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PRESIDENT'S MESSAGE

Dear IPPS members

I wish you all a healthy, happy and successful 2022, hopefully with less restrictions than in the past, almost two, years. We are still experiencing a difficult time and meeting other people, especially internationally is virtually impossible. That is a real pity, as I experienced during the short relief in the travel restrictions, in a couple of face to face meetings that gave so much more energy than online. Nevertheless, fortunately we have the online possibilities and I personally greatly enjoy the online IPPS seminars, which are a great success. And of course we have our newsletter, Haustorium, to stay connected. Also this issue again has a great selection of parasitic plant related news.

In 2022 we will continue to host the online IPPS seminars from February thru April, then have a 5-months break around the World Congress on Parasitic Plants, where the real exchange of ideas and creation of new plans and collaborations can take place. The 16th WCPP is going to be held in Nairobi in July 2022 with hybrid, on site and online, participation. Please keep an eye on our website, for updates. The IPPS seminars will be held on the first Wednesday of the month at 3:00 PM GMT. See the programme and the announcements with the exact time in the different time zones and the zoom link (accessible for members only). Group leaders can share the zoom link with their students.
You may have noticed the change in the Twitter feed on our website, which is more professional now, allows for more search terms and generally also shows the pictures in the original tweets. I want to invite you to contribute to that Twitter feed by using the hashtag #Parasiticplants. Please also use the other possibilities of our website and reach out to other IPPS members and the society at large: login into the member area and post news, for example on your most recent paper or project funding, and job vacancies. I would also greatly appreciate if you keep your profile up to date, with your picture and that of your institution and with a short description of your research area. You may want to add some expertise keywords as the member list is searchable, allowing others to find you based on your expertise. I also encourage you to check out the News and Society pages regularly, for member and society news, and the homepage where we have two continuously refreshed feeds, from Google Scholar and Scopus, showing the most recent papers on parasitic plants, as well as the Twitter feed.

If you are reading Haustorium but are not an IPPS member yet, consider to become a member. For the year 2021-2022 we have a reduced fee of 20 euro for regular members; for students we waive this year's membership fee. We use these fees to run the society and to support the organization of the WCPP and its attendance by young researchers. If you are a member but did not pay your membership fee, please do so here.
I would like to end with wishing you all a great 2022.

Harro Bouwmeester
IPPS President

MEETING REPORT

XI Weed Science Congress and Symposium on Herbicides and Growth Regulators. Palić, Serbia, 20th to 23rd of September 2021

The Eleventh Serbian Weed Science Congress was planned for the year 2020, just 40 years after the first. However, the COVID-19 pandemic led to its postponement to 2021,

National and eminent international lecturers presented oral and poster presentations, describing the most important results of scientific research done in the field of weed science for the last five years. For the first time the programme included a *Symposium on Herbicides and Growth Regulators*, to encourage better communication and cooperation between colleagues working in primary production, scientific institutions, pesticide industry, and all other fields which share the common interest in the study and control of weeds.

A total of 90 papers were presented, 16 of which were by invited speakers (including prof. dr Ahmet Uludag, prof. dr Husrev Mennan, prof. dr Stevan Knezevic, prof. dr Heinz Müller-Schärer and prof. dr Mostafa Oveisi) presenting a broad picture of developments, newest contributions, and a vision of future research in the field. Of 33 oral papers 3 involved parasitic plants as follows:

Marija Sarić-Krsmanović *et al.* - Field dodder: the old problem looking for a new approach (in Serbian).

About 10 *Cuscuta* species are known in Serbia. The most frequent, *Cuscuta campestris,* may be a problem in tomato, sweet pepper, potato and cabbage and recently in sugar beet; also in other crops grown in plastic greenhouses. However, it is most devastating in newly-established alfalfa, clover, etc. Successful requires an integrated approach involving crop rotation, use of pure seeding material, physical removal by mowing, hand weeding or flaming, the use of tolerant cultivars and biological agents, as well as treatments with herbicides when the problem cannot be solved any other way.

Lyuben Zagorchev *et al.* - Response of field dodder (*Cuscuta campestris* Yunck.) to salinity independence of the host plants (in English).

Being a stem parasite, *Cuscuta campestris*, once attached to its host is not directly exposed to abiotic stress factors such as drought and high soil salinity. However, germination and early growth are shown to be seriously affected by salinity. After attachment to the host its success depends on that of the host. Host susceptibility was increased in some species but notably reduced in *Capsicum album*.

Sandra Cvejić *et al.* - Genetic control of broomrape in sunflower (in English).
Reviewing the problems from development of new races of *Orobanche cumana* and emphasising the need for pyramiding of resistance genes from different sources into a single genotype. Noting the value of new techniques using maker analyses for identifying and mapping resistance genes.

Marija Sarić-Krsmanović

PROFILE

THISMIACEAE

Introduction

Heterotrophic plants come in two flavors: holoparasitic plants make a physical connection to a host plant to obtain carbon, while mycoheterotrophic plants use root-associated fungi as carbon source. The latter mode of life has evolved over 40 times in plant evolution and includes over 550 species broadly distributed through the world's forest ecosystems. Due to their rarity and unusual appearance the species in the plant family Thismiaceae are among the most intriguing mycoheterotrophic plants. Here I provide an overview of the diversity, evolution, and ecology of these remarkable plants and I discus their apparent rarity.

Diversity, and distribution

Thismiaceae comprise five genera and c. 100 species, all of which have a fully mycoheterotrophic mode of life (Merckx et al. 2013; Yudina et al. 2021; Fig. 1). The family has a pantropical distribution; and occurs throughout the rainforests of South and Middle America, Africa, western India, Southeast Asia, and Australasia, although it is notably absent from Madagascar and tropical oceanic islands (Fig. 2). The distribution extends into subtropical and even temperate regions in the USA, China, Japan, Australia, and New Zealand (see *Thismia*; Merckx et al. 2013)

Figure 1. A: *Afrothismia winkleri,* pictured at Mount Kupe, Cameroon. B: *Thismia tentaculata,* Hong Kong, China. C: *Thismia clavarioides* at Moreton National Park, NSW, Australia. D: *Thismia rodwayi,* Tasmania, Australia. E: *Thismia hillii,* Mount Pirongia, New Zealand. All photos by Vincent Merckx.

The largest genus within the family is *Thismia*, with more than 80 species currently known to science – a number that is rising rapidly due the description of new species almost every month lately (mostly from Southeast Asia, but see Ferreira da Silva et al. 2020). *Thismia* occurs in the tropical forests of the Americas, India and Southeast Asia, but is remarkably absent from Africa and Madagascar. Its distribution extends into subtropical and even temperate forests in China, Japan, Australia, and New Zealand. In the northern America, one species was known to occur near Chicago, but is assumed to be extinct (see further). The second largest genus of the family, *Afrothismia*, contains over 10 species which are all known from tropical Africa (excluding Madagascar). The little-known genus *Oxygyne* comprises 6 species, of which 3 are described from a single collection in tropical West Africa. The other 3 species occur in subtropical regions in Japan (Cheek et al. 2018). Finally, of both genera *Haplothismia* and *Tiputinia* only a single species is known, from India and Ecuador respectively (Merckx et al. 2013).

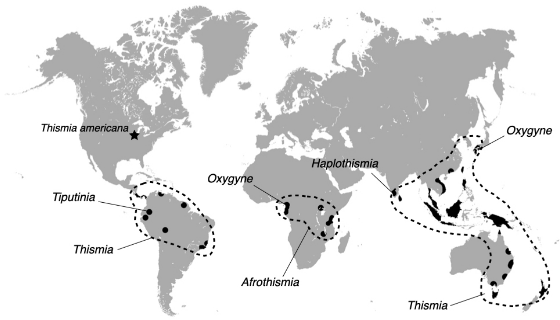

Figure 2. Global distribution map of Thismiaceae. Adapted from Merckx & Smets (2014)

Classification

Due to the strong reduction of vegetative organs and the rarity of most species involved, Thismiaceae taxonomy has been the subject of much debate. Most classifications included Thismiaceae, as a subtribe “Thismieae,” in a broadly defined Burmanniaceae (Miers 1847; Schlechter 1921; Jonker 1938; Maas et al. 1986; Maas-van de Kamer 1998; Caddick et al. 2002; APG 2009) while other authors favored the recognition of a separate family of Thismiaceae closely related to the mycoheterotrophic Burmanniaceae (Hutchinson 1934, 1959; Dahlgren et al. 1985; Takhtajan 1997; APG 1998). Thismiaceae or Burmanniaceae (including Thismieae) on their part were linked to various other families, including other mycoheterotrophic groups such as Triuridaceae, Geosiridaceae, Corsiaceae, and Orchidaceae (see Maas et al. 1986 for an overview). However, these relationships are now completely discredited based on convergence of character states involved, due to their mycoheterotrophic mode of life (Soltis et al. 2005). DNA-based phylogenetic analyses place Thismiaceae in Dioscoreales (Caddick et al. 2002; Davis et al. 2004) , but outside Burmanniaceae (Merckx et al. 2006, 2009; Lam et al. 2018). Nuclear and mitochondrial DNA data suggest that Thismiaceae are paraphyletic, due to the inclusion of *Tacca* (Merckx et al. 2009), but these relationships remain unclear.

Evolution

The potential inclusion of the genus *Tacca* within Thismiaceae (see Classification) suggests that a mycoheterotrophic mode of life has evolved independently in *Afrothismia* and in the common ancestor of the remaining Thismiaceae (Merckx et al. 2009). Thismiaceae are absent from the fossil record but according to molecular clock estimates both lineages originated during the Cretaceous (Merckx et al. 2010), which makes it one of the oldest known extant lineages of mycoheterotrophic plants known. The loss of photosynthesis has led to pronounced gene-loss in the chloroplast genome; the chloroplast genomes of *Thismia* species are among the smallest known in plants (Lim et a. 2016; Yudina 2021).

Figure 3. Detail of a cluster of root tubercles of *Afrothismia foertheriana.* Photo by Vincent Merckx

Ecology

Morphological observations indicate that species of Thismiaceae grow on arbuscular mycorrhizal fungi (Glomeromycotina), which are the most common mycorrhizal associates of plants. In fact, they obtain carbon from surrounding plants through these shared fungi (Gomes et al. 2020). DNA sequencing of several species of *Thismia* and *Afrothismia* indicate that their interactions with these fungi are very specific, often associating with a single narrow fungal lineage (Merckx & Bidartondo 2008; Merckx et al. 2017; Guo et al. 2019), particularly in relation to surrounding green plants (Gomes et al. 2017). In

Afrothismia the fungi housed are in highly specialized root tubercles (Fig. 3).

Pollination is poorly studied in Thismiaceae, but because many species have showy flowers with a conspicuously pigmented corolla, a trap-like perianth tube, long tepal appendages, and nectaries. These specializations are highly variable between species and suggest cross-pollination; it is likely that genera such as *Thismia* are either xenogamous or maintain a mixed selfing–outcrossing reproductive strategy (Vogel 1962; Stone 1980; Maas et al. 1986). The particular floral morphology and odor of *Tiputinia* points to sapromyophily (Woodward et al. 2007). Recently, the pollination of *Thismia tentaculata* was studied in detail demonstrating that the flowers are pollinated by a single species of fungus gnats (Corynoptera, Sciaridae), which are attracted by the yellow pigments and are temporarily restrained within the perianth chamber before departing via apertures between the anthers. The plants are self-compatible but predominantly xenogamous (Guo et al. 2019). Similar observations have been made for *T. hongkongensis* (Mar & Saunders 2015).

The seed dispersal mechanism of Thismiaceae species is poorly-studied, but the cup-shaped fruit of *Thismia* species points towards dispersal by rain splash (Mar & Saunders 2015; Coehlo et al. 2021).

Rarity

A remarkable common feature of most Thismiaceae is their apparent rarity (Stone 1980; Maas et al. 1986; Franke 2004). The majority of species are known exclusively from the type collection, which in some cases was made more than a century ago (Stone 1980; Maas et al. 1986). However, our knowledge about the occurrence of Thismiaceae may be considerably biased by the plants' ability to remain unnoticed by collectors. Most species are only known from remote areas where botanical inventories have yet to be carried out. Moreover, mycoheterotrophic plants can only be spotted when they are flowering or fruiting, mostly for a short period of time only and often in the wet season, when few botanists are eager or able to enter the forest. The rest of the year, they remain underground hiding from discovery (Fig. 4), and they may not even flower each year. Even when flowering, many species of *Thismia* may fail to protrude above the dense leaf litter and remain covered by fallen leaves. It is little wonder that these mycoheterotrophs are often spotted by mushroom hunters or by a botanist during a sanitary break; some species may be more abundant than we asume because we just fail to find them even when actively looking for them. The fact that new species are constantly being described and thus escaped discovery for a long time illustrates the secret nature of Thismiaceae species. Notorious is the discovery of two new *Afrothismia* species in Korup Forest Dynamic Plot in Cameroon (Sainge and Franke 2005; Sainge et al. 2005). This 50-ha plot was established in 1994 and is frequently monitored, yet two *Afrothismia* species escaped discovery for almost a decade, despite the fact that a path through the plot was also going through one of the *Afrothismia* populations (Franke 2007). Similarly, *Tiputinia foetida*, with a flower of 5 cm in diameter, was discovered in 2005 in a biological station in Ecuador growing within a meter of the path linking the station's dining hall to the laboratory (Woodward et al. 2007).

Figure 4. Root of *Thismia hillii* at Mount Pirongia, New Zealand. Photo by Vincent Merckx

The influence of collection effort has been addressed for the once-rare species *Thismia rodwayi* (Roberts et al. 2003; Wapstra et al. 2005). From its discovery in 1890 until 2002, there were only five records of *T. rodwayi* in Tasmania (Roberts et al. 2003). Since the discovery of two specimens at a new site in Tasmania, subsequent searches on this and other sites with similar habitat characteristics revealed several additional population and sites, and *T. rodwayi* is now known from at least 26 sites from 7 disparate locations in Tasmania (Wapstra et al. 2005). During searches in 2012 the plant was observed in high numbers at several sites throughout Tasmania, and appears to be a relatively common species of wet sclerophyll forest (Merckx & Wapstra 2013). Removing leaf litter at sites with suitable vegetation, it would usually take less than 5 minutes to locate specimens of *T. rodwayi* (pers. observ.; Fig. 5). As standard biological inventories fail to encounter species like *T. rodwayi* (Roberts et al. 2003), another conclusion that can be drawn from this study is that this species, and other inconspicuous Thismiaceae, can only be reliably recorded by targeted surveys. Because very few botanists search tropical rainforests specifically for mycoheterotrophic plants, the majority of collections result from chance encounters, hence explaining the lack of collections for so many Thismiaceae species and other mycoheterotrophic plants. The few intensive searches for mycoheterotrophic plants that have been carried out lead, in many cases, to the discovery of unexpected mycoheterotrophic plant diversity or even to the discovery of undescribed taxa (e.g., Franke 2007).

Figure 5. Flowers of *Thismia* (red dots) appearing after removal of the leaf litter. Blue Mountains, NSW, Australia. Photo by Vincent Merckx.

Since many mycoheterotrophic species, particularly those occurring in tropical rainforests, grow in inaccessible areas and are extremely difficult to spot (see above), it is impossible to declare any mycoheterotrophic species as extinct with confidence. Even when the type locality is destroyed and a species has not been seen for many decades, it is still possible that other populations escaped discovery. Sometimes species have been rediscovered after a notably long hiatus. *Haplothismia exannulata* was rediscovered at its type locality in India in 2000, 49 years after its discovery and only a few years after being declared “extinct” (Sasidharan and Sujanapal 2000). The second collection of *Thismia clavigera* (Thismiaceae) was made 115 years after the first and over 1,000 km from the type locality (Stone 1980). Similarly, 151 years passed between the first and second collection of *Thismia neptunis* in western Sarawak on Borneo (Sochor et al. 2018).

In other cases, however, chances for survival of the species seem grim because the type locality and surrounding habitat has been destroyed. One of the most famous, now destroyed, localities is the “Alto Macahé” near Nova Friburgo (Rio de Janeiro), which is part of the coastal rainforest of southeast Brazil. In the nineteenth century, John Miers and Auguste Glaziou collected many remarkable mycoheterotrophic plants at this location. As a result, Alto Macahé is the type locality of *Thismia fungiformis*, *T. caudata*, *T. macahensis*, *T. janeirensis*, and *T. glaziovii*. Of these species, only *Thismia janeirensis* and *T. glaziovii* were later collected at another location. All other species have not been recorded since the type collection, and because 95% of the original Mata Atlântica rainforest has been replaced by farmland (Prance et al. 2000; Murray-Smith et al. 2009), little hope remains that these species escaped extinction (Maas et al. 1986). A similar fate was suffered by the endemic Thismiaceae of Mount Cameroon, where most of the forest has been replaced by farmland, thereby destroying the type localities of *Oxygyne triandra*, *Afrothismia pachyantha*, and *A. winkleri* (Schlechter 1906, 1921). The latter species was later found at another nearby location (Mount Kupe), but *Oxygyne triandra* and *Afrothismia pachyantha* have not been collected for more than 100 years and may be extinct.

Arguably, the most mysterious of all Thismiaceae species is *Thismia americana*. This tiny species was discovered in August 1912 by Norma E. Pfeiffer in a low prairie near Chicago Illinois (USA) (Pfeiffer 1914; Fig. 6). *Thismia americana* was observed at this locality for several subsequent summers and was probably The type locality of *Thismia americana* has been replaced by an industrial complex, and numerous attempts to relocate this enigmatic species have been unsuccessful. Therefore, the species is currently listed as “possibly extinct” (Lewis 2002) last seen in 1916 (Merckx & Smets 2014).,

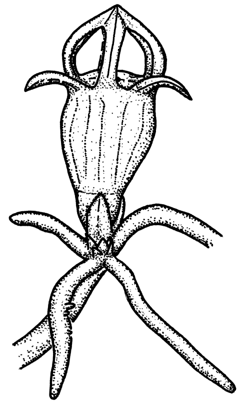

Figure 6. *Thismia americana.* Redrawn from Pfeiffer (1914).

While *Thismia* has a widespread distribution and covers a considerable variety of forest habitats, the occurrence of a *Thismia* species in a prairie in temperate North America, more than 3,500 km from the nearest *Thismia* site (southern Costa Rica), is truly remarkable. The average temperature in the Chicago area lowers to −5°C during winter, by far the lowest temperature for any Thismiaceae site. This led Pfeiffer (1914) to the suggestion that the plant was perennial and that the underground parts of the plant were able to hibernate. Based on morphological similarities, it has been suggested that the closest known relative of *T. americana* is *T. rodwayi* from Australia and New Zealand (Jonker 1938; Maas et al. 1986), forming one of the "most anomalous disjunctions known in flowering plants" (Thorne 1972, p. 407). However, this affinity is questionable, and most likely *T. americana* is most closely related to *Thismia* species from eastern Asia (Merckx & Smets 2014). Was this *Thismia* population the result of a human introduction, a recent long-distance dispersal, or the last remnant of an ancient boreotropical *Thismia* distribution? Unless the plant is rediscovered, this mystery will remain unsolved. Many people assume that the species is still present in the area. The only certainty is that if *T. americana* still exists, it is extremely difficult to find. In a letter to Prof. Warren H. Wagner in 1956, Pfeiffer recalled that it took her 3 h to relocate the plants when she returned to the exact same spot shortly after her first discovery.

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ZOOMINARS

IPPS Seminar series

August 4th, 2021

Francisco E. Fontúrbel - Cascade impacts of climate change on ecological interactions: lessons from a keystone mistletoe.

Climate change is triggering ecological responses all over the world as a result of frequent, prolonged droughts. It could also affect ecological interactions, particularly pollination and seed dispersal, which play a key role in plant reproduction. We used a tripartite interaction with a mistletoe, its pollinator, and its disperser animals to gain insight into this issue. We studied flower and fruit production, and visitation rates during average (2012) and dry (2015) austral summers. Drought in our study area affected precipitation and soil water availability. Although pollinator visits did not significantly differ in these summers, during the dry summer flower and fruit production experienced an important decline, as did seed disperser visits. Also, mistletoe mortality increased from 12% in 2012 to 23% in 2015. This empirical evidence suggests that the cascade effects of climate change may indirectly be hindering ecological interactions in the Valdivian temperate rainforest ecosystem we studied. Long-term research is essential to provide the knowledge necessary to understand how key ecological processes may be affected in a changing world.

Min-Yao Jhu - CcLBD25 functions as a key regulator of haustorium development in *Cuscuta campestris*

Cuscuta campestris is a stem parasite that attaches to its host, using haustoria to extract nutrients and water. We analyzed the transcriptome of six *C. campestris* tissue types and identified a key gene, LATERAL ORGAN BOUNDARIES DOMAIN 25 (CcLBD25), as highly expressed in prehaustoria and haustoria. Gene co-expression networks indicated that CcLBD25 could be essential for regulating cell wall loosening and organogenesis. We employed host-induced gene silencing by generating transgenic tomatoes expressing hairpin RNAs to down-regulate CcLBD25 in the parasite. Our results showed that *C. campestris* growing on CcLBD25 RNAi transgenic tomatoes transited to the flowering stage earlier and had reduced biomass compared with *C. campestris* growing on wild-type hosts, suggesting that parasites growing on transgenic plants were stressed due to insufficient nutrient acquisition. With our in vitro haustorium system, we found that *C. campestris* grown on RNAi tomatoes produced fewer prehaustoria than those grown on wild-type tomatoes, indicating that down-regulating CcLBD25 may affect haustorium initiation. *C. campestris* haustoria growing on RNAi tomatoes exhibited reduced pectin digestion and lacked searching hyphae, interfered with haustorium penetration and formation of vascular connections. The results of this study elucidate the role of CcLBD25 in haustorium development and might contribute to developing parasite-resistant crops.

September 1st, 2021

Soyon Park - Functional study of a mobile protein; Jasmonate-Induced Protein 23 (JIP23)
Abstract: We are increasingly aware of the exchange of macromolecules such as RNAs between *Cuscuta* and their hosts, but the functional significance of such transfer remains unclear. Recognizing that proteins are important functional molecules regardless of their site of synthesis, we sought to investigate mobile proteins in the parasite-host interaction. We explored the *Cuscuta campestris* / Arabidopsis thaliana system using liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS) to analyze total protein extracts from host and parasite stems near the haustorium region. We identified 97 mobile *Cuscuta* proteins in Arabidopsis stems and 447 mobile Arabidopsis proteins in *Cuscuta* stems. Among the most highly abundant *Cuscuta* mobile proteins found in the host was a 23 kDa *Cuscuta* Jasmonate-induced protein (CcJIP23). The mRNA encoding this protein was found in previous transcriptome analyses as mobile from *Cuscuta* to Arabidopsis and tomato hosts (Kim et al., 2014). JIP23 has not been well characterized in other plants, so we set out to identify the CcJIP23 function using various molecular techniques. Y2H screening revealed that CcJIP23 interacts to Arabidopsis l-3-ketoacyl CoA thiolase (AtKAT2) which is involved in the jasmonate synthesis pathway. Arabidopsis transgenic plants over-expressing CcJIP23 (35S::CcJIP23) had no JA-Ile induction under wounding stress. In sum, we hypothesize that *Cuscuta* produces CcJIP23, which may be mobile as a transcript, protein, or both, and once in the host acts to regulate the jasmonate pathway of the host plant, resulting in suppressed defense response against *Cuscuta*.

Damaris A. Odeny - What we know about sorghum-*Striga* interactions
Sorghum (*Sorghum bicolor* L.) is a diploid (2n=2x=20) drought tolerant cereal crop native to Africa. Among the many biotic challenges affecting successful production of sorghum in Africa is a parasitic weed, *Striga hermonthica*, which can result in up to 100% yield loss. Traditionally, farmers have managed *Striga* in sorghum fields using cultural and mechanical methods. There are now various recommended scientific methods for studying *Striga* both in the field and under contained conditions that have led to the identification of several *Striga* resistant/tolerant varieties. The reported mechanisms of resistance to *Striga* range from low germination stimulants to the creation of mechanical barriers. Despite the significant knowledge generated to enhance our understanding of sorghum-*Striga* interactions, *Striga* continues to destroy farmers' crops, suggesting there are still no lasting solutions to this obnoxious weed. We will provide an overview of studies done so far, covering the screening and gene discovery methods, mechanisms of resistance, sources of resistance and some candidate genes studied so far.

October 6th, 2021

Thomas Spallek - Signaling between *Phtheirospermum* and *Arabidopsis.*
I will present our ongoing work on the molecular communication between root parasitic plants of the Orobanchaceae family and their hosts. We mainly work with *Phtheirospermum japonicum* (Phtheirospermum), a euphytoid parasite, and its host *Arabidopsis thaliana* (Arabidopsis) - two model species that allow in-depth analysis of plant parasitism. In my talk, I will give an overview of how studying *Phtheirospermum* and Arabidopsis can help us to understand related crop-parasitizing species. I will present our recent work on potential substrates of subtilases expressed during infection. Subtilases are a class of proteases with diverse functions in plants. Subtilases are also required for the efficient maturation of the *Phtheirospermum haustorium* (Ogawa et al., 2021). Our data suggest that some of these subtilases process precursors of peptide hormones. The bio-active peptide is perceived by the parasite and may also play a role in host-parasite communication. Homologs are also present in parasitic weeds *Striga hermonthica* and *Striga* asiatica.

Immaculate Mwangangi - Enhancing sorghum post-attachment resistance against *Striga* by improved host nutrition
The use of *Striga* resistant cultivars is considered to be a crucial component in integrated *Striga* management. Studies also show that fertilizers may play a key role in the reduction of *Striga* infection levels and crop performance. The combination of *Striga* resistant germplasm and targeted host-plant nutrition is therefore proposed to be a feasible and effective integrated *Striga* management. To date, most research has focused on the role (macro-) nutrients play in pre-germination *Striga* resistance. Our understanding of the effect of host-plant nutrition on post-

germination *Striga* resistance is much more limited. In this study, we used rhizotron assays to determine the interaction between post-germination *Striga* resistance and host-plant nutrition. Three sorghum genotypes were selected based on their mechanism of post-attachment resistance (i.e., N13: mechanical barriers, Framida: hypersensitive response, IS9830: incompatibility reaction) and these were compared to a susceptible check (i.e., Ochuti). These four genotypes were subjected to four different nutrient treatments (F1: control, F2: macronutrients, F3: micronutrients and F4: macro and micronutrients). Our findings show that recommended levels of macronutrients, alone or in combination with micronutrients, generally increase post-germination *Striga* resistance whereas the application of only micronutrients has a weaker and more inconsistent effect on post-germination resistance. While these findings are awaiting confirmation, we are currently investigating their mechanistic explanation and also studying the nutritional effects on host-plant tolerance. This research project will enhance our understanding of the interaction between host-plant defense mechanisms and nutrition, which should ultimately lead to tailored management recommendations for *Striga*-affected smallholders in Africa.

November 3rd, 2021

Salim Al-Babili - Harnessing hormones and signaling molecules for combating *Striga*.
The root parasitic plant *Striga hermonthica* is one of the major threats to global food security and is a severe agricultural problem, particularly in sub-Saharan Africa. The dependency of *Striga* seed germination on host-released strigolactones (SLs), opens up different combating possibilities, including the suicidal germination strategy, which refers to application of SL analogs/mimics in host's absence, application of *Striga*-specific SL antagonists that inhibit *Striga* germination host's presence, and reducing the release of SLs. In the last years, we have explored, together with our collaborators, the potential of these hormone-based possibilities. We have developed SL analogs and tested their efficiency in inducing *Striga* seed germination in lab, greenhouse, and in infested farmer's fields in Burkina Faso. For this purpose, we have established an application protocol for rain-fed agriculture, which makes the suicidal germination strategy applicable in sub-Saharan Africa. Indeed, our field trials show clear reduction in *Striga* infestation. Following serendipity discovery that unraveled the detergent Triton X-100 as a tightly binding ligand of the *Striga* SL receptor ShHTL7, we combined structural elements of Triton X-100 with those of trizole ureas known to inhibit SL perception in host plants and developed *Striga* specific seed germination inhibitors. Greenhouse tests confirmed the inhibition activity of the developed compounds, which provides a basis for further developments. Finally, we synthesized mimics of the regulatory, carotenoid-derived metabolite zaxinone that promotes growth and inhibits SL biosynthesis and release in rice. Greenhouse tests confirmed the activity of zaxinone and its mimics in promoting growth and alleviating *Striga* infestation.

Stéphane Muños - Use of the genetic diversity within *Helianthus* for the resistance to sunflower broomrape.
The sunflower broomrape (*Orobanche cumana*) is an obligate parasitic plant that attaches to the sunflower roots. These very small seeds (approx. 200 µm) remain dormant in the soil until a molecule produced by sunflower root exudates is detected and induces its germination. Once connected to the vascular system of the sunflower root, it will uptake water and nutrients from the host to develop an underground tubercle before a flower shoot emerges from the ground. *O. cumana* populations are found from southern Spain to China. They differ in their genetic diversity, their level of virulence and aggressiveness. While most cultivated sunflowers are susceptible to broomrape, there are many resistance mechanisms among the 52 wild *Helianthus* species. I will present how these resistances are used to improve the resistance of the cultivated sunflower varieties and how they can provide a better understanding of the interaction mechanism.

December 1st, 2021-11-18

Kateřina Knotková - Interactions between and parasitic plants and invasive hosts: the experimental evidence.
Plant invasions are a component of global change that threatens biodiversity and impacts ecosystems worldwide. The main concerns of traditional invasion biology were exclusively alien invaders, but expansions of native species (native invaders) have recently been shown to have comparable effects on biota. Preventing further invasion, reducing invasive species, and

restoring the original diversity represent a major global challenge.

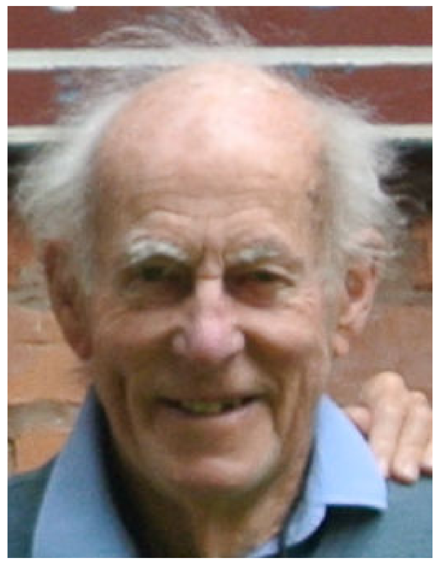
Biological control represents a significant component of plant invasion management. Parasitic plants may be used within the Biotic Resistance Hypothesis framework, which relies on antagonistic ecological interactions between the invader and its generalist native enemy. Therefore the recent experience suggests mainly root hemiparasites and parasitic vines (*Cuscuta*, *Cassytha*) with relatively wide host ranges as potential biocontrol agents.

Our recent project focuses on gathering systematic empirical evidence on the interactions between alien and native invasive plants and root-hemiparasites in the Czech Republic. We have conducted an extensive pot experiment testing parasite-invader combinations. Pilot field trials were consequently established for the promising associations. Among all the candidate invader-hemiparasite pairs, we identified *Melampyrum arvense* and *Odontites vernus* as hemiparasites, which may suppress alien invaders *Solidago gigantea*, and *Symphyotrichum lanceolatum*. For these, we established detailed field experiments. Just after one year, *Melampyrum* proved to be highly successful against *Solidago* and moderately against *Symphyotrichum*. With *Odontites*, we encountered issues with its establishment, which we hope to overcome next year. Additional hemiparasite-host combinations still wait to be tested.

Emily Bellis - Evolution of parasitic plant-host interactions from gene to continent scales
Understanding how species interactions evolve across diverse environments is a key question for evolutionary ecology. This talk presents the results of our recent work demonstrating that patterns of adaptation to local host communities emerge at broad scale in the parasitic plant *Striga hermonthica*, and follow up work investigating the genetic mechanisms of parasite specialization to different cereal hosts.

YOUR EDITOR AT 90

I recently enjoyed celebrating my 90th birthday, but hope to continue helping to produce Haustorium for some time yet. Co-incidentally around that time I was honoured with an invitation to contribute to the new (virtual) issue of Plants journal as a 'tribal elder' in the subject of Parasitic Weeds and their Control and my 'Personal history' is listed below. I am indebted to Coby Goldwasser and Evgenia Dor for the invitation and for their patience in the process of its editing, and to Lytton Musselman for his help and support in its preparation. I have also to acknowledge Lytton's help and encouragement over a period of nearly 50 years since we met at the first international meeting in Malta in 1973. Most of the developments in which I have been involved, including Haustorium would not have happened without his energy and initiative.



And the Parker involvement may continue beyond my eventual departure. Grandson Adam is pursuing a PhD at Sheffield University and has recently authored a detailed review 'Epigenetics: a catalyst of plant immunity against pathogens' (https://nph.onlinelibrary.wiley.com/doi/full/10.1111/nph.17699?af=R) There is no mention of parasitic plants, but some of our readers may find it of interest. Long live Lamarck!

Chris Parker

PRESS REPORTS

Does mistletoe help treat cancer? An evidence-based look

Mistletoe extracts are commonly prescribed to people with cancer in some European countries. Prescription mistletoe products are usually injected under the skin and are typically used in

combination with traditional cancer treatments such as chemotherapy.
Mistletoe extract contains a variety of biologically active compounds that have powerful immune-modulating effects, which may be effective in cancer treatment. Some research suggests that mistletoe extract may be beneficial in improving quality of life, survival, and symptoms in people with cancer. However, researchers have voiced concerns about the reliability and mixed results of existing studies.

Study results suggest that prescription mistletoe products are generally safe. However, if you have cancer, discuss any medication or supplement changes with your oncology team to ensure safety.

NB This is a heavily abridged version of the full report which can be found at: https://www.healthline.com/nutrition/mistletoe-and-cancer

(See also Loef and Walach, 2020, below.)

An app to help African farmers defeat crop pests (abridged)

African smallholder farmers face major challenges from weeds such as *Striga* and insect pests such as fall armyworm. Fall armyworm is a serious threat to food security and livelihoods. But a solution exists – 'push-pull technology' – and it avoids the need to use harmful and expensive chemical pesticides. Push-pull technology is a scientific method of planting crops such as maize and sorghum alongside particular species of forage grasses and legumes, which repel pests and suppress weeds. The method was developed by scientists at the International Centre of Insect Physiology and Ecology (icipe) in Kenya with partners and is designed to protect the plants against devastating pests like the fall armyworm and the *Striga* weed, with the companion plants also improving soil fertility.

But a major challenge is how to communicate advice and information about this crop management technique to millions of smallholder farmers in sub-Saharan Africa. To help address this challenge, a new mobile phone app – called 'Push-Pull' – has been launched by Agape Innovations Ltd, in collaboration with a team of scientists from the University of Leeds, Keele University and icipe. The app is part of a larger project called 'Scaling up Biocontrol Innovations in Africa' funded by the Global Challenges Research Fund (GCRF), which seeks to understand how biocontrol methods have been used across Africa and to encourage their uptake. The project involves a cluster of previous GCRF-funded research programmes, including the Leeds-led AFRICAP project (https://africap.info/)

Principal Investigator Dr Steve Sait, from Leeds' School of Biology, said: 'The push-pull method of pest control is decades old and is used successfully by thousands of smallholder farmers across Africa. 'We hope that this collaboration, and this new app, can help us extend knowledge of this technique to potentially millions of other farmers who could be benefitting from it. Compared to chemical pesticides, push-pull costs less money to the farmer, results in less damage to their crops, and it avoids harming other insect species that play valuable roles in the ecosystem. The Push-Pull app, which has launched today, is available on Android phones. It has been designed to work on the basic smartphones that are being increasingly used by smallholder farmers in Africa. It gives farmers information they need to get started with push-pull farming, and is not only free but will work offline, meaning a lack of internet connection in rural regions will not affect its function. 'At Agape, we built the Push-Pull app as a global tool to equip a farmer with all that is needed for a successful push-pull garden. Embedded with audio, visual and graphical expressions we are certain that the Push-Pull app will be relevant to maize and sorghum farmers worldwide for both today and tomorrow in controlling fall armyworm, *Striga* and maize stalk borer.'

The Push-Pull app can be downloaded on the Google Play website

Environment news 11 August 2021

Botanists name astonishing new species of 'fairy lantern' from Malaysian rainforests

Oxford University scientist, Dr Chris Thorogood, from Oxford Botanic Garden teamed up with Siti-Munirah at the Forest Research Institute Malaysia, and local explorer, Dome Nikong, to describe a strange plant from the depths of the Malaysian rainforest.

So-called 'fairy lanterns' (genus *Thismia*) are among the most extraordinary-looking of all flowering plants. These curious, leafless plants grow in the darkest depths of remote rainforests where they are seldom seen. There are some 90 species worldwide, distributed across the forests of Asia, Australasia, South America, and the USA. They all lack true leaves and chlorophyll, obtaining their food from root-associated fungi shared with other green plants. Their mysterious flowers emerge just briefly, and often under leaf litter, so few people are lucky enough to encounter them.

Scientists at Oxford and in Malaysia have just described a species of fairy lantern completely new to science. It was first discovered by rainforest explorer Dome Nikong in 2019 who, astonishingly, found the plant growing along a popular tourist track on Gunung Sarut, a mountain located in the Hulu Nerus Forest Reserve in the state of Terengganu. In February 2020, Dome Nikong was joined by a team of botanists including researcher Siti-Munirah. To their dismay, the only known 'fairy lantern' plants had been destroyed by wild boars except for a single fruiting specimen.

Examining the little material collected from the two trips, Siti-Munirah and Dr Chris Thorogood, who is Deputy Director and Head of Science for Oxford Botanic Garden and Arboretum and lecturer at the Department of Plant Sciences, were able to describe and illustrate the new species. They examined the architecture of the flower – its shape, colour and surface characteristics. They found that it has a unique and peculiar orange, lantern-like flower with pillars holding up a so-called 'mitre' – an umbrella-like structure, the function of which is a mystery.

Together, the scientists named the plant *Thismia sitimeriamiae* after Dome's mother Siti Meriam, honouring the support she has given his life's dedication to conservation work in Terengganu, Malaysia. The plant's unique and remarkable 'mitre', colour and surface texture make *Thismia sitimeriamiae* among the most eye-catching plants ever described from Peninsular Malaysia. Dr Chris Thorogood says, 'The extraordinary architecture of the flower raises interesting questions about how it is pollinated'.

See also:
https://www.sciencealert.com/enchantingly-strange-fairy-lanterns-discovered-growing-in-a-malaysian-rainforest

THESIS

2020. Mistletoes as keystone species in pine woodlands: exploring the ecological consequences of a new interaction cocktail. PhD, University of Granada. Advisors Zamora Rodríguez, Regino Jesús**;** Hodar Correa and José Antonio.

Abstract
In this thesis, a study is made of the different roles that the European mistletoe (*Viscum album* subsp. *austriacum*) can play simultaneously in a Mediterranean pine forest, and their ecological consequences generating multiple plant–plant and plant–animal interactions in their ecosystem. Due to their hemiparasitic nature, the mistletoe has been traditionally regarded as a host pathogen, causing detrimental effects on growth, morphology, and reproduction. However, recently other ecological interactions that mistletoe establishes in the forest ecosystem have been found to be noteworthy, not only with its host but also with the rest of the community where they live. Consequently, the presence of mistletoe in the forest canopy can cause direct and indirect effects in their ecosystem through trophic and non– trophic relationships, favoring the restructure of community composition. Therefore, this thesis has been split into three main parts examining the role of mistletoe: I) as a keystone resource for its associated arthropods

(Chapters 1–3); II) as direct competitor with its host (Chapters 4–5); and III) as indirect competitor with host–feeding herbivores (Chapter 6) and facilitator for the herbaceous community (Chapter 7). From a holistic view, it is concluded that mistletoes are keystone species that trigger a series of interactions with important ecological consequences at the community level, causing direct and indirect effects at different trophic levels. This has profound implications for the dynamics of the forest ecosystem, restructuring the entire community, from nutrient dynamics and herbaceous community to primary and secondary consumers. Thus, by simultaneously providing new resources while acting as a competitor and facilitator, mistletoes become ecosystem engineers, building an additional level of heterogeneity to the forest canopy and amplifying biodiversity and complexity in their ecosystem.

ANNUAL REPORT

Annual Report 2019-2020. Society for Cancer Research, Arlesheim, Switzerland: 44pp. Contents include a brief chapter by F. Pelzer on *Viscum album* therapy for relieving fatigue in cancer, and one by H. Rahm on Christoph Surbeck's role in cultivating *V. album* in his apple orchard, specifically for therapeutic research and use, before he died of cancer. Also a look back at Rudolf Steiner's role in promoting mistletoe use, and a look in to the future of the subject.

COMPOSITE FILES

All issues of Haustorium are available in two PDF documents, 'Haustorium1-48' and 'Haustorium49-80 (shortly to be amended to 49-81) on Lytton Musselman's Haustorium website - https://ww2.odu.edu/~lmusselm/haustorium/index.shtml **- these can be searched for species, author etc.**

FORTHCOMING MEETINGS

The 16th World Congress on Parasitic Plants, Nairobi, Kenya 10-15 July 2022. https://www.parasiticplants.org/2021/10/16th-world-congress-on-parasitic-plants-10-15-july-2022-nairobi-kenya/

Bioherbicides 2021 – Overcoming the barriers to adoption of microbial bioherbicides. Postponed to late 2022. Bari, Italy, dates to be confirmed. https://bioherbicides2021.wordpress.com/

19th EWRS International Symposium, Lighting the future of weed science. Athens, 20-23 June 2022 including sessions: Parasitism–mechanisms and molecular basis; Distribution and impact of parasitic weeds; Control of parasitic weeds. full programme – 19th International Symposium (ewrs2022.org)

WSSA and CWSS joint meeting, Vancouver, February 21-25, 2022 2022 WSSA/ CWSS Joint Annual Meeting

GENERAL WEB SITES

For individual web-site papers and reports see: (some 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/ (may be temporarily unavailable)??

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

*Abdalla, M.M.F., Saleh, H.M. and Khater, M.A. 2020. Detection of genetic variations in *Orobanche crenata* using inter simple sequence repeat (ISSR) markers. Bulletin of the National Research Centre 44(139): (https://doi.org/10.1186/s42269-020-00390-0) [Detecting extensive genetic variation in all populations of *O. crenata* in Egypt.]

Abdallah, F. and 9 others. 2020. Wild *Lathyrus* species as a great source of resistance for introgression into cultivated grass pea (*Lathyrus sativus* L.) against broomrape weeds (*Orobanche crenata* Forsk. and *Orobanche foetida* Poir.). Crop Science 61(1): 263-276. [13 species of *Lathyrus* showed complete resistance to *O. crenata* and *O. foetida* in *L. articulatus* and moderate resistance in *L. aphaca* and *L. ochrus*. Two accessions of *L. sativa,* IG64782 and IG65197, showed complete resistance to *O. crenata* associated with reduced germination and slow tubercle development.]

Acharya, B.D., Bista, A., Jyawali, S. and Darai, N.K. 2021. Evaluation of non-host crops as trap crops to reduce *Orobanche* seed bank in tomato fields. Journal of Research in Weed Science 4(3): 210-217. [*Capsicum frutescens*, *Cicer arietinum*, *Lens culinaris* and *Vicia faba* were classified as highly potential trap crops and reduced seed bank of *Phelipanche aegyptiaca* by at least 50%/]

Adhityo Wicaksono, Sofi Mursidawati and Molina, J. 2020 A plant within a plant: insights on the development of the *Rafflesia* endophyte within its host. Botanical Review 87(2): 233-242. [Post-germination, the *Rafflesia* endophyte, within its *Tetrastigma* host, forms a clonal network of vegetative meristematic cells separated by the dividing host tissue; each meristematic cell cluster eventually developing into the primordial floral bud or protocorm.]

*Adu, G.B., Badu-Apraku, B. and Akromah, R. 2021. Strategies for selecting early maturing maize inbred lines for hybrid production under low soil nitrogen and *Striga* infestation. Agronomy 11(7): (https://doi.org/10.3390/agronomy11071309) [100 inbred lines screened under low N and *S. hermonthica.* The character most associated with good results was Ear Aspect. 49 lines identified as *Striga*-resistant.]

Afolabi, S., Menkir, A., Oyekunle, M., Abdullahi, U., Gedil, M., Meseka, S. and Mengesha, W. 2021. Assessing performance of white endosperm testers with varying resistance reactions to *Striga* (*Striga hermonthica*) for evaluating resistant maize (*Zea mays*) inbred lines. Plant Breeding 140(5): 786-800.

*Ahmed, S.E.D.A.E.G., Messiha, N.K., El-Masry, R.R. and El-Dabaa, M.A.T. 2020. The dual allelopathic capacity of two Brassicaceae plants' seed powder in controlling *Orobanche crenata* infesting *Pisum sativum* as well as stimulating its growth and yield. Bulletin of the National Research Centre 44(17): (https://doi.org/10.1186/s42269-020-0276-6) [Pot experiments with unrealistic doses of powdered seeds of *Eruca sativa* and *Sinapis arvensis,* also dazomet applied 1 week before planting peas, apparently suppressed *O. crenata* and improved crop growth.]

Aleksandrov, V.V., Aleksandrov, T.B., Cruzado, L.L. and Escamilla, R.J.A. 2021. Controlled transition in a model of biomass dynamics of root hemiparasitic plants. Moscow University Mechanics Bulletin 76: 111–117. (https://doi.org/10.3103/S0027133021040026) ['Showing the possibility of solving the problem of the transition between periodic and point attractors in the bistable Rosenzweig–MacArthur model with modifications for the dynamics of root hemiparasitic plants and their hosts.']

Ali, M.A., Rahman, M.O., Lee Joongku, Al-Hemaid, F., Kambhar, S.V., Meena Elangbam and Gurung, A.B. 2020. Dissecting molecular evolutionary relationship of Krameriaceae inferred from phylotranscriptomic analysis. Bangladesh Journal of Plant Taxonomy 27(2): 427-433. [Phylotranscriptomic analyses infer evolutionary relationships of *Krameria lanceolata* with *Tribulus eichlerianus* and *Larrea tridentata* in the family Zygophyllaceae.]

Aliche, E.B., Screpanti, C., de Mesmaeker, A., Munnik, T. and Bouwmeester, H.J. 2020. Science and application of strigolactones. New Phytologist 227(4): 1001-1011. [Exploring various aspects of strigolactone function and highlighting distinct areas of agriculture that may benefit from their use, but also identifying possible bottlenecks.]

Ancheta, M.H. 2021. Distribution modeling of *Rafflesia schadenbergiana* and *Rafflesia consueloea* using multi criteria decision analysis-analytical hierarchy process in GIS. Journal of Degraded and Mining Lands Management 8(4): 2903-2909. [Finding *R. schadenbergiana* grew best at 20-22°C and *R. consueloea* at 24-25°C.]

*Anderson, B.M., Krause, K. and Petersen, G., 2021. Mitochondrial genomes of two parasitic Cuscuta species lack clear evidence of horizontal gene transfer and retain unusually fragmented ccmF<inf>C</inf> genes. BMC Genomics 22: https://doi.org/10.1186/s12864-021-08105-z) [Working with *C. australis* and *C. campestris*.]

Anteyi, W.O. and Rasche, F. 2020. Role and in vivo localization of *Fusarium oxysporum* f. sp. *strigae* and *Bacillus subtilis* in an integrated *Striga hermonthica* biocontrol system. PhytoFrontiers 1(1): 51-61. [Application of *B. subtilis* depressed the effect of *F. oxysporum* f. sp. *strigae* on *S. hermonthica*.]

Anton, F.G. and Rîsnoveanu, L. 2020. Sunflower genotypes from *Nardi fundulea* in field infestation with broomrape in Braila area, in year 2019. "Ion Ionescu de la Brad", Romania, 63(1): 91-94. [Identifying sunflower hybrid H19 as the most resistant to *Orobanche cumana* races G and H at the National Agricultural Research and Development Institute, Fundulea, Romania.]

Arti Garg, Singh, R.K. and Kholia, B.S. 2020. *Pedicularis raghvendrae* (*Orobanchaceae*), a new species from Sikkim Himalaya, India. Phytotaxa.452(1): 110-115. [Describing *P. raghvendrae* closely related to *P. pantlingii* in series *Furfurae.*]

Asodewine, P.A., Lamptey, S. and Dzomeku, I.K. 2021. Pearl millet-cowpea intercrop effect on *Striga hermonthica* and grain yield. Indian Journal of Weed Science 53(2): 146-152. [Varieties Akad-kom and Naad-kohblug show some tolerance of *S. hermonthica* and are recommended as sole crops or intercropped with cowpea (1:1) in NE Ghana.]

*Ataei, N., Schneeweiss, G.M., García, M.A., Krug, M., Lehnert, M., Valizadeh, J. and Quandt, D. 2020. A multilocus phylogeny of the non-photosynthetic parasitic plant *Cistanche* (Orobanchaceae) refutes current taxonomy and identifies four major morphologically distinct clades. Molecular Phylogenetics and Evolution 151: 106898. [Analysis of three plastid markers and one nuclear marker, using maximum parsimony, maximum likelihood and Bayesian inference separated 12 species of *Cistanche* into four geographically differentiated clades: East Asian Clade, Northwest African Clade, Southwest Asian Clade and Widespread Clade. These do not correspond with previous classifications.]

Atencio, N.O., Vidal-Russell, R., Chacoff, N. and Amico, G.C. 2021. Host range dynamics at different scales: host use by a hemiparasite across its geographic distribution. Plant Biology 23(4): 612-620. [*Tristerix corymbosus* was studied across 22 localities in Chilean matorral and temperate forest. *Aristotelia chilensis* was the most parasitized in the temperate forest, with *Populus* sp. the most in the matorral.]

Balasubramanian, A., Prasath, C.N.H., Radhakrishnan, S. and Sivaprakash, M. 2021. Host-specific influence on early growth and physiological attributes of sandal (*Santalum album*) grown in farmlands. Journal of Environmental Biology 42(4) (Supplement Issue):1162-1167. [Studying the growth of *S. album* with and without an N-fixing host *Dalbergia odorifera* at different levels of N fertilizer.]

*Badu-Apraku, B., Fakorede, M.A.B., Akinwale, R.O., Adewale, S.A. and Akaogu, I.C. 2021. Developing high-yielding *Striga*-resistant maize in sub-Saharan Africa. CAB Reviews 16: 030. (10.1079/PAVSNNR202116030) [Reviewing the work of IITA in identifying quantitative trait loci for resistance to *Striga hemonthica* in extra-early white and extra early yellow maize.]

*Badu-Apraku, B. , Obisesan, O. , Olumide, O.B. and Toyinbo, J. 2021. Gene action, heterotic patterns, and inter-trait relationships of early maturing pro-vitamin A maize inbred lines and performance of test crosses under contrasting environments. Agronomy 11(7): (https://doi.org/10.3390/agronomy11071371) [Hybrids TZEIOR 4 × TZEIOR 158 and TZEIOR 119 × TZEIOR 158 were outstanding in performance and show promise for possible commercialization to combat malnutrition with tolerance of *Striga hermonthca*.]

* Bandaoud, F., Kim, G., Larose H., Westrwood, J., Zermane, N. and Haak, D. 2021. GBS analysis of *Orobanche crenata* populations in Algeria supports local adaptation and host-specialization. [Authorea.S(eptember 24): (DOI: 10.22541/au.163245464.46250620/v1 (10.22541/au.163245464.46250620/v1) [Using Genotyping-By-Sequencing to study variation across 10 populations of *O. crenata* and finding some variation according to distance but more pronounced differences across the 5 main hosts, with pea having an SNP profile distinct from faba bean, chickpeas, carrot and tomato.]

Bao GenSheng, Song MeiLing, Wang YuQin, Liu Jing and Wang HongSheng. 2020. (Interactive effects of different densities of *Pedicularis kansuensis* parasitism and *Epichloë* endophyte infection on the endogenous hormone levels and alkaloid contents of *Stipa purpurea*.) (in Chinese) Acta Prataculturae Sinica 29(4): 147-156. [Confirming that infection by the endophyte significantly reduced the damage caused to *S. purpurea* and could therefore have potential to assist recovery of degraded grassland in the Qinghai Tibet Plateau where *P. kansuensis* is widely distributed.]

Baráth, K. 2021. Effect of species environment on host preference of *Cuscuta campestris*. Plant Ecology 222(9): 1023-1032. [The frequency and intensity of *C. campestris* infestations varied greatly amongst 174 detected host species in Hungary. Frequently parasitized hosts are not necessarily preferred. Most host species have infestations of varying intensity in different species environments.]

*Bari, V.K., Nassar, J.A. and Aly, R. 2021. CRISPR/Cas9 mediated mutagenesis of *MORE AXILLARY GROWTH 1* in tomato confers resistance to root parasitic weed *Phelipanche aegyptiaca*. Scientific Reports 11(2): (https://doi.org/10.1038/s41598-021-82897-8) [Demonstrating that CRISPR/Cas9-mediated targeted editing of the strigolactone biosynthetic gene *MAX1* in tomato confers resistance to *P. aegyptiaca*.]

Bari, V.K., Nassar, J.A., Meir, A. and Aly, R. 2021. Targeted mutagenesis of two homologous ATP-binding cassette subfamily G (ABCG) genes in tomato confers resistance to parasitic weed *Phelipanche aegyptiaca*. Journal of Plant Research 134(3): 585-597. [CRISPR/Cas9-mediated targeted mutagenesis of two genes, *ABCG44* (*Solyc08g067610*) and *ABCG45* (*Solyc08g067620*), in tomato significantly reduces orobanchol in the root exudate and abolishes germination of the root-parasitic weed *P. aegyptiaca*.]

*Bascos, E.M.A., Fernando, E.S., Duya, M.V. and Rodriguez, L.J.V. 2021. Beginnings of a plant parasite: early development of *Rafflesia consueloae* inside its *Tetrastigma* host. Planta 254(3): (https://doi.org/10.1007/s00425-021-03710-4) [Infection begins within the vascular cambium where the endophyte appears to initially reside prior to their radial spread to the vascular tissues. The parasite may persist in the host tissues for prolonged periods as small cell clusters without transitioning to the reproductive stage. However, floral shoots may develop in scarcely infected host tissues indicating that extensive endophyte growth within the host is not a prerequisite to the onset of reproductive development.]

Becher, H., Powell, R.F., Brown, M.R., Metherell, C., Pellicer, J., Leitch, I.J. and Twyford, A.D. 2021. The nature of intraspecific and interspecific genome size variation in taxonomically complex eyebrights. Annals of Botany 128(5): 639-651. [Studying genome size in 192 individuals of *Euphrasia* spp., concluding that there was considerable variation intra- as well as inter-specifically. Diploids varied according to isolation-by-distance, while in tetraploids size increased with latitude in outcrossing *E. arctica*, but with little genome size variation in the highly selfing *E. micrantha*. Concluding that genome size was an outcome of polygenic variation affected by hybridization.].

Bellisa, E.S and 15 others. 202 0. Genomics of sorghum local adaptation to a parasitic plant. Proceedings of the National Academy of Sciences of the United States of America 117(8): 4243-4251. [Experiments with CRISPR-Cas9-edited sorghum indicate that the benefit of low-stimulant-mediated resistance (apparently associated with the long-term occurrence of *Striga hermonthica*) strongly depends on parasite genotype and abiotic environment and comes at the cost of reduced photosystem gene expression. Our study demonstrates long-term maintenance of diversity in host resistance genes across smallholder agroecosystems, providing a valuable comparison to both industrial farming systems and natural communities.]

Bilonozhko, Yu.O., Rabokon, A.M., Postovoitova, A.S., Kalafat, L.O., Pryvalikhin, S.M., Demkovych, A.Ye, Blume, Ya.B. and Pirko, Ya. 20211. Intraspecific differentiation in white mistletoe (*Viscum album* L.) using the analysis of intron length polymorphism of β-tubulin genes and the SSR analysis. Cytology and Genetics

55(1): 1-9. [β-tubulin analysis was shown to be more useful for differentiating between *V. album* ssp. *austriacum* and *V. album* ssp *album*, whereas the SSR analysis was more suitable for studying genotypic variability within a particular subspecies.]

Bozukov, H. and Dagnon, S. 2021. Study of the conditions of synthesizing scopolentin in tobacco plants and scopolentin capacity as a means of controlling *Orobanche* spp. Bulgarian Journal of Crop Science 58(1): 46-49. [Showing that the roots of tobacco plants infected with *Tomato spotted wilt virus* show increase scopoletin and increased resistance to *Orobanche* sp. (probably *O. cernua*).]

* Boukteb, A., Sakaguchi, S., Ichihashi, Y., Kharrat, M., Nagano, A.J., Shirasu, K. and; Bouhadida, M. 2021. Analysis of genetic diversity and population structure of *Orobanche foetida* populations from Tunisia using RADseq. Frontiers in Plant Science 12: (https://doi.org/10.3389/fpls.2021.618245) [A study using UNEAK, pyRAD and Stacks showed that genetic differentiation occurred in the Tunisian *O. foetida* emphasizing the isolation by distance effect. However, no strong population clustering was detected.]

Braguy, J. and 13 others. 2021. Seedquant: a deep learning-based tool for assessing stimulant and inhibitor activity on root parasitic seeds. Plant Physiology 186(3): 1632-1644. [Using the Faster Region-based Convolutional Neural Network algorithm to count germinated *Striga hermonthica* seeds in routine germination tests showed an accuracy of 94% in counting seeds and reduced the required time from approximately 5 min to 5 seconds per image. Proposed software, SeedQuant can be further trained to count different types of seeds for research purposes.]

Burns, K.C. 2021. Gender dimorphism in the virulence of a dioecious mistletoe. International Journal for Parasitology 51(12): 985-987. [Finding that female plants of *Misodendrum quadrifolium* grow larger than the male, and cause greater reduction of photosynthesis in the host (*Nothofagus pumili*).]

Cai, L., Arnold, B.J., Xi, Z., Khost, D.E., Patel, N., Hartmann, C.B., Manickam, S., Sasirat, S., Nikolov, L.A., Mathews, S., Sackton, T.B., and Davis, C.C. 2021. Deeply altered genome architecture in the endoparasitic flowering plant *Sapria himalayana* Griff. (Rafflesiaceae). Current Biology 31:1002-1011.e1009. [The nuclear genome of *Sapria* has lost 44% of the genes conserved in eurosids. Remaining genes have either very long or very short introns and at least 1.2% of the genome is the result of horizontal gene transfer.]

Caires, C.S. and Proença, C.E.B. 2020. Return to the original concept and new typification of *Loranthus spicatus* (Loranthaceae), an economically important neotropical mistletoe. Taxon 69(6): 1342-1349. [Tabula 68 published in *Selectarum stirpium americanarum historia* in 1763 is proposed as lectotype.]

Carmona-Gallego, I., Murillo-Serna, J.S., Roldán, F.J. and Alzate-Guarín, F. 2020. A new species of *Oryctanthus* (Loranthaceae) from Colombia. Phytotaxa 470(2): 186-193. [A new mistletoe from Antioquia Colombia, *O. perticus* is named. Its taxonomic affinities and conservation status are discussed.]

*Ceriotti, L.F., Roulet, M.E. and Sanchez-Puerta, M.V. 2021. Plastomes in the holoparasitic family Balanophoraceae: extremely high AT content, severe gene content reduction, and two independent genetic code changes. Molecular Phylogenetics and Evolution 162: (https://pubmed.ncbi.nlm.nih.gov/34029719/ [The plastomes of *Lophophytum leandri* and *Ombrophytum subterraneum* (Balanophoraceae) have lost the gene *trnE*, have high AT, and utilize a different genetic code where the stop codon TGA codes for tryptophan.]

*Chaudron, C., Mazalová, M., Kuras, T., Malenovský, I. and Mládek, J. 2021. Introducing ecosystem engineers for grassland biodiversity conservation: a review of the effects of hemiparasitic *Rhinanthus* species on plant and animal communities at multiple trophic levels. Perspectives in Plant Ecology, Evolution and Systematics 52: (https://doi.org/10.1016/j.ppees.2021.125633) [Reviewing the literature on the impacts of root hemiparasites such as *Rhinanthus* spp. on plant communities, herbivores, predators, pollinators, and soil biota. Concluding that they can be valuable for suppressing grass species and encouraging diversity of plants, pollinators and herbivores; also possibly for suppressing invasive species.]

Chesterfield, R.J., Vickers, C.E. and Beveridge, C.A. 2020. Translation of strigolactones from plant hormone to agriculture: achievements, future perspectives, and challenges. Trends in Plant Science 25(11): 1087-1106. [Reviewing how manipulation of strigolactone signalling can be used when developing new tools and crop varieties to address critical challenges, such as nutrient acquisition, resource allocation, stress tolerance, and plant-parasite interactions.]

Chi FangHe, Liu Xi, Zhang FengYao, Pu JinBao, Chen JianBo and Chen ZhengHai. 2021. (Notes on the seed plant flora of Zhejiang (X).) Journal of Zhejiang Forestry Science and Technology 41(3): 79-84. [A new record of *Taxillus chinensis*.]

Chileen, B.V., McLauchlan, K.K., Higuera, P.E., Parish, M. and Shuman, B.N. 2020. Vegetation response to wildfire and climate forcing in a Rocky Mountain lodgepole pine forest over the past 2500 years. Holocene 30(11): 1493-1503. [Pollen analyses show an increase in *Arceuthobium* spp. ca 1200 years ago when winters became wetter.]

*Choi KyoungSu and Park Seonjoo. 2021. Complete plastid and mitochondrial genomes of *Aeginetia indica* reveal intracellular gene transfer (IGT), horizontal gene transfer (HGT), and cytoplasmic male sterility (CMS). International Journal of Molecular Sciences 22(11): (https://doi.org/10.3390/ijms22116143) [Complete chloroplast and mitochondrial genome assemblies of *A. indica* showing evidence for intracellular and horizontal gene transfers.]

Cirocco, R.M., Watling, J.R. and Facelli, J.M. 2020. The combined effects of water and nitrogen on the relationship between a native hemiparasite and its invasive host. New Phytologist 229(3): 1728-1739. [Results suggested that stem hemiparasites such as *Cassytha pubescens* can better extract resources from hosts (such *as Ulex europaeus*) when water availability is high, resulting in a greater impact on the host under these conditions. When hemiparasitic plants are being investigated for biocontrol of invasive weeds, they may be more effective in wetter habitats than in drier ones.]

Clapco, S., Martea, R. and Duca, M. 2020. (The relationship between genetic distance and geographical distance in some populations of *Orobanche cumana* Wallr. from Moldova.) (in Romanian) Ştiinţa Agricolă 2020(1): 73-80 [Principal coordinate analysis revealed a clear grouping of populations of *O. cumana* from central and southern Romania into two clusters, regardless of their race (E-H).]

Clapco, S., Port, A., Wang Chao and Duca, M. 2020. The study of broomrape diversity in different sunflower cultivating countries based on morphological arameters of parasite seeds. "Ion Ionescu de la Brad" Iasi, Seria Agronomie 63(1): 135-140. [Comparing the precise dimensions of *Orobanche cumana* seed from a wide range of countries showed no significant differences.]

Costa, C.deM., Boaretto, A.G., Ferreira, P.P.A., Silva, S.S.da, Nepomuceno, S.C., Silva, D.B. and Alves, F.M. 2020. New records of *Cuscuta* L. (Convolvulaceae) in Central-West Brazil. Check List 16(6): 1725-1729. [*Cuscuta platyloba*, *Cuscuta partita* and *Cuscuta xanthochortos* var. *carinata* are cited for the first time from Mato Grosso do Sul state.]

Costea, M., da Silva, S., Simão-Bianchini, R., Simões, A., and Stefanović, S. 2021. Notes on the systematics of *Cuscuta* sect. *Subulatae* (subg. *Grammica*) with the description of *Cuscuta mantiqueirana*, a new species from Brazil. PhytoKeys 184: 27-44. (doi:doi:10.3897/phytokeys.184.69037) [Morphological and phylogenetic analyses showed the new species to be a component of subg. *Grammica* sect. *Subulatae*.]

Costea, M., Elmiari, H., Farag, R., Fleet, C. and Stefanović, S. 2020. *Cuscuta* sect. *Californicae* (Convolvulaceae) revisited: 'cryptic' speciation and host range differentiation. Systematic Botany 45(3): 638-651. [Molecular methods were used to clarify the *C. californica* complex in California, finding that that its members displayed different host ranges, and also confirmed a new species *C. diffilis* differing from *C. brachycalyx* in subtle calyx lobe and corolla tube shape differences.]

Cuadra-Valdés, J., Vizentin-Bugoni, J. and Fontúrbel, F.E. 2021. An exotic magnet plant alters pollinator abundance and behavior: a field test with a native mistletoe. Biological Invasions 23(8): 2515-2525. [*Eucalyptus globulus* acts as an exotic magnet species and apparently alters the behavior of the hummingbird that pollinates *Tristerix corymbosus* (Loranthaceae). Hummingbirds visited mistletoe flowers more frequently early in the morning at the plantations and in the afternoon at the native forests.]

Da Costa-Lim, J.L. and Chagas, E.C.deO. 2021. Typification and synonymy of the Atlantic Forest endemic species *Napeanthus primulifolius* (Gesneriaceae). Webbia 76(1): 89-95. [Concluding that *Pedicularis acaulis* is a synonym of *N. primulifolius*.]

Dancák, M., Hroneš, M. and Sochor, M. 2020. *Thismia*: the rarest of the rare? Ranges of some Bornean species are much larger than previously believed. Phytotaxa 455(4): 245-261. [Describing newly-discovered populations of 6 species of *Thismia* spp. across Borneo.]

Dancák, M., Hroneš, M. and Sochor, M. 2020. *Thismia ornata* and *T. coronata* (*Thismiaceae*), two new species from Sarawak, Borneo. Willdenowia 50(1): 65-76. [Describing *Thismia ornata* and *T. coronata*, the former from several sites in W. Sarawak, and the latter at only one site in N. Sarawak.]

Delbac, L., Rusch, A. and Thiéry, D. 2020. Temporal dynamics of *Drosophila suzukii* in vineyard landscapes. Entomologia Generalis 40(3): 285-295. [Egg deposition and emergence of *D. suzukii* occurred on nine wild and cultivated species in a French vineyard area, including *Viscum album*.]

*Dhliwayo, V., Gasura Edmore, Nyakurwa, C.S., Mabasa, S., Mashingaidze, A.B. and Setimela, P. 2021. Germplasm bred for resistance to *Striga hermonthica* exhibited high resistance levels to *Striga asiatica* compared to commercial checks. Advances in Agriculture 2021: 9915370. (https://doi.org/10.1155/2021/9915370) [From screening of maize genotypes, ex IITA, in Zimbabwe, Ax31, Ax28, Ax7, and Ax32 proved resistant to *S. asiatica*.]

Dieni, Z., Tignegre, J.B.delaS, Batieno, B.T.J., Zida, F.W.M.S. and Congo, A.K. 2021. Inheritance and allelic relationships of *Alectra vogelii* Benth. resistance genes in cowpea genotypes B301 and KVx414-22-2. Journal of Agricultural Science (Toronto) 13(8): 10-15 . [Studying the genes conferring resistance to *A. vogelii* in the cowpea in Burkina Faso, concluding there are two dominant genes in B.301, and an unrelated dominant gene in KVx414-22-2.]

Dipankar Borah,Singh, R.K. Arti Garg. 2020. Rediscovery of *Pedicularis denudata* (Orobanchaceae), a little known, rare herb after 135 years from India. Phytotaxa 461(2): 136-138.

Du Chao and 10 others. 2020. (Ecological effect for sunflowers furrow film ridge drought-resistant planting technique in Hetao irrigated area.) (in Chinese) Journal of Northern Agriculture 48(3): 55-59. [In this region of NW China, irrigation can lead to salinity/alkalinity problems - lack of irrigation to drought and damage from '*Orobanche cernua'* (= *O. cumana*). Mechanical one-time furrow opening, fertilization, plastic film covering the bottom of the trench to the top of the slope, and seed sowing on the shoulder of the slope resulted in improved sunflower yield and reduced *O. cumana.*]

Duca, M. and Bivol, I. 2021. Discriminating ability of ISSR markers in the revealing of the genetic polymorphism in Turkish broomrape populations. Abstracts, Agribalkan 2021. III Balkan Agricultural Congress, Edirne, Turkey: 297. [Analysis of informativity level and discriminatory capacity for 14 ISSR-markers shows this it is applicable for the assessment of intra- and interpopulation genetic polymorphism for species *O. cumana* from different regions of Turkey.]

*Durbecq, A., Buisson, E., Jaunatre, R., Cluchier, A. and Bischoff, A. 2021. Seedling recruitment in mountain grassland restoration: effects of soil preparation and grazing. 24(1): (https://doi.org/10.1111/avsc.12564) [Soil preparation by harrowing reduced the competition from existing vegetation and improved the establishment of introduced *Rhinanthus alectorolophus*.]

Durlik, K., Żarnowiec, P., Piwowarczyk, R. and Kaca, W. 2021. Culturable endophytic bacteria from *Phelipanche ramosa* (Orobanchaceae) seeds. Seed Science Research 31(1): 69-75. [Isolating *Brevibacterium frigoritolerans* and *Bacillus simplex*, regarded as plant growth-promoting rhizobacteria, from within seeds of *P. ramosa*.]

***Dvorakova, M., Hylovaa, A., Soudek, P., Retzer, K., Spichal, L. and Vanek, T. 2021. Resorcinol-type strigolactone mimics as potent germinators of the parasitic plants *Striga hermonthica* and *Phelipanche ramose*.. Journal of Natural Products 81(11): 2321–2328. [Reporting the synthesis of resorcinol-type strigolactone mimics related to debranones, highly stable even at alkaline pH levels and able to induce seed germination of *Striga hermonthica* and *Phelipanche ramosa* at low concentrations.]**

Efimov, P.G., Yu, K.G., Kuropatkin, V.V. and Popov, E.S. 2021. (Additions to the "conspectus of the vascular flora of Pskov region.) (in Russian) Botanicheskii Zhurnal 106(8): 807-814. [Noting the new occurrence of *Cuscuta campestris.*]

Eiseman, C.S. 2020. Further nearctic rearing records for phytophagous muscoid flies (Diptera: Anthomyiidae, Scathophagidae). Proceedings of the Entomological Society of Washington 122(3): 595-603. [Parasitoids and other associates are discussed for *Gimnomera cerea* (Coquillett) (Scathophagidae), which feeds in seed capsules of *Pedicularis canadensis* L.]

:*El-Dabaa, M.A.T. and Abd-El-Khair, H. 2020. Applications of plant growth promoting bacteria and *Trichoderma* spp. for controlling *Orobanche crenata* in faba bean. Bulletin of the National Research Centre 44(4): (08 January 2020). (https://bnrc.springeropen.com/articles/10.1186/s42269-019-0263-y) [*Bacillus subtilis* and *B. pumilus* applied to soil 1 week before sowing were somewhat less effective than glyphosate in controlling *O. crenata*, but resulted in improved growth of faba bean.]

Ensing, D.J., Sora, D.M.D.H. and Eckert, C.G. 2021. Chronic selection for early reproductive phenology in an annual plant across a steep, elevational gradient of growing season length.

Evolution : International Journal of Organic Evolution 75(7): 1681-1698. [Analysis of selection on five phenological traits for three generations of *Rhinanthus minor* at 12 sites across the Canadian Rocky Mountains shows that although selection was weak for most traits, it consistently favored early flowering across the entire gradient rather than only under short seasons.]

Facelli, E., Wynn, N., Tsang, H.T., Watling, J.R. and Facelli, J.M. 2020. Defence responses of native and invasive plants to the native generalist vine parasite *Cassytha pubescens* - anatomical and functional studies. Australian Journal of Botany 68(4): 300-309. [*C. pubescens* failed to form functional haustoria on the native *Acacia myrtifolia* but developed well on the invasive *Cytisus scoparius*, suggesting that *C. pubescens* could be considered for biocontrol.]

*Fernández-Aparicio, M., Lidia del Moral, Muños, S., Velasco, L. and Pérez-Vich, B. 2021. Genetic and physiological characterization of sunflower resistance provided by the wild-derived OrDeb2 gene against highly virulent races of *Orobanche cumana* Wall. Theoretical and Applied Genetics 2021: (https://doi.org/10.1007/s00122-021-03979-9) [Locating and studying OrDeb2, a dominant resistance gene against races F and G on chromosome 4.]

Fitzpatrick, C.R. and Schneider, A.C. 202. Unique bacterial assembly, composition, and interactions in a parasitic plant and its host. Journal of Experimental Botany 71(6) 2198-2209. [Studying the complex inter-relations of root bacteria inhabiting *Orobanche hederae* and hosts *Hedera* spp.]

Friday, C. and Scasta, J.D. 2020. Checklist of vascular plants for Wind River Indian Reservation (USA) high-elevation basins: ecological drivers of community assemblages. Plant Ecology and Evolution 153(2): 292-311. [*Castilleja flava* identified as an important component of vegetation.]

Furuhashi, K., Iwase, K. and Furuhashi, T. 2021. **Role of light and plant hormones in stem parasitic plant (*Cuscuta* and *Cassytha*) twining and haustoria induction.** Photochemistry and Photobiology 97(5): 1054-1062. [Showing that blue light is essential for twining, and a lower far-red/red light (FR/R) ratio is important for subsequent haustoria induction in both genera.]

*Gao FangLei, Alpert, P. and Yu FeiHai. 2021. [Parasitism induces negative effects of physiological integration in a clonal plant. New Phytologist 229(1): 585-592. (https://doi.org/10.1111/nph.16884) [Testing the hypothesis that clonal integration, which often increases fitness of clonal plants, may decrease when some (but not all) connected ramets within a clone are parasitized. Results indicate that parasitism can cause clonal integration to negatively affect fitness, possibly because parasites can import resources from connected, but unparasitized ramets through signaling.]

Gao FangLei, He QiaoSheng, Xie RuQian, Hou JiaHui, Shi ChenLu, Li JunMin and Yu FeiHai. 202312. Interactive effects of nutrient availability, fluctuating supply, and plant parasitism on the post-invasion success of *Bidens pilosa*. Biological Invasions 23(10): 3035-3046. [Showing the effect of *Cuscuta australis* in supressing the invasive weed *B. pilosa* (in China) when nutrient availability was low and fluctuating, but not under other nutrient conditions.]

Gebremedhin, Z., Alemayehu, G. and Ayalew, D. 2021. Intercropping different legumes for striga (*Striga hermonthica* del Benth) management and enhancement of Sorghum productivity in north west Ethiopia. Journal of Crop and Weed 17(1): 1-12. [Comparing sole crop sorghum with the crop inter-planted with legumes soybean, haricot bean, mung bean, and cowpea. All legumes substantially reduced the infestation of *S. hermonthica* without significantly reducing sorghum yield and improving overall productivity. Cowpea was the most favourable, followed by soyabean.]

Gibot-Leclerc, S., Connault, M., Perrpone, R. and Dessaint, F. 2021. Differences in seed germination response of two populations of *Phelipanche ramosa* (L.) Pomel to a set of GR24 concentrations and durations of stimulation. Seed Science Research 31(3): 243-248. [Showing distinct differences in response to GR24 between populations of *P. ramosa* from tobacco and oilseed rape.]

Glazkova, E.A. and Liksakova, N.S. 2020. New and rare adventive species of vascular plants in the Kuril Islands. (in Russian) Botanicheskii Zhurnal 105(12: 1226-1234. [A first record of *Rhinanthus minor*.]

Glazkova, E.A. ansd Liksakova, N.S. 2021. New and rare vascular plant species of the Kuril islands: distribution, ecology, and population status. Contemporary Problems of Ecology 14(2): 128-137. [A first record for *Pedicularis adunca* for the Kuril Islands in far eastern Russia.]

*Goldwasser Y., Rabinovitz, O., Gersil, Z., Hsser, A., Paporisch, A., Kuzikaro, H., Sibony, M. and Rubin, B. 2021. Imazapic herbigation for Egyptian broomrape (*Phelipanche aegyptiaca*) control in processing tomatoes—laboratory and greenhouse studies. Plants 10; (https://doi.org/10.3390/plants10061182) [Studying, under laboratory and greenhouse conditions, the factors involved in the behavior of soil-herbigated imazapic, and its resulting influence on *P. aegyptiaca* and tomato plants. Effects on the parasite only occur after absorption by tomato, but its movement to newly formed roots is limited.]

Granados-Hernández, L.A., Pisanty, I., Raventós, J., Márquez-Guzmán, J. and Mandujano, M.C. 2021. Better alone? A demographic case study of the hemiparasite *Castilleja tenuiflora* (Orobanchaceae): a first approximation. Population Ecology 63(2): 152-164. [Confirming that *C. tenuifolia* can mature without a host but is stronger on any of 19 local host species in Central Mexico, the best being *Piqueria trinervia.*]

*Gray, E.R., Russell, M.B. Windmuller-Campione, M.A. 2021. The difficulty of predicting eastern spruce dwarf mistletoe in lowland black spruce: model benchmarking in northern Minnesota, USA. Forests 12(7): (https://doi.org/10.3390/f12070843) [Using a Bayesian hierarchical model to explore what features of stand structure or composition influencing occurrence of *Arceuthobium pusillum* in *Picea mariana.*]

Greifenhagen, A., Braunstein, I., Pfannstiel, J., Yoshida, S., Shirasu, K., Schaller, A. and Spallek, T. 2021. **The *Phtheirospermum japonicum* isopentenyltransferase PJIPT1a regulates host cytokinin responses in Arabidopsis.** New Phytologist 23(4) 1582-1590. [During parasitism, the *Phtheirospermum* haustorium transfers hypertrophy-inducing cytokinins to the infected host root. [Identifying the enzyme that induces response to the hypertrophy-inducing cytokinins transferred through the haustorium of *P. japonicum* to the infected host root.]

Gu Xi, Chen IngGin, Harding, S.A.,Nyamdari, Ortega, M.A., Clermont, K., Westwood, J.H. and Tsai ChungJui. 2021. Plasma membrane phylloquinone biosynthesis in nonphotosynthetic parasitic plants. Plant Physiology 185(4): 1443-1456. [Findings suggest that nonphotosynthetic holoparasites such as *Phelipanche aegyptiaca* exploit alternative targeting of phylloquinone, normally involved in photosystem I electron transport, for transmembrane redox signaling associated with parasitism.]

*Gu Xi, Chen IngGin and Tsai ChungJui. 2021. **How do holoparasitic plants exploit vitamin K1?** Plant Signaling and Behavior 16(11): (https://doi.org/10.1080/15592324.2021.1976546) [as above.]

Gwada, R.O., Bett, H.K. and Sibiko, K. 2021. Effect of integrated pest management technology on the livelihoods of small-scale maize producers. Review of Agricultural and Applied Economics 24(1): 37-55. [A survey of 240 farms concluded that uptake of push-pull technology to control *Striga hermonthica* in Kenya improved household health and wealth. Analysing the factors influencing uptake and recommending literacy development, extension training, and resource availability to encourage further uptake.]

*Haan, N.L., Bowers, M.D. and Bakker, J.D. 2021. Preference, performance, and chemical defense in an endangered butterfly using novel and ancestral host plants. Scientific Reports 11(1): (https://doi.org/10.1038/s41598-020-80413-y) [*Euphydryas editha* feeds on the native *Castilleja hispida* and *C. levisecta,* and now on the exotic *Plantago lanceolata* on which it grows more strongly, but it has retained breadth in preference and ability to use other hosts.]

Habtamu Demelash Tamir. 2021. Application of marker assisted selection for *Striga hermonthica* resistance on sorghum (*Sorghum bicolor* (L.) Moench. Asian Plant Research Journal 7(3): 15-26. [Describing marker-assisted selection and emphasizing its value in exploiting inheritance traits or low germination stimulant production for developing varities resistant to *S. hermonthica.*]

Haran, J.M. 2021. This study reviews the species of the tribe Smicronychini Seidlitz, 1891 found in southern Africa. European Journal of Taxonomy 735: 34-73. [Describing 18 species of *Smicronyx* and related genera, 12 of them newly described and their association with a number of families including Orobanchaceae.]

Heer, N., Klimmek, F., Kurtogullari, Y., Prati, D., Rieder, N.S., and Boch, S. 2021. Density effects of two hemiparasitic *Melampyrum* species on grassland plant diversity. *Tuexenia* 41: 411–422. [Intermediate densities of the two hemiparasite species (13 and 40% cover for *M. arvense* and *M. nemorosum*) gave the highest total vascular plant species richness.]

*Hegenauer, V. and 19 others. 2020. The tomato receptor CuRe1 senses a cell wall protein to identify *Cuscuta* as a pathogen. Nature Communications 11(10): (https://doi.org/10.1038/s41467-020-19147-4) [Identifying a glycine-rich protein which serves as a pathogen-associated molecular pattern and specifically binds and activates a membrane-bound immune receptor in the resistant tomato, the Cuscuta Receptor 1, leading to a defence response in resistant hosts.]

Hong Truong Luu, Hieu Cuong Nguyen, Huu Dang Tran, Quoc Dat Nguyen and Tran Quoc Trung Nguyen. 2020. *Balanophora aphylla* (Balanophoraceae), a new holoparasitic species from Vietnam. Annales Botanici Fennici 57(1/3): 67-70. [From the central highlands of Vietnam, *B. aphylla* differs from *B. latidepala* in features of tuber, ovary, spadicles and anther cells.]

Jhu, M.Y., Ichihashi, Y., Farhi, M., Wong, C. and Sinha, N.R. 2021. *Lateral organ boundaries domain 25* functions as a key regulator of haustorium development in dodders. Plant Physiology 186(4): 2093-2110. Analysing the transcriptome of 6 *C. campestris* tissues and identifying a key gene, *LATERAL ORGAN BOUNDARIES DOMAIN 25* (*CcLBD25*) as highly expressed in prehaustoria and haustoria. And generating *CcLBD25* RNAi transgenic tomatoes on which growth of *C. campestris* was reduced.]

Jiang ZhengQiang and 10 others. 2021. Host sunflower-induced silencing of parasitism-related genes confers resistance to invading *Orobanche cumana*. Plant Physiology 185(2): 424-440. [Recombinant tobacco rattle virus vectors were constructed to express RNA interference inducers to cause virus-induced gene silencing in sunflower, resulting in suppression of *O. cumana* infection. The possible interference mechanism is also discussed by analyzing RNAi machinery genes in *O. cumana.*]

Kakpure, M.R. 2020. Some noteworthy plants record to the flora of Yavatmal district, Maharashtra, India. Tropical Plant Research 7(3): 604-608. [Recording *Striga asiatica* and *Orobanche cernua*.]

Kapitonova, O.A. 2020. Additions to the vascular flora of the Tyumen region, Western Siberia. Acta Biologica Sibirica 6: 339-355. [Noting *Pedicularis dasystachts*.]

Kara, A. and Ata, E. 2021. (Determination of weed species, density and frequency of occurence in the vineyards of tekirdağ province.)Journal of Tekirdag Agricultural Faculty 18(2): 333-343. [Including observation that *Cuscuta monogyna* can occur, causing weakening of the vines.]

***Kavuluko. J., Runo, S. and 9 others. 2021. GWAS provides biological insights into mechanisms of the parasitic plant (*Striga*) resistance in sorghum BMC Plant Biology 21: (https://doi.org/10.1186/s12870-021-03155-7) [Describing a wide range of techniques for assessing mechanisms of resistance to *S, hermonthica* in sorghum and the genes involved.]**

*Kawada, K., Uchida, Y., Takahashi, I., Nomura, T., Sasaki, Y., Asami, T., Yajima, S. and Ito, S. 2020. Triflumizole as a novel lead compound for strigolactone biosynthesis inhibitor. Molecules 25(23): (https://doi.org/10.3390/molecules25235525) [Triflumizole reduced the levels of 4-deoxyorobanchol in root exudates from rice, inhibiting the enzymatic activity of Os900, a rice enzyme that converts the SL intermediate carlactone to 4DO. Treated rice showed reduced germination of *Striga hermonthica*.]

Kędziora, W., Bobińska, A. and Wójcik, R. 2010. (Proposition of a large-scale mistletoe inventory method.) (in Polish) Sylwan 164(7): 568-575. [*V. album* is causing increasing damage to Polish forests due to increasing drought. An inventory method involved the assessment of study of random 15-tree plots.]

*Kefelegn, G.A. and Desta, B. 2021. *Ximenia americana*: economic importance, medicinal value, and current status in Ethiopia. The Scientific World Journal 2021: (https://doi.org/10.1155/2021/8880021) [Reviewing the status of *X. americana* as a food, medicine, essential oil source, and industrial component to other product and noting that its existence is threatened by deforestation.]

Komeil, D.A. and Badry, H.H. 2021. Arbuscular mycorrhizal fungi improved host-plant resistance against crenate broomrape in faba bean. Asian Journal of Plant Sciences 20(3): 477-487. [A mixture of arbuscular mycorrhizal fungi isolated from a maize rhizosphere in soils in Alexandria, Egypt, reduced *Orobanche crenata* and significantly improve growth in both susceptible Nubaria1, and tolerant Giza843 faba bean varieties.]

Kosachev, P.A, Yang ZongZong, Chi JianCai, Ma, M. and Nahmat, N. 2021. Three species of *Pedicularis* L. (Orobanchaceae) new to china found in Xinjiang. Turczaninowia 24(2): 5-11. [Describing *P. alatauica* , *P. compact*. and *P. pubiflora*.]

Kösters, L.M., Wiechers, S., Lyko, P., Müller, K.F. and Wicke, S. 2021. *WARPP*-web application for the research of parasitic plants. Plant Physiology 185(4): 1374-1380. [Introducing the *Web Application for the Research of Parasitic Plants* (*WARPP*) as an online resource dedicated to advancing research and development of parasitic plant biology. The initial set of online tools includes a genome browser that centralizes genomic information for sequenced parasitic plant genomes, an orthogroup summary detailing the presence and absence of orthologous genes in parasites compared with nonparasitic

plants, and an ancestral trait explorer showing the evolution of life-history preferences along phylogenies.]

Krivosheina, N.P. and Krivosheina, M.G. 2021. New data on the larvae of the hover-fly genus *Eumerus* Meigen, 1822 (Diptera, Syrphidae). Entomological Review101(2): 162-173. [Describing the larvae of *E. arnoldii* and *E. ammophilus* from the stems of *Orobanche* spp. (unspecified in abstract).]

*Kruh, L.I., Bari, V., Abu-Nassar, J., Lidor, 0. and Aly, R. 2020. Characterization of an endophytic bacterium (*Pseudomonas aeruginosa*), originating from tomato (*Solanum lycopersicum* L.), and its ability to inhabit the parasitic weed *Phelipanche aegyptiaca*. Plant Signaling and Behavior 15(7): (https://www.tandfonline.com/doi/full/10.1080/15592324.2020.1766292) [An isolate of *Pseudomonas aeruginosa* from tomato which reduces *Orobanche* parasitism was shown to produce twice the *P. aeruginosa* quinoline signal, which was found to transfer to the parasite.]

*Krupp, A.C., Bertsch, B. and Spring, O. 2021. Costunolide influences germ tube orientation in sunflower broomrape – a first step toward understanding chemotropism. Plant Science., (August 2021) (https://doi.org/10.3389/fpls.2021.699068) [A rare confirmation of the significance of chemotropism in a parasitic weed. Showing that costunolide (but not GR24) had a dual function of stimulating germination of *O. cumana* and causing it to grow towards the root of sunflower.]

*Kumar, K. and Amir R. 2021. The effect of a host on the primary metabolic profiling of *Cuscuta campestris* main organs, haustoria, stem and flower. Plants 10(10): (https://doi.org/10.3390/plants10102098) [Identifying significant differences in the metabolic profiles of *C. campestris* that developed on the different hosts, *Heliotropium hirsutissimum, Polygonum equisetiforme* and *Amaranthus viridis,,* suggesting that the parasites rely highly on the host's metabolites, but changes in the metabolites' contents between the organs that developed on the same host suggest that the parasite can also self-regulate its metabolites.]

*Kurotani, K.I. and 9 others. 2020. Host-parasite tissue adhesion by a secreted type of β-1,4-glucanase in the parasitic plant *Phtheirospermum japonicum*. Communications Biology 3(7): (https://doi.org/10.1038/s42003-020-01143-5) [Showing that *P. japonicum* can be grafted on to interfamily species, proving insights into the commonality between parasitism and grafting in plants.]

Lakić, B. 2020. (Influence of wind on damage of fir and spruce in beech forests with fir and spruce.) (in Croatian) Naše Šume 18(60/61): 40-46. [Noting presence of *Viscum album* ssp. *abietis* on *Abies alba* in Bosnia and Herzegovina.]

Lapirov, A.G., Belyakov, E.A. and Lebedeva, O.A. 2021. Effects of duration and conditions of storage on germination of seeds of *Pedicularis sceptrum-carolinum* (Orobanchaceae). Regulatory Mechanisms in Biosystems 12(2): 234-239. [In a study in Russia, best germination of is *P. sceptrum-carolinum*as obtained by storing dry seeds at 2-3°C for 3-6 months. Severe cold (- 26 °C) was less favourable.]

Lara, C., Xicohténcatl-Lara, L. and Ornelas, J.F. 2021. Differential reproductive responses to contrasting host species and localities in *Psittacanthus calyculatus (Loranthaceae)* mistletoes. Plant Biology 23(4): 603-611. [Finding that fruit formation, percentage of fruits formed, and pollen viability were similar regardless of host species or locality.]

Lázaro-González, A. 2020. Mistletoes as keystone species in pine woodlands: exploring the ecological consequences of a new interaction cocktail. PhD Thesis, Universidad de Granada. [See THESIS above]

Lázaro-González, A., Gargallo-Garriga, A., Hódar, J.A., Sardans, J., Oravec, M., Urban, O., Peñuelas, J., and Zamora, R. 2021. Implications of mistletoe parasitism for the host metabolome: A new plant identity in the forest canopy. Plant, Cell & Environment 44: 3655-3666. [Ecometabolomic techniques were used to study the *Viscum album-Pinus nigrum* system. Antioxidant metabolites increased in the pines, suggesting oxidative stress, as well as metabolites required by mistletoe.]

Lázaro-González, A., Hódar, J.A. and Zamora, R. 2020. Ecological assembly rules on arthropod community inhabiting mistletoes. Ecological Entomology 45(5): 1088-1098. [Studying how ecological factors drive changes in arthropod communities inhabiting *Viscum album* subsp. *austriacum*, in a Mediterranean pine forest.]

*Le Ru, A., Ibarcq, G., Boniface, M.C., Baussart, A., Muños, S. and Chabaud, M. 2021. Image analysis for the automatic phenotyping of *Orobanche cumana* tubercles on sunflower roots. Plant Methods 17(80): (https://doi.org/10.1186/s13007-021-00779-6) [Describing a phenotyping tool, RhizOSun, for the automatic counting of the number of tubercles on the roots of sunflower grown in Plexiglas boxes for rapid assessment of large numbers of accessions to a range of races of *O. cumana*.]

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. [Concluding that use of variety Deber, combined with chlorsulfuron and nitrogen fertilizer were optimal for yield and control of *Striga hermonthica*.]

Letemariam Desta and Dawit F. Weldearegay. 2021. Effects of Chlorsulfuron 75% WDG herbicide and varieties on *Striga* control and sorghum yield in Tigray, Ethiopia. Asian Journal of Research in Crop Science. 5(3): 11-19. [Apparently duplicating the above.]

Li JuanJuan, Li Xin, Han Peng, Liu Hui, Gong JianChuan, Zhou WeiJun, Shi BiXian, Liu Ake and Xu Ling. 2021. Genome-wide investigation of *bHLH* genes and expression analysis under different biotic and abiotic stresses in *Helianthus annuus* L. International Journal of Biological Macromolecules 189: 72-83. [Concluding that *HabHLH024* is a potential candidate gene in breeding sunflower for resistance to *Orobanche cumana.*]

Li Rongde and 9 others. 2021. The identification of new sunflower varieties resistant to *Orobanche cumana* in field. Abstract in: Duca, M. (Ed.): International Congress of Geneticists and Breeders from the Republic of Moldova, Chişinău, Moldova, 15-16 June 2021: 94. [Assessing the resistance of 36 sunflower varieties in 2 districts of Inner Mongolia, where races F and G predominated. 20 varieties were immune to race F and 16 to race G.]

Li SuHua and 10 others. 2021. Strigolactone mimic 2-nitrodebranone is highly active in Arabidopsis growth and development. Plant Journal 107(1): 67-76. [Evaluating a suite of debranones and finding 2-nitrodebranone more active than GR24 in various aspects of *Arabidopsis* growth but less active in stimulating germination of *Orobanche cumana*.]

Li Tao, Zhang Ling, Deng YunShuang, Deng XiaoLing and Zheng Zheng. 2021. Establishment of a *Cuscuta campestris*-mediated enrichment system for genomic and transcriptomic analyses of '*Candidatus* Liberibacter asiaticus'. Microbial Biotechnology14(2): 737-751. [Finding that *C. campestris* parasitizing citrus infected with the non-culturable α-proteobacterium *'Candidatus* Liberibacter asiaticus' which causes citrus greening, could accumulate 30-200 times the concentration of the pathogen, providing material for more detailed genomic analysis.]

Li Xin, Yang JunBo, Wang Hong, Song Yu, Corlett, R.T., Yao Xin, Li DeZhu and Yu WenBin. 2021. **Plastid NDH pseudogenization and gene loss in a recently derived lineage from the largest hemiparasitic plant genus *Pedicularis* (Orobanchaceae).** Plant and Cell Physiology 62(6): 971-984. [Invesstigating the evolutionary dynamics of plastomes in the monophyletic and recently derived *Pedicularis* sect. *Cyathophora.* We obtained 22 new plastomes, 13 from the six recognized species of section *Cyathophora*, six from hemiparasitic relatives and three from autotrophic relatives. NA(D)H dehydrogenase, *accD* and *ccsA* have lost function multiple times, with the function of *accD* being replaced by nuclear copies of an *accD*-like gene in *Pedicularis* spp. The study provides evidence for plastome evolution in the transition from autotrophy to heterotrophy.]

Liu WenSheng, Zheng Li and Qi DanHui. 2020. Variation in leaf traits at different altitudes reflects the adaptive strategy of plants to environmental changes. Ecology and Evolution 10(15): 8166-8175. [A study of 3 species, including *Pedicularis densispica* in the Yulong M0untains, China, showed leaf length and width decreasing and leaf thickness increasing at higher elevations, helping to reduce transpiration, enhanced internal temperature and improved photosynthesis.]

*Lobulu, J., Shimelis, H., Laing, M.D., Mushongi, A.A. \and Shayanowako, A.I.T., Characterization of maize genotypes (*Zea mays* L.) for resistance to *Striga asiatica* and *S. hermonthica* and compatibility with *Fusarium oxysporum* f. sp. strigae (*FOS*) in Tanzania. Agronomy 11(5): (https://doi.org/10.3390/agronomy11051004) [In a study in Tanzania of 56 maize genotypes with some resistance to *Striga* spp., resistance was enhanced by combination with *F. oxysporum*.]

*Loef, M. and Walach, H. 2020. Quality of life in cancer patients treated with mistletoe: a systematic review and meta-analysis. BMC Complementary and Alternative Medicine20 .227. (https://doi.org/10.1186/s12906-020-03013-3) [Using the Cochrane Risk of Bias tool version 2, a comprehensive meta-analysis of 26 publications with 30 data sets suggests that extracts of *Viscum album* provide a significant, medium-sized effect on quality of life in cancer.]

Luminita, B-D. and Ion, N. 2020. Physiological particularities of the species *Viscum album L. ssp.album* and *Loranthus europaeus jack*, hemi-parasites on lignuous species from the Comanesti forest, Romania. Annals of the University of Craiova - Agriculture, Montanology, Cadastre

Series 50(2): 52-60. [Studies on *Viscum album* on *Acer campestre*, and *Loranthus eurpaeus* on *Quercus cerris*.]

Luminita, B-D. and Ion, N. 2020. Parasitic plants and their physiological interactions in the natural ecosystems. Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series 50(2): 42-51. [Studies in Romania on the physiology of *Cuscuta campestris* and *Orobanche caryophyllacea*.]

*Luyang Hu, Jiansu Wang, Chong Yang, Faisal Islam, Bouwmeester, H.J., Muños, S. and Weijun Zhou. 2021. The effect of virulence and resistance mechanisms on the interactions between parasitic plants and their hosts. 2020. International Journal of Molecular Sciences 21(23): 9013 (https://doi.org/10.3390/ijms21239013) [Discussing the virulence mechanisms of parasitic plants and resistance mechanisms in their hosts, focusing on *Orobanche* and *Striga.* Proposing a mechanism by which host plants use NLR (nod-like receptor) proteins to activate downstream resistance gene expression. Also discussing use of CRISPR/Cas9-mediated genome editing and RNAi for deeper insight into the life cycle of parasitic plants and potentially for their control.]

Machin, D.C. and Bennett, T. 2020. Nature Plants 6(6): 602-603. [New research shows that, unexpectedly, response to strigolactone bypasses the core gibberellin-dependent pathway for germination in both *Striga* and *Arabidopsis*.]

Makaza, W., Rugare, T., Mabasa S., Gasura, E., Gwatidzo, O.V. and Masndumba, E. 2021. In vivo and in vitro performance studies on groundnut (*Acharis hypogea* L.) genotypes for yellow witchweed (*Alectra vogelii* Benth.) resistance. Journal of Current Opinion in Crop Science 2(20): 165-1676. [Zimbabwean groundnut varieties Ljiva, Ilanda and Guinea fowl tolerated *A. vogelii* infection, whereas Dendera, Jessa, Nyanda and Tern were susceptible.]

*Maponga, T.S., Ndagurwa, H.G.T., and Witkowski, E.T.F. 2021. Functional and species composition of understory plants varies with mistletoe-infection on *Vachellia* karroo trees in a semi-arid African savanna. Global Ecology and ConservationVolume 32: (https://doi.org/10.1016/j.gecco.2021.e01897) [Infestation of *V. karroo* by ? significantly increased grass, forb and tree species diversity in the understory.]

*Marenya, P.P., Wanyama, R., Solomon Alemu and Woyengo, V. 2021. Trait preference trade-offs among maize farmers in western Kenya. Heliyon7(3): (10.1016/j.heliyon.2021.e06389) [Women farmers were prepared to make larger yield sacrifices for tolerance to drought, *Striga* resistance and good storability than men. Men showed higher willingness to sacrifice yield for closed tip.]

Martini, F. 2021. (Upgrades to the flora of Fruili Venezia Giulia (NE-Italy), new series. IV (85-117).) (in Italian) Gortania (Botanica, Zoologia) 41: 31-46. [Recording *Rhinanthus alectorolophus*.]

Masumoto, N. and 12 others. 2021. Three-dimensional reconstructions of haustoria in two parasitic plant species in the Orobanchaceae. Plant Physiology 185(4): 1429-1442. [Detailed descriptions of the spatial arrangements of multiple cell types inside haustoria of *Striga hermonthica* on rice, and *Phtheirospermum japonicum* on Arabidopsis.]

*Matthes, H. and 9 others. 2020. Statement to an insufficient systematic review on *Viscum album* L. therapy. Evidence-based Complementary and Alternative Medicine 2020: 7091039. (https://doi.org/10.1155/2020/7091039) [Criticising reviews by Freuding *et al.,* 2019, but supportive of that by Loef and Walach (above).]

*Mathieson, R.L. and Kenaley, S.C. 2021. The classification of dwarf mistletoes (*Arceuthobium* spp., Viscaceae) in section *Campylopoda*, series *Campylopoda.* Botany (15 November 2021) (https://doi.org/10.1139/cjb-2021-0108 [Demonstrating that pecies of populations ascribed to *A, campylpopodium* cvould more proper;y be re-defined as subspp. of *Arceuthobium abietinum*, *Arceuthobium microcarpum* and *Arceuthobium tsugense.*]

Miraki, M., Sohrabi, H., Fatehi, P., and Kneubuehler, M. 2021. Detection of mistletoe infected trees using UAV high spatial resolution images. Journal of Plant Diseases and Protection 128: 1679-1689. [An RGB camera mounted on a drone could distinguish trees infected by *Viscum album* with 70-87% accuracy.]

Mirzaei, K. and Wesselingh, R.A. 2020. Development of a large set of diagnostic SNP markers using ddRAD-seq to study hybridization in *Rhinanthus major* and *R. minor* (Orobanchaceae). Conservation Genetics Resources 13(1): 31-33. [Selecting 1106 putative loci that contain diagnostic, species-specific SNPs, which can be used for assessing and monitoring hybridization and introgression between *R. major* and *R. minor*.]

*Muchira, N. , Ngugi, K., Wamalwa, L.N., Avosa, M., Chepkorir, W., Manyasa, E., Nyamongo, D. and Odeny, D.A. 2021. Genotypic variation in cultivated and wild sorghum genotypes in response to *Striga hermonthica* infestation. Frontiers in Plant Science 12: (https://doi.org/10.3389/fpls.2021.671984) [64 sorghum genotypes including wild relatives screened for resistance to *S. hermonthica.* Three genotypes F6YQ212, GBK045827, and F6YQ212xB35 and one check SRN39 were among the most resistant to *Striga* in both pot and field trials. Identifying new sources of resistance to be included in further breeding.]

*Murakami, R., Ushima, R., Sugimoto, R., Tamaoki, D., Karahara, I., Hanba, Y., Wakasugi, T. and Tsuchida, T. 2021. A new galling insect model enhances photosynthetic activity in an obligate holoparasitic plant. Scientific Reports 11(6): (https://doi.org/10.1038/s41598-021-92417-3) [Results suggest that the gall-inducing weevil *Smicronyx madaranus* enhances the photosynthetic activity in *Cuscuta campestris*, and modifies the plant tissue to a nutrient-rich shelter for them.]

Murillo-Serna, J.S., Dettke, G.A., Carmona-Gallego, I. and Alzate, F. 2021. Novelties in *Phoradendron killipii* (Viscaceae): an endemic and rare species from Colombia. Phytotaxa 490(3): 285-290. [Describing morphology of *P. killipii* fruits and staminate inflorescences for the first time, confirming its generic identity. Evidence of the dioecy the species and some aspects of its distribution and ecology are also discussed.]

Murillo-Serna, J.S., Roldán-Palacio, F.J., Carmona-Gallego, I. and Alzate, F. 2021. A new species of *Aetanthus* (Loranthaceae) from Colombia with notes on *A. engelsii*. Candollea 76(1): 71-76. [*A. alternifolius* from northeastern Colombia is newly described and illustrated in relation to *A. colombianus* and *A. coriaceus* Patsch. The rediscovery of original material in Paris herbarium of the poorly known *Phyllostephanus engelsii* Tiegh. (= *Aetanthus engelsii* (Tiegh.) Engl.) is discussed and an identification key is provided to the 10 species of *Aetanthus* occurring in Colombia.]

Mursidawati Sofi and Wicaksono Adhityo. 2020. Tissue differentiation of the early and the late flower buds of *Rafflesia patma* Blume. Journal of Plant Development 27: 19-32. [Further identifying the several types of meristematic cells involved in development of flower buds in *R. patma*.]

Mutu (Calmis), A., Clapco, S. and Duca, M. 2021. Efficiency of microsatellite markers in genotyping of *Orobanche cumana* popuations. In: Symposium of Agriculture and Food engineering, Iași, Romania, October 2021: 48. [

Mutuku, J.M., Cui SongKui, Yoshida, S. and Shirasu, K. 2020. Orobanchaceae parasite-host interactions. New Phytologist 230(1): 46-59. [A detailed review highlighting recent progress in understanding how Orobanchaceae parasites attack their hosts and how the hosts mount a defence against the threats.]

*Nagassa Dechassa and Belay Abate. 2021. *Striga* (witchweed) threats to cereal crops production and its management: a review. Advances in Life Science and Technology 88: (10.7176/ALST/88-02) [A general review of *Striga* problems in Ethipia, with emphasis on *S. hermonthica* and the various control measures that might be applied, including water conservation practices, soil fertility amendment and use of parasitic fungi (*Fusarium oxysporum* and vesicular arbuscular mycorrhiza.]

Narukawa, H., Yokoyama, R., Kuroha, T. and Nishitani, K. 2020. Host-produced ethylene is required for marked cell expansion and endoreduplication in dodder search hyphae. Plant Physiology 185(2): 491-502. [Showing that, when Arabidopsis is invaded by *Cuscuta campestris*, ethylene biosynthesis by the host plant promotes elongation of the parasite's search hyphae and studying the gene expression involved.]

Ndagurwa, H.G.T., Maponga, T.S. and Muvengwi, J. 2020. Mistletoe litter accelerates the decomposition of recalcitrant host litter in a semi-arid savanna, south-west Zimbabwe. Austral Ecology 45(8): 1080-1092 . [Leaf litter from *Erianthemum ngamicum*, *Plicosepalus kalachariensis* and *Viscum verrucosum* greatly accelerated the decay of leaf litter beneath their host *Vachelia karroo* releasing nutrients with resultant effects on other organisms within the ecosystem.]

Nelson, D.C. 2021. The mechanism of host-induced germination in root parasitic plants. Plant Physiology 185(4): 1353-1373. [A review synthesising the recent discoveries of strigolactone receptors in parasitic Orobanchaceae, their signalling mechanism, and key steps in their evolution.]

Nickrent, D.L., Su, H-J., Lin, R-Z., Devkota, M.P, Hu, J-M., and Glatzel, G. 2021. Examining the needle in the haystack: evolutionary relationships in the mistletoe genus *Loranthus* Jacq. (Loranthaceae). Systematic Botany 46: 403-415. [Complete plastome, nuclear ribosomal DNA, and mitochondrial 26S rDNA sequences were used to assess the phylogeny of the 9 bona fide members of the genus.]

Nikolin, E.G. and Yakshina, I.A. 2021. (Concrete flora of the Chinke and Sobol-Yuryage river basins (Ust-Lensky Nature Reserve, Yakutia).)

(in Russian) Botanicheskii Zhurnal 106(8): 756-768. [Noting the presence of 10 *Pedicularis* spp.; also the rare endemic *Castilleja arctica*.]

Nishimura, A., Fuse, S., Tamura, M.N., Kato, H. and Takayama, K. 2020. DNA barcoding reveals evolutionary changes in host specificity of a parasitic plant, *Orobanche boninsimae* (Orobanchaceae), endemic to the Bonin (Ogasawara) Islands. Pacific Science 74(1): 87-97. [Determining that *Ochrosia nakaiana* (Apocynaceae), *Melicope grisea* (Rutaceae), and *M. nishimurae* (Rutaceae), and one exotic tree, *Bischofia javanica* (Phyllanthaceae), were host species of *O. boninsimae* on the Japanese Chichijima and Hahajima Islands.]

Nobis, M. and 24 others! 2020. Turkish Journal of Botany 44(4): 455-480. (https://link.springer.com/article/10.1007%2Fs11707-020-0829-x) [Studies with *Cuscuta chinensis* on hosts (unspecified in abstract) showing differences affecting the leaf waxes of paleo-ecological interest.]

*Oblinger, B.W. 2021. Susceptibility of sugar pine, Shasta red fir and sierra lodgepole pine to mountain hemlock dwarf mistletoe (*Arceuthobium tsugense* subsp. *Mertensianae*, Viscaceae) in south central Oregon. Forest Pathology 51(4): (https://doi.org/10.1111/efp.12693) [From a survey of trees close to mountain hemlock heavily infested with *A. tsugense* ssp. *metrtensianae*, it was concluded that sugar pine (*Pinus lambertiana*) can be classified as a secondary host, Shasta red fir (*Abies magnifica* var. *shastensis*) and lodgepole pine (*Pinus contorta*) as immune, and Western white (*Pinus monticola*) and whitebark (*Pinus albicaulis*) pines as susceptible.]

Ochiel, D.C., Dida, M.M., Ouma, E., Olweny, P.A. and Gudu, S. 2021. Response of selected sorghum (*Sorghum bicolor* (L.) Moench) genotypes to *Striga hermonthica* (del.) Benth in western Kenya. Journal of Plant Breeding and Crop Science 13(3): 103-114. [Selecting elite sorghum genotypes T53B, N68, N57, and T 30B as tolerant, and C 26, Uyoma 47 Brown, IESV 92038/2-SH, and IESV 92036-SH as resistant to *S. hermonthica*.]

Olkeba, L.D., Wondimu, T.T., Zelalem Bekeko and Ketema Belete. 2021. Prevalence and socio-economic impact of striga (*Striga hermonthica*) in Sorghum producing areas of east and west Hararghe zones, Ethiopia. Journal of Research in Weed Science 4(3): 242-256. [A survey of 6 districts showed 25-90% of fields infested by *S. hermonthica,* density varying from 18 to 85 parasites per m^2 causing estimated yield losses up to 80%.]

***Oliva, M., Guy, A., Galili, G., Dor, E., Schweitzer, R., Amir, R. and Hacham, Y. 2021. Enhanced production of aromatic amino acids in tobacco plants leads to increased phenylpropanoid metabolites and tolerance to stresses. Frontiers in Plant Science12: (https://doi.org/10.3389/fpls.2020.604349) [Transformation of tobacco with a bacterial gene to influence the first enzyme of the shikimate pathway resulted in greatly increased aromatic amino acid production and substantial resistance to *Phelipanche aegyptiaca.*]**

Oloyede-Kamiyo, Q.O., Olaniyan, A.B., Abdul-Waheed, J.A. and Akinseye, B.A..**2021. Sources of tolerance to low soil nitrogen in some *Striga* resistant and quality protein maize (*Zea mays* L.) varieties.** Korean Society of Crop Science, Suwon, Korea Republic Journal article : Journal of Crop Science and Biotechnology 24(5): 513-520. [25 varieties tested under low N conditions, confirming that *S. hermonthica*-tolerant maize also possesses the ability to tolerate low N.].

Osipitan, O. A,; Hanson, B., Goldwasser, Y., Fatino, M. and Mesgaran, M. 2021. The potential threat of branched broomrape for California processing tomato: a review. California Agriculture 75(2): 64-73. [After eradication some decades ago, *Phelipanche ramosa.* has recurred. Hence this review of its biology and potential control methods including herbicide rimsulfuron, crop rotation and fertilizer application.]

Ouedraogo, A.P, Danquah, A., Tignegre, J.B., Batieno, B.J., Bama, H., Ouedraogo, J.T., Ayertey, J.N. and Ofori, K. 2020. Participatory rural appraisal on cowpea production constraints and farmers' management practices in Burkina Faso. Modern Applied Science 14(11): 9-18. [*Striga gesnerioides* among main restraints to cowpea production but main emphasis on aphids.]

*Oyekale, S.A., Badu-Apraku, B., Adetimirin, V.O., Unachukwu, N. and Gedil, M. 2021. Development of extra-early provitamin a quality protein maize inbreds with resistance/tolerance to *Striga hermonthica* and soil nitrogen stress. Agronomy 11(5): (https://doi.org/10.3390/agronomy11050891) [Identifying inbreds TZEEIORQ 5, TZEEIORQ 52, and TZEEIORQ 55 with impoved provitamin A content and resistance to *S. hermonthica*.]

Padrón, P.S., Vélez, A., Miorelli, N. and Willmott, K.R. 2020. [Urban areas as refuges for endemic fauna: description of the immature stages of *Catasticta flisa duna* (Eitschberger & T. Racheli, 1998) (Lepidoptera: Pieridae) and its ecological interactions. Neotropical Biodiversity 6(109-116): 109-116. [Occurring on *Phoradendron nervosum*.]

Panek-Wójcicka, M. and Piwowarczyk, R. 2020. (Host preferences of Cuscuta lupuliformis (Convolvulaceae) in Sandomierz.) (in Polish) Fragmenta Floristica et Geobotanica Polonica 27(2): 696-702. [*Cuscuta lupuliformis* in S. Poland found on 31 hosts species in 14 families, mainly Salicaceae, Asteraceae and Rosaceae.]

*Parker, C. 2021. A personal history in parasitic weeds and their control. Plants 2021, 10(11), (https://doi.org/10.3390/plants10112249) [A self-indulgent record of my career in the subject, prepared under duress!]

Păun, A. and 9 others. 2020. Separation of impurities from the mass of small seeds by using an innovative technology. Conference paper: ISB-INMA TEH 2020 International Symposium, Bucharest, Romania, 30 October 2020: 814-826. [Describing equipment for removing impurities from crop seeds (foreign bodies, remains of seed plants or fruit, soil, stones, dead insects, weed seeds, etc.) including seeds of *Cuscuta* spp.]

Pawlikowski, P., Dembicz, I., Kozub, Ł. and Galus, M. 2020. (*Orobanche alba* subsp. *major* (Orobanchaceae) - a new species for Mazovia Province in the planned Raj Nature Reserve by Solec and Wisłą.) (in Polish) Fragmenta Floristica et Geobotanica Polonica 27(2): 706-709. [Recording a new site for *O. alba* subsp. *major*, a parasite of *Salvia* spp. in Poland.]

Pawlikowski, P., Dembicz, I., Kozub, Ł. and Galus, M. 2020. (*Orobanche alba* subsp. *major* (Orobanchaceae) - a new species for Mazovia Province in the planned Raj Nature Reserve by Solec nad Wisłą.) (in Polish) Fragmenta Floristica et Geobotanica Polonica 27(2): 709-714. [Recording a new site for *O. alba* subsp. *major*, a parasite of *Salvia* spp. in Poland. (Repetition unclear!)]

Peery, R.M., McAllister, C.H., Cullingham, C.I., Mahon, E.L., Arango-Velez, A. and Cooke, J.E.K. 2021. Comparative genomics of the chitinase gene family in lodgepole and jack pines: contrasting responses to biotic threats and landscape level investigation of genetic differentiation. Botany 99(6): 355-378. [The study involved trees infested with *Arceuthobium americanum*.]

Pelzer, F. Does mistletoe therapy help against chronic fatigue during cancer? In: Report 2019-2020. Society for Cancer Research, Arlesheim, Switzerland: 9-11.

Pismarkina, E.V. and Bystrushkin, A.G. 2020. (Records of alien species of vascular plants in the Yamal-Nenets autonomous area (Russia).) (in Russian) Turczaninowia 23(2): 22-32. [A first record of *Pedicularis sibirica* in the region.]

*Piwowarczyk, R., Ochmian, I., Lachowicz, S., Kapusta, I., Malinowska, K. and Ruraz, K. 2021. Correlational nutritional relationships and interactions between expansive holoparasite *Orobanche laxissima* and woody hosts on metal-rich soils. Phytochemistry 190: (https://doi.org/10.1016/j.phytochem.2021.112844) [Recording the uptake of a wide range of minerals by *Punica granatum* and *Fraxinus angustifolia* and their transfer *Orobanche laxissima*. The parasite tended to accumulate K and Ca, and heavy metals such as Zn, Ni, and Cd. Also noting the metabolism and accumulation of polyphenols in the parasite.]

Piwowarczyk, R., Schneider, A.C., Góralski, G., Kwolek, D., Denysenko-Bennett, M., Burda, A., Ruraż, K., Joachimiak, A.J. and Pedraja, Ó.S. 2021. Phylogeny and historical biogeography analysis support Caucasian and Mediterranean centres of origin of key holoparasitic Orobancheae (Orobanchaceae) lineages. PhytoKeys 2021(174): 165-194. [Assessing phylogenetic relationships of poorly known, problematic, or newly described species and host-races of four genera of Orobancheae in the Caucasus region and analyzing its historical biogeography.]

Plata, A. and Guzmán-Guzmán, S. 2020. Pollen morphology of *Ombrophytum villamariensis* (Balanophoraceae). Phytotaxa 472(1): 74-78. [The study revealed the presence of diagnostic characters in the pollen grain such as small size and a circular endoaperture. Unlike other species, only tricolporate pollen grains were observed.]

*Pointurier, O., Gibot-Leclerc, S., Moreau, D. and Colbach, N.. 2021. How to pit weeds against parasitic plants. a simulation study with *Phelipanche ramosa* in arable cropping systems. European Journal of Agronomy 130: (https://doi.org/10.1016/j.eja.2021.126368) [Using the model PheraSys (see Pointurier *et al.* 2021 in Haustorium 80) concluding that delayed sowing and trap- and catch-cropping crops should reduce *P. ramosa* infestation. Also tolerating a low-density weed flora could contribute to reduction, assuming the weeds triggered suicidal germination.]

Ponce-Sánchez, J., Zurita-Benavides, M.G. and Peñuela, M.C. 2021. Reproductive ecology of white cacao (*Theobroma bicolor* humb. & Bonpl.) in Ecuador, western Amazonia: floral visitors and the impact of fungus and mistletoe on fruit production. Brazilian Journal of Botany 44(2): 479-489. [Finding a drastic loss of 84% of

fruits in cacao infested by the mistletoe *Oryctanthus* cf. *alveolatus*.]

Probatova, N.S., ; Kazanovsky, S.G., Kotenko, O.V., Kozhevnikova, Z.V., Krivenko, D.A., Kryukova, M.V., Motorykina, T.N. and Zykova, E.Y. 2021. Botanica Pacifica plant chromosome data 1. Botanica Pacifica 10(1): 109-119. [Confirming the chromosome number of *Pedicularis striata* as 2n = 16.]

Prodan, T., Pacureanu, M.J., Risnoveanu, L., Dan, M., Anton, G., Bran, A., Sava, E., Lipşa, F.D. and Ulea, E. 2020. Broomrape (*Orobanche cumana* Wallr.) control by developing genetic resistant genotypes in sunflower. "Ion Ionescu de la Brad" Iasi, Seria Agronomie 63(2): 75-78. [Reporting good resistance to *O. cumana* in some crosses of sunflower with wild *Helianfhuis* spp. but results not clearly presented.]

Qasem, J.R. 2021. Broomrapes (*Orobanche* spp.) the challenge and management: a review. Jordan Journal of Agricultural Sciences, 17(3 Suppll.): 115-148. [A broad review of *Orobanche* and *Phelipanche* spp. with emphasis on their occurrence and importance in Jordon.]

*Raaijmakers, J., Getahun Mitiku, Desalegn Etalo, KleinGunnewiek, P., Dominika Rybka, Taye Tessema. 2021. Molecular detection and quantification of the *Striga* seedbank in Ethiopian sorghum field soils. Research Square: (10.21203/rs.3.rs-572695/v1) [Describing a method that combines density- and size-based separation techniques with quantitative polymerase chain reaction (qPCR)-based detection of *Striga* seeds in soil allowing high-through-put and accurate mapping of the *Striga* seedbank in physicochemically diverse field soils.]

*Raaijmakers, J., Getahun Mitiku, Desaelgn Woldesenbet Etalo and Taye Tessema. 2021. Molecular detection and quantification of the *Striga* seedbank in Ethiopian sorghum field soils. Research Square: (10.21203/rs.3.rs-572695/v1) [

Rabefiraisana, H.J. and 9 others. 2021. Impact of mulch-based cropping systems using green mulch and residues on the performance of advanced mutant lines of maize (*Zea mays* (L.)) under infested field with the parasitic weed *Striga asiatica* (L.) Kuntze in Madagascar. Chapter 24 in: Sivasankar, S. *et al.* (eds) Mutation breeding, genetic diversity and crop adaptation to climate change 2021: 235-242. [Infestation by *S. asiatica* is greatly reduced and yields significantly improved on 3 maize mutants derived from var. PLATA with or without mulching with *Styosanthes* sp. and interplanting with cowpea.]

Rahayu, S., Triyogo, A., Widyastuti, S.M. and Ardianyah, F. 2021. Pests and diseases on *Falcataria moluccana* trees in agroforestry systems with pineapple in East Java, Indonesia. Biodiversitas: Journal of Biological Diversity 22(5): 2779-2788. [Noting occurrence of *Scurrula* sp. on *F. moluccana.*]

Ramalingam Kottaimuthu and Basu, M.J. 2020. *Pedicularis hongii* Kottaim., a new name for *P. multicaulis* W.B. Yu, H. Wang & D.Z. Li (Orobanchaceae). Annales Botanici Fennici 57(4/6): 209-210. [According to Art. 53.1 of ICN, the recently published *P. multicaulis* W.B. Yu, H. Wang & D.Z. Li (Orobanchaceae) is an illegitimate later homonym of *P. multicaulis* Bonati and hence *P. hongii* Kottaim. is proposed as a replacement name.]

*Ramsauer, J., Brotons, L., Herrando, S. and Morán-Ordóñez, A. 2021. A multi-scale landscape approach to understand dispersal of the mistletoe by birds in Mediterranean pine forests. Landscape Ecology 2021: (https://doi.org/10.1007/s10980-021-01369-6) [Climatic conditions and % of olive groves were somewhat more important than the presence of seed-dispersing birds, mainly *Turdus* spp. .in the distriubution fo *Viscum album* in Spain.

Rätzel, S., Hand, R., Christodoulou, C.S. asnd Uhlich, H. 2021. *Phelipanche chionistrae* (Orobanchaceae): a new holoparasitic species from Cyprus. Candollea 76(1): 77-82. [*P. chionistrae,* parasitc on *Alyssum troodi* is described from highest summit of the Troodos range in Cyprus. Close to *P. rosmarina* and *P. olbiensis* it differs in colouration, structure of calyx and type of indumentum and being restricted to a high-montane serpentinophytic coenosis.]

Reuben, O.A., Njeru, E.M., Omari, A. and Birgen, J.K. 2021. New evaluation of *Alternaria brassicicola* isolates against *Striga hermonthica* seeds emergence on maize in Kenya. Journal of Research in Weed Science 4(3): 218-225. [Two *A. brassicicola* isolates LM019a and LM013 inhibited *S. hermonthica* emergence by 79%, and 57%.]

Rial, C., Tomé, S., Varela, R.M., Molinillo, J.M.G. and Macías, F.A. 2020. Phytochemical study of safflower roots (*Carthamus tinctorius*) on the induction of parasitic plant germination and weed control. Journal of Chemical Ecology 46 (9):: 871-880. [Root exudates from safflower found to contain the sesquiterpene lactone dehydrocostuslactone and the structurally related costunolide, known to stimulate germination of *Phelipanche ramosa* and *Orobanche cumana.* These compounds were found to be toxic to *Lolium perenne*, *Lolium rigidum* and

Echinochloa crus-galli. Solanacol and fabacyl acetate were also identified.]

Richards, J.H., Henn, J.J., Sorenson, Q.M., Adams, M.A., Smith, D.D., McCulloh, K.A. and Givnish, T.J. 2021. Mistletoes and their eucalypt hosts differ in the response of leaf functional traits to climatic moisture supply. Oecologia 195(3): 759-771. [Low moisture caused decreases in leaf area and specific leaf area, while C:N ratio, leaf thickness, N per area, and $\delta^{13}C$ all increased in a eucalypt host, while, thanks to reduced transpiration and abundant succulent leaf tissue, effects were much less in the mistletoes - *Amyema miraculosum*, *A. miquelii*, *A. pendula*, and *Muellerina eucalyptoides* - all Loranthaceae.]

Rios-Carrasco, S. and Vázquez-Santana, S. 2021. Comparative morphology and ontogenetic patterns of *Bdallophytum* species (Cytinaceae, Malvales): insight into the biology of an endoparasitic genus. Botany 99(4): 221-238. [A detailed study of the floral structure of the 3 *Bdallophytum* species in Mexico, concluding that a unitegmic ovule is a unique trait for *Bdallophytum*.]

*Rouamba, A., Shimelis, H., Drabo, I., Laing, M., Prakash Gangashetty, Mathew, I., Mrema, E. and Shayanowako, A.I.T. 2021. Constraints to pearl millet (*Pennisetum glaucum*) production and farmers' approaches to *Striga hermonthica* management in Burkina Faso. Sustainability 13(15): (https://doi.org/10.3390/su13158460) [40% of farmers in the surveyed area ranked *S. hermonthica* infestation as the primary constraint affecting pearl millet production, causing up to 80% yield loss. No effective control methods available.]

*Rubiales, D., Moral, A. and Flores, F. 2021. Heat waves and broomrape are the major constraints for lentil cultivation in Southern Spain. Agronomy 11(9): (https://doi.org/10.3390/agronomy11091871) [*Orobanche crenata* second to high temperatures in limiting lentil production. Noting accessions S14 and R17 to have useful resistance to *O. crenata.*]

*Rubiales, D., Osuna-Caballero, S., González-Bernal, M.J., Cobos, M.J. and Flores, F. 2021. Pea breeding lines adapted to autumn sowings in broomrape prone Mediterranean environments. Agronomy 11(4): (https://doi.org/10.3390/agronomy11040769) [Hybridising pea with landraces and wild relatives yielded breeding lines NS22, NS34, NS8, NS39, NS35, NS21 and NS83 showing high to moderate resistance to broomrape.]

*Ruraz, K., Piwowarczyk, R., Gajdoš, P., Krasylenko, Y. and Certík, M. 2020. Fatty acid composition in seeds of holoparasitic Orobanchaceae from the Caucasus region: relation to species, climatic conditions and nutritional value. Phytochemistry 17: (https://doi.org/10.1016/j.phytochem.2020.112510) [A study of the fatty acid composition of 54 samples of *Cistanche*, *Orobanche*, *Phelipanche*, and *Phelypaea* spp. from the Caucasus revealed variation in content from 1 to 42%. 13 fatty acids were identified, *Orobanche* and *Phelipanche* showing divergent ratios of n-6 and n-3 fatty acids.]

*Sadda, A-S. and 8 others. 2021. The witchweed *Striga gesnerioides* and the cultivated cowpea: A geographical and historical analysis of their West African distribution points to the prevalence of agro-ecological factors and the parasite's multilocal evolution potential. Plos One: https://doi.org/10.1371/journal.pone.0254803 [Noting the increasing severity of *S. gesnerioides* on cowpea across West Africa, apparently associated with intensification of the crop in the driest zones]

Sasal, Y., Amico, G.C. and Morales, J.M. 2020. Host spatial structure and disperser activity determine mistletoe infection patterns. Oikos 130(3): 440-452. [Studies of *Tristerix corymbosus* on its most common host species in northwest Patagonia. The distribution was determined by the structure of potential host populations and by the activity of the main dispersal agent, the endemic marsupial *Dromiciops gliroides.* Compared to bird dispersed mistletoes, the scale of the infection was smaller.]

*Sato, H.A. and Gonzalez, A.M. 2021. Anatomy, embryology and life cycle of *Lophophytum*, a root-holoparasitic plant. In: 'Parasitic Plants': (https://www.intechopen.com/online-first/78568) [Reviewing in detail the 5 *Lophophytum* spp. (Balanophoraceae) which are characterized by an aberrant vegetative body called a tuber, devoid of stems and leaves, parasitizing trees and shrubs, exclusively in South America.]

Saudy, H.S., Hamed, M.F., El-Metwally, I.M., Ramadan, K.A. and Aisa, K. 2021. Assessing the effect of biochar or compost application as a Spot placement on broomrape control in two cultivars of faba bean. Journal of Soil Science and Plant Nutrition 21(3): 1856-1866. [Claiming useful results from biochar and/or compost in control of *Orobanche crenata* in faba bean, but no doses or economics in abstract.]

Sawadogo-Ilboudo, T.C., Yonli, D., Traoré, H. and Boussim, J. I. 2021. Use of essential oils from local plants as potential bio-herbicides to deplete

Striga hermonthica seedbank. Journal of Research in Weed Science 4(1): 57-69. [Oils from *Cymbopogon citratus*, *C. nardus* and *Lippia multiflora* inhibited germination of *S. hermonthica* in the lab, while that from *C.citratus* stimulated germination. Practicality of result not clear.]

Sayantan Tripathi and Mondal, A.K. 2020. *A taxonomic note on Viscum monoicum* Roxb. ex DC. (Santalaceae: Santalales) and new hosts in West Bengal, India. Phytomorphology 70(1/2): 11-16. [*V. monoicum* recorded from West Bengal. 'New hosts' not named in abstract.]

*Scalon, M.C., Rossatto, D.R. and Franco, A.C. 2021. How does mistletoe infection affect seasonal physiological responses of hosts with different leaf phenology? Flora (Jena) 281: (https://doi.org/10.1016/j.flora.2021.151871) [Finding differences between evergreen host *Miconia albicans* and deciduous *Byrsonima verbascifolia* in responses to mistletoe *Passovia ovata*.]

Scatigna, A.V., Saraiva, R.V C,.; Couto, A.F.M., Souza, V.C. and Muniz, F.H. 2020. *Buchnera nordestina* (Orobanchaceae), an overlooked new species from Northeast Brazil, with an updated identification key for *Buchnera* of Brazil. Acta Botanica Brasilica 34(4): 789-795. [*B.nordestina* is characterized by long bracts, that are usually two times longer than the calyx tube and by the presence of axillary brachyblasts. Also presenting an updated identification key to all species of *Buchnera* from Brazil.]

*Schelkunov, M.I., Nuraliev, M.S., and Logacheva, M.D. 2019. *Rhopalocnemis phalloides* has one of the most reduced and mutated plastid genomes known. PeerJournal: (https://doi.org/10.7717/peerj.7500) [The plastome is 18.6 kb in length with an AT composition of 86.8%.]

*Schelkunov, M.I., Nuraliev, M.S., and Logacheva, M.D. 2021. Genomic comparison of non-photosynthetic plants from the family Balanophoraceae with their photosynthetic relatives. PeerJournal: (https://peerj.com/articles/12106/) [The transcriptomes of *Rhopalocnemis phalloides* and *Balanophora fungosa* were compared to three hemiparasites in Santalales *Daenikera* sp., *Dendropemon caribaeus* and *Malania oleifera.* Although the AT content did not differ markedly, the substitution and negative selection rates were several times higher in the holoparasites. Several plastome repair gene transcripts were not detected.]

Schneider, A.C., Sanders, K.M., Idec, J.H.. Lee, Y.J., Kenaley, S.C. and Mathiasen, R.L. 2021. Plastome and nuclear phylogenies of dwarf mistletoes (*Arceuthobium*: Viscaceae). Systematic Botany 46:389-402. [Nuclear ribosomal DNA and 45 kb of the plastome were used to examine the phylogeny of *Arceuthobium.*]

Scott, D., Scholes, J.D., Randrianjafizanaka, M.T., Randriamampianina, J.A.,Autfray, P. and Freckleton, R.P. 2021. Identifying existing management practices in the control of *Striga asiatica* within rice–maize systems in mid-west Madagascar. Ecology and Evolution 11(19): 13579-13592. [Identifying the importance of crop variety and legumes in driving *S. asiatica* density and significant effect of precipitation seasonality, mean temperature, and altitude in determining abundance. Emphasising the need for integration of practices in control.]

Serafimov, P., Kalinova, S., Golubinova, L., Yanov, M. and Mitkov, A. 2020. Allelopathic activity of sunflower broomrape (*Orobanche cumana* Wallr.) on sunflower (*Helianthus annuus* L.) varieties. Scientific Papers - Series A, Agronomy.63(1): 514-519. [Showing that dried shoots of *O. cumana* could inhibit sunflower germination, but not at all clear that the quantities required would be practicable.]

*Severns, P.M. and Guzman-Martinez, M. 2021. Plant pathogen invasion modifies the eco-evolutionary host plant interactions of an endangered checkerspot butterfly. Insects 12(3): (https://doi.org/10.3390/insects12030246) [Recent invasion by the pathogen *Pyrenopeziza plantaginis* (Dermateaceae) is severely damaging *Plantago lanceolata* an important food plant for the pre-diapause larvae of endangered butterfly *Euphydryas editha taylori,* which otherwise depends on the rare *Castilleja parviflora*.]

Shabbaj, I.I., Abdelgawad, H., Tammar, A., Alsiary, W.A. and Madany, M.M.Y. 2021. Future climate CO_2 can harness ROS homeostasis and improve cell wall fortification to alleviate the hazardous effect of *Phelipanche* infection in pea seedlings. Plant Physiology and Biochemistry 166: 1131-1141. [Enhanced eCO_2 quenched the severity of *P. aegyptiaca* infection on pea by diminishing the number and biomass of *P. aegyptiaca* tubercles.]

Shen GuoJing, Liu Nian, Zhang JingXiong, Xu YuXing, Baldwin, I.T. and Wu JianQiang. 2020. *Cuscuta australis* (dodder) parasite eavesdrops on the host plants' FT signals to flower. Proceedings of the National Academy of Sciences of the United States of America 117(37): 23125-23130. [Biochemical analysis revealed that host-synthesized FT flowering signals are able to move into dodder stems, where they physically interact with a dodder flowering transcription factor to activate *C. australis* flowering.]

Shepeleva, E.A. and 14 others. 2020. Phylogenetics of the mycoheterotrophic genus *Thismia* (Thismiaceae: Dioscoreales) with a focus on the Old World taxa: delineation of novel natural groups and insights into the evolution of morphological traits. Botanical Journal of the Linnean Society 193(3): 287-315. [Discussing the phylogenetic relationships of 41 species of *Thismia*. NB See also PROFILE above.]

Shugute Addisu and Gebrekidan Feleke. 2021. Distribution and importance of *Striga hermonthica* on tef [*Eragrostis tef* (Zucc.) Trotter] in Tigray regional state of Ethiopia: a preliminary survey. International Journal of Agriculture and Biosciences 10(3): 69-73. [In a survey in 2016/17, 90% of tef fields were infested by *S. hermonthica* at elevations of 1500 to 2500 m.]

Sidibe, H., Tignegre, J.B.D.L.S., Batieno, B.T.J., Zida, S.F M., Poda, L.S., Nanema, R.K., Ouedraogo, J.T. and Sawadogo, M. 2021. Inheritance of the *Bt* gene and *Striga gesnerioides* in transgenic line, 709A and line IT98K-205-8, resistant to *Striga gesnerioïdes* in Burkina Faso. Journal of Applied Biosciences 163: 16897-16905. [Confirming that resistance to race 1 *S. gesnerioides* and to pod borer, *Maruca vitrata* are each controlled by a single dominant gene.]

Singh, L.J. 2021. *Septemeranthus* (Loranthaceae), a new monotypic genus from the Andaman and Nicobar Islands, India and its relationship with allied genera. Feddes Repertorium 132(3): 193-203. [Describing a new monotypic genus, *S. nicobaricus* that parasitizes *Horsfieldia glabra*. The genus is questionably distinct from *Macrosolen*.]

*Sisou, D., Tadmor, Y., Plakhine, D., Ziadna, H., Hübner, S. and Eizenberg, H. 2021. Biological and transcriptomic characterization of pre-haustorial resistance to sunflower broomrape (*Orobanche cumana*) in sunflowers (*Helianthus annuus*). Plants 10(9): (https://doi.org/10.3390/plants10091810) [Identifying genes β-1,3-endoglucanase, β-glucanase, and ethylene-responsive transcription factor 4 (ERF4). These genes were previously reported to be pathogenesis-related in other plant species.]

Siti-Munirah, M.Y., Dome, N. and Thorogood, C.J. 2021. *Thismia sitimeriamiae* (Thismiaceae), an extraordinary new species from Terengganu, Peninsular Malaysia. PhytoKeys 179: 75-89. [See Press reports]

Sivaramakrishna, P., Yugandhar, P., and Ekka, G.A**.** 2021. A new species *Dendrophthoe laljii* (Loranthaceae) infesting *Artocarpus heterophyllus* Lam. (Moraceae) in Andaman and Nicobar Islands, India. Journal of Asia-Pacific Biodiversity 14:452-459. [This new species is described and a key to the 8 species found in India is given.]

Škorić, D., Joița-Păcureanu, M., Gorbachenko, F., Gorbachenko, O. and Maširević, S. 2021. Dynamics of change in broomrape populations (*Orobanche cumana* Wallr.) in Romania and Russia (Black Sea area). Helia 44(74): 1-14. [390 sunflower genotypes were studied over four localities in Romania infested by *O. cumana* suggesting that some new individuals were occurring beyond races G and H. In a further screen of 10 hybrids, only Hy-7 was resistant at all 5 locations. Further screening in Russia again confirmed the occurrence of a new race. Results suggest a permanent change in variability of broomrape populations can be confirmed practically year after year.]

Smith, J.D., Johnson, B.I, Mescher, M.C. and de Moraes, C.M. 2020. A plant parasite uses light cues to detect differences in host-plant proximity and architecture. Plant, Cell and Environment 44(4): 1142-1150. [Results indicate that *Cuscuta epilinum* can discriminate minute differences in R:FR signatures corresponding to host proximity and shape. This keen sensory ability underpins its sophisticated foraging behaviour and highlights the broader importance of light cues in plant ecology.]

Sokat, Y. and Demirkan, H. 2020. (Research on the methods for controlling broomrape (*Phelipanche ramosa* (L.) Pomel.), problem in eggplant production areas in Turkey.) (in Turkish) Turkish Journal of Weed Science 23(1): 44-51. [Field trials with various treatments gave best reduction of *P. ramosa* by polyethylene mulch followed by sulfsulfuron and N fertilizer. Yield results not given in abstract.]

Solikin. S. 2020. Infestation of mistletoe *Dendrophthoe pentandra* (L.)Miq on various canopy shading and plants diversity in purwodadi botanic garden: a study on medicinal plant *Cassia fistula* L. Journal of Biological Researches / Berkala Penelitian Hayati 26(1): 1-7.

Solikin. S. 2021. Population dynamics of mistletoes species on *Cassia fistula* in purwodadi botanic garden, Indonesia. Biodiversitas: Journal of Biological Diversity 22(4): 1612-1620.

[*Dendrophthoe pentandra* and *Viscum articulatum* infested *C. fistula,* while *Macrosolen tetragonus*, *Scurrula atropurpurea* and *Viscum ovalifolium* infested other species.]

Song Yu, Yu WenBin, Tan YunHong, Jin JianJun, Wang Bo, Yang JunBo, Liu Bing and Corlett, R.T. 2020. Plastid phylogenomics improve phylogenetic resolution in the Lauraceae. Journal of Systematics and Evolution 58(4): 423-439. [A phylogenetic analyses of 43 newly generated Lauraceae plastomes together with 77 plastomes obtained from GenBank, plus nine barcodes from 19 additional species in 18 genera of Lauraceae confirm that the *Cassytha* clade is well-supported.]

Sosnovsky, Y., Krasylenko, Y. and Nachychko, V. 2021. ***Viscum meyeri* (Viscaceae)-a new name for *Viscum anceps*, an old-established mistletoe species endemic to Southern Africa.** Phytotaxa 523(4): 284-290. [The reason being that '*V. anceps*' is the basionym for the presently accepted name *Phoradendron anceps*.]

Strelnikov, E., Antonova, T., Gorlova, L. and Trubina, V. 2020. The environmentally safe method of control of broomrape (*Orobanche cumana* Wallr.) parasitizing on sunflower. BIO Web of Conferences 21: 623-630. (https://doi.org/10.1051/bioconf/20202100039) [In a pot experiment, ground fresh material added to soil at equivalent of 15-22 t/ha reduced emergence of *O. cumana* on sunflower. White mustard best, with 47% reduction, other brassicas 20-30%.]

*Su, H.-J., Liang, S.-L., Nickrent D.L. 2021. Plastome variation and phylogeny of *Taxillus* (Loranthaceae). PLoS ONE 16: (**https://doi.org/10.1371/journal.pone.0256345**) [This study explored plastome genetic diversity, located genetically variable hotspots, and proposed several regions as potential DNA barcodes in the taxonomically difficult genus *Taxillus*.]

Su YaJie, Du Lei, Yun XiaoPeng, Bai QuanJiang, Tian XiaoYan and Ge Tong; Du Chao. 2020. (Effects of soaking with autumn irrigation and overwintering on the seeds germination of sunflower parasitic *Orobanche cumana* in the Yellow River Irrigation Districts of Bayannur.) (in Chinese) Journal of Northern Agriculture 48(4): 100-104. [Annual irrigation of fields in Inner Mongolia for 5 years reduced germination of *O. cumana* to zero after 3 years, while germination of non-irrigated seeds were still 70% after 5 years.]

Subhankar, B., Yamaguchi, K., Shigenobu, S. and Aoki, K. 2021. *Trans*-species small RNAs move long distances in a parasitic plant complex. Plant Biotechnology 38(2): 187-196. [Mobility of *Cuscuta. campestris*-derived small RNA in *sgs3* and *rdr6* mutants of *Arabidopsis thaliana* suggested the occurrence of direct long-distance transport without secondary siRNA production in the recipient plant.]

Suetsugu, K. 2021. No evidence of pollination mutualism between the holoparasitic plant *Mitrastemon yamamotoi* Makino (Mitrastemonaceae) and its herbivore *Assara balanophorae* Sasaki & Tanaka, 2004 (Lepidoptera: Pyralidae). The Pan-Pacific Entomologist 97 (1): 1-5. [The moth genus *Assara* is a brood-site pollinator of *Balanophora*, however, observations of *Mitrastemon* showed these moths carry few pollen grains and feeding by the pyralid larvae on the plant significantly lowered seed viability.]

Suetsugu, K. and Hisamatsu, S. 2020. Potential brood-site pollination mutualism between *Balanophora tobiracola* makino (Santalales: Balanophoraceae) and the sap beetle *Epuraea ocularis* fairmaire, 1849 (Coleoptera: Nitidulidae). Coleopterists Bulletin 74(4): 652-655.

*Sun Qi, Wu Lei, Yang YunFei, Zhao JiMin and Zhang YanWen. 2021. Geographic variation of fruit color dimorphism in *Viscum coloratum* (Kom.) Nakai in northeast China. Flora (Jena) 280: (https://doi.org/10.1016/j.flora.2021.151846) [Survey of 23 populations of *V. coloratum* in NE China showed more red-morphs at high latitudes and more yellow-morphs at low latitudes and proposing two non-exclusive hypotheses - the food-finding strategies hypothesis, and the ecological-fitting hypothesis to explain the patterns observed.]

*Tamudo, E., Camarero, J.J., Sangüesa-Barreda, G. and Anadón, J.D. 2021. **Dwarf mistletoe and drought contribute to growth decline, dieback and mortality of junipers.** Forests 12(9): (https://doi.org/10.3390/f12091199) [[Low summer precipitation and infestation by *Arceuthobium oxycedri* contributed to a short-term growth decline in *Juniperus communis*.]

*Tatiana Matveeva and Otten, L. 2021. Opine biosynthesis in naturally transgenic plants: genes and products. Phytochemistry189: (https://www.sciencedirect.com/science/article/abs/pii/S003194222100162X?via%3Dihub) [Opines originating from *Agrobacterium*, are found in natural genetically transformed organisms, also in tobacco and *Cuscuta* spp.]

Teixeira-Costa L, Davis CC (2021) Life history, diversity, and distribution in parasitic

flowering plants. Plant Physiology 187 (1): 32-51. [A review of life history features of all haustorial parasite lineages focused mainly upon attachment modes.]

Temam Gemeda Genemo 2021. Optimizing bio-ethanol production from *Striga hermonthica u*sing yeast (Saccharomyces cerevisiae) as a fermenting agent. American Journal of Bioscience and Bioengineering 9(3): 93-97. [Concluding that treating fresh *S. hermonthica* material with 1% sulphuric acid is economically viable for production of ethanol.]

Thorogood, C.J., Leon, C.J., Di Lei, Majed Aldughayman, Lin-fang Huang and Hawkins J.A. 2021. Desert hyacinths: An obscure solution to a global problem? Plants, People, Planet (94): 302-307. [A meticulous review of the traditional use, ecology and evolution of *Cistanche* spp., describing many taxonomic confusions and uncertainties such as the dubious distinction of *C. salsa* from *C. deserticola* and of *C. tubulosa* and *C. tinctoria* and discussing their potential as a subsistence crop in a global context of climate change land degradation. Well illustrated with excellent drawings and photographs.]

Thorogood, C.J., Teixeira-Costa, L., Ceccantini, G., Davis, C and Hiscock, S.J. 2021. Endoparasitic plants and fungi show evolutionary convergence across phylogenetic divisions. New Phytologist 232(3): 1159-1167. [Endoparasites spend their entire life cycles within the tissues of other plants, except when briefly emerging to flower and set seed. They occur in 4 distinct families, in 8 genera including e.g. *Rafflesia* and *Cytinus.* This paper reviews their life history, anatomy, and molecular genetics, noting convergence with fungi at molecular and physiological levels.]

Tian YuQing, Sui XiaoLin, Zhang Ting, Li YanMei and Li AiRong. 2021. (Effects of soil nitrogen heterogeneity and parasitism by *Pedicularis* species on growth and root spatial distribution of *Polypogon monspeliensis*.) (in Chinese) Guangxi Zhiwu / Guihaia 40(12): 1838-1848. [Analyzing the effects of *Pedicularis* species on spatial distribution of host roots under different nutrient conditions.]

*Tian YongJing, Zhou JingBo, Zhang YunYan, Wang Shuang, Wang Ying, Liu Hong and Wang ZhongSheng. 2021. Research progress in plant molecular systematics of Lauraceae. Biology 10(5): (https://doi.org/10.3390/biology10050391) [Reviewing the phylogenetic relationships and main controversies of 'the Core Lauraceae', the systemic position of fuzzy genera (*Neocinnamomum*, *Caryodaphnopsis* and *Cassytha*) and the development of chloroplast genome and DNA barcodes.]

Trabelsi, I. Thebti, S., Amri, M., Kharrat, M. and Abbes, Z. 2020. (Study of the behavior of some Tunisian varieties of chickpea towards *Orobanche foetida*.) (in French) Annales de l'INRAT.93: 65-77. [A study of 9 Tunisian varieties of chickpea showed Nayer, Nour and Bouchra to have good resistance to *O. foetida*, mainly thanks to low stimulant exudation.]

*Vanhaverbeke, C. and 13 others. 2021. Untargeted metabolomics approach to discriminate mistletoe commercial products. Scientific Reports 11: (https://doi.org/10.1038/s41598-021-93255-z) [*Viscum album* mistletoe extracts were examined using LC-(HR)MS(/MS) and 1H-NMR. Composition was primarily driven by the manufacturer/preparation method rather than the different host trees. These differences in composition may affect immunostimulation and anticancer activities.]

*Vargas, H.A., Vargas-Ortiz, M. and Gielis, C.. 2020. A new species of *Stenoptilia hübner* (Lepidoptera: Pterophoridae) associated with *Neobartsia peruviana* (Orobanchaceae) in the Andes of northern Chile. Revista Brasileira de Entomologia 64(2): (https://doi.org/10.1590/1806-9665-RBENT-2019-0028)

*Venugopal, D.K., Santhosh Nampy, Pradeep, A.K., Dani Francis, Vishnu Mohan and Sasi, S.R. 2021. A new species of *Parasopubia* (Orobanchaceae) from the Southern Western Ghats, India. Anales del Jardín Botánico de Madrid 78(1): (https://doi.org/10.3989/ajbm.2585) [*P. raghavendrae* resembles *P. delphinifolia* and *P. hofmannii* but differs in length of calyx tube, hairiness of staminal filaments and stomium, and shape and ornamentation of seeds.]

Verloove, F.. Gonggrijp, S., Vooren, P. van, Mortier, B. and Barendse, R. 2020. Campsites as unexpected hotspots for the unintentional introduction and subsequent naturalization of alien plants in Belgium and the Netherlands. Gorteria 42(1): 66-107. [Unexpected records included *Parentucellia latifolia*.]

Wakabayashi, T., Ishiwa, S., Shida, K., Motonami, N., Suzuki, H., Takikawa, H., Mizutani, M. and Sugimoto, Y. 2021. Identification and characterization of sorgomol synthase in Sorghum strigolactone biosynthesis. Plant Physiology 185(3): 902-913. [Identifying the gene responsible for sorgomol production in sorghum.]

Walters, S.J., Robinson, T.P., Byrne, M., Wardell-Johnson, G.W. and Nevill, P. 2020. Contrasting patterns of local adaptation along climatic gradients between a sympatric parasitic and autotrophic tree species. Molecular Ecology 29(16): 3022-3027. [A study based on the hemiparasite *Nuytsia floribunda* and sympatric autotroph *Melaleuca rhaphiophylla* in Western Australia.]

Wang, D., Yu, H. and Chen, G. 2020. Scent chemistry and pollinators in the holoparasitic plant *Cynomorium songaricum* (*Cynomoriaceae*). Plant Biology 23(1): 111-120. [In a study in Inner Mongolia, 42 volatiles were identified in inflorescences of *C. songaricum* including compounds known as typical carrion scents, such as *p*-cresol, indole, dimethyl disulphide and 1-octen-3-ol which attracted *Musca domestica* and other Diptera for pollination.]

Wang YuPei, Yao Ruifeng, Du Xiaoxi, Guo Lvjun, Chen Li, Xie DaoXin and Smith, S.M. 2021. Molecular basis for high ligand sensitivity and selectivity of strigolactone receptors in *Striga*. Plant Physiology 185(4): 1411-1428. [The *Striga hermonthica* hyposensitive to light (ShHTL) protein ShHTL7 shown to have high affinity for F-box protein AtMAX2 and interacts with AtMAX1 to confer very high sensitivity to srigolactones.]

Wani, K.I., Andleeb Zehra, Sadaf Choudhary, Naeem, M., Khan, M.M.A., Castroverde, C.D.M. and Tariq Aftab. 2021. Mechanistic insights into strigolactone biosynthesis, signaling, and regulation during plant growth and development. Journal of Plant Growth Regulation 40 (5): 1836-1852. [Reviewing current mechanistic understanding of strigolactone biosynthesis, receptors, and signalling also highlighting recent advances regarding their interaction with other hormones during developmental processes and stress conditions.]

Wenzell, K.E., McDonnell, A.J., Wickett, N., Fant, J.B. nd Skogen, K.A. 2021. Incomplete reproductive isolation and low genetic differentiation despite floral divergence across varying geographic scales in *Castilleja*. American Journal of Botany 108(7): 1270-1288. [A study of *C. sessiliflora* and *C. purpurea*, characterized by high diversity in floral colour which is not well supported in phylogenetic analyses. Concluding that patterns of genetic distance in *C. sessiliflora* suggest species cohesion maintained over long distances despite variation in floral traits, while in the *C. purpurea* complex, divergence in floral color across narrow geographic clines may be driven by recent selection on floral colour.]

Wheeler, A.G.,Jr. and Flynn, D.J. 2021. **First U.S. records of the mistletoe-associated *Micrutalis discalis* (Walker) (Hemiptera: Membracidae), description of the male, and redescription of the female.** Proceedings of the Entomological Society of Washington 123(3): 652-664. [Describing the hemipteran treehopper *M. discalis* from *Phoradendron californicum*, parasitic on *Parkinsonia microphylla, Prosopis velutina Senegalia greggii* in Arizona.]

Woldemariam, Z.G.**,** Damot, G.A. and Zewdie, D.A. 2022**.** Nitrogen fertilizer and cattle manure for *Striga* (*Striga hermonthica*) management and enhancement of Sorghum productivity in Northwest Ethiopia. Journal of Plant Nutrition 45(2): 232-245. [Highest yields and maximum economic return were from a combination of N 92 kg/ha and cattle manure 20 t/ha.]

*Xiaoxin Ye, Meng Zhang, McErlean,C,S,P and Yongqing Ma. 2021. Nitrogen and phosphorus supply strongly reduced the control efficacy of maize against sunflower broomrape. Archives of Agronomy and Soil Science : (https://doi.org/10.1080/03650340.2021.2004586). [Confirming the value of maize as a trap crop in reducing *O. cumana* in the following sunflower crop. The effect was increased by N, and particularly P, applied to the maize. There was also an indirect benefit through increased abscisic acid.]

Xu Bo Chen GuangFu, Dong JinLong and Chen LinYang. 2020. (*Mannagettaea* (Orobanchaceae), a new record to Xizang.) (in Chinese) Acta Botanica Boreali-Occidentalia Sinica 40(5): 892-894. [*M. hummelii* newly discovered at 4,500 m on the Qinghai-Tibet Plateau.]

*Xu XueHong,Li WenJun, Shomurodov, K.F., Abduraimov, O. and Niu ShuKui. 2020. [*Thesium longiperianthium* (Santalaceae), a new replacement name for *T. brevibracteatum* P.C.Tam. Biodiversity Data Journal 8: e59007. (https://bdj.pensoft.net/article/59007)

Yang Qian, Xin Cheng, Li JianFang, Peng FangFang, Zhang RuiTing, Wang Jiao, Li ZhongHu, Biffin, E. and Liu ZhanLin. 2020. Complete chloroplast genome of *Triaenophora shennongjiaensis* (Orobanchaceae), an endangered medical herb from China. Annales Botanici Fennici 57(1/3): 23-31.

*Yang Xin andf Huang XianYu. 2003. Different patterns of molecular, carbon and hydrogen isotope compositions of *n*-alkanes between heterotrophic plant and its hosts. Frontiers of Earth Science 14(4): 783-788. [New records noted for *Orobanche serbica* and *Viscum album* subsp. *austriaca*) from Italy; and *Phelipanche lavandulacea* from Serbia.]

Yashmita-ulman, Manoj Singh, Awadhesh Kumar and Madhubala Sharma. 2021. **Conservation of plant diversity in agroforestry systems in a biodiversity hotspot region of northeast India.** Agricultural Research 10(4): 569-581. [As part of as revision of *Aphyllon* sect. *Aphyllon* (Orobanchaceae) describing *Aphyllon franciscanum*, a widespread species throughout western North America previously recognized within a polyphyletic *A. fasciculatum,* differing in floral color, corolla lobe tip shape, the calyx cup to calyx lobe ratio, calyx lobe length, and degree of bend in the corolla tube.]

Yelpitiforov, E. and Klymenko, Y. 2020. European mistletoe (*Víscum album* L.) in national botanical garden M.M. Grushko Nas of Ukraine: an overview of its distribution and hosts. ScienceRise: Biological Science 3: 24-28. [Identifying '50 plants' (=species?) infected in the Grushko garden, including especially *Robinia pseudacacia*.]

Yoda, A. and 11 others. 2021. Strigolactone biosynthesis catalyzed by cytochrome P450 and sulfotransferase in sorghum, New Phytologist 232(5): 1999-2010. [Showing that Low Germination Stimulant 1 gene in sorghum uses a sulfo group to catalyze leaving of a hydroxyl group and cyclization of 18-OH-CLA, a unique biosynthetic pathway that confers *Striga*-resistance to sorghum and is not found in other plant species.]

***Yoneyama, K. and Brewer, P.B. 2021. Strigolactones, how are they synthesized to regulate plant growth and development? Current Opinion in Plant Biology 63: (https://doi.org/10.1016/j.pbi.2021.102072) [A review discussing how, in the light of recent transcriptomics and reverse genetic techniques, the various (more than 30) strigolactones so far characterized, are synthesized and what their structural diversity means for plant growth and development.]**

*Yoshimura and 11 others. 2020. Total synthesis and biological evaluation of zealactone 1a/b. Helvetica Chimica Acta 103(4): (https://doi.org/10.1002/hlca.202000017) [Desribing the total synthesis of zealactone 1a/b using a [2+2]-cycloaddition strategy and a chemoselective *Baeyer-Villiger* oxidation to forge the γ-butyrolactone fragment. Also describing the biological activities of zealactone 1a/b on corn and in soil in comparison with related synthetic analogues.]

*Yu, R., Sun, C,, Liu, Y., and Zhou, R. 2021.Shifts from cis-to trans-splicing of five mitochondrial introns in *Tolypanthus maclurei*. PeerJournal: (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8489412/ 260) [The mitogenome of *T. maclurei* (Loranthaceae) was sequenced and assembled into a circular chromosome of 256 kb in size containing 33 protein coding genes, three rRNA and 10 tRNA genes. One group I and 23 group II introns were seen as well as five cis-to trans-splicing introns, rare phenomena in angiosperms.]

*Yudina, S.V. and 11 others. 2021. Comparative analysis of plastid genomes in the non-photosynthetic genus *Thismia* reveals ongoing gene set reduction. Frontiers in Plant Science 12: (https://doi.org/10.3389/fpls.2021.602598) [18 species of *Thismia* were examined and their high AT plastomes are reduced to 14-18 kb, loosing genes such as accD, ribosomal protein genes, rRNA and tRNA.]

*Yudina, S.V. nd 11 others. 2021. **Comparative analysis of plastid genomes in the non-photosynthetic genus *Thismia* reveals ongoing gene set reduction.** Frontiers in Plant Science 12(March): (https://doi.org/10.3389/fpls.2021.602598) [Demonstrating how a gradual loss of genes shapes the miniaturized plastomes of 18 *Thismia*, spp. where the plastome is reduced to 14–18 kb and is highly AT-biased. The most complete gene set observed includes *accD*, seven ribosomal protein genes, three rRNA, and two tRNA genes. Different clades of *Thismia* have undergone further gene loss (complete absence or pseudogenization.]

Yue Xin and Chen GuiLin. 202. (*In vitro* germination, callus induction and primary haustorium organogenesis in the parasitic plant *Cynomorium songaricum*.) (in Chinese) Bulletin of Botanical Research 40(6): 846-854. [Gibberellic acid (GA3), in combination with kinetin and 2,4-D promoted embryo development and germination of *C. songaricum* seeds.]

*Zagorchev, L., Stöggl, W., Teofanova, D., Junmin Li and Kranner, I. 2021. Plant parasites under pressure: effects of abiotic stress on the between parasitic plants and their hosts. International Journal of Molecular Sciences 22(14): (https://www.mdpi.com/1422-0067/22/14/7418 [Reviewing literature on response of parasitic plants to drought, salinity, heavy metal, and herbicides, highlighting knowledge gaps and discussing perspectives for future research and potential agricultural applications.]

Zamora, R.m Lázaro-González, A. and Hódar, J.A. 2020. Secondary foundation species foster novel plant-animal interactions in the forest canopy: evidence from mistletoe. Insect Conservation and

Diversity 13: 470-479. [Showing that the presence of mistletoe (*Viscum album* and/or *V. cruciatum*) increases the range of insects, including *Cacopsilla visci* and many others.]
Zare, A. and Porameri, Z. 2021. Breaking of physical dormancy and evaluation of environmental factors on seed germination of field dodder parasite (*Cuscuta campestris*). Iranian Journal of Seed Science and Technology 10(2): 1-13. [Confirming that 30 minute soaking in suphuric acid and temperature of 25-35°C as optimal for germination of *C. campestris* seeds. There was no dependence on light.]
Zhang JingXiong Xu YuXing, Xie Jing, Zhuang HuiFu, Liu Hui, Shen GuoJing and Wu JianQiang. 2020. Parasite dodder enables transfer of bidirectional systemic nitrogen signals between host plants. Plant Physiology 185(4): 1395-1410. [Revealing that *Cuscuta campestris* facilitates plant-plant communications under N-stress conditions by enabling extensive bilateral N-systemic signaling between different hosts.]
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