme biosensors for direct detection of strigolactones, BioRxiv (https://doi.org/10.1101/2020.03.10.986562) [[Development of fluorescent biosensors for detection of strigolactones in high-throughput screening analyses]

*Choi InSu, Schwarz, E.N., Ruhlman, T.A., Khiyami, M.A., Sabir, J.S.M., Hajarah, N.H., Sabir, M.J., Rabah, S.O. and Jansen, R.K. 2019. Fluctuations in Fabaceae mitochondrial genome size and content are both ancient and recent. BMC Plant Biology 19: 448. (https://doi.org/10.1186/s12870-019-2064-8) [An exhaustive analysis of Fabaceae mitogenomes providing further insight into horizontal gene transfer between Caesalpinioideae hosts and the hemiparasitic *Lophophytum* (Balanophoraceae)]

*Clarke, C.R., So-Yon Park. Tuosto, R., Xiaoyan Jia, Yoder, A., Van Mullekom, J. and Westwood, J. 2020. Multiple immunity-related genes control susceptibility of *Arabidopsis thaliana* to the parasitic weed *Phelipanche aegyptiaca***.** Peer Journal 8(5423): e9268. (https://peerj.com/articles/9268/) [In a study of 46 mutant lines of *A. thaliana*, host plants with mutations in genes involved in jasmonic acid biosynthesis/signaling or the negative regulation of plant immunity were less susceptible to *P. aegyptiaca* parasitization. In contrast, *A. thaliana* plants with a mutant allele of the putative immunity hub gene *Pfd6* were more susceptible to parasitization. While most tested *A. thaliana* lines were fully susceptible to *P. aegyptiaca* parasitization, this work revealed several host genes essential for full susceptibility or resistance to parasitism.]

Dafaallah, A.B., Babiker, A.E.T. and Hamad Elneel, A.H. 2019. Variability and host specificity of *Striga hermonthica* in response to in situ root exudates of *Pennisetum glaucum*. Tunisian Journal of Plant Protection 14(1): 83-92. [Comparing the response of 15 collections of *S. hermonthica,* from sorghum and millet, to exudates from millet, and finding a clear indication of specificity.]

Danil, S, Pacureanu-Joiţa, M., Anton, F.G. and Dan, M. 2019. Sunflower hybrids with resistance at sulfonilureea herbicide and at imidazolinone herbicide created at NARDI Fundulea. Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series 49(1): 138-142. [Cataloguing the sunflower hybrids developed and released by NARDI Fundulea in Romania, FD15CL44, FD16CL50 and FD18CL58, resistant to imidazoline herbicide, and FD15E27 and FD18E41, resistant to sulfonilurea herbicides, listing their oil content period to maturity, ideal planting density, and range of *O. cumana* races to which they are resistant.]

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

Das, T.K., Ghosh, S., Gupta, K., Sen, S., Behera, B. and Raj, R. 2020. The weed *Orobanche*: species distribution, diversity, biology and management. Journal of research in Weed Science 3(2): 162-180. [A general review with emphasis on India.]

*de Saint Germain, A., Jacobs, A. and 15 others. 2020. A *Phelipanche ramosa* KAI2 protein perceives enzymatically strigolactones and isothiocyanates. bioRxiv June 2020; preprint (10.1101/2020.06.09.136473) [Identifying five putative SL receptors in *P. ramosa*, of which PrKAI2d3 is involved in seed germination stimulation. PrKAI2d3 enzymatic activity confers hypersensitivity to strigolactones. Additionally, demonstrating that methylbutenolide-OH binds PrKAI2d3 and stimulates *P. ramosa* germination with a bioactivity comparable to that of ITCs. All suggesting that *P. ramosa* has extended its signal perception system during evolution, a fact to be considered in the development of specific and efficient bio-control methods.]

*Dejene, T., Agamy, M.S., Agúndez, D. and Martin-Pinto, P. 2020. Ethnobotanical survey of wild edible fruit tree species in lowland areas of Ethiopia. Forests 11(2): (https://www.mdpi.com/1999-4907/11/2/177) [Including reference to the use of the roots of *Ximenia americana* as a food.]

Delavault, P. 2020. Are root parasitic plants like any other plant pathogens? New Phytologist 226(3): 641-643. (https://doi.org/10.1111/nph.16504) [A detailed commentary on the article by Su *et al.* (see below), emphasising how that study demonstrates clear parallels between parasitic plants and other plant pathogens and the ways in which they can evolve to overcome resistance.]

Đokić, D., Stanisavljević, R., Terzić, D., Milenković, J., Jevtić, G., Štrbanović, R. and Koprivica, R. 2019. The influence of different purity of natural alfalfa seeds on the processing efficiency. AGROFOR International Journal 4(2): 5-11. [Unspecified *Cuscuta* sp. seeds were found in 8 of 10 samples of alfalfa seed in Serbia. Treatment by mixing with Nutra Fine RS steel powder and passing through a magnetic separator serves to eliminate *Cuscuta* seed from the alfalfa.]

Domina, G., Scafidi, F. and Gargano, M.L. 2018. Typification of the name *Orobanche ebuli* Huter & Rigo (Orobanchaceae) and its taxonomic implications. Phytotaxa 344(2): 198-200. [*Orobanche ebuli* is an Italian endemic, exclusive to Lazio and Abruzzo. It grows on the edge of beech woods at 1200-1300 m, host *Sambucus ebulus*. 'This name, as far as we are aware, is not yet typified.']

Dor, E., Plakhine, D., Joel D.M. and Larose, H. 2020. A new race of sunflower broomrape (*Orobanche cumana*) with a wider host range due to changes in seed response to strigolactones. Weed Science 68(2): 132-142. [Identifying a new race of *O. cumana* with ability to attack tomato and tobacco as well as sunflower, being able to respond to strigolactones and dehydrocostus lactone while most *O. cumana* only responds to the latter and *O. cernua* only to strigolactones. It is 'currently spreading and posing a threat to processing tomato in Israel'.]

El-Fatah, B.E.S.A. and Nassef, D.M.T. 2020. Inheritance of faba bean resistance to broomrape, genetic diversity and QTL mapping analysis. Molecular Biology Reports 47(1): 11-32. [Six faba bean parents and their F_1 and F_2 generations were used to study the genetic system controlling resistance of faba bean (*Vicia faba* L.) to *Orobanche crenata*. The population $P_5 \times P_6$ (Assiut 125 × Romy 12) gave the highest value of relative yield and tolerance index.]

*Emran, S., Nawade, B., Yahyaa, M., Abu Nassar, J., Tholl, D., Eizenberg, H. and Ibdah, M. 2020. Broomrape infestation in carrot (*Daucus carota*): changes in carotenoid gene expression and carotenoid accumulation in the parasitic weed *Phelipanche aegyptiaca* and its host. Scientific Reports 10: 324. (https://doi.org/10.1038/s41598-019-57298-7) [Decrease in carotenoid levels of the different carrot cultivars when parasitized by *Phelipanche aegyptiaca* and accumulation of different carotenoids in parasite tubers]

*Ennami, M., Mbasani-Mansi, J., Briache, F.Z., Oussible, N., Gaboun, F., Ghaouti, L., Belqadi, L., Ghanem, M.E., Aberkani, K., Westwood, J. and Mentag, R. 2020. Growth-defense tradeoffs and source-sink relationship during both faba bean and lentil interactions with *Orobanche crenata* Forsk. Crop Protection 127: pp.104924. (https://www.sciencedirect.com/science/article/pii/S0261219419302704) [During the first stage of infection, reductions in host biomass were observed on susceptible and resistant faba bean cultivars (54 and 27%, respectively for Lobab and Misr 3) and on susceptible lentil cultivar (Zaaria). Considering biomass partitioning over the various host parts, *O. crenata* parasitism on susceptible faba bean and lentil cultivars greatly increased host root dry mater, but delayed and reduced host reproduction. Source-sink relationships explained the dry weight diversion from host to parasite during the last phases of the interaction.]

Esquivel, J., Park ByungBae, Casanoves, F., Delgado, D., Park GoEun and Finegan, B. 2020. Altitude and species identity drive leaf litter decomposition rates of ten species on a 2950 m altitudinal gradient in Neotropical rain forests. Biotropica 52(1): 11-21. [Identifying *Minquartia guianensis* among the slower decomposing species in the forest of Costa Rica.]

Expósito, A.B., Siverio, A., Bermejo, L.A. and Sobrino-Vesperinas, E. 2018. Checklist of alien plant species in a Natural Protected Area: Anaga Rural Park (Tenerife, Canary Islands); effect of human infrastructures on their abundance. Plant Ecology and Evolution 151(12): 142-152. [*Cuscuta campestris* among 216 alien species posing threats to the endemic flora.]

Fadini, S.R.M.C., Barbosa, R.I., Rode, R., Corrêa, V. and Fadini, R.F. 2020. Above-ground biomass estimation for a shrubby mistletoe in an Amazonian savanna. Journal of Tropical Ecology 36(1): 6-12. [The biomass of

Psittacanthus plagiophyllus constituted less than 0.15% (0.5-22 kg ha^{-1}) of the total above-ground biomass, suggesting that this life-form is irrelevant to the local biomass stock despite its unequivocal biological importance.]

*Ferrenberg, S. 2020. Dwarf mistletoe infection interacts with tree growth rate to produce opposing direct and indirect effects on resin duct defenses in lodgepole pine. Forests 11(2): (https://www.mdpi.com/1999-4907/11/2/222) [A study aiming to disentangle the influences of tree age, growth rate, and *Arceuthobium americanum* infection on resin duct defences in lodgepole pine, *Pinus contorta,* concluding that there was an increase in resin duct formation only partially offset by the negative effect of the mistletoe on overall growth. And discussing the potential influence of this on susceptibility to natural enemies.]

Flores-Sánchez, I.J. and Garza-Ortiz, A. 2019. Is there a secondary/specialized metabolism in the genus *Cuscuta* and which is the role of the host plant? Phytochemistry Reviews 18(5): 1299-1335. ['This review attempts to discuss the host plants' influence on the phytochemistry and pharmacology of parasitic plants like *Cuscuta,* from the evidence that has been published until recent years in specialized literature'. Not altogether clear how successful that attempt has been.]

Francisco-Gutiérrez, A., Castillo-Campos, G. and García-Franco, J.G. 2018. A new rare species of *Agalinis* (Orobanchaceae) from the coast of Veracruz, México. Phytotaxa 349(3): 265-272. [A new species of *Agalinis* is described, illustrated (but not named?) and compared with *A. flexicaulis*, *A. harperi*, *A. maritima* var. *grandiflora*, and *A. peduncularis*. The new taxon was found in a single locality on the northern coast of Veracruz, Mexico, near to a mangrove-swamp.]

Fujii, S. 2019. (An examination of confidence in open data of specimens: *Cuscuta australis* (Convolvulaceae).) (in Japanese) Japanese Journal of Ecology 69(2) 127-131. [Title only. No English summary.]

Gholamreza Mohammad. 2019. Can soil microorganisms reduce broomrape (*Orobanche* spp.) infestation in cropping systems? In: Kumar V., Prasad R., Kumar M. and Choudhary D. (eds) Microbiome in Plant Health and Disease. Springer, Singapore. pp. 385-402. (https://link.springer.com/chapter/10.1007%2F978-981-13-8495-0_17) [A review.]

Gholizadeh, R. and Hemmati, R. 2019. Occurrence and pathogenicity of some fungal species on broomrape**.** Iranian Journal of Plant Pathology 55(1): Fa83-Fa86. [46 fungal isolates from unhealthy *Phelipanche ramosa* were studied. These included *Aspergillus ochraceus* and *F. fujikuroi* recorded for the first time on broomrape. Also *Macrophomina phaseolina*, *F. acuminatum* and *F. equiseti* for the first time in Iran. *F. acuminatum*, *F. fujikuroi* and *F .proliferatum* caused the most disease severity on tubercles.]

Gulwaiz Akhter and Khan, T.A. 2020. Survey of parasitic weeds (*Orobanche* spp.) associated with brinjal (*Solanum melongena*) in Banda District of Uttar Pradesh India. Pakistan Journal of Weed Science Research 26(1): 93-101. [The brinjal crop in Banda district is most commonly infested with *Phelipanche aegyptiaca*, followed by *Orobanche cernua* and lastly *P. ramosa.* Noting the risk of spread and the lack of effective management programmes.]

Guo AnMin, Li YuHuic, Wang JunGang and Liu ChengJiang. 2019. (Study on fermentation technology of fresh *Cistanche tubulosa* wine.) (in Chinese) Food Research and Development 40(20): 59-64. [Precise recipe for production of 'typical high-quality *Cistanche tubulosa* low-grade wine.'!]

Guzmán-Guzmán, S. 2019. A new species of *Ombrophytum* (Balanophoraceae), a genus not previously recorded for Colombia. Phytotaxa 424(1): 61-66. [A detailed description of *O. villamariensis* from the Central Cordillera, in Andina region of Colombia.]

Haan, N.L., Bakker, J.D., Dunwiddie, P.W. and Linders, M.J. 2018. Instar-specific effects of host plants on survival of endangered butterfly larvae. Ecological Entomology 43(6): 742-753. [Survival of *Euphydryas editha* ssp. *taylori* (Taylor's checkerspot) was lower on *Castilleja levisecta* and *C. hispida* than on *Plantago lanceolata.*]

*Hamad, M.A., Babiker, A.G.T. and Mohamed Osman A.A. 2019. *Striga* resistance/tolerance in sorghum: an outcome of interactive intrinsic and extrinsic factors. Journal of Agricultural and Veterinary Sciences 20(1): (http://repository.sustech.edu/handle/123456789/23348) [A project to transfer *Striga* resistance genes from the donor parents, IS9830, 555, SAR33, Framida, N13, ICSV006, ICSV007, PQ-34, Brhan and SRN39, and its derivatives P401, P402 and P405, to the improved elite Sudanese sorghum

cultivars, Wad Ahmed, Tabat, Butana and Arfagadamek-8 as recurrent parents. Resistance to *S. hermonthica* in the crosses varied from 12% to 89%.]

*Hamad, M.A., Babiker, A.G.T. and Mohamed Osman A.A. 2019. Yield adaptability and stability of grain sorghum crosses across environments under *S. hermonthica* infestation in Sudan. Journal of Agricultural and Veterinary Sciences 20(2): (http://repository.sustech.edu/handle/123456789/24358) [Studying the genetic x environment interaction in a range of crosses. Based on Additive Main Effect and Multiplicative Interaction (AMMI) analysis the crosses Framida x AG-8, PQ-34 x BU, ICSV006 x BU, ICSV007 x BU, SAR33 x BU, SAR33 x TA, P402 x TA, PQ-34 x WA, P405 x WA, P401 x WA, Framida x WA, SAR33 x WA and Brhan x WA were identified as the most stable, endowed with *S. hermonthica* resistance and/or tolerance and high grain yield (1139-1548 kg ha-1).]

Hayat, S.A., Farrukh Hussain, Zhu HaiFeng and Fayaz Asad. 2019. Floristic composition and ecological characteristics of plants of Tehsil Razar, Swabi District, Pakistan. Silva Balcanica 20(2): 95-108. [Recording *Cuscuta reflexa*.]

*Imarhiagbe, O. and Aigbokhan, E. I. 2019. Studies on *Thonningia sanguinea* Vahl. (Balanophoraceae) in Southern Nigeria. Range and host preference. International Journal of Conservation Science 10(4): 721-732. [A paper based on the senior author's PhD thesis – see Haustorium 73 – recording the hosts of *T. sanguinea* which include the native *Guarea cedrata, Lophira alata*, *Musanga cecropiodes*, *Myrianthus arboreu* and *Ricinodendron heudelotii*, and the introduced rubber and cacao. *L. alata* was the most susceptible host, while *M. cecropiodes* had the highest percentage occurrence with 32%. This species is currently 'Not Evaluated' by IUCN, but conservation is recommended.]

*Inayat-ur-Rahman and 12 others. 2020. Response of plant physiological attributes to altitudinal gradient: plant adaptation to temperature variation in the Himalayan region. Science of the Total Environment 706: pp.135714. (https://www.sciencedirect.com/science/article/pii/S0048969719357092?via%3Dihub) [Including study of response of *Pedicularis punctata* to altitude and hence cold stress.]

***Jamil, M., Kountche, B.A., Jian You Wang, Haidar, I., Kun-Peng Jia, Takahashi, I., Ota, T., Asami, T. and Al-Babili, S. 2020. A new series of carlactonoic acid based strigolactone analogs for fundamental and applied research. 2020. Frontiers in Plant Science: 15 April 2020. (https://doi.org/10.3389/fpls.2020.00434) [Describing the development and characterisation of a new series of easy-to-synthesise methyl phenolactones which resemble the non-canonical strigolactone carlactonoic acid. Some show higher activity than GR-24 in triggering germination of parasitic weeds and offer potential for control of *Striga hermonthica.*]**

Jiang Di, Ma Rui, Li JiaLiang, Mao QiYun, Miao Ning and Mao KangShan. 2019. Characterization of the complete chloroplast genome of *Scurrula parasitica*. Mitochondrial DNA Part B 4(1): 247-248. [The genome contains 106 genes, including 66 protein-coding genes, 28 tRNA genes, 8 ribosomal RNA genes and 4 pseudogenes. Phylogenetic analysis revealed that *S. parasitica* is closely related to *Taxillus* (3 spp.), with strong support values.]

*Jost, M., Naumann, J., Rocamundi, N., Cocucci, A.A. and Wanke, S. 2020. The first plastid genome of the holoparasitic genus *Prosopanche* (Hydnoraceae). Plants 9(3): (https://www.mdpi.com/2223-7747/9/3/306) [First report of plastid genome of the holoparasitic *Prosopanche*, showing clear signs of functionality. Evolutionary hypotheses are further discussed in the paper.]

*Julio, E., Malpica, A., Cotucheau, J., Bachet, S., Volpatti, R., Decorps, C. and de Borne, F.D. 2020. RNA-Seq analysis of *Orobanche* resistance in *Nicotiana tabacum*: development of molecular markers for breeding recessive tolerance from 'Wika' tobacco variety. Euphytica 216(1): pp.6. (https://link.springer.com/article/10.1007%2Fs10681-019-2544-9) [The tobacco variety 'Wika' induces lower or delayed germination of *Phelipanche ramosa* seeds, thanks to a single recessive gene. An F2 population segregating for 'Wika' recessive tolerance was then used for marker validation and mapping. All candidates were situated on chromosome 14. Other potential tolerant lines were then identified and markers for conventional gel electrophoresis are now available facilitating the transfer of 'Wika' recessive tolerance into elite lines.]

*Kaga, Y., Yokoyama, R., Sano, R., Ohtani, M., Demura, T., Kuroha, T., Shinohara, N. and

Nishitani, K. 2020. Interspecific signaling between the parasitic plant and the host plants regulate xylem vessel cell differentiation in haustoria of *Cuscuta campestris*. Frontiers in Plant Science 11(March): (https://www.frontiersin.org/articles/10.3389/fpls.2020.00193/full) [Findings suggest the involvement of host-derived signals in the regulation of non-autonomous xylem vessel differentiation in *C. campestris* and suggest that its connection to the *Arabidopsis* host xylem during haustorium development activates a set of key genes for differentiation into xylem vessel cells.]

Kalinova, S., Marinov-Serafimov, P., Golubinova, I. and Encheva, V. 2020. Allelopathic effect of sunflower broomrape (*Orobanche cumana* Wallr.) on the development of sunflower (*Helianthus annuus* L.). Bulgarian Journal of Agricultural Science 26(1): 132-140. [Describing the apparent allelopathic effect of a range of *O. cumana* samples on germination of sunflower.]

*Kamara, A.Y., Menkir, A., Chikoye, D., Solomon, R., Tofa, A.I. and Omoigui, L.O. 2020. Seed dressing maize with imazapyr to control *Striga hermonthica* in farmers' fields in the savannas of Nigeria. Agriculture 10(3): (https://www.mdpi.com/2077-0472/10/3/83) [Reporting the results of trials from 2014/2015 in which seed dressings on herbicide-resistant hybrid and open-pollinated maize with imazapyr + pyrithiobac substantially reduced emergence of *S. hermonthica* but failed to give consistent increases in yield.]

Kaplan, Z. and 11 others. 2019. Distributions of vascular plants in the Czech Republic. Part 8. Preslia 91(4): 257-368. [Noting that *Orobanche artemisiae-campestris*, *O. coerulescens*, *Phelipanche arenaria* and *P. caesia* have declined in distribution in the Czech Republic, and *O. teucrii* has been reduced to a single site, while *O. minor* is present as an alien species.]

Karlík, P. and Poschlod, P. 2019. Identifying plant and environmental indicators of ancient and recent calcareous grasslands. Ecological Indicators 104: 405-421. [Comparing recent and ancient grasslands in Central Europe and identifying the few species which can distinguish them, Noting that *Melampyrum arvense* is mostly a relic of cultivation in recent grassland.]

*Kassie, Mengistu. 2019. An ex-ante impact assessment of *Striga* control technology for sorghum production in Ethiopia. MSc, Kansas State University. Advisor: Timothy John Dalton. (http://hdl.handle.net/2097/39591) [Showing that the impact of *Striga* control technology (regrettably not specified in the abstract!) on farmer's welfare in ten different scenarios. In all the ten scenarios, producers will have a negative surplus even though the *Striga* control technology is assumed to increase sorghum production by 65%. However, the consumer surplus is positive. Since sorghum producers are also consumers, the net benefit of adopting the new technology is positive. Confusing?]

Kirilova, I., Hristeva, T. and Denev, I. 2019. Identification of seeds of *Phelipanche ramosa*, *Phelipanche mutelii* and *Orobanche cumana* in the soils from different agricultural regions in Bulgaria by molecular markers. Biotechnology & Biotechnological Equipment 33(1): 520-528. [56 soil samples were assayed using PCR-based assay for detection of broomrape seeds with methods to distinguish species based on nuclear ITS sequences. 22 contained *O. cumana* and 6 contained *P. ramosa.* The analyses surprisingly revealed that the isolated sequences from supposedly *P. mutelii* seeds diverge from those annotated by other authors on 16 different nucleotide positions and were almost identical with *P. rosmarina*. It is hypothesized that *P. mutelii*/*P. rosmarina* populations are in a period of active expansion]

*Kosonen, Juho Aleksi. 2019. Structure activity investigations of XTH inhibitors. MSc, Universitetet i Tromsø. Advisor: Tore Lejon. http://hdl.handle.net/10037/16067) [XTHs regulate xyloglucan cross-linking in cell walls and play an essential role in regulation of plant growth. It is thought that XTHs play an integral role in the way the parasitic vine plant *Cuscuta* is able to penetrate host plant cell walls. Another study to synthesise analogues of the triphenylmethyl food colorant Brilliant Blue R250 with increased activity – see Petersen, 2019 below.]

Kuijt, J. and Delprete, P.G. 2019**.** A new species of *Ombrophytum* (Balanophoraceae) from Chile, with notes on subterranean organs and vegetative reproduction in the family. Phytotaxa 420(4): 264-272. [Describing *O. chilensis* from the Chilean desert, closely related to *O. subterraneum.* Including critical comments on the underground organs and reproduction in Neotropical Balanophoraceae.]

Kumar, T.G.A. and Mathew, L. 2020. A short survey for new hosts of *Helicanthes elastica*

(Desr.) Danser and its morphological diversity on selected hosts. Indian Forester 146(2): 143-147. [Noting that *H. elastica* (Loranthaceae) occurs on a wide range of hosts including some gymnosperms (un-specified in abstract). Its host selection is influenced by bark characteristics and peripheral tissue system of hosts. The host may also influence the spreading of epicortical runners, branching of haustoria and their penetration into the host.]

Lamilla, L.A., Robayo, C.A., Castaño, F., Marquínez, X. and Raz, L. 2020. Floral anatomy of *Tristerix longebracteatus* (Loranthaceae). Revista de Biología Tropical 68(1): 87-97. ['The gynoecium with a single ovarian cavity and central mamelon is a condition shared by *Tristerix* (subtribe Ligarinae) and all the genera of the subtribe *Psittacanthinae*, except *Tripodanthus*. The base of the style forms a nectary similar to that found in the sister genus *Ligaria*. This type of stylar nectary is of taxonomic value for grouping species of the subtribe Ligarinae and differs from the annular nectary of subtribe Psittacanthinae.']

*Lati, R.N., Filin, S., Elnashef, B. and Eizenberg, H. 2019. 3-D image-driven morphological crop analysis: a novel method for detection of sunflower broomrape initial subsoil parasitism. Sensors 19(7): pp.1569. (https://www.mdpi.com/.../pdf) [Using effects on height of the host and length of first internode to indicate early infection of sunflower by *Orobanche cumana* and hence time to apply herbicide.]

Le Ngoc Han, Tran The Bach, Bui Hong Quang, Do Van Hai, Bui Thu Ha, Averyanov, L.V. and Nuraliev, M.S. 2019. Taxonomic notes on *Tolypanthus* and *Taxillus* (Loranthaceae) in Vietnam, including lectotypifications and new national records. Phytotaxa 424(3): 167-176. [New records for the mistletoe flora of Vietnam, with detailed descriptions and illustrations.]

*Lech, P., Żółciak, A. and Hildebrand, R. 2020**.** Occurrence of European mistletoe (*Viscum album* L.) on forest trees in Poland and its dynamics of spread in the period 2008-2018. Forests 11(1): pp.83. (https://www.mdpi.com/1999-4907/11/1/83) [Noting that *V. album* has become an important agent of damage to forest trees in Central Europe. Reporting on 10 years of surveys, finding infestation worst on silver fir and Scots pine, much less often on birches and deciduous admixture species. Common beech, pedunculate, and sessile oaks, as well as coniferous admixture species, were found to be free from the parasite.]

Lee, D.C., Powell, V.J. and Lindsell, J.A. 2019. Understanding landscape and plot-scale habitat utilisation by Malayan sun bear (*Helarctos malayanus*) in degraded lowland forest. Acta Oecologica 96: 1-9. [Noting the importance of Olacaceae (unspecified in abstract) as a food source for the endangered *H. malayensis*.]

Letemariam Desta, Ibrahim Fitiw, Alemu Araya and Dawit Fisseha. 2020. Chlorsulfuron and nitrogen rates effect on striga and sorghum varieties yield at Humera, North West Ethiopia. International Journal of Agriculture and Biosciences 9(2): 74-82. [Providing results of an elaborate split plot experiment involving 4 levels of N, 4 levels of herbicide and 3 sorghum varieties. Yields were highest with var. Deber, treated with chlorsulfuron at rates of 10-20 g/ha and with added N at 23 kg/ha. *Striga hermonthica* numbers were least on the relatively resistant variety Brihan, but yields were lower with this local variety as also with var. wediaker. An integrated approach was best for control of *Striga* and for optimum yield, using N fertilizer, herbicide, and variety.]

*Li JuanJuan, Liu Hui, Yang Chong, Wang Jian, Yan GuiJun, Si Ping, Bai QuanJiang, Lu ZhanYuan, Zhou WeiJun and Xu Ling. 2020. Genome-wide identification of *MYB* genes and expression analysis under different biotic and abiotic stresses in *Helianthus annuus* L. Industrial Crops and Products 143: pp.111924. (https://www.sciencedirect.com/science/article/pii/S0926669019309343) [Identification and characterization of myeloblastosis genes in sunflower indicate their involvement with abiotic and biotic stresses, possibly including responses to infestation by *Orobanche cumana*.]

Li ManRu and Zhang Ling. 2019. (Reproductive phenological characteristics and impact factors of *Macrosolen cochinchinensis* in Xishuangbanna.) (in Chinese) Guangxi Zhiwu / Guihaia 39(9): 1252-1260. [Finding that the flowering period of *M. cochinchinensis* and its host *Schima superba* were closely correlated and overlapped in time. In light of other findings it is concluded that 'the reproductive phenological characteristics of mistletoe species may be influenced by many factors, and it is essential to consider comprehensively combination of multiple factors such as many biotic and abiotic factors to understand the reproductive phenological characteristics of those hemiparasite mistletoes in the ecosystem.']

Li ShaLan, Zhang JingXiong, Liu Hui, Liu Nian, Shen GuoJing, Zhuang HuiFu and Wu JianQiang. 2020. Dodder-transmitted mobile signals prime host plants for enhanced salt tolerance. Journal of Experimental Botany 71(3): 1171-1184. [Transcriptomic analysis indicated that 24 h after salt treatment of one cucumber, the transcriptome of another *Cuscuta*-connected cucumber largely resembled that of the salt-treated one, which showed reduced leaf withering and cell death in response to subsequent salt stress. Salt treatment of one of the cucumbers also induced physiological changes, including altered proline contents, stomatal conductance, and photosynthetic rates, in both of the dodder-connected cucumbers.]

Li WenJun, Guan KaiYun, Abduraimov, O. and Feng Ying. 202. *Pedicularis multicolor* (Orobanchaceae), a new replacement name for the *Pedicularis inconspicua*. Phytotaxa 437(2): 118-118. [Concluding that *P. inconspicua* is an invalid name for the plant described from Uzbekistan and correcting it to *P. multicolour.*]

Li YuanJie and Zhang Ling. 2019. (Preliminary studies on effects of host functional traits on host specificity of mistletoe species.) (in Chinese) Journal of Tropical and Subtropical Botany 27(2): 187-195. [Surveying the occurrence of mistletoes *Dendrophthoe pentandra, Scurrula chingii* var. *yunnanensis, S. chingii, Helixanthera parasitica, Macrosolen cochinchinensis, Viscum monoicum* and *V. ovalifolium* in monocultures of citrus, mango and *Pouteria australis* and in mixed forest in a Yunnan botanical garden. *D. pentandra* had the highest number of different hosts (258) while the *Viscum* spp. had only 4 or 5.]

Licona-Vera, Y., Ortiz-Rodriguez, A.E. Vásquez-Aguilar, A.A. and Ornelas, J.F. 2018. Lay mistletoes on the Yucatán Peninsula: post-glacial expansion and genetic differentiation of *Psittacanthus mayanus* (Loranthaceae). Botanical Journal of the Linnaean Society 186(3): 334-360. [Results from ecological niche modelling (ENM) and approximate Bayesian computation (ABC) highlight the influence of Pleistocene events in shaping the geographical distribution of genetic variation in Neotropical lowland forest. The phylogeographic and environmental patterns in *P. mayanus* provide an opportunity to investigate further the evolution of Mexican lowland forest biodiversity.]

Liu Nian and 10 others. 2020. Extensive inter-plant protein transfer between *Cuscuta* parasites and their host plants. Molecular Plant 13(4): 573-585. [More than 1500 proteins are shown to be transferred between *Cuscuta* and hosts *Arabidopsis* and soybean. Such an intensive protein traffic may play an important role in host-parasite interactions.]

Liu XiaoQing and 11 others. 2020. Diverse trajectories of plastome degradation in holoparasitic *Cistanche* and genomic location of the lost plastid genes. Journal of Experimental Botany 71(3): 877-892. [Assembling the complete plastomes of three *C. salsa*, *C. mongolica*, and *C. sinensis.* Compared to *Orobanche*, they some plastid-derived genes with diverse genomic locations.]

Lobachev, Y.V., Kudryashov, S.P., Kurasova, L.G. and Bandurina, Y.Y. 2020. (The source material for the selection of decorative sunflower.) (in Russian) Agrarnyy nauchnyy zhurnal 2020(4): 28-30. [Seven lines of decorative sunflowers derived from YuV-28B with different coloured leaves were assessed and all found to be resistant to local races of *Orobanche cumana* in SE Russia.]

Madany, M.M.Y., Obaid, W.A., Wael Hozien, AbdElgawad, H., Hamed, B.A. Saleh, A.M. 2020. Salicylic acid confers resistance against broomrape in tomato through modulation of C and N metabolism. Plant Physiology and Biochemistry 147: 322-335. [Concluding that salicylic acid-induced resistance against unspecified *Orobanche/Phelipanche* sp. relies on the rational utilization of C and N assimilates in a manner that disturbs the sink strength of the parasite and/or activates the defence pool of the host.]

Malagon, M.delP, Mendoza-Cifuentes, H., Gómez-Parra, S. and Uribe-Convers, S. 2019. *Neobartsia matuy* (Orobanchaceae), a new species from the Colombian Andes. Phytotaxa 424(2): 87-96. [Describing *N. matuy*, from the an elevation of c. 3500 m., belonging to section Orthocarpiflorae and morphologically characterized by floral bracts light green with glandular hairs, corolla yellowish green, the galea cucullate, longer than the lip, retrorsely glandular-puberulous, the lip three-lobed, glabrous and the corolla tube decurved.]

*Malaník, M., Daňková, I., Pokorná, M., Gazdová, M. and Šmejkal, K. 2019. Iridoid aglycones from the underground parts of

Lathraea squamaria. Biochemical Systematics and Ecology 86: pp.103928. (https://www.sciencedirect.com/science/article/pii/S0305197819302601) [Two epimeric pairs of iridoid aglycones isolated and their structures confirmed from *L. squamaria*. The chemophenetic significance and possible reasons for the occurrence of such iridoid aglycones in holoparasitic plants are discussed.]. [

Martignoni, M., Banfi, E. and Galasso, G. 2019. Vascular flora of Milan Malpensa airport (Lombardy, Italy). Part I: Checklist. Natural History Sciences 6(2): 3-10. [Including a record for *Euphrasia cisalpina*, an endemic to the Alps.]

Martinčová, M., Kaštier, P., Krasylenko, Y.A., Gajdoš, P., Čertík, M., Matušíková, I. and Blehová, A. 2019. Species-specific differences in architecture and chemical composition of dodder seeds. Flora (Jena) 256: 61-68. [Recording differences in the structure and chemical composition of the seeds of *Cuscuta europaea* and *C. monogyna* in Europe which may influence their germination behaviour.]

Matveeva, T.V. and Otten, L. 2019. Widespread occurrence of natural genetic transformation of plants by *Agrobacterium*. Plant Molecular Biology 101(4/5): 415-437. [Describing the role of *Agrobacterium* in the horizontal genetic transfer of bacterial DNA into 10% of over 200 dicot species including *Cuscuta*.]

Meng Sengm, Ma HaiBin, Wang ShengKun, Li ZhenShuang, Zhao Zhong and Lu JunKun. 2019. Cloning and the haustorium-inducing factor response analysis of *SaRbohA* gene in *Santalum album* Linn. (in Chinese) Acta Botanica Boreali-Occidentalia Sinica 39(12): 2132-2137. ['Tissue-specific expression analysis showed that the *SaRbohA* gene had low expression in stems, high expression in young leaves and apical buds, especially in roots of *S. album*. 2, 6-dimeth oxy-ρ-benzoquinoe (an important haustorium-inducing factor) can strongly induce the expression of *SaRbohA*. *SaRbohA* may play important roles in the development of ROS-mediated haustorium development and be induced by the chemical factor.']

*Menkir, A., Crossa, J., Meseka, S., Bossey, B., Muhyideen, O., Roberio, P.F., Coulibaly, M., Olaoye, G. and Haruna, A. 2020. Stacking tolerance to drought and resistance to a parasitic weed in tropical hybrid maize for enhancing resilience to stress combinations. Frontiers in Plant Science 2020: (https://doi.org/10.3389/fpls.2020.00166) [Describing a sequential selection scheme which offers an opportunity to accumulate desirable stress-related traits in parents contributing to superior agronomic performance in hybrids across *Striga hermonthica*- and drought-affected environments.]

Mounde, L.G., Anteyi, W.O. and Rasche, F. 2020. Tripartite interaction between *Striga* spp., cereals, and plant root-associated microorganisms: a review. CAB Reviews 15(005): 1-17. [Reviewing in detail the influence of *Striga* sp. on the growth of cereal crops and the possible contribution of plant growth regulating rhizobacteria in growth promotion of the host to strengthen its tolerance; and discussing necessary research towards the greater exploitation of these interactions.]

Mrema, E., Shimelis, H., Laing, M.and Mwadzingeni, L. 2020. Integrated management of *Striga hermonthica* and *S. asiatica* in sorghum: a review. Australian Journal of Crop Science 14(1): 36-45. [Reviewing the problems from *S. hermonthica* and *S. asiatica* in East Africa and discussing the available management options. Breeding sorghum for *Striga* resistance, and compatibility to *Fusarium oxysporum* f. sp. *strigae* are highlighted as key components of an integrated management strategy.].

*Mudereri, B.W., Abdel-Rahman, E. M., Dube, T., Landmann, T., Khan, Z., Kimathi, E., Owino, R, and Niassy, Saliou. 2020. Multi-source spatial data-based invasion risk modeling of Striga (*Striga asiatica*) in Zimbabwe, GIScience and Remote Sensing, DOI: 10.1080/15481603.2020.1744250 [Using vegetation phenology from remote sensing , bioclimatic and other variables to model the likelihood of *S. asiatica* infestations, and finding seasonal warmth and precipitation to most useful.]

Mudereri, B.W., Abdel-Rahman, E. M., Dube, T., Landmann, T. and Kimathi, E. 2019. Leveraging on the strength of remote sensing for climate-smart "Push-Pull" upscaling. In: 23rd Meeting and Conference of the African Association of Insect Scientists (AAIS), Abidjan, Côte d'Ivoire, 2019. [See previous item.]

*Mudereri, B.T., Dube, T., Niassy, S., Kimathi, E., Landmann, T., Khan, Z. and Abdel-Rahman, E.M. 2020. Is it possible to discern striga weed (*Striga hermonthica*) infestation levels in maize agro-ecological systems using *in-situ* spectroscopy? International Journal of Applied Earth Observation and Geoinformation 8: (https://www.sciencedirect.com/science/article/pii/S0303243419305689?via%3Dihub) [Using *in-situ* FieldSpec® Handheld 2™ analytical spectral device to discriminate among different levels of *S. hermonthica* infestations in maize fields in western Kenya. The 'random forest' algorithm was superior to others. Discussing many other details and results but concluding that there is potential for use of hyperspectral, resampled Sentinel-2 multispectral datasets and machine learning discriminant algorithms as a tool to accurately discern *Striga.*]

Nboyine, J.A., Boyer, S., Saville, D.J. and Wratten, S.D. 2019. Identifying plant DNA in the faeces of a generalist insect pest to inform trap cropping strategy. Agronomy for Sustainable Development 39(6): pp.57. [Using DNA to identify food plants of the New Zealand weta *Hemiandrus* sp. as a means to reduce its damage to crops. Species represented in the faeces included *Pedicularis* spp.]

*Nickrent, D.L. 2020. Parasitic angiosperms: How often and how many? Taxon (https://doi.org/10.1002/tax.12195) [Haustorial angiosperm parasites evolved 12 times resulting in over 290 genera and 4700 species. This comprehensive review summarizes the molecular phylogenetic information available for all 12 clades.]

Nickrent, D.L. 2020. *Gymnosiphon syceorosensis* (Burmanniaceae), the second new species for the Philippines. PhytoKeys 146: 71-87. [This new mycoheterotrophic plant is described from Mt. Hamiguitan on the island of Mindanao. Its morphology suggests an alliance with *G. affinis*.]

*Nie LiPing, Cui YingXian, Wu LiWei, Zhou JianGuo, Xu ZhiChao, Li YongHua, Li XiWen, Wang Yu and Yao Hui. 2019. Gene losses and variations in chloroplast genome of parasitic plant *Macrosolen* and phylogenetic relationships within Santalales. International Journal of Molecular Sciences 20(22): pp.5812. (https://www.mdpi.com/.../pdf) [In this study, the complete chloroplast genome sequences of *M. cochinchinensis*, *M. tricolor* and *M. bibracteolatus* are reported.]

Nyakurwa, C., Gasura, E., Setimela, P.S., Mabasa, S., Rugare, J.T. and Mutsvanga, S. 2018. Reaction of new quality protein maize genotypes to *Striga asiatica*. Crop Science 58(3): 1201-1218. [Five genotypes with good protein quality (MH1416, MQ623, SC643, SC527, and SC535) produced higher and more stable grain yields than most of the lower quality protein checks in *Striga*-infested fields in Zimbabwe.]

Ohlson, E.W. and Timko, M.P. 2020. Race structure of cowpea witchweed (*Striga gesnerioides*) in West Africa and its implications for *Striga* resistance breeding of cowpea. Weed Science 68(2): 125-133. [A study of the virulence of 58 populations of *S. gesnerioides* on 7 varieties of cowpea revealed 6 races of the parasite. No cowpea line was resistant to all; and none of the *S. gesnerioides* races was able to overcome the resistance of all 7 varieties. A novel race SG6 from Kudu, Nigeria, was found to overcome more cowpea resistance than any previously reported race. Proposing the need to stack multiple resistance genes.]

*Oliveira, L., Neumann, P. Tae-Soo Jang, Klemme, S., Schubert, V., Koblížková, A., Houben, A. and Macas, J. 2019. Mitotic spindle attachment to the holocentric chromosomes of *Cuscuta europaea* does not correlate with the distribution of CENH3 chromatin. Frontiers in Plant Science 2019: (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6992598/) [see Press Report above.]

*Olszewski, Magdalena. 2019. Diversity and evolution of seeds in *Cuscuta* (dodders, Convolvulaceae): morphology and structure. MSc, Wilfrid Laurier University, Ontario, Canada. Advisor: Dr. Mihai Costea (https://scholars.wlu.ca/etd/2186) [A study of 104 species of *Cuscuta,* looking at seed coat morphology, embryo shape, mechanism of water entry, seed size, seeds per capsule and hilar region morphology, from which an identification key for 16 species present and of concern in Canada is prepared.]

Oltra Benavent, J. E. and Navarro Peris, A. 2020. (Some new vascular plants from La Safor (Valencia, Spain).) (in Spanish) Flora Montiberica 76: 139-146. [Recording localities for *Parentucellia viscosa*.]

Onisan, E., Petrescu, I. and Sarac, I. 2019. The difficulties in obtaining *Orobanche cumana* sunflower resistance hybrids. Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series 49(2): 125-130. [Noting that the development of new sunflower varieties resistant to *O. cumana* has become more difficult because the interaction of the female line with the genes from the

restore line must fit perfectly in order to have a complete resistance to the parasite, due to the very fast development of new and more virulent races. Commenting that 'there are also reported two dominant genes, one recessive gene, double dominant epistasis and dominant recessive epistasis, leading to the conclusion that resistance must be incorporated into both parental lines for developing resistant hybrid'. The paper presents some strategic conclusions from the past 5 year of their sunflower breeding program in Romania.]

Pan Da, Hülber, K., Willner, W. and Schneeweiss, G.M. 2020. An explicit test of Pleistocene survival in peripheral versus nunatak refugia in two high mountain plant species. Molecular Ecology 29(1): 172-183. [In *Pedicularis asplenifolia* the peripheral plus nunatak survival hypothesis was supported by Bayes factors, consistent with current habitat preferences.]

*Pelser, P.B., Nickrent, D.L., van Ee, B.W. and Barcelona, J.F. 2020. A phylogenetic and biogeographic study of *Rafflesia* (Rafflesiaceae) in the Philippines: limited dispersal and high island endemism. Molecular Phylogenetics and Evolution 139: 106555. (https://doi.org/10.1016/j.ympev.2019.106555) [These analyses indicate that dispersal between islands is rare resulting in high island endemism. BioGeoBEARS analyses suggest Borneo as the ancestral range of the genus and that divergences occurred earlier than previously assumed.]

*Pettersen, Martin. 2019. Synthesis of XTH inhibitors. PhD, Universitetet i Tromsø. Advisor: Prof. Tore Lejo. (http://hdl.handle.net/10037/16065) [XTHs (xylogclucan endotransglucosylase/hydrolases) are a group of enzymes possibly involved in the infection of tomato plants by *Cuscuta* spp. This study shows that Brilliant Blue R250 works as a good inhibitor for these enzymes, and attempts to synthesise structurally similar molecules to potentially increase water solubility and inhibitor activity. Compounds with sulfonate groups replaced with phosphonate showed desired activity.]

*Pointurier, O., 2019. (Modelling cropping system effects on branched broomrape dynamics in interaction with weeds.) (in French) Doctorat de Sciences agronomiques, Université de Bourgogne, Dijon, France. (http://www.theses.fr/2019UBFCK058) [The model allowed identification of promising combinations of techniques to control both *Phelipanche ramosa* and other weeds, and revealed that weeds may regulate broomrape. See also Haustorium 77: Pointurier *et al.* 2019.]

*Qasem, J.R. 2020. Control of branched broomrape (*Orobanche ramosa* L.) in tomato (*Lycopersicon esculentum* Mill.) by olive cake and olive mill waste water. Crop Protection 129: pp.105021. (https://www.sciencedirect.com/science/article/abs/pii/S0261219419303679?via%3Dihub) [Olive mill waste water at 400 ml per pot reduced shoot number and dry weight of *O. ramosa* by 70% and 74%. It was more selective and effective against *O. ramosa* than olive cake and of a 'high potential use for parasite control in tomato'.]

*Queijeiro-Bolaños, M.E., Malda-Barrera, G.X., Carrillo-Angeles, I.G. and Suzán-Azpiri, H. 2020. Contrasting gas exchange effects on the interactions of two mistletoe species and their host *Acacia schaffneri*. Journal of Arid Environments 173: pp.104041. (https://www.sciencedirect.com/science/article/abs/pii/S0140196318319037) [This study evaluated gas exchange (photosynthetic net rate (*A*), stomatal conductance (*G*) and intrinsic water use efficiency ($_{i}WUE$)) of uninfected *A. schaffneri* trees, compared to trees infected by two mistletoe species, *Psittacanthus calyculatus* and *Phoradendron brachystachyum*, in a semi-arid zone in central Mexico. Stomatal conductance in trees infected with *P. brachystachyum* was significantly lower, particularly on severely infected trees. But results suggest that overall, seasonality effect is more important than mistletoe infection in the physiological performance of the host.]

*Qin Yan, Zhang JingXiong, Hettenhausen, C., Liu Hui, Li ShaLan, Shen uoJing, Cao GuoYan and Wu JianQiang. 2019. The host jasmonic acid pathway regulates the transcriptomic changes of dodder and host plant under the scenario of caterpillar feeding on dodder. BMC Plant Biology 19(No.540). (https://bmcplantbiol.biomedcentral.com/articles/10.1186/s12870-019-2161-8) [Finding that during caterpillar attack on *C. campestris*, the JA pathway of the tobacco host plant is required for the proper transcriptomic responses of both dodder and host. This study highlights the importance of the host JA pathway in regulating the inter-plant systemic signaling between dodder and hosts.]

Radu, I., Manole, D., Gurau, L.R. and Jinga, V. 2019. Phytosanitary status and yield capacity of some sunflower hybrids in south Dobrogea. Romanian Journal for Plant Protection 12: 61-66. [Noting that sunflower is an immensely important crop in Romania. Twenty hybrids were screened for resistance to several pathogens. Hybrids Aurimi, Centros and Rubisol proved susceptible to *Orobanche cumana* (race unspecified), but a number of others showed excellent resistance.]

*Rafferty, N.E., Agnew, L. and Nabity, P.D. 2019. Parasitism modifies the direct effects of warming on a hemiparasite and its host. PLoS ONE 14(10): e0224482. (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0224482) [In studies with *Castilleja sulphurea* and its host *Bouteloua gracilis*, the host produced more root biomass relative to shoot biomass when grown with a parasite and when warmed (without parasite). Warmed parasite had lower root:shoot ratios but only when grown with a host. Under elevated temperatures, *C. sulphurea* aboveground biomass was marginally greater, and plants produced significantly more haustoria.]

Ramarumo, L.J., Maroyi, A. and Tshisikhawe, M.P. 2020. Plant species used for birdlime-making in South Africa. Bangladesh Journal of Botany 49(1): 117-124. [The fruits of *Erianthemum dregei, E. ngamicum, Tapinanthus forbesii* and *T. rubromarginatus* were all recorded being used for making bird lime but were not among the most favoured.]

Randle, C.P. and 10 others. 2018. Host cues mediate growth and establishment of oak mistletoe (*Phoradendron leucarpum*, Viscaceae), an aerial parasitic plant. Castanea 83(2): 249-262. [Studies to determine why *P. leucarpum* favours *Quercus nigra* and certain other species as hosts demonstrated that light, host physiochemistry, and volatiles released from potential host trees serve as cues affecting the viability and establishment of mistletoe seedlings. In particular, 3 common monoterpenes, limonene, β-myrcene, and β-phellandrene induce a positive growth response of *P. leucarpum* radicles.]

*Ren ZiChun, Zagortchev, L., Ma JunXia, Yan Ming and Li JunMin. 2020. Predicting the potential distribution of the parasitic *Cuscuta chinensis* under global warming. BMC Ecology 20(28): (09 May 2020). (https://bmcecol.biomedcentral.com/articles/10.1186/s12898-020-00295-6) [Concluding that global warming may tend to decrease the distribution of *C. chinensis* in China, both through direct effects on the parasite and through adverse effects on the main host soyabean.]

Ripoche, A. Autfray, P. and Marnotte, P. 2019. (Control of *Striga asiatica* using 2-4-d in rainfed rice in middle-western Madagascar.) (in French) 24e Conférence du COLUMA : Journées internationales sur la lutte contre les mauvaises herbes, Orleans, France, 3, 4 et 5 décembre 2019. [Noting that *S. asiatica* can cause severe crop loss in rain-fed rice in Madagascar and that pre-emergence 2,4-D had proved helpful elsewhere for control of *S. hermonthica*, 2,4-D was applied at 4 stages, at 30 days after planting (prior to *S. asiatica* emergence) and at 45, 60 and 75 days after planting. The two earliest applications reduced *Striga* emergence by 80 and 50% respectively and provided significant increases in yields.]

Robayo, C., Marquínez, X. and Nickrent, D. L. 2020. Floral anatomy of the plant *Psittacanthus schiedeanus* (Loranthaceae). Revista de Biología Tropical 68(1): 1-11. [The floral anatomy is generally like that of other Psittacanthinae. The morphological comparison of pedicel, bracteole and calyculus provides support for the interpretation of the calyculus as a reduced calyx. The septate locules of the anther are here considered an adaptation for releasing pollen over an extended time period.]

Runo, S. 2019. Modern breeding approaches for durable resistance against the parasitic plant *Striga*. Afrika Focus 32(2): 109-115. (https://ojs.ugent.be/AF/article/view/15770/13336) [Reviewing technologies for a new approach to *Striga* resistance breeding that incorporates host resistance breeding while taking account of the tendency for *Striga* to evolve virulence – by genotyping the parasite in different eco-geographical regions and identifying fingerprints unique to these regions and subsequently linking that to genetic markers.]

Rusch, D., Kope, H., Murray, M., Yurkewich, J. and Zeglen, S. 2019. Dwarf mistletoe management in British Columbia. Land Management Handbook - British Columbia Ministry of Forests, Lands and Natural Resource Operations No.73: 13 pp. [Describing the serious losses from *Arceuthobium* spp. in BC, Canada. Noting that removal of susceptible host trees through harvesting and eradication of susceptible natural regeneration is the best way to reduce future losses. Also discussing the possible effects of climate change.]

*Safoora Amini, Khadijah Rosli, Mohd-Faizal Abu-Bakar, Halimah Alias, Mohd-Noor Mat-Isa, Mohd-Afiq-Aizat Juhari, Jumaat Haji-Adam, Goh HoeHan and Wan KiewLian. 2019. Transcriptome landscape of *Rafflesia cantleyi* floral buds reveals insights into the roles of transcription factors and phytohormones in flower development. PLoS ONE 14(12): pp.e0226338. (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0226338) [Comparative gene expression analysis of different floral bud stages identifies various transcription factors related to flower development, providing new resouces for molecular studies in the flower development process in the large-flowered *R, cantleyi*.]

Salama, A., Shukla, M.R., Popova, E., Fisk, N.S., Jones, M.P. and Saxena, P.K. 2018. In vitro propagation and reintroduction of golden paintbrush (*Castilleja levisecta*), a critically imperilled plant species. Canadian Journal of Plant Science 98(3): 762-770. [Concluding that *in-vitro* cultures from nodal explants, in combination with reintroduction efforts, offers an excellent opportunity for conserving the endangered *C. levisecta* and facilitating *in situ* conservation efforts by providing plants for reintroduction.]

Salifou, M.**,** Souleymane, O.**,** Hamidou, M.**,** Tignegre, J.B.L.S.**,** Tongoona, P.**,** Offei, S. **and** Ofori, K. 2019. Screening of cowpea germplasm for resistance to *Striga gesnerioides* in Niger. African Crop Science Journal 27(4): 641-652. [Recording immunity to *S. gesnerioides* in lines IT93K-693- 2, IT99K-573-1-1 and IT98K-205-8.]

Sánchez-Villegas, R. and 14 others 2019. Chorological novelties for the vascular flora of the Gredos range (Central System, Spain). (in Spanish) Flora Montiberica 75: 101-110. [Including comment on the distribution of *Cytinus ruber*.]

Sangare, S., Coulibaly, M., Doumbia, I., Sanogo, O., Kwadwo, O. and Gracen, V. 2020. Breeding opportunities and varietal preferences as per farmers' perceptions for development of striga (*Striga hermonthica*) resistant varieties and hybrids in maize. Journal of Genetics, Genomics and Plant Breeding 4(1): 37-46. [Surveys in Mali show that farmers are all too aware of the danger from *S. hermonthica* and its association with low soil fertility, but high cost limits the use of fertilizer. They mostly grow local landraces of maize which are chosen for their taste and maturity. *Striga* is removed by hand. Emphasising the need for the breeding of resistant varieties of maize.]

*Sawadogo, P., Batieno, T.B.J., Dieni, Z., Sawadogo, N., Ouedraogo, T.J. and Sawadogo, M. 2020. Geographical distribution and alternate hosts of *Striga gesnerioides* (Willd.) Vatke in Burkina Faso. Journal of Applied Biosciences 145: 14955 – 14964. (https://doi.org/10.35759/JABs.v145.10) [*Cassia mimosoides, Alysicarpus ovalifolius, Ipomea eriocarpa, Ipomea sp.* and *Tephrosia pedicellata* were identified as hosts of *S. gesnerioides* in addition to cowpea. Four morphotypes were also distinguished, but the host range of the different populations was not determined.]

*Sanogo, S. and Lujan, P. 2018. Rarity of a fungal pathogen and a parasitic flowering plant versus the commonness of a mycorrhizal fungus in pecan orchards in New Mexico. Plant Health Progress 2018(August): PHP-05-18-0024-S. (https://www.plantmanagementnetwork.org/php/elements/sum2.aspx?id=11042) [Recording *Phoradendron tomentosum* at very low levels on pecan trees in New Mexico and suggesting that its occurrence should be closely monitored.]

*Sarfowaa, Adwoa. 2019. Activity of xyloglucan endotransglucosylases/hydrolases XTHs during host plant infection by the parasitic plant *Cuscuta*. MSc, Universitetet i Tromsø. Supervisors: Prof. Kirsten Krause and Dr. Stian Olsen (http://hdl.handle.net/10037/15947) [The action of XTHs in haustoria formation, previously observed in *Cuscuta reflexa* was studied in *C. campestris* and *C. platyloba* infecting *Pelargonium zonale.* The expression of Cp-XTH1 was well regulated in the haustoria of *C. platyloba*, but not in *C. campestris*, while the expression of Cc-XTH2 was greatly regulated in *C. campestris* but not in *C. platyloba*. Concluding that the high levels of XTHs, xyloglucan endotransglycosylase enzymes (XET) and xyloglucan work synergistically to modify the parasitic plant leading to the formation of the specialized structures called haustoria.]

Sari, R., Huda, M., Susandarini, R. and Astuti, I. P. 2019**.** *Rafflesia hasseltii* Suringar

(Rafflesiaceae): a new record to Kalimantan, Indonesia. Reinwardtia 18(2): 65-70. [*R. hasseltii* recorded for the first time from Sambas District, West Kalimantan and describing the detailed characteristics of the flowers.]

Saric-Krsmanovic, M., Uludag, A., Bozic, D., Radivojevic, L., Gajic-Umiljendic, J. and Vrbnicanin, S. 2020. The effect of glyphosate on anatomical and physiological features of alfalfa infested with field dodder (*Cuscuta campestris* Yunck.). Tarim Bilimleri Dergisi 26(2): 181-189. [Showing that glyphosate at 288 and 360 g/ha caused recovery of the harmful effects of *C. campestris* on alfalfa, confirming that glyphosate can control field dodder at early stages of infestation on alfalfa.]

*Scharenberg, F., Stegemann, T., Çiçek, S.S. and Zidorn, C. 2019. Sequestration of pyridine alkaloids anabasine and nicotine from *Nicotiana* (Solanaceae) by *Orobanche ramosa* (Orobanchaceae). Biochemical Systematics and Ecology 86: pp.103908. (https://www.sciencedirect.com/science/article/pii/S0305197819301553?via%3Dihub) [*O. ramosa* is capable of sequestering natural products from different species of *Nicotiana* hosts. These products, namely pyridine alkaloids anabasine and nicotine, are not synthesized by the parasite itself.]

*Scott, D. Scholes, J.D., Randrianjafizanaka, M.V., Randriamampianina, J.A., Autfray, P. and Freckleton, R.P. 2020. Mapping the drivers of parasitic weed abundance at a national scale: a new approach applied to *Striga asiatica* in the mid-west of Madagascar. Weed Research 25 June. (https://onlinelibrary.wiley.com/doi/abs/10.1111/wre.12436) [Surveying the occurrence of *S. asiatica* across Madagascar, where it is a serious parasite of rice and finding its density related to crop variety, companion crop and previous crop , as well as density in neighbouring fields and socio-economic factors, suggesting some readily available control options, rather than novel technologies requiring introduction.]

Sharma, R., Amarjeet and Punia, S.S. 2019. Response of various chemicals, neem cake and hand pulling on growth and development of Egyptian broomrape (*Phelipanche aegyptiaca*) in Indian mustard. Journal of Crop and Weed 15(2): 126-131. [Application of recommended doses of fertilizer (N and P), plus foliar sprays of glyphosate at 25 and 50 g/ha, plus 1.0% solution of ammonium sulphate at 25 and 55 DAS, reduced the infestation of *P. aegyptiaca* significantly throughout the growing season and proved best in increasing yield as well as oil content in Indian mustard. Neem cake, pendimethalin and metalaxyl, alone or in combination with glyphosate, exhibited control of *P. aegyptiaca* at early growth stages only.]

*Shimels, Mahdere Z. 2019. The mechanism underlying strigolactone diversification in sorghum and its role in resistance against the parasitic weed *Striga hermonthica.* PhD, Wageningen University. Advisors: H.J. Bouwmeester, C.P. Ruyter-Spira. (http://library.wur.nl/WebQuery/wurpubs/554879) [Sorghum lines with high *Striga* germination stimulant activity predominantly produce 5-deoxystrigol while the low germination stimulant lines produce orobanchol. Evidence is provided for the functional loss of an enzyme annotated as a sulfotransferase (*Sobic.005G213600*, SbSOT4A) and it is hypothesized that it is responsible for the stereospecific difference of strigolactones between low- and high-germination stimulant sorghum lines. It is thus concluded that in high germination stimulant lines, SbSOT4A is intact; after sulfation of C18-hydroxycarlactone it is further oxidized at the C19 position to form a carboxy group and upon the loss of the sulfate group ring closure occurs which results in the formation of 5-deoxystrigol. Also studying the synthesis and role of sorgomol.]

*Silberg, T.R., Richardson, R.B. and Lopez, M.C. 2020. Maize farmer preferences for intercropping systems to reduce *Striga* in Malawi. Food Security (https://doi.org/10.1007/s12571-020-01013-2) [Noting that repeated droughts have exacerbated the problem of *S. asiatica* in southern Africa, affecting 80% farmers in Malawi. This paper discusses the potential benefits from inter-cropping with legumes and reports on a survey to establish the extent to which farmers are prepared to sacrifice some yield of maize for suppression of *Striga*. Noting differences between male and female farmers.]

Şİn, B., Öztürk, L., SİvrĪ, N., Avcı, G.G. and Kadıoğlu, İ. 2019. Weed flora of cherry, walnut, apple, almond and pear orchards in northwestern Marmara region of Turkey. Turkish Journal of Agriculture - Food Science and Technology 7(12): 2252-2258. [*Viscum album* was widespread among pear trees while

Cuscuta campestris was detected only on emerged suckers in apple and cherry orchards.]
Singh, P., Těšitel, J., Plesková, Z., Peterka, T., Hájková, P., Dítě, D., Pawlikowski, P. and Hájek, M. 2019. The ratio between bryophyte functional groups impacts vascular plants in rich fens. Applied Vegetation Science 22(4): 494-507. [Although non-sphagnaceous bryophytes, especially so-called brown mosses, prevail over sphagna under alkaline conditions, in sub-alkaline conditions, rich fens allow the co-occurrence of both these functional groups. Then sphagna tend to be dominant over the brown mosses and over seedlings of vascular plants. Hence the importance of brown mosses in the preservation of endangered species including *Pedicularis palustris*.]
*Skrypnik, L., Maslennikov, P., Feduraev, P., Pungin, A. and Belov, N. 2020. Ecological and landscape factors affecting the spread of European mistletoe (*Viscum album* L.) in urban areas (a case study of the Kaliningrad city, Russia). Plants 9(3): (https://www.mdpi.com/2223-7747/9/3/394) [The commonest hosts of *V. album* in Kalingrad were *Tilia cordata*, *Acer platanoides*, and *Populus nigra* with up to 10 parasites per tree, but those with the heaviest infestations, up to 50 per tree were *Populus* × *berolinensis*, *Populus nigra*, and *Acer saccharinum*. Levels of infestation were not correlated with soil or air pollution, but were with tree age.]
Steševič, D., Küzmič, F., Stanišić-Vujačić, M. and Šilc, U. 2020. Coastal sand dune vegetation of Velika plaža (Montenegro). Acta Botanica Croatica 79(1): 43-54. [Describing a new ecological association Cuscuto cesatianae-Phyletum nodiflorae involving *C. cesatiana*.]
Su, Chun, Hai Liu, Wafula, E.K., Honaas, L., de Pamphilis, C.W. and Timko, M.P. 2020. SHR4z, a novel decoy effector from the haustorium of the parasitic weed *Striga gesnerioides,* suppresses host plant immunity New Phytologist 226(3): 891-908. (https://doi.org/10.1111/nph.16351) [A study with cowpea var B301 which is resistant to most races of *S. gesnerioides* but susceptible to race SG4z, revealed the presence of secreted effector protein 'SHR4z' which has homology to the SERK family of proteins which bind to VuPOB1 which is shown to be a regulator of host resistance. This is silenced in B301 allowing parasitism by SG4z.]
Subhashini, K., Kumar, P.K.R. and Gaddeyya, G. 2019. A comprehensive review on *Dendrophthoe falcata* (L.f.) Ettingsh. (Loranthaceae**).** Tropical Plant Research 6(3): 514-520. [A general review of *D. falcata,* commonly occurring on mango and forest trees in India.]
Sultan, A., Robertson, A.W., Callmander, M.W., Phillipson, P.B., Meyer, J-Y. and Tate, J.A. 2019. Widespread morphological parallelism in *Korthalsella* (Santalaceae, tribe Visceae): A molecular phylogenetic perspective. Taxon 68:1204-1218. [Nuclear ribosomal ITS and plastid trnL-F phylogenies show that historical sectional classifications based on morphology are not supported and that geographical distribution is a better indicator of relationships in these mistletoes.]
Suonan DengDeng, Chen WeiDong and Lin PengCheng. 2020. (Habitat and factors of endangerment of wild and endangered medicinal herb *Dactylorhiza hatagirea* in Qinghai-Tibet Plateau.) (in Chinese) Guangxi Zhiwu / Guihaia 39(9): 1166-1179. [Noting the presence of *Pedicularis longiflora* var. *tubiformis* alongside the myco-heterotrphic orchid *D. hatagirea* in certain habitats.]
Susatya, A. 20120. The growth of flower bud, life history, and population structure of *Rafflesia arnoldii* (Rafflesiaceae) in Bengkulu, Sumatra, Indonesia. Biodiversitas: Journal of Biological Diversity 21(2): 792-798. [Measurements were made on 17 flowers from two host vines and the growth rates calculated. Despite the title, little information is given on actual population structure and life history of this holoparasite (e.g. nothing about host infection.]
*Swarnalatha, G., Sarala, K., Prabhakara Rao, K., Baghyalakshmi, K., Baghyalakshmi, K., Sambasiva Rao, K.R.S. and Bindu, J.P. 2020. Parasitic interactions of *Orobanche* with selected *Nicotiana* species and identification of effective resistant genotypes. Genetic Resources and Crop Evolution (https://doi.org/10.1007/s10722-020-00900-z) [Of 7 wild relatives, *N. benthamiana-repanda* and *N. nesophila* showed tolerance, while *N. umbratica-nesophila* showed some resistance.]
Tang DanDan, Wu Yi, Liu WenYao, Hu Tao, Huang JunBiao and Zhang TingTing. 2019. (Ecological stoichiometry of two common hemiparasite plants and their relationship with host trees in Ailao Mountain, Yunnan, China.) (in Chinese) Chinese Journal of Plant Ecology 43(3): 245-257. [Analysis of chemical proportions of carbon, nitrogen and

phosphorus in branches and leaves of *Loranthus delavayi* and *Taxillus delavayi* and their hosts, providing data for the study of nutrient utilization strategies in these parasites]

Tedoradze, G., Nakhutsrishvili, G., Seip, M., Theissen, T., Waldhardt, R., Otte, A. and Magiera, A. 2020. Terrain impacts the composition of the persistent soil seed bank: a case study of steep high mountain grasslands in the Greater Caucasus, Georgia. Phytocoenologia 50(1): 47-63. [Including reference to *Rhinanthus minor* but no detail in abstract.]

Teixeira-Costa, L. and Ocampo, G,G.C. 2020. Morphogenesis and evolution of mistletoes' haustoria. In: Demarco D, (Ed.) Plant ontogeny: studies, analyses and evolutionary implications. Hauppauge, New York: Nova Science. Pp 108-157. [Studies on the morphogenesis of mistletoes haustoria were used for a phylogenetic analysis of ancestral character state reconstruction coupled with divergence time estimations for all clades within Santalales. From an ancestor with either root or epicortical root haustoria, drier climates may have driven the expansion and specialization of mistletoe's endophytic tissue, leading to the evolution of cortical strands.]

Testi, V., Delvago, C., Colla, R., Boselli, R., Tabaglio, F.A.V. and Montemurro, P. 2018. (Results of *Phelipanche ramosa* control trials on processing tomato.) (in Italian) Conference paper: Atti, Giornate Fitopatologiche, Chianciano Terme (SI), Italia, 6-9 marzo 2018, Volume primo 2018: 573-578. (http://www.giornatefitopatologiche.it...) [An ill-defined 'sostanze vegetali' with and without a zinc product, controlled *P. ramosa* better than rimsulfuron, but no indication of safety to tomatoes.]

Tigist Beyene and Meseret Chimdessa Egigu. 2020. *Striga hermonthica* (Del.) Benth has dual negative effect on its host *Sorghum bicolor* (L.) Moench. Turkish Journal of Agriculture - Food Science and Technology 8(1): 165-170. [Suggesting that extracts of leaf and flower of *S. hermonthica* could cause reductions in germination and early root growth of sorghum in petri dishes, but subject to the usual doubts surrounding studies of allelopathy.]

Tilal, S.A., Babiker, A.G.T. and Finckh, M.R. 2019. Effects of powder and aqueous extracts of *Euphorbia hirta* on *Phelipanche ramosa* germination and haustorium initiation. Archives of Phytopathology and Plant Protection 51(17-18): 1-14. [Confirming that both dried powder and aqueous extracts of *E. hirta* stimulated germination of *P. ramosa* and also suppressed haustorium initiation when applied during conditioning. They also 'have potential as spot treatments also for control of *Striga hermonthica.*']

*Tippe, Dennis Erro. 2019. Developing parasitic weed control strategies for rainfed rice production environments. PhD, Wageningen University. Supervisors: N.P.R. Anten, L. Bastiaans and J. Rodenburg. (https://library.wur.nl/WebQuery/wurpubs/555308) [Studying three options for control of *Striga asiatica* and *Rhamphicarpa fistulosa* in rain-fed rice in Tanzania – delayed sowing, short-duration cultivars and fertilizer. Delayed sowing reduced infection by *S. asiatica*, especially when combined with a short-duration rice variety, but increased that by *R. fistulosa*. Application of fertilizer showed only a small and inconsistent benefit. Farmers' experience indicated that the early sowing time under lowland conditions favoured the traditional late maturing rice variety. Under upland conditions, farmers were more impressed with a newly developed, early maturing, resistant rice variety. Organic fertilizers, particularly rice husks, in combination with mineral fertilizers were the preferred soil amendment. Conclusion – no simple solutions! (See also papers by Tippe *et al.* 2017 in Haustorium 72).]

Tippe, D.E, Bastiaans, L., van Ast, A., Dieng, I., Cissoko, M., Kayeke, J., Makokha, D.W. and Rodenburg, J. 2020. Fertilisers differentially affect facultative and obligate parasitic weeds of rice and only occasionally improve yields in infested fields. Field Crops Research 253 (1 September 2020): 107845. (https://www.sciencedirect.com/science/article/abs/pii/S0378429019316028?via%3Dihub) [Reporting the results as described in Tippe, 2019 above.]

Ugbaa, M., Omoigui, L. and Bello, L. 2020. Phenotypic screening of cowpea (Vigna unguiculata) genotypes in response to parasitic weed Alectra vogelii. Asian Journal of Agriculture 4(10):14-17. [Screening of local cowpea varieties in Nigeria confirmed resistance in B301, IT98K-573-1-1 and IT98K-205-8.]

Üstüner, T. 2020. (The effect of field dodder (*Cuscuta campestris* Yunck.) on the phenological and pomological characteristics of Dila pepper (*Capsicum annuum* L.).) (in

Turkish) Harran Tarim ve Gida Bilimleri Dergisi / Harran Journal of Agricultural and Food Science 24(1): 53-63. [A 'very dense' infestation of *C. campestris* shown to cause 17% yield loss in Dila pepper in Turkey.]

Vacher, C., Gatard, L., Guinchard, L., Reibel, C., Gautheron, N., Dessaint, F., Delye, C., Edel-Hermann, V., Steinberg, C. and Gibot-Leclerc, S. 2019. (Tobacco branching broomrape (*Phelipanche ramosa* L.): identifying new conventional and biocontrol solutions.) (in French) 24e Conférence du COLUMA : Journées internationales sur la lutte contre les mauvaises herbes, Orleans, France, décembre 2019. [The herbicides rimsulfuron, sulfosulfuron and clethodim did not provide fully satisfactory control. Some results with *Fusarium* collections proved promising but require further evaluation.]

*Wang Dan, Cui BoChao, Duan SuSu, Chen JiJun, Fan Hong, Lu BinBin and Zheng JiangHua. 2019. Moving north in China: the habitat of *Pedicularis kansuensis* in the context of climate change. Science of the Total Environment 697: pp.133979. (https://www.sciencedirect.com/science/article/pii/S004896971933949X?via%3Dihub) [Modelling the potential of climate change to affect the distribution of *P. kansuensis* and concluding that increased populations to the north by 2070 would only amount to about 0.5%.]

*Wang JianYou, Salim Al-Babili and 16 others. 2019. The apocarotenoid metabolite zaxinone regulates growth and strigolactone biosynthesis in rice. Nature Communications 10(2): pp.810. (https://www.nature.com/articles/s41467-019-08461-1) [Mutants (*zas*) containing less zaxinone, exhibit retarded growth and show elevated levels of strigolactones, confirming that zaxinone is a key regulator of rice development and biotic interactions and has potential for increasing crop growth and combating *Striga*.]

*Wang XiangTao, Niu Ben, Zhang XianZhou, He YongTao, Shi PeiLi, Miao YanJun, Cao YaNan, Li Meng and Wang ZhiPeng 2020. Seed germination in alpine meadow Steppe plants from central Tibet in response to experimental warming. Sustainability 12(5): 1884. (https://doi.org/10.3390/su12051884) Finding that germination of *Pedicularis kansuensis* would be higher (but slightly slower) with increased temperatures of 3°C.]

*Wei XuePing, Guo HaoJie, Che Peng, Zhang BenGang, Liu HaiTao and Qi YaoDong. 2019. The complete chloroplast genome sequence of *Viscum coloratum* (Viscaceae), a semiparasitic medicinal plant. Mitochondrial DNA Part B 4(2): pp.2904-2905. (https://www.tandfonline.com/doi/full/10.1080/23802359.2019.1660923) [Phylogenetic analysis were performed based on 30 shared genes of 12 species in Santalales using maximum likelihood method. The results showed a close relationship between *V. coloratum* and *V. album*.]

Wimolsakcharoen, W., Dumrongrojwatthana, P. and Trébuil, G. 2020. Production of non-timber forest products (NTFPS) and diversity of harvesters' practices and decision-making processes in northern Thailand community forests. Bois et Forêts des Tropiques 343: 39-52. [Young shoots of *Melientha suavis* (Opiliaceae), were found to be one of the three main non-timber forest products collected, with productivity of 2 kg/ha/year.]

Wolfe, A.D. 2018. *Hyobanche hanekomii* (Orobanchaceae), a new species from the Western Cape of South Africa. Phytotaxa 340(1): 93-97. [*H. hanekomii* is described and illustrated, somewhat intermediate in appearance between *H. sanguinea* and *H. atropurpurea*. It occurs in the Cape Fold Belt Mountains of the northwest part of the Western Cape. Host not identified in the abstract.]

*Xiaoxin Ye, Meng Zhang, Manyun Zhang and Yongqing Ma. 2020. Assessing the performance of maize (*Zea mays* L.) as trap crops for the management of sunflower broomrape (*Orobanche cumana* Wallr.) Agronomy 10(1): 100. (https://doi.org/10.3390/agronomy10010100) [Finding that maize stimulated germination of *O. cumana* germination. Varieties differed in effectiveness, cultivar N314 being best and greatly reducing infestation after 3 years, leading to a doubling of sunflower yield.]

*Yakubu, Mohammed Nuru. 2019. Physiological and genetic study of the three-way interactions between rice, arbuscular mycorrhizal fungi and the parasitic weed *Striga***.** PhD, University of Aberdeen. Advisors: Adam Price, Ahmad Abdulhameed. (https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.794127) [This study screened diverse rice cultivars for *Striga* resistance, evaluating the influence and nature of mycorrhizal (*Rhizophagus intraradices*)-induced protection against *S. hermonthica* using a split-root technique, assessing activity on *Striga* seed germination, and examining evidence that variation in the presence or absence of the MAX1 ortholog gene is implicated in resistance.]

Yan JiaKun, Zhang NingNing and Duan YiZhong. 2019. The complete chloroplast genome sequence of *Tribulus terrestris*, an important traditional Chinese medicine. Mitochondrial DNA Part B 4(2): 3108-3109. [A total of 129 genes were annotated, including 37 tRNA, 8 rRNA, and 84 protein-coding genes. Phylogenetic analysis showed *T. terrestris* clustered with *Krameria lanceolata* and *Krameria bicolor*.]

Yanev, M. and Kalinova, S. 2019. Influence of glyphosate on leaf gas exchange and photosynthetic pigments of broomrape-infested tobacco plants. Bulgarian Journal of Agricultural Science 26(2): 435-440. [Glyphosate is used for partial control of *Phelipanche ramosa* and *P. mutelii* in tobacco in Bulgaria, but has to be applied at the precise dose of 144 g/ha and only to the lower leaves if the yield is not be adversely affected. This study confirms that application to the upper leaves reduces photosynthesis via a reduction in chlorophylls while application to the lower leaves does not.]

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

Yildiz, Ü.C., Kiliç, C., Gürgen, A. and Yildiz, S. 2020. Possibility of using lichen and mistletoe extracts as potential natural wood preservative. Maderas: Ciencia y Technologia 22(2): 179-188. [Extraction of *Viscum album* in water or methanol has good potential to prevent fungal rotting of wood.]

***Yoneyama, K. 2020. Recent progress in the chemistry and biochemistry of strigolactones. Journal of Pesticide Science (10.1584/jpestics.D19-084) [Reviewing the subject 50 years since the identification of strigol and summarising the recent advances in chemistry and biology of the strigolactones.]**

Yu RunXian, Zhou SongYan, Zhou QiuJie, Liu Ying and Zhou RenChao. 2019. The complete chloroplast genome of a hemiparasitic plant *Tolypanthus maclurei* (Loranthaceae). Mitochondrial DNA Part B 4(1): 207-208. [All the *ndh* genes except *ndhB* are lost and five protein-coding genes are pseudogenized. Phylogenetic analysis shows that *Tolypanthus* is sister to *Macrosolen* within Loranthaceae.]

*Yue Guo. Li Cheng , Weihua Long Jianqin Gao, Jiefu Zhang, Song Chen, Huiming Pu and Maolong Hu. 2020. Synergistic mutations of two rapeseed AHAS genes confer high resistance to sulfonylurea herbicides for weed control. Theoretical and Applied Genetics (2020). (https://link.springer.com/article/10.1007%2Fs00122-020-03633-w) [Describing the development of a line of rapeseed with exceptionally high resistance to herbicides with potential to control weeds including *Phelipanche ramosa*.]

Zagorchev, L., Traianova, A., Teofanova, D, Li, J., Kouzmanova, M. And Goltsev, V. 2020. Special issue in honour of Prof. Reto J. Strasser – Influence of *Cuscuta campestris* Yunck. on the photosynthetic activity of *Ipomoea tricolor* Cav. - *in vivo* chlorophyll *a* fluorescence assessment. Photosynthetica 58(2): 422-432. [Effect of *C. campestris* on the photosynthetic apparatus of *I. tricolor* hosts depends on the physiological age of the host plant leaves.]

Zaheer Abbas, Khan, S.M., Jan Alam, Zainul Abideen and Zahid Ullah. 2020. Plant communities and anthropo-natural threats in the Shigar valley, (Central Karakorum) Baltistan-Pakistan. Pakistan Journal of Botany 52(3): 987-994. [Recording the rare *Pedicularis staintonii*.]

Zázvorka, J., Sánchez Pedraja, Ó., Moreno Moral, G., Carlón Ruiz, L., Domina, G., Laínz Gallo, M. and Piwowarczyk, R. 2019. *Orobanche centaurina* Bertol. the correct name for *O. kochii* F.W. Schultz (*Orobanchaceae*). Flora Montiberica 75: 52-56. [Concluding, after comparison with *O. kochii* and other specimens, that *O. centaurina* Bertol. is the correct name for the plant parasitizing *Centaurea paniculata* in the Czech Republic.]

Zeid, M.M. and Hemeid, M.M. 2019. Effect of glyphosate on performance of faba bean varieties under heavy infestation of *Orobanche crenata*. Alexandria Science Exchange 40(1): 169-176. [Field trials with glyphosate sprays at 86 g/ha in Morocco reduced *O. crenata* but failed to increae faba bean yield and is not recommended. Variety Misr 3 was seen as the most promising variety combining generally good yield and low number of emerged *O. crenata* compared to older varieties Giza 843 and Misr 1.]

Zeid, M.M. and Komeil, D.A. 2019. Same-hill intercropping of different plant species with faba bean for control of *Orobanche crenata*. Alexandria Science Exchange 40(2): 228-238. [Radish interfered with *O. crenata* germination, fenugreek had a small effect and fennel, none. Interplanted in the field, fenugreek reduced the crop when in the same hill but sometimes reduced *O. crenata* when planted separately in the ridge. Effects in heavily infested fields were generally disappointing.]

Zhang YingYing**,** Wang DaWei**,** Shen YueQuan and Xi Zhen. 2020. Crystal structure and biochemical characterization of *Striga hermonthica* HYPO-SENSITIVE TO LIGHT 8 (ShHTL8) in strigolactone signaling pathway. Biochemical and Biophysical Research Communications 523(4): 1040-1045. [*Striga* has eleven different kinds of ShHTL hydrolases. The study indicates that on ShHTL8, L125, M147, M154 and I194 are important binding sites, and of which L125 be especially important. The corresponding residue, Y124 of ShHTL1 and F135 of ShHTL2 may also play a significant role.]

Zhang YingYing, Wang DaWei, Shen YueQuan and Xi Zhen. 2020. Crystal structure and biochemical characterization of *Striga hermonthica* HYPO-SENSITIVE TO LIGHT 8 (ShHTL8) in strigolactone signaling pathway. Biochemical and Biophysical Research Communications 523(4): 1040-1045. [Determination of the crystal structure of a *Striga* hydrolase, a protein that responds to the presence of strigolactones in the soil. The work shows specific structural residues that play a role in substrate recognition.]

*Zhou Nong. 2019. Characterization of the complete chloroplast genome of *Boschniakia himalaica* J. D. Hooker & Thomson (Orobanchaceae), a medicinal species in southwest China. Mitochondrial DNA Part B 4 No.2(2) pp.3064-3065. (https://www.tandfonline.com/doi/full/10.1080/23802359.2019.1664952) [The chloroplast genome contained 84 genes, including 50 protein-coding genes, 30 tRNA genes, and 4 rRNA genes. The phylogenetic analysis indicated *B. himalaica* was closely related to *Cistanche deserticola*.]

*Zhou Tao, Ruhsam, M., Wang Jian, Zhu HongHong, Li WenLi, Zhang Xiao, Xu YuCan, Xu FuSheng and Wang XuMei. 2019. The complete chloroplast genome of *Euphrasia regelii*, pseudogenization of *ndh* genes and the phylogenetic relationships within Orobanchaceae. Frontiers in Genetics 10(May): pp.444. (https://www.frontiersin.org/articles/10.3389/fgene.2019.00444/full) [First complete chloroplast genome of *E. regelii*, which is more conserved when compared to other hemiparasitic Orobanchaceae genera. Structural rearrangements or gene losses were not detected.]

Zhuo Zhou, Jin-Jin Hu, Jun Wen and Hang Sun. 2019. Morphometric, phylogenetic and biogeographic analyses of *Pyrularia* (Santalales), a parasitic disjunct lineage between eastern Asia and eastern North America. Taxon 68: 47-71. [*Pyrularia* is a small genus that displays the well-known intercontinental disjunct distribution between eastern Asia and eastern North America. Molecular phylogenetics and dating indicate there are two species in the genus that diverged in the late Miocene.]

HAUSTORIUM 78
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