

HAUSTORIUM

Parasitic Plants Newsletter

Official Organ of the International Parasitic
Seed Plant Research Group

May 1997 Number 32

● ● WHAT HAPPENED TO HAUSTORIUM?

The editors apologize for the delay in publishing HAUSTORIUM 32. The good news is that we have received support from the Food and Agriculture Organization for HAUSTORIUM. This has enabled us to upgrade computer capabilities and develop a home page. But we still very much need contributions from you! And we still need long term financial support.

● WE'RE ON THE WORLD WIDE WEB!!

HAUSTORIUM now has its own homepage! Find us at the Old Dominion University homepage: www.odu.edu Select College of Sciences, the Department of Biological Sciences, then faculty, then Musselman. At the end of the Musselman page click on HAUSTORIUM. This homepage will be updated regularly. You can contact us electronically at: ljm100f@viper.mgb.odu.edu.

● THE SEVENTH INTERNATIONAL SYMPOSIUM ON PARASITIC WEEDS

Possible venues and dates for the next parasitic weed symposium were discussed at Cordoba. **Norfolk, Virginia** was suggested as a possible site. The date is yet to be determined but is very tentatively planned for May 1999. Suggestions and offers for sponsorship are eagerly sought!

● ICRISAT *Strigu* Review

A Review of *Strigu* Control in Sorghum and Millet was held at ICRISAT, Samanko, Mali on 27-28 May 1996. Participants from National Agricultural Research Programs in West and Southern Africa; Universities and Research Institutes in UK, Germany and USA; as well as ICRISAT scientists from Africa and India attended the two-day meeting. The review was based on a series of papers which summarized and synthesized the present status of research on methodologies for control of *Strigu* in sorghum and millet. This was complemented by working groups which critically reviewed ICRISAT's past and present efforts on *Strigu* control and made priority recommendations on future research needs to improve the focus and organization of the research and collaboration with existing and new partners (NARS, IARCs, ARIs, NGOs etc.).

The main recommendations of the review included the reinforcement of ICRISAT's strategy to develop integrated control methodologies; the need for ICRISAT to place more emphasis on *Strigu* in sorghum; the need to enhance collaborative linkages for strategic research especially related to better understanding of variability within major *Strigu* spp. for developing sound strategies for resistance breeding and developing improved screening methodologies through the use of existing bioassays and molecular marker technology; the need to develop a well-balanced, multi-disciplinary team in West Africa; and the importance of supporting the Parasitic Weeds Theme of the System-wide IPM Initiative to foster collaboration with IITA and CIMMYT. A pro-

ceedings from the review is being prepared for publication by ICRISAT in 1997.

J. Lenne, ICRISAT, Patancheru, India

● A ROOT PARASITE FROM THE UPLANDS OF SRI LANKA

During a recent visit to Sri Lanka it was possible to travel to some of the higher altitude areas in the center of the island, where the world-famous tea industry is based. The natural sub-montane flora in the 2000-2500 m range bears a striking similarity to the Himalayan flora found at a similar altitude in Nepal some 1400 miles to the north. In both habitats the majestic *Rhododendron arboreum* is a dominant tree species and the large species of *Magnolia* of the middle Himalayas are mimicked by *Michelia nilagiriensis* in Sri Lanka. Among the sub-shrubs *Berberis zeylanica* is a reminder of the gaudy yellow flowered Himalayan species *Mahonia napaulensis* which has contributed so much to the genetic foundation of the varieties of *Mahonia* favored by horticulturists.

This dwarf montane forest is engulfed by cloud for large parts of the year and it is thought to intercept significant amounts of precipitation. Experiments are currently underway to quantify the contribution of this interception to the soil water balance and its importance to the water economy of the upper Mahaweli river catchment. It was while inspecting the site of an experiment in this montane forest that the striking root parasite *Christisonia bicolor* was spotted. *Christisonia* has one of the largest and most spectacular flowers I have seen in the Orobanchaceae. The genus is confined to Asia and most records are from south India and Sri Lanka (the only Himalayan collection - a single collection from Sikkim - has been *C. hookeri*, interestingly) though it extends to China in the North to Burma, the Philippines and Peninsular Malaysia in the East. Clumps of *Christisonia bicolor* can be found among the dark understory of the mature forest. Trimen in the Handbook Flora of Ceylon records that it is parasitic on the roots of Acanthaceae. These are likely to be

Strobilanthes species which are common sub-shrubs in the area. In India both *C. calcarata* and *C. neilgherrica* are reported to be parasitic on *Strobilanthes* spp. (Hooker, 1850). Very little has been published on the genus since it was first described by Gardner in 1847 who recognized seven species. Several additions have been made to the genus subsequently and at least three are endemic to Sri Lanka. There are two closely related parasitic genera *Aeginetia* and *Campbellia* and the taxonomic boundaries between them are not clear and similarly, there is no agreement on the species limits within *Christisonia*. *Christisonia aurantiaca* is considered synonymous with *C. bicolor* but this is not apparent from the illustrations in Wight or from Gardner's original descriptions.

There appears to be almost no information on this group of plants in modern literature. There are illustrations of *C. calcarata* in Wight 1885 and of *C. aurantiaca* and *C. lawii* in Neilgherry Plants published in 1893. Wight was also impressed by the beauty of these plants and suggested that they could be as popular in cultivation as orchids were it not for their parasitic habit. He predicted that one day they would become popular horticultural subjects but to date this has not happened.

The stem is a flattened structure partially submerged in the soil but appearing cobbled and uneven from the numerous large flower buds on the surface. Flowers appear singly or in small groups. They are tubular up to 5 cm. in length opening to a weakly defined bilabiate mouth. The throat of the corolla is deeply purple fading to white at the margins. The style is very persistent with a large clavate, papillose stigma up to 75 mm broad. Styles remain erect from the flattened stem after the corolla has disappeared and the viscid stigma remains pendulous with several in various stages of maturity. Anthers are in two pairs with pronounced spurs articulating on the tips of the filaments at their centers. There appears to be no chlorophyll in any part of the plant. The pollination biology of this peculiar plant can only be guessed but the viscid

persistent stigmata might be attractive to slugs or to snails.

[For beautiful line drawings of these plants, see HAUSTORIUM 32 on the Web]

Philip Bacon, Oxford Forestry Institute, University of Oxford, South Parks Road, Oxford, UK

● **FOURTH INTERNATIONAL WORKSHOP ON *OROBANCHE* RESEARCH**

This symposium is scheduled for **23-26** September 1998 in Albena, Bulgaria and is sponsored by the Institute for Wheat and Sunflower in Bulgaria. The institute is a leading center for *Orobanche* research in sunflower. Sessions will include germination, physiology, growth and development, resistance and other topics of interest to parasitic plant researchers. Albena is a small resort city on the beautiful Bulgarian Black Sea coast. For further information contact the Technical Secretariat for the symposium at fax number (359) 058 26364.

● **SIXTH INTERNATIONAL PARASITIC WEEDS SYMPOSIUM**

The Sixth International Symposium was successfully held in Cordoba from 16 to 18 April. About 150 delegates and their spouses attended from at least **30** countries, and enjoyed what must have been the cultural highlight of our series so far, as well as a scientific programme to equal any. The meetings were held in the exquisite atmosphere of the Palacio de Congressos only just outside the walls of the ancient mosque, but the facilities were very much up-to-date. Just over 100 papers were accepted for publication in the attractive Proceedings entitled 'Advances in Parasitic Plant Research' which was available on arrival. About half these were presented orally, the remainder as posters.

The meeting was opened by a represen-

tative of the main sponsors, the Directorate General of Agricultural Research, Consejero de Agricultura y Pesca, Junta de Andalucía. Professor Jose Cubero then treated us to a thought-provoking review of the progress and content of the *six* symposia so far.

The first invited lecture, presented by Dan Nickrent, showed how new molecular techniques using ribosomal RNA, could be used to clarify the evolutionary and phylogenetic relationships between and within different families of parasitic plants. Results have suggested a reappraisal of several of these relationships and confirmed many others. A number of other papers pursued the same theme, using both molecular and more traditional cladistic techniques. These tended to confirm the possible separation of the 'agrestal' *Striga asiatica* from other closely related taxa such as *S. hirsuta* and *S. lutea*, while suggesting a relatively close relationship between *S. hermonthica* and *S. aspera*, the former perhaps representing another 'agrestal species' derived from the latter (invited paper by Mohamed, Musselman and others). The concept of agrestal species might also be applied to the Old World *Orobanche cernualcumana* which has relatively recently evolved to attack New World species such as sunflower, tomato and tobacco. The separation of this pair of species, as well as the *O. ramosalaegyptiaca* pair appeared to be justified by several of the studies. A workshop devoted to the topic of molecular biology provided useful reminders of its potential but also of the need for careful selection of technique to match the objectives of the study. In the most detailed review of the subject to date, Jose Cubero came to valuable conclusions on the relationships within Orobanchaceae, based on cytogenetic studies.

Turning to more conventional morphology and development, there were welcome descriptions of less familiar parasites, including an excellent invited paper from Alfredo Cocucci on *Prosopanche* (Hydnoraceae) in Argentina. Other papers touched upon *Rhamphicarpa*, *Thesium*, *Santalum* and *Arnyema*, trichomes in *Striga*, tuberisa-

tion in *Orobanche*, predation and redistribution of *Orobanche* seeds by soil fauna, while a further novelty was a time-lapse video showing the strange circumnutations of *Viscum album*, as it arrives at the most efficient arrangement of its branches for light interception (R. Dorka).

Papers on host/parasite relationships were introduced by an invited lecture from Klaus Wegmann (not included in the Proceedings), followed later by one on nitrogen effects by Arnold Pieterse and that by Danny Joel on the haustorium and resistance mechanisms. The effects of nitrogen on germination continue to attract attention, while the work of Malcom Press and colleagues reinforces the idea of a role for N in protecting the host from damage. This team also demonstrated clearly how the influence of *Striga* on cereal hosts involves a great deal more than the mere removal of carbon metabolites (which can explain most of the effects of *Orobanche* on tobacco and tomato) though the relative importance of effects on host photosynthesis and re-partitioning of resources, is still not fully clear. Other papers concerned the transfer of S, N and alkaloids from various hosts to *Cuscuta*. Inge Dorr gave us further elegant demonstration of symplastic connections in several host/parasite systems and some new structures in the xylem connections of *Striga hermonthica*.

Several papers reinforced the probable importance of phytoalexins in host resistance, while others showed correlations between peroxidase activity and resistance to *Cuscuta* in tomato, and between enzymes triggering lignin synthesis and the *Cuscuta*-resistance of *Phaseolus*. A report on the induction by *Orobanche* of a defence-related gene in tobacco (by Westwood and others) seems likely to be followed by many more on this theme at future meetings.

In terms of selection and breeding for resistance, no outstanding advances were reported on resistance to *Striga* in maize or sorghum, though several Spanish groups reported valuable new sources of *Orobanche* resistance in wild species of *Helianthus* and

Vicia while Riches reported encouraging progress in the search for resistance to *Striga* spp. in rice and Scharpf corresponding progress in the (very long) process of developing resistance to *Arceuthobium* in ponderosa pine.

Papers on biocontrol were discussed in a workshop session, at which serious doubts were expressed over the practicality and economics of the use of *Fusarium* spp. as mycoherbicides, whether for *Striga* or *Orobanche*. However, the importance of natural soil suppression (by bacteria, as well as fungi) was also emphasized and hopes expressed that ways could be found to enhance this phenomenon, which is presumed to be responsible for surprising declines in soil seed counts of *S. hermonthica* in some studies in Kenya.

For more direct control, the most novel results have been with herbicides applied as seed-dressings, using seeds of normal faba bean treated with imidazolinone herbicides such as imazapyr for control of *O. crenata* (Luis Garcia-Torres and colleagues) and seeds of genetically-engineered herbicide-resistant maize treated with imazapyr and sulphonylureas for control of *S. hermonthica* (Gordon Abayo, Joel Ransom and colleagues). In neither case is complete control achieved but the idea promises to provide the farmer with a relatively simple and inexpensive technique. An especially welcome report was that showing successful selective control of *O. aegyptiaca* in tomato with application of triasulfuron via sprinkler irrigation (Kleifeld and colleagues). Other papers reported promise from more conventional applications of chlorsulfuron to sorghum to control *Striga* in Sudan, imidazolinone herbicides to faba bean to control *Orobanche foetida* in Tunisia and for control of *Cuscuta* in carrots in Israel. Among papers on non-chemical methods, the transplanting of sorghum as a means of reducing *Striga* attack is confirmed as one more option to be considered. Trap-cropping to reduce the *S. hermonthica* seed bank gave disappointing results in Kenya, emphasizing the need for a better understanding of the factors affecting *Striga* germination in the

field, including varietal differences within trap-crops. Another paper was the first to report on the potential for use of agroforestry species for control of *Striga*, and we hope will be followed by many more as realization grows of the importance of longterm improvement in soil fertility.

In a final session on integrated control systems there were no outstanding new ideas, but a welcome increase in consideration of the role of extension and education in the development and delivery of ideas for integrated control systems.

Jose Cubero and Maria-Teresa Moreno are to be congratulated on their superb contributions to the success of this meeting and for arranging fascinating programmes for the evenings and for accompanying persons. All of us will remember Cordoba as a wonderfully colorful, convivial city.

Enquiries about the availability of the Proceedings should be addressed to:

D. Rafael Cantizano
 Direccion General de Investigacion Agraria
 Consejeria de Agricultura, Pesca y Alimentacion
 c/Juan de Lara Nieto 1
 41013 Sevilla
 SPAIN

C. Parker

● POSTDOCTORAL RESEARCH POSITION IN MAIZE

The Rockefeller Foundation seeks a postdoctoral maize breeder to help implement a program supporting research on the production of African maize varieties with durable resistance to parasitic weeds of the genus *Striga*. The selected candidate will be assigned to a research institute in Africa that is a grantee of the Foundation. Write to:

Postdoctoral Search-Maize Breeder
 Agricultural Sciences Division
 The Rockefeller Foundation
 420 Fifth Avenue
 New York, **NY** 10018-2702

USA

● TWO EXCELLENT NEW BOOKS ON PARASITIC PLANTS

Dwarf Mistletoes: Biology, Pathology, and Systematics. 1996. F. G. Hawksworth and D. Wiens. Agriculture Handbook 709. United States Department of Agriculture, Forest Service. Washington, D.C. xiv + 410. Cost not given.

Dwarf Mistletoes is a wonderful book that will be THE resource on dwarf mistletoes for years to come. Beautifully laid out (except, inexplicably, for the front cover with a title difficult to discern against the mistletoe background), this world class monograph is carefully planned, thorough, well documented, and readable. .pp After the succinct introduction, the life cycle of *Arceuthobium* is discussed, emphasizing seedling establishment of the parasite. I find the diagram of the life cycle and the figure of the intriguing ballistic fruits (pages 8 and 9) to be especially useful for classes when discussing fruit dispersal and phanerogamic parasites. Following chapters discuss sexual reproduction, biogeography, host relationships (especially important since dwarf mistletoes are serious forest pathogens), ecology (including biotic relationships other than host-parasite), physiology?pathology, and control. In short, everything you want to know about dwarf mistletoes is here including a table documenting those established beyond their natural ranges, medicinal uses, etc, etc.

Approximately half of the book deals with taxonomy, including molecular systematics. The "formal taxonomy" section includes distribution maps, excellent color photographs (although some are too dark in my copy), and list of specimens examined. Most helpful, however, are the observations of the authors, both keen students of nature who convey their fascination with dwarf mistletoes even in the "formal taxonomy". The list of references is exhaustive and the indices functional.

This book is in memory of the first author, Frank Hawksworth, who died while the present book, a successor to a 1972 edition, was being written. Frank's enthusiasm, keen observation, and love of mistletoes is appropriately enshrined in this outstanding volume. (Adapted from a review to appear in *ECONOMIC BOTANY*)

Parasitic Plants. 1995. Edited by Malcom Press and Jonathan Graves. Chapman and Hall, London. xii + 292. Cost: **L45**.

"...an attempt to provide a baseline of information to fill the gap since Kuijt's [1968] text" is the *raison d'être* the editors give for this volume. Simply put, Kuijt's book can probably never be replaced by a single volume due to the tremendous advances made since, and in many cases because of, his *Biology of Parasitic Flowering Plants*. There are simply too many papers. As Press and Graves note, many of these papers are included in the proceedings of the symposia on parasitic weeds. While these volumes are readily available, they are not handled the same way as other archival literature and thus, alas, not utilized as they should be.

The present work should ameliorate this situation by providing a modern (at least up to 1995) treatment of parasitic angiosperms. Almost three decades have elapsed between *Parasitic Plants* and *The Biology of Parasitic Flowering Plants*. Therefore, it is not surprising that the approach is different. The eleven chapters are organized more around how the parasites function rather than on taxonomy and morphology. There is an introductory chapter and two chapters on parasitic weeds. The remainder deal with germination, haustorial initiation, mineral nutrition, carbon and nitrogen relations, water relations, reproductive biology, genes and genomes, and host responses.

Press and Graves suggest that this book will find value as a textbook. The cost is prohibitive for general student use, especially when compared to the relatively inexpensive albeit less stringently edited symposia volumes. Considering the state of *flux* in the field of parasitic angiosperms, I felt it was

better to use the book as a reference in my course in parasitic vascular plants and emphasize rather the primary archival and electronic literature.

This book is very carefully edited and contains useful tables and charts. However, the incredibly poor binding (at least on my copy) lessens its value.

L. J. Musselman

● PARASITIC PLANT INITIATIVE FOR THE INTERNATIONAL AGRICULTURAL CENTERS

On August 26 through August 30, 1996, the parasitic flowering plants task force met at IITA, Cotonou to develop a project proposal and formally launch this aspect of the CG system-wide IPM initiative. During the course of the meeting, the participants focussed on developing a collaborative, CG system-wide project for integrated parasitic flowering plant management in West Asia and all of Africa. The outcome of the meeting was a logical framework for the project entitled Collaborative Integrated Parasitic Plant Management (CoIPPM). The logical framework contains 21 outputs and 67 activities centered around two project themes: research and implementation. In addition, the activities of the project were further focussed around development of 13 pilot sites in the ecoregions associated with the African Highlands Initiative (3 sites), the Desert Margins Initiative (3 sites), the Moist Savanna Consortium (3 sites), North Africa (3 sites), and West Asia (1 site).

It was decided that outputs should be allocated 52% to research and 48% to implementation. The outputs were prioritized within each of these two project themes, and projected funding was assigned to each output based on the prioritization. In addition, it was decided that the IARC to NARES split of the budget allocations would be 20% to 80%, respectively. This resulted from the conviction that this project was heavily oriented toward on-farm adoption

and that NARES would need a larger share of the funds to accomplish this. Matching funds from the IARCs and NARES (based on current core and special project allocations) were estimated to be approximately equal to requested supplemental funding.

Dana K. Berner, International Institute for Tropical Agriculture, Ibadan, Nigeria.

● LITERATURE

- Abbasher, A.A., J. Sauerborn, J. Kroschel and D.E. Hess. 1996. Evaluation of *Fusarium semitectum* var. *majus* for biological control of *Striga hermonthica*. In: V.C. Moran and J.H.J. Hoffman (Eds), Proceedings, 9th International Symposium on Biological Control of Weeds, Stellenbosch, 1996. pp. 115-120. (Encouraging results from preliminary work in Sudan; good control and no pathogenicity to sorghum.)
- Abou-Salama, A. M. 1995. Utilization of crop rotation for the control of *Orobanche crenata* Forsk. Assiut Journal of Agricultural Science 26(1): 245-252. (*Orobanche crenata* apparently reduced most by rotation with flax or sugarcane.)
- Abu-Irmaileh, B. E. 1996. Management of parasitic weeds (*Orobanche* and *Cuscuta* spp.) in North Africa and Near East. In: H. Brown, G.W. Cussans, M. D. Devine, S. O. Duke, C. Fernandez-Quintanilla, A. Helweg, R. Labrada, M. Landes, P. Kudsk and S. C. Streibeig (Eds.) Proceedings, 2nd International Weed Control Congress, Copenhagen, Denmark, 1996, pp. 629-638.
- Agha, A. M., E. A. Sattar and Ahmed Galal. 1996. Pharmacological study of *Cuscuta campestris* Yuncker. Phytotherapy Research 10(2): 117-120.
- Ahn WonYung 1996. (Analysis of chemical constituents of saccharides and triterpenoids in the Korean native mistletoes.) (in Korean) Mogjae Gonghak = Journal of Korean Weed Science and Technology 24(1): 27-33. (Studies related to *Korthalsella japonica* on *Camellia*, *Viscum album* var. *coloratum* on *Quercus* and *Loranthus yadoriki* on *Neolitsia*.)
- Albert, H. and A. Runge-Metzger. 1995. Management of natural resources: systems approaches to *Striga* control in sub-Saharan Africa. Journal for Farming Systems Research-Extension 5(1): 91-106.
- Alpha, T., P. Raharivelomanana, J-P. Bianchini, R. Faure and A. Cambon. 1997. Bisalolane sesquiterpenoids from *Santalum austrocaledonicum*. Phytochemistry 44: 1519-1522.
- Americanos, P. G. and N. A. Vouzounis. 1995. Control of *Orobanche* in cabbage. Technical Bulletin 170. 7 pp. Agricultural Research Institute, Ministry of Agriculture, Natural Resources and the Environment, Nicosia, Cyprus. (Four plants of *O. aegyptiaca* per host can cause total crop failure. Two applications of glyphosate 60-100 g/ha or imazaquin 5-10 g/ha successful some years but not reliable?)
- Amsellem, Z., Y. Kleifeld, Z. Kerenyi, L. Hornik, Y. Goldwasser, and J. Gressel. 1996. Isolation of mycoherbicidal pathogens from juvenile broomrape plants. Phytopathology 86: 1-11.
- Antonova, T. S. and S. J. ter Borg. 1996. The role of peroxidase in the resistance of sunflower against *Orobanche cumana* in Russia. Weed Research 36: 113-121. (Distinguishing races C and D on the basis of extra-cellular excretion of peroxidase from seedlings of C - resulting in reaction with host phenolics and the creation of a lignin barrier and resistance - but not from D - hence no host reaction, and a consequent virulence.)
- Atkinson, M. D. 1996. The distribution and naturalization of *Lathraea clandestina* L. (Orobanchaceae) in the British Isles. Watsonia 21: 119-128.
- Auer, C.G. 1996. (Diseases of urban trees.) (in Portuguese) Documentos - Centro Nacional de Pesquisa de Florestas, No 28. 18 pp. (including problem of mistletoes.)
- Ba, A.T. and P.I. Samb. 1994. [Action of *Pyrausta heliamma* (Meyr.), insect Crambidae, parasite of *Striga gesnerioides* (Willd.) Vatke a parasitic weed of crops in Senegal.] (in French) Bulletin de l'Institut Fondamental d'Afrique

- Noire. Serie A, Sciences Naturelles 47:47-50. (Recording a lepidopteran damaging flowers.)
- Bakos, A., M. Fari, O. Toldi and M. Lados. 1995. Plant regeneration from seedling-derived callus of dodder (*Cuscuta trifolii* Bab. et Giggs). Plant Science (Limerick) 109:95-101.
- Barker, E. R., M. C. Press, J. D. Scholes and W. P. Quick. 1996. Interaction between the parasitic angiosperm *Orobanche aegyptiaca* and its tomato host: growth and biomass allocation. The New Phytologist 133: 637-642. (Damage noted from the lowest infection rate and up to 80% reduction in biomass at high levels. Stem and fruit reduced but not leaves and roots.)
- Barker, E. R., J. D. Scholes, M. C. Press and W. Quick. 1995. Effects of the holoparasite *Orobanche aegyptiaca* on the growth and photosynthesis of its tomato host. In: Physiological responses of plants to pathogens, Dundee, 1995. Aspects of Applied Biology 42: 141-148.
- Barlow, B.A. 1995. Advances in systematic knowledge of Australian Loranthaceae and Viscaceae: a review. Telopea 6: 851-862.
- Baumel, P., W. D. Jeschke, N. Rath, F. C. Czygan and P. Proksch. 1995. Modelling of quinolizidine alkaloid net flows in *Lupinus albus* and between *L. albus* and the parasite *Cuscuta reflexa*: new insights into the site of quinolizidine alkaloid synthesis. Journal of Experimental Botany 46: 1721-1730. (Including interesting conclusions on the roles of xylem and phloem in transport of alkaloids.)
- Bedi, J. S. and N. Donchev. 1995. A technique for macroconidia production by *Fusarium oxysporum* f.sp. *orthoceras*, a biocontrol agent for *Orobanche*. Plant Disease Research 10(1): 62-63. (Best results with old maturing lemon leaves on Houston's agar medium.)
- Bennetts, R.E., G.C. White, F.G. Hawksworth and S.E. Severs. 1996. The influence of dwarf mistletoe on bird communities in Colorado ponderosa pine forests. Ecological Applications 6: 899-909. (24 of 28 bird species positively correlated with levels of *Arceuthobium vuginatum*, perhaps due to more death of branches, snags, nesting sites, etc.: hence control of dwarf mistletoe can damage wildlife habitat.)
- Bhandari, N.N. and K.G. Mukherji. 1993. The Haustorium. RSP/John Wiley & Sons.
- Brandes, D. and C. Sander. 1995. (Alien flora of river banks of the Elbe.) (in German) Tuexenia 15: 447-472. (Noting distribution of *Cuscuta campestris* by rivers.)
- Berner, D., R. Carsky, K. Dashiell, J. Kling and V. Manyong. 1996. A land management based approach to integrated *Striga hermonthica* control in sub-Saharan Africa. Outlook on Agriculture 25: 157-164. (An outline of possible control measures, with emphasis on rotation with soyabean, clean crop seed, enhancing soil suppressiveness, varietal resistance and seed treatment with herbicide.)
- Boa, E.R. 1995. A guide to the identification of diseases and pests of neem (*Azadirachta indica*). RAP Publication No 1995/41. FAO Regional Office for Asia and the Pacific, Bangkok. 71 pp. (Includes reference to mistletoes.)
- Bottenberg, H. 1995. Farmers' perceptions of crop pests and pest control practices in rainfed cowpea cropping systems in Kano, Nigeria. International Journal of Pest Management 41: 195-200. (Over 30% of farmers reported infestation of cowpea by *Striga gesnerioides* and about 40%, infestation of sorghum by *S. hermonthica*.)
- Boukar, I., D.E. Hess and W.A. Payne. 1996. Dynamics of moisture, nitrogen and *Striga* infestation on pearl millet transpiration and growth. Agronomy Journal 88: 545-549. (Infestation and damage from *S. hermonthica* in pots higher under reduced moisture; also higher with added N but this associated with much increased root length. Attachments per m of root reduced by N.)
- Briggs, J. 1996. Mistletoe survey update. Botanical Society of the British Isles

- News 72: 42. (Noting a conference in Germany at which medical uses of *Viscum album* were discussed, products Iscador, Helixor and Abnoba being used in cancer treatment.)
- Cajic, V. and M. Stjepanovic. 1995. (Alfalfa seed losses and quality as affected by presence of weed species during processing.) (in Croatian) Sjemernarstvo 12: 123-124. (Seeds of *Cuscuta* spp. among those not readily separated from alfalfa seed by either air-screen cleaner or magnetic separator.)
- Calvin, C. L. and C. Wilson. 1995. Relationship of the mistletoe *Phoradendron macrophyllum* (Viscaceae) to the wood of its host. International Association of Wood Anatomists Journal 16 (1): 33-45.
- Carlson, C. E., J. W. Byler and J. E. Dewey. 1995. Western larch: pest-tolerant conifer of the northern Rocky Mountains. In: Ecology and Management of *Larix* Forests: a look ahead. Proceedings of an International Symposium, Whitefish, Montana, 1992. USDA Forest Service General Technical Report -Intermountain Research Station No INT-GTR-319. pp. 123-129. (Including summary of biology and control of dwarf mistletoe.)
- Carsky, R. J., R. Ndikawa, R. Kenga, L. Singh, M. Fobasso and M. Kamuanga. 1996. Effect of sorghum varieties on *Striga hermonthica* parasitism and development. Plant Varieties and Seeds 9: 111-118. (Moderately resistant varieties S-35 and CS-54 supported less *S. hermonthica* emergence and seed production, and significantly lower seed numbers in the soil, than local varieties Djigani and Damongari.)
- Castro-Tendero, A. J. and L. Garcia-Torres. 1995. SEMAGI - an expert system for weed control decision making in sunflowers. Crop Protection 14: 543-548. (Includes formula for effect of different levels of *Orobanche cernua* on sunflower yield.)
- Cetinsoy, S. 1995. Biology and chemical control of *Melampyrum arvense* L. in cereal fields of Anatolia. The Journal of Turkish Phytopathology 24: 63-68. [A slightly belated English version of his 1980 paper in Turkish, reporting on average densities of 17 *M. arvense* per sq. m in cereal fields in Kutaya province (in 1976) and best control by bromoxynil plus MCPA.]
- Cheng-Zhong Zhang. 1996. Fructosides from *Cynomorium songaricum*. Phytochemistry 41: 975-976. (*Cynomorium songaricum* grows in NW China and is used traditionally for kidney disorders.)
- Coghan, A. 1995. Keep kissing to save the British mistletoe. New Scientist 2009/2010: 5. (Bewailing the decline of *Viscum album* in UK due to destruction of old apple orchards.)
- Coghan, A. 1995. Mistletoe's kiss of death revealed. New Scientist 2002: 21. [Reporting work comparing the dimeric structure of mistletoe lectin 1 (ML1) with that of ricin, and the possibilities for improved activity against cancer cells.]
- Cullings, K., T. Szaro and T. Bruns. 1996. Evolution of extreme specialization within a lineage of ectomycorrhizal epiparasites. Nature 379: 63-66.
- Dabrowski, Z. T. and A. Hamdoun (Eds). 1995. Report on the First National Workshop on Control Methods of Bromorape, *Orobanche* in Sudan. ICIPE Science Press, Nairobi. 58 pp. (Including 9 papers and a summary of discussions among 42 participants meeting in August 1995. Main species in Sudan is *O. ramosa* along Nile and Red Sea and other hot spots, on tomato, potato; also some *O. cernua* and *O. minor* along coast. Preliminary work with solarization shows promise.)
- Deacon, J. W. 1996. Ecological implications of recognition events in the pre-infection stages of root pathogens. New Phytologist 133: 135-145. (Mainly on fungi but including reference to *Striga* and *Orobanche*.)
- Debrah, S. K., D. Sanogo and F. O. Boadu. 1996. On-farm experiments with sorghum to assess the acceptability of new varieties and herbicide treatments. Experimental Agriculture 32: 219-223. [A survey studying farmers' criteria for using herbicide (2,4-D) for control of *S.*

- hermonthica* and adopting new sorghum varieties.]
- Delavault, P. M., N. M. Russo, N. A. Lusson and P. O. Thalouarn. 1996. Organization of the reduced plastid genome of *Lathraea clandestina*, an achlorophyllous parasitic plant. *Physiologia Plantarum* 96: 674-682.
- Delavault, P., V. Sankyan and P. Thalouarn. 1995. Divergent evolution of two plastid genes, *rbcL* and *atpB* in a non-photosynthetic parasitic plant (*Lathraea clandestina*). *Plant Molecular Biology* 29: 1071-1079.
- Dhanapal, G.N. and P.C. Struik. 1996. Broomrape (*Orobancha cernua*) control before attachment to host through chemically or biologically manipulating seed germination. *Netherlands Journal of Agricultural Science* 44: 279-291. (In lab and pot experiments, *O. cernua* stimulated moderately by GR 24 and ethephon, and by exudates from *Vigna radiata*, *V. mungo*, sunflower and sesame; less well by pea, pigeonpea and soybean.)
- Diarra, C., M. Ciotola, S.G. Hallett, D.E. Hess and A.K. Watson. 1996. Mass production of *Fusarium oxysporum* (M12-4A), a biological control agent for *Striga hermonthica*. In: V.C. Moran and J.H.J. Hoffman (Eds), *Proceedings, 9th International Symposium on Biological Control of Weeds*, Stellenbosch, 1996. pp. 149-152.
- Dini, I., C. Iodice and E. Ramundo. 1995. Phenolic metabolites from *Orobancha speciosa*. *Planta Medica* 61: 389-390. (Relating to the uses of *O. crenata* in folk medicine - anti-inflammatory, antimicrobial and cicatrizing.)
- Dominguez, J. 1996. R-41, a sunflower restorer inbred line, carrying two genes for resistance against highly virulent Spanish population of *Orobancha cernua*. *Plant Breeding* 115: 203-204. (Identifying two dominant genes for resistance to *O. cernua* population EC94.)
- Dominguez, J., J.M. Melero-Vara, J. Ruso, J. Miller and J.M. Fernandez-Martinez. 1996. Screening for resistance to broomrape (*Orobancha cernua*) in cultivated sunflower. *Plant Breeding* 115: 201-202. (240 crop lines tested, of which 10 resistant.)
- Donohue, K. 1995. The spatial demography of mistletoe parasitism on a Yemeni *Acacia*. *International Journal of Plant Sciences* 156: 816-823. (*Plicosepalus curvijlorus* commonest in low-density stands of *A. tortilis* but complex interactions noted between host and parasite populations.)
- Ems, S., C. Morden, C. Dixon, K. Wolfe, C. dePamphilis, and J. Palmer. 1995. Transcription, splicing and editing of plastid RNAs in the nonphotosynthetic plant *Epifagus virginiana*. *Plant Molecular Biology* 29: 721-733.
- Fan ZhiWei, Dong XingGuo, Zhou YuFang and Shen YiDe. 1995. Chemical control of Chinese taxillus on rubber trees. *Planter* 71: 459,468. (*Taxillus chinensis* reportedly controlled 80% by injection of 'Miesangling 3'.)
- Filep, G. M., J. J. Colbert, C. A. Parks and K. W. Seidel. 1995. Effects of thinning on growth and vigor of *Larix occidentalis* infected with *Arceuthobium laricis* in Oregon. In: *Ecology and Management of Larix Forests: a look ahead. Proceedings of an International Symposium*, Whitefish, Montana, 1992. USDA Forest Service General Technical Report-Intermountain Research Station No INT-GTR-319. pp. 307-309.
- Fineran, B. 1995. Green tissue within the haustorium of the dwarf mistletoe *Korthalsella* (Viscaceae). An ultrastructural comparison between chloroplasts of sucker and aerial stem issues. *Protoplasma* 189: 216-228.
- Fineran, B.A. 1996. Flange-type parenchyma cells: occurrence and structure in the haustorium of the dwarf mistletoe *Korthalsella*. *Protoplasma* 194: 40-53. (Involving *K. lindsayi*, *K. salicornioides* and *K. clavata*.)
- Fischer, E. 1996. A revision of the genus *Alectra* Thunberg (Scrophulariaceae) in Madagascar, with a description of *Pseudemelasma*, gen. nov. *Bulletin du Musee Nationale de l'Histoire Naturelle, Paris 4e series* 18, section B, Adansonia (1-2): 45-65. (Five species recognised:

- Alectra sessiliflora* plus 4 newly described - *A. hildebrandtii*, *A. humbertii*, *A. ibityensis* and *Pseudomelasma pedicularioides*.)
- Fischer, E. 1996. *Sieversandreas*, a new monotypic genus of Scrophulariaceae-Gerardiaceae from Madagascar. Bulletin du Musie Nationale de l'Histoire Naturelle, Paris 4e sries 18, section B, Adansonia (3-4): 213-217. (Related to *Sopubia* and presumably hemiparasitic?)
- Fischer, E. 1997. Notulae ad Floram Germanicum 11. Typifications of Linnean names of Scrophulariaceae occurring in Germany. Feddes Repertorium 108: 111-117.
- Fischl, G. 1996. [A leaf-spot disease of mistletoe (*Viscum album* L.).] (In Hungarian) Novenyvedelem 32(4): 181-183. (Refers to 'control by '....*Botryophaerostoma visci* (*Sphaeropsis visci*)' and to 'a new pathogen of *V. album*, *Plectophomella visci*...'.)
- Forstreuter, W., C. Beyer and H. C. Weber. 1995. (Comparative investigation of haustoria of the Loranthaceae.) (in German) Feddes Repertorium 106: 439-444. (Development and structure of haustoria described for the root-parasitic *Atkinsonia ligustrina*, *Gaia-dendron punctatum* and *Nuytsia floribunda* and the mainly epiphytic *Tripodanthus acutifolius*.)
- Freyer, R., K. Neckermann, R. M. Maier and H. Kossel. 1995. Structural and functional analysis of plastid genomes from parasitic plants: loss of an intron within the genus *Cuscuta*. Current Genetics 27: 580-586. (Comparison of *C. europaea* and *C. reflexa*.)
- Frick, E., D. Frahne, K. Wegmann. 1996. Biochemical synthesis of 2,6-dimethoxy-para-benzoquinone, a haustorial stimulant of *Striga asiatica* (L.) Kuntze. Natural Products Letters 9: 153-159.
- Frost, H. M. 1995. *Striga hermonthica* surveys in Western Kenya. Proceedings, Brighton Crop Protection Conference - Weeds, Brighton, 1995. pp. 145-150. (Concludes the *Striga* problem has the potential to spread to other regions of Kenya. Some useful information on farmer attitudes and knowledge - or lack of it.)
- Frost, D.L., A.L. Gurney, M.C. Press and J.D. Scholes. 1997. *Striga hermonthica* reduces photosynthesis in sorghum: the importance of stomatal limitations and a potential role for ABA? Plant, Cell and Environment 20: 483-492. (In root chambers studies, photosynthesis reduced in CSH-1 more than in Ochuti, perhaps due to differential change in stomatal conductance; however, both varieties equally affected in increased root:shoot ratio and reduced shoot biomass.)
- Gao, Jian-Jun, Zhong-Jian Jia and Carles Codina. 1996. An eremophilane sesquiterpenoid from *Pedicularis striata* Pall ssp. *arachnoidea*. Phytochemistry 43: 1411-1412.
- Gabius, S., K. Kayser and H. J. Gabius. 1995. [Mistletoe (*Viscum album*) extracts and their application - from a scientific point of view.] (in German) Munschener Medizinische Wochenschrift 137: 602-606.
- Garcia-Torres, L., M. Castejon-Munoz, F. Lopez-Granados and M. Jurado-Exposito. 1995. Imazapyr applied post-emergence in sunflower (*Helianthus annuus*) for broomrape (*Orobanche cernua*) control. Weed Technology 9: 819-824. (Good selective control achieved with 10-15 g/ha applied at 12 to 19 leaf stages.)
- Garcia-Torres, L., M. Castejon-Munoz, F. Lopez-Granados and M. Jurado-Exposito. 1995. [HTCS (herbicide-treated crop seed) treatments for the control of broomrape (*Orobanche* spp.).] (in Spanish) In: Proceedings 1995 Congress of the Spanish Weed Science Society, Huesca, Spain, 1995. pp. 369-372. [Soaking crop seed in 1-5% herbicide product for 3-5 minutes gives promising results in faba bean and pea (with imazethapyr), in lentil (with imazapyr) and in sunflower (with propyzamide).]
- Garcia-Torres, L., M. Castejon-Munoz, F. Lopez-Granados and M. Jurado-Exposito. 1995. [Imazapyr applied post-emergence in sunflower (*Helianthus*

- annuus*) for broomrape (*Orobanche cernua*) control.] (in Spanish) In: Proceedings 1995 Congress of the Spanish Weed Science Society, Huesca, Spain, 1995. pp. 303-306. (Imazapyr at 10-15 g/ha at 12-14 leaf stage selective against *O. cernua* just emerging; later treatment more damaging.)
- Garcia-Torres, L., M. Castejon-Munoz, M. Jurado-Exposito and F. Lopez-Granados. 1996. Modelling the economics of controlling nodding broomrape (*Orobanche cernua*) in sunflower (*Helianthus annuus*). Weed Science 44: 591-595.
- Gbehounou, G., A.H. Pieterse and J.C. Verkleij. 1996. The decrease in seed germination of *Striga hermonthica* in Benin in the course of the rainy season is due to dying off process. Experientia 52: 264-267. (At a site 70 km N. of Parakou, viability of seeds declined rapidly during wet season and prevention of new seeding for 2 seasons should result in dramatic decrease of the problem.)
- Georgieva, I. G. and H. G. Bozoukov. 1995. Study on the properties of some pesticides to stimulate germination of the broomrape (*Orobanche* spp.) seeds. Bulgarian Journal of Agricultural Science 1(1): 13-17. (Among 52 fungicides, herbicides and insecticides tested, active compounds included thiophanate-methyl, endosulfan, thiofanox and ver-nolate.)
- Goldwasser, Y. 1995. Spinach (*Spinacia oleracea* var. Attica) as a host of Egyptian broomrape (*Orobanche aegyptiaca*). Phytoparasitica 23: 357-358.
- Goldwasser, Y., Y. Kleifeld, S. Golan, A. Barguti and B. Rubin. 1995. Dissipation of metham-sodium from soil and its effect on the control of *Orobanche aegyptiaca*. Weed Research 35: 445-452.
- Gomes, S. 1996. (Cape Verde Flora. Vascular Plants. Orobanchaceae.) (in Portuguese) Flora de Cabo Verde No 82. 7 pp. (Including description and illustrations of *Cistanche phelypaea*.)
- Gomez, M.A., M.T. Saenz, M.D. Garcia, R. de la Puerta and M.C. Ahumada. 1996. Effect of methanolic extract of parasitic *Viscum cruciatum* Sieber on mitosis in *Allium cepa* L. Cytobios 85(340): 59-63.
- Goncalves, M. L. 1995. (Cape Verde Flora. Vascular plants. 73. Cuscutaceae.) (in Portuguese). Flora de Cabo Verde No 73, 9 pp. (Describing *Cuscuta planiflora* vars. *approximata* and *planijlora* and *C. umbellata*.)
- Gressel, J., L. Segel and J. K. Ransom. 1996. Managing the delay of evolution of herbicide resistance in parasitic weeds. International Journal of Pest Management 42: 113-129. (With suitable care and roguing, it is estimated that resistance to imidazolinone and sulfonyleurea herbicides should be delayed for at least 6-8 seasons.)
- Gurney, A. L., M. C. Press and J. K. Ransom. 1995. The parasitic angiosperm *Striga hermonthica* can reduce photosynthesis of its sorghum and maize hosts in the field. Journal of Experimental Botany 46: 1817-1823. (Photosynthesis in infested CK60 sorghum and H511 maize reduced by 46% and 31% respectively by 63 days after planting: Ochuti sorghum parasitized but photosynthesis unaffected.)
- Haidar, M. A., W. Bibi and N. Abdel-Khalek. 1995. Effect of wheat and barley residues on branched broomrape (*Orobanche ramosa*) growth and development in potatoes. Proceedings, Brighton Crop Protection Conference - Weeds, Brighton, 1995. pp. 871-876. (Rates of 6,000-12,000 kg straw/ha, preferably incorporated, reduced *O. ramosa* emergence by at least 50% and increased potato yield in some cases.)
- Haigh, S.L. 1996. Saltcedar (*Tamarix ramosissima*), an uncommon host for the desert mistletoe (*Phoradendron californicum*). Great Basin Naturalist 56(2): 186-187.
- Hajta, T., K. Hostanska, J. Fischer and H. Lentzen. 1996. Investigation of cellular parameters to establish the response of a biomodulator: galactoside-specific lectin from *Viscum album* plant extract. Phytomedicine 3: 129-137. (The lectin showed to increase the priming of polymorphonuclear leukocytes in humans.)

- Haynes, A.R., N.C. Coile and T.S. Schubert. 1996. Comparison of two parasitic vines: dodder (*Cuscuta*) and woe vine (*Cassytha*). Botany Circular (Gainesville) No 30. 3 pp.
- Hall, J. P. 1996. Forest insect and disease conditions in Canada 1994. 112 pp. (Including mistletoes.)
- Harten, A. van. 1996. *Sitobion loranthi*, a new aphid from Angola living on mistletoes (Homoptera: Aphididae). Entomologische Berichten 56: 76-79. (A new species occurring on several species of Loranthaceae in Angola.)
- Haynes, S. C., W. L. MacDonald and L. J. Musselman. 1996. Oilnut parasitism of firs. U. S. Department of Agriculture, Forest Service, Northeastern Area, Southern Region. NA-PR-03-96. (A pest alert poster for oilnut, *Pyrularia pubera*, Santalaceae, that attacks *Abies balsamea* and *A. fraseri* grown as Christmas trees in the Appalachian Mountains of West Virginia.)
- Hershenhorn, J., Y. Goldwasser, D. Plakhine, G. Herzlinger, S. Golan, R. Russo and Y. Kleifeld. 1996. Role of pepper (*Capsicum annuum*) as a trap and catch crop for control of *Orobanchae aegyptiaca* and *O. cernua*. Weed Science 44: 948-951. (Pepper caused more germination of *O. aegyptiaca* than tomato but was less attacked; sweet peppers were less attacked than paprika or hot peppers; 3 pepper varieties caused germination of *O. cernua* but were not attacked at all.)
- Hezewijk, M.J. van and J.A.C. Verkleij. 1996. The effect of nitrogenous compounds on in vitro germination of *Orobanchae crenata* Forsk. Weed Research 36: 395-404. (Germination strongly inhibited by 4 mM ammonium sulphate, but only partially by 8 mM urea and not at all by 16 mM nitrate.)
- Hibberd, J. M., W. P. Quick, M. C. Press and J. D. Scholes. 1995. Carbon fixation, partitioning and growth of cowpea parasitized by *Striga gesnerioides*. In: Physiological responses of plants to pathogens, Dundee, 1995. Aspects of Applied Biology 42: 117-124.
- Hibberd, J. M., W. P. Quick, M. C. Press and J. D. Scholes. 1996. The influence of the parasitic angiosperm *Striga gesnerioides* on the growth and photosynthesis of its host *Vigna unguiculata*. Journal of Experimental Botany 47: 507-512. (*Striga gesnerioides* causes no change in root:shoot ratio and inconsistent effects on photosynthesis. The main damage appears to result from its strength as a sink.)
- Hillocks, R.J., J.W.M. Logan, C.R. Riches, A. Russell-Smith and L.J. Shaxson. 1996. Soil pests in traditional farming systems in sub-Saharan Africa - a review. Part 2. Management strategies. International Journal of Pest Management 42: 253-265. (Including discussion of host resistance and cultural methods for control of *Striga* and *Alectra* spp.)
- Hoffman, G., C. Diarra and D. Dembele. 1994. *Striga asiatica*, new pest of maize in Mali. FAO Plant Protection Bulletin 42: 214-215. (First report of *S. asiatica* on crops in Mali.)
- Hunt, R.S., J.N. Owens and R.B. Smith. 1996. Penetration of western hemlock, *Tsuga heterophylla* by the dwarf mistletoe, *Arceuthobium tsugense*, and the development of the parasite cortical system. Canadian Journal of Plant Pathology 18: 342-346.
- Igbinosa, I., K. F. Cardwell and S. N. C. Okonkwo. 1996. The effect of nitrogen on the growth and development of giant witchweed, *Striga hermonthica* Benth.: effect on cultured germinated seedlings in host absence. European Journal of Plant Pathology 102(1): 77-86. (In general nitrate enhanced seedling growth, while ammonium and urea suppressed it.)
- Igbinosa, I. and P. A. Thalouarn. 1996. Nitrogen assimilation enzyme activities in witchweed (*Striga*) in hosts presence and absence. Weed Science 44: 224-232.
- Jeschke, W. D., P. Baumel and N. Rath. 1995. Partitioning of nutrients in the *Cuscuta reflexa*-*Lupinus albus* association. Aspects of Applied Biology 42: 71-79.

- Jeschke, W.R. and A. Hilpert. 1997. Sink-stimulated photosynthesis and sink-dependent increase in nitrate uptake: nitrogen and carbon relations of the parasitic association *Cuscuta reflexa* - *Ricinus communis*. *Plant, Cell and Environment* 20: 47-56. (Exploring the relatively mild damage caused to the host in this combination, and the important role of N.)
- Johnson, D.E., C.R. Riches, R. Diallo and M.J. Jones. 1997. *Striga* on rice in West Africa; crop host range and the potential of host resistance. *Crop Protection* 16: 153-157. (Rice was susceptible to *S. aspera* from maize and rice; to *S. hermonthica* from maize, sorghum and rice; and to *S. asiatica* from maize and *Andropogon gayanus* : 5 vars of *O. glaberrima* and 2 of *O. sativa* (IR 47255 -B-B-5-4 and IR 49255 -B-B-5-2) were partially resistant to *S. aspera* and *S. hermonthica*.)
- Jurado-Exposito, M., M. Castejon-Munoz and L. Garcia-Torres. 1996. Broomrape (*Orobanche crenata*) control with imazethapyr applied to pea (*Pisum sativum*) seeds. *Weed Technology* 10: 774-780. (*Orobanche crenata* well controlled (SO-SO%) and pea undamaged by seed dressing or seed soaking with imazethapyr equivalent to 20-40 g/ha, leading to significant increase of crop yield.)
- Kadas, I., G. Arvai, K. Miklo, G. Horvath, L. Toke, G. Toth, A. Szollosy and M. Bihari. 1996. Novel approach to the potent germination stimulant strigol and its analogues. *Journal of Environmental Science and Health. Part B, Pesticides, Food Contaminants, and Agricultural Wastes* 31: 561- 566.
- Kamlesh Mathur, R.B. Gurjar and K. Chittle. 1995. Onion and garlic - two new hosts of dodder. *Indian Journal of Mycology and Plant Pathology* 25:335. (Occurrence of unspecified *Cuscuta* in Rajasthan, India.)
- Khalid, A.N. and S.H. Iqbal. 1996. Mycotrophy in a vascular stem parasite *Cuscuta reflexa*. *Mycorrhiza* 6(1): 69-71. (AM-inoculated plants of *C. reflexa* showed increased biomass and longevity.)
- Kim, S.K. and V.O. Adetimirin. 1997. Responses of tolerant and susceptible maize varieties to timing and rate of nitrogen and *Striga hermonthica* infestation. *Agronomy Journal* 89: 38-44. [Yields of 8322-1 (tolerant) much greater than those of 8338-1 (susceptible) under high artificial infestation: benefits of N greatest at 2 weeks after planting.]
- Kim, PyoungSu and Ahn WonYung 1996. Analysis of chemical constituents of saccharides and triterpenoids in the Korean native mistletoes. II Screening the extractives of Korean camellia mistletoe (*Pseudixus japonicus* for cytotoxicity. *Mogjae Gonghak = Journal of Korean Weed Science and Technology* 24(1): 87-94.
- Kroschel, J., A. A. Abbasher and J. Sauerborn. 1995. Herbivores of *Striga hermonthica* in northern Ghana and approaches to their use as biocontrol agents. *Biocontrol Science and Technology* 5: 163-164. (Noting that *Smicronyx umbrinus* commonly causes damage in Ghana but not in Tanzania, Malawi or Madagascar, while *Junonia orithya* occurs in all areas.)
- Kroschel, J., A. Hundt, A.A. Abbasher and J. Sauerborn. 1996. Pathogenicity of fungi collected in northern Ghana to *Striga hermonthica*. *Weed Research* 36: 515-520. (Encouraging results with two isolates of *Fusarium oxysporum* and one of *F. solani* - *S. hermonthica* well controlled and no apparent pathogenicity to sorghum.)
- Kuijt, J. 1996. Cataphylls and taxonomy in *Phoradendron* and *Dendrophthora* (Viscaceae). *Acta Botanica Neerlandica* 45: 263-277.
- Kuijt, J. and E.A. Kellogg. 1996. Miscellaneous mistletoe notes, 20-36. *Novon* 6(1): 33-35. (Describing 11 new spp.; 4 *Dendrophthora*, 6 *Phoradendron* and 1 *Psittacanthus* and several new combinations in *Dendrophthora* and *Phthirusa*.)
- Kunjo, E.M. (1996) Practical results of *Striga* research in the Gambia. In: H. Brown, G.W. Cussans, M.D. Devine, S.O. Duke, C. Fernandez-Quintanilla, A. Helweg, R. Labrada, M. Landes, P. Kudsk and S.C. Streibig (Eds.) Proceed-

- ings, 2nd International Weed Control Congress, Copenhagen, Denmark, 1996, pp. 685-686.
- Killick, J. 1996. Mistletoe in Oxfordshire. *Botanical Society of the British Isles News* 72: 42-43. (Noting some association of *Viscum album* with chalk soils, urban areas and river valleys. See also Showler, 1996.)
- Kim, S. K. 1995. Genetics of maize tolerance of *Striga hermonthica*. *IITA Research* 11: 1-6. (Concludes that tolerance to *Striga* damage is inherited quantitatively.)
- King, S. B. and S. Z. Mukuru. 1995. An overview of sorghum, finger millet and pearl millet in eastern Africa with special attention to diseases. In: Daniel, D. L. (ed.) *Breeding for disease resistance with emphasis on durability. Proceedings of a regional workshop for eastern, central and southern Africa*, Njoro, Kenya, 1994. pp. 24-34. (Work on *Striga* resistance is mentioned.)
- Kutbay, H. G., F. Karaer and M. Kilinc. 1996. Nutrient relationships of *Cuscuta epithimum* var. *epithimum*. In: H. Brown, G. W. Cussans, M. D. Devine, S. O. Duke, C. Fernandez-Quintanilla, A. Helweg, R. Labrada, M. Landes, P. Kudsk and S. C. Streibeig (Eds.) *Proceedings, 2nd International Weed Control Congress, Copenhagen, Denmark, 1996*, pp. 91-94. (On host *Heliotropium europaeum* in Turkey; discusses active v. passive uptake theories.)
- Ladley, J. J. and D. Kelly. 1995. Explosive New Zealand mistletoe. *Nature* 378: 766. (Suggesting a solution to Kuijt's 'unsolved mystery' -the reason for the flowers of some Loranthaceae opening from the base. This is shown to occur in *Perixilla tetrapetala* when flowers, normally opened by birds, are not visited.)
- Ladley, J.J. and D. Kelly. 1996. Dispersal, germination and survival of New Zealand mistletoes (Loranthaceae): dependence on birds. *New Zealand Journal of Ecology* 20(1): 69-79. (Observations on the role of bellbirds, silvereyes and tui in the dispersal of *Alepis flavida*, *Peraxilla tetrapetala*, *Ileostylis micranthus* and *Tupeia antarctica*.)
- Lagoke, S. and R. Hoevers, editors. 1995. *Striga* Newsletter. Number 5. 26 pages.
- Lagoke, S. and L. E. van der Straten, editors. 1996. *Striga* Newsletter. Number 6. 26 pages. (Both numbers 5 and 6 of the newsletter are an excellent source of information on current research and surveys.)
- Lagoke, S.J.O., R. Labrada, S.S. M'Boob and L. van der Straten. 1996. *Striga* problem and its control in Africa south of the Sahara. In: H. Brown, G.W. Cussans, M.D. Devine, S.O. Duke, C. Fernandez-Quintanilla, A. Helweg, R. Labrada, M. Landes, P. Kudsk and S.C. Streibeig (Eds.) *Proceedings, 2nd International Weed Control Congress, Copenhagen, Denmark, 1996*, pp. 761. (Outlining the activities of PASCON.)
- Lane, J. A., T. H. M. Moore, D. V. Child and K. F. Cardwell. 1996. Characterization of virulence and geographical distribution of *Striga gesnerioides* on cowpea in West Africa. *Plant Disease* 80: 299-301. (Five races differentiated on the basis of their virulence on 5 discriminator varieties.)
- Larson, D.L. 1996. Seed dispersal by specialist versus generalist foragers: the plant's perspective. *Oikos* 76(1): 113-120. (Studies on *Phoradendron californicum* and three bird species, the specialist mistletoe-feeder *Phainopepla nitens* and the generalists, Gila woodpecker (*Melanerpes uropygialis*) and mocking bird (*Mimus polyglottus*).
- Lechowski, Z. 1995. Element contents and guard cell physiology of the root hemiparasite *Melampyrum arvense* L. before and after attachment to the host plant. *Journal of Plant Nutrition* 18: 2551-2567. (P, Na, N, Cl etc measured in host, *Capsella bursa-pastoris* and parasite before and after attachment. Results include the interesting observation that stomata usually closed in the dark in the unattached parasite but remained open after attachment.)
- Lechowski, Z. 1996. Gas exchange in leaves of the root hemiparasite *Melampyrum arvense* L. before and after attachment to the host. *Physiologia Plantarum* 38: 85-93. [Net photosynthesis on a leaf

- area basis is low-15 and 23% of that in the host (*Capsella bursa-pastoris*) before and after attachment respectively. Chlorophyll and carotenoids are low; respiration high - X1.8 and 2.6 before and after.]
- Lechowski, Z. 1997. Stomatal response to exogenous cytokinin treatment of the hemiparasite *Melampyrum arvense* L. before and after attachment to the host. *Biologia Plantarum* 39: 13-21. (Before attachment to host, cytokinin increased stomatal aperture: after attachment, parasite insensitive to additional cytokinin and/or K.)
- Lehtila, K. and K. Syrjanen. 1995. Compensatory responses of two *Melampyrum* species after damage. *Functional Ecology* 9: 511-517. (Studies on *M. pratense* and *M. sylvaticum* in Finland.)
- Lobin, W. and B. Dull. 1996. [The genus *Cistanche* (Orobanchaceae) on the Cape Verde Islands with consideration of the species on the West African continent.] (In German) *Willdenowia* 25: 583-594. (All material from Cape Verde and Senegal designated *C. phelypaea*; delimitation from *C. tubulosa* and 2 other spp. outlined.)
- Lock, G. M. and M. C. Press. 1995. Effects of elevated CO₂ on *Agrostis capillaris* infected with the hemiparasite *Rhinanthus minor*. In: *Physiological responses of plants to pathogens*, Dundee, 1995. *Aspects of Applied Biology* 42: 155-159.
- Löffler, C., A. Sahm, V. Wray, F. C. Czygan and P. Proksch. 1995. Soluble phenolic constituents from *Cuscuta reflexa* and *Cuscuta platyloba*. *Biochemical Systematics and Ecology* 23: 121-128. (Phenolic content, highest in the haustorial region, was not influenced by the host on which they were growing.)
- Lopez-Granados, F. and L. Garcia-Torres. 1996. Effects of environmental factors on dormancy and germination of crenate broomrape (*Orobanche crenata*). *Weed Science* 44: 284-289.
- Lusson, N., P. Delavault and P. Thalouarn. 1995. The plastid rpl20 gene from *Lathraea clandestina* (holoparasite) is conserved in a functional form. *Comptes Rendus de l'Academie des Sciences. Serie III, Sciences de la Vie* 318: 659-664. (Comparisons also with *Melampyrum pratense*, *Epifagus* and *Digitalis purpurea*.)
- Mansuetus, S.B.A. 1995. Sorghum diseases in Tanzania. *African Crop Science Journal* 3:203-207. (*Striga* included with 22 diseases as major constraints on sorghum production in Tanzania.)
- Marshall, J. D., T. E. Dawson and J. R. Ehleringer. 1994. Integrated nitrogen, carbon, and water relations of a xylem-tapping mistletoe following nitrogen fertilization of the host. *Oecologia* 100: 430-438. (Work with *Phoradendron juniperum* on *Juniperus osteosperma* partially confirms the hypothesis that the gas-exchange characteristics of mistletoes are designed to ensure adequate nitrogen gain, but also suggests that the low water-use efficiency of the parasite is an inevitable consequence of an imbalance in C and N assimilation.)
- Martinez, del Rio, C., M. Hourdequin, A. Silva and R. Medel. 1995. The influence of cactus size and previous infection on bird deposition of mistletoe seeds. *Australian Journal of Ecology* 20: 571-576. (Interesting observations on the interrelations of *Tristerix aphyllus* with *Mimus thenca* (the Chilean mockingbird), and the cactus hosts *Echinopsis chilensis* and *Eulychnia acida* in Chile.)
- Martinez del Rio, C., A. Silva, R. Medel and M. Hourdequin. 1996. Seed dispersers as disease vectors: bird transmission of mistletoe seeds to plant hosts. *Ecology* 77: 912-921. (see Martinez et al., 1995.)
- Marvier, M. A. 1996. Parasitic plant host interactions: plant performance and indirect effects on parasite-feeding herbivores. *Ecology* 77: 1398-1409. (Reporting varying interactions of *Castilleja wightii* with hosts *Lupinus arboreus*, *Artemisi pycnocephala* and *Eriophyllum staechadifolium* and the survival of aphid *Nearctaphis bachena*.)
- Maschadi, A.M., J. Sauerborn, J. Kroschel and M.C. Saxena. 1997. Effect of plant density on grain yield, root-length density and *Orobanche crenata* infestation

- in two faba bean genotypes. Weed Research 37: 39-49. (Crop density had only minor effects but var. 402/29/84 showed excellent resistance, associated with hypersensitivity, a smaller root system, and early flowering.)
- Mathiasen, J. S. Beatty and C. M. Hildebrand. 1995. First report of larch dwarf mistletoe on Pacific silver ~~fir~~ and on mountain hemlock in the Cascade Mountains, WA. Plant Disease 79: 1249. (*Arceuthobium larcis* on *Abies amabilis* in Washington State, USA.)
- Mathiasen, R.L., J.T. Hoffman, J.C. Guyon and L.L. Wadleigh. 1996. Comparison of two roadside survey procedures for dwarf mistletoes on the Sawtooth National Forest, Idaho. Great Basin Naturalist 56(2): 129-134. (Concludes that roadside-plot and transect-plot surveys give similar results for *Arceuthobium americanum* and *A. douglasii* in *Pinus contorta* and *pseudotsuga menziesii* respectively.)
- Mathiasen, J. S., B. W. Geils, C. E. Carson and F. G. Hawksworth. 1995. Larch dwarf mistletoe not found on alpine larch. Fort Collins, Colorado, USA Research Note - Rocky Mountain Forest and Range Experiment Station, USDA Forest Service no RM-533, 4 pp. (Noting that previous reports of *Arceuthobium larcis* on *Larix lyallii* are erroneous, the host being re-identified as *L. occidentalis*.)
- Mathiasen, J. S. Beatty and C. M. Hildebrand. 1996. First report of lodgepole dwarf mistletoe on subalpine fir. Plant Disease 80: 342. (*Arceuthobium americanum* on *Abies lasiocarpa* var. *lasiocarpa* in Washington State, USA.)
- Matthies, D. 1995. Host parasite relations in the root hemiparasite *Melampyrum aruense*. Flora 190: 383-394.
- Matthies, D. 1995. Parasitic and competitive interactions between the hemiparasites *Rhinanthus serotinus* and *Odontites rubra* and their host *Medicago sativa*. *Journal of Ecology* 83: 245-251.
- Matthies, D. 1996. Interactions between the root hemiparasite *Melampyrum aruense* and mixtures of host plants: heterotrophic benefit and parasite-mediated competition. *Oikos* 75(1): 118-124. (Host damage and growth of parasite greatest on *Medicago sativa*, less on *Linum usitatissimum* and *Lolium perennans*.)
- Mburu, C. 1995. Research in production constraints of sorghum in Kenya. In: Daniel, D. L. (ed.) Breeding for disease resistance with emphasis on durability. Proceedings of a regional workshop for eastern, central and southern Africa, Njoro, Kenya, 1994. pp. 74-80. (Including *Striga* as a notable constraint.)
- Mertzig, C. and S. Prien. 1996. (Occurrence of pine mistletoe in forest stands in Niederlausitz.) (in German) AFZ/Der Wald, Allgemeine Forst Zeitschrift fur Waldwirtschaft und Umweltvorsorge 51: 160-162. (Three forms of *V. album* ssp. *laxum* distinguished. Planting broad-leaved trees around stand margins suggested as a means of reducing incidence.)
- Meti, S.S. and M.M. Hosmani. 1994. Bromrape control in *bidi* tobacco by soil solarization. Tobacco Research 20(1): 67-70. (*O. cernua* reduced 78% by clear polyethylene 0.05 mm thick for 40 days.)
- Mishra, S. and G. G. Sanwal. 1995. Changes in lipid composition of *Brassica siliquae* upon infection by *Cuscuta*. Journal of Plant Physiology 146:303-306.
- Molotkovskii, Yu. I. and A. A. Konnov. 1995. Some characteristics of the growth and water exchange in juniper affected by a plant parasite, *Arceuthobium oxycedri* (DC.) M.B. Russian Journal of Ecology 26:296-299. (Transpiration rate of *A. oxycedri* higher than that of hosts *Juniperus turkestanica* and *J. semiglobosa*.)
- Moore, T. H. M., J. A. Lane, D. V. Child, G. M. Arnold, J. A. Bailey and G. Hoffmann. 1995. New sources of resistance of cowpea (*Vigna unguiculata*) to *Striga gesnerioides*, a parasitic angiosperm. Euphytica 84: 165-174. (Reporting the identification of 2 lines of cowpea, APL-1 and 87-2, with resistance to *S. gesnerioides* in most W. African countries, but not to *Alectra*.)

- Musselman, L. J. **1996**. Parasitic weeds in the Southeastern United States. *Castanea* **61(3): 271-292**. (A review of the distribution, ecology, and host range of native and introduced parasites as well as a discussion of potential new problems.)
- Murty, D.S., S.A. Bello and S.E. Eladele. **1995**. Screening sorghum for resistance to *Striga* under artificial field inoculation. *International Sorghum and Millets Newsletter* **36: 84-86**. (Three techniques used; Framida least attacked of **10 vars** in all tests.)
- Nandula, V. K., C. L. Foy and J. H. Westwood. **1995**. Effect of adjuvants, germination stimulants and nutrients on germination of *Orobanche* spp. *Proceedings Northeastern Weed Science Society* **49: 32**.
- Nandula, V. K. and C. L. Foy. **1996**. Analysis of total amino acids in Egyptian broomrape (*Orobanche aegyptiaca*) and a host (carrot). *Proceedings, Southern Weed Science Society* **49: 154**.
- Nimbal, C. I., J. F. Pedersen, C. N. Yerkes, L. A. Weston and S. C. Weller. **1996**. Phytotoxicity and distribution of sorgoleone in grain sorghum germplasm. *Journal of Agricultural and Food Chemistry* **44: 1343-1347**. (Showing that sorgoleone comprises **85-90%** of all root exudates from sorghum; amounts vary 20-fold among genotypes; toxic effects - mainly on photosynthesis occur down to **10 micromolar** in some species of *Digitaria sanguinalis*.)
- Norton, D. A., R. J. Hobbs and L. Atkins. **1995**. Fragmentation, disturbance and plant distribution: mistletoes in woodland remnants in the Western Australian wheatbelt. *Conservation Biology* **9: 426-438**. (Concerning the distribution of *Amyema miquelii* in *Eucalyptus salomonophloia* woodland.)
- Nun, N. B., G. Ben-Hod, E. Lavi and A. M. Mayer. **1996**. Purification of a pectin methylesterase from *Orobanche aegyptiaca*. *Phytochemistry* **41: 403-406**.
- Odasz, A.M. and O. Savolainen. **1996**. Genetic variation in populations of the arctic perennial *Pedicularis dasyantha* (Scrophulariaceae) on Svalberd, Norway. *American Journal of Botany* **83: 1379-1385**. This parasite shows more isozyme genetic variability than the 5 other species reported in this genus but less than other spp. with limited regional distribution. Noted this sp. self-compatible and has long-lived perennial habit.)
- Olivier, A. **1995**. Le Striga, mauvaise herbe parasite des ciriales africaines: biologie et methodes de lutte. *Agronomie* **15: 517-525**. (General review.)
- Olivier, A. **1996**. La relation entre le Striga hermonthica et ses hotes: une synthese. *Canadian Journal of Botany* **74: 1119-1137**. (Another general review.)
- Orr, J.P. **1996**. Nightshade and dodder control in processing tomatoes. *Proceedings, Western Society of Weed Science* **49: 30-32**. (*Cuscuta* sp. controlled **95%** by application of rimsulfuron at cotyledon stage of crop; repeat application gave **100%** control season-long.)
- Orr, G.L., M.A. Haidar and D.A. Orr. **1996**. Smallseed dodder (*Cuscuta planiflora*) gravitropism in red light and in red plus far-red. *Weed Science* **44: 795-796**. (In 4-hour spells of mixed red/far-red light, some positive gravitropism observed, but negative gravitropism resumed in 4-hour spells of red only.)
- Overton, J.McC. **1996**. Spatial autocorrelation and dispersal in mistletoes: field and simulation results. *Vegetatio* **125(1): 83-98**. (Studies of *Phrygilanthus* (= *Notanthera*) *sonorae* and *Phoradendron californicum* on *Bursera microphylla* and *Cercidium microphyllum* in Mexico.)
- Pazy, B., U. Plitmann and O. Cohen. **1996**. Bimodal karyotype in *Cynomorium cocineum* L. and its systematic implications. *Botanical Journal of the Linnean Society* **120: 279-281**. (Chromosome number $2n = 28$; results support separation of Cynomoriaceae from Balanophoraceae.)
- Pennings, S. C. and R. M. Callaway. **1996**. Impact of a parasitic plant on the structure and dynamics of salt marsh vegetation. *Ecology* **77: 1410-1419**. (Reporting that *Cuscuta salina* prefers host *Salicornia virginica* over *Limonium californicum* etc.)

- Popovic, S. and M. Stjepanovic. 1995. (Production of alfalfa seed is limited by presence of *Cuscuta* spp.) (in Croatian) Sjemenarstvo 12: 135-149. (Propyzamide as Kerb, 3-4 kg/ha gave best control.)
- Popp, M., R. Mensen, A. Richter, H. Buschmann and D. J. von Willert. 1995. Solutes and succulence in southern African mistletoes. Trees: Structure and Function 9: 303-310. (Studies on *Tapi-nanthus oleifolius* and *Viscum rotundifolium* on various hosts in Namibia. Succulence of older leaves a mechanism for diluting excess sodium?)
- Press, M. C. 1995. How do the parasitic weeds *Striga* and *Orobanche* influence host carbon relations? In: Physiological responses of plants to pathogens, Dundee, 1995. Aspects of Applied Biology 42: 63-70. (Discussing the relative importance of i. transfer of carbon, ii. change in host architecture and iii reduced photosynthesis.)
- Pundir, Y. P. S. 1995. Host range of *Scurrula pulverulenta* (Wall.) G. Don. (Loranthaceae) from Doon Valley and adjacent areas. Indian Journal of Forestry 18: 74-79. (Total hosts recorded in this area now 131 species from 58 genera, 34 plant families.)
- Pujadas, A. and A. Lora. 1995. (*Orobanche almeriensis* A. Pujadas (Orobanchaceae), a new species from the southeast Iberian Peninsula.) (in Spanish) Anales del Jardin Botanico de Madrid 53(1): 47-53.
- Pundir, Y.P.S. 1995. Two new hosts of *Dendrophthoe falcata* (L.f.) Ettingh (Loranthaceae). World Weeds 2: 1-2. (*Terminalia alata* and *Bauhinia uahlii*.)
- Pundir, Y.P.S. 1995. *Scurrula parasitica* L. (Loranthaceae), a new record for Garhwal and Kumaon Himalaya. World Weeds 2: 59-60. (On *Quercus leucotrichophora* and hyperparasitising *Taxillus vestitus* on the same host.)
- Pundir, Y.P.S. 1995. Observations on the witches-broom formations in *Scurrula pulverulenta* (Wall.) G. Don (Loranthaceae). World Weeds 2: 63-68. (Brooms caused by insect *Sumatrophis* sp.)
- Pundir, Y.P.S. 1995. Is *Dendrophthoe falcata* (L.f.) Ettingh (Loranthaceae) ascending in Garhwal Himalaya. World Weeds 3: 145-146. (On *Quercus himalayana* at 2410 m.)
- Ramlan, M. F. and J. D. Graves. 1996. Estimation of the sensitivity to photoinhibition in *Striga hermonthica*-infected sorghum. Journal of Experimental Botany 47: 71-78. (Results indicate that *Striga*-infested plants suffered from photoinhibition due to damage to electron-transport/photophosphorylation processes.)
- Ransom, J. K. 1996. Integrated management of *Striga* spp. in the agriculture of sub-Saharan Africa. In: H. Brown, G. W. Cussans, M. D. Devine, S. O. Duke, C. Fernandez-Quintanilla, A. Helweg, R. Labrada, M. Landes, P. Ludsk and S. C. Streibeig (Eds.) Proceedings, 2nd International Weed Control Congress, Copenhagen, Denmark, 1996, pp. 623-628. (A useful review of the potential IPM components and their combination for *Striga* control.)
- Raynal-Roques, A. 1994. Repartition géographique et speciation dans le genre *Striga* (Scrophulariaceae parasites). Memoires de la Societe Biogeographique (3eme serie) IV, 83-94. (Commenting on characteristics and distribution of a total 41 species.)
- Reichmann, S., J. Kroschel and J. Sauerborn. 1995. Distribution and infestation of *Striga* species in Shinyanga region of Tanzania and evaluation of control methods. Proceedings, Brighton Crop Protection Conference-Weeds, Brighton, 1995. pp. 151-156. (Over 50% of fields were infested with *S. hermonthica* and 24% with *S. asiatica*. *Striga passargei* and *S. densiflora* also recorded. Farmers were generally unaware of the parasitic nature and seed propagation of *Striga*.)
- Reid, N., M. S. Smith and Yan ZhaoGui. 1995. Ecology and population biology of mistletoes. In: Lowman, M. D. and N. M. Nadkarni (Eds) Forest Canopies, Academic Press San Diego California. pp. 285-310. (A review based mainly on Australian mistletoes.)

- Reiss, G., R. J. Pring, J. A. Lane and J. A. Bailey. 1995. *Striga gesnerioides*: mechanisms of infection and resistance. In: Physiological responses of plants to pathogens, Dundee, 1995. Aspects of Applied Biology 42: 301-306. (On the resistant B301, hyaline tissue failed to develop; a cytokinin helped initiate parasite growth but this factor could not explain continued failure to develop.)
- Rhui-cheng, F., L. J. Musselman and U. Plitmann. 1995. *Cuscuta*. pp 322-325 in Zheng-yi, W. and P. H. Raven, Editors. Flora of China. Volume 16. Gentianaceae through Boraginaceae. Beijing: Science Press and St. Louis: Missouri Botanical Garden. (Eleven species are recorded including *C. campestris*.)
- Ribereau-Gayon, G., M. L. Jung, J. P. Beck and R. Anton. 1995. Effect of fetal calf serum on the cytotoxic activity of mistletoe (*Viscum album* L.) lectins in cell culture. Phytotherapy Research 9: 336-339.
- Rivera, G.L., L. Galetto and L. Bernardello. 1996. Nectar secretion pattern, removal effects, and breeding system of *Ligaria cuneifolia* (Loranthaceae). Canadian Journal of Botany 74: 1996-2001. (From studies of *L. cuneifolia* on *Acacia aroma* in Argentina it is concluded that the reproductive system is 'primarily xenogamous, but reproductive success is related to flower age'.)
- Rizzini, C.T. (1995) (Flora of the Serra do Cipo, Minas Gerais: Loranthaceae.) (in Portuguese) Boletim de Botanica, Universidade de Sao Paulo 14: 207- 221. (Descriptions of 7 species of *Phoradendron*, 4 of *Struthanthus* and 1 each of *Dendrophthora* and *Psittacanthus*.)
- Rugutt, J.K., J.K. Rugutt, R.J. Irani, N.H. Fischer, D.K. Berner and T.D. McCauley. 1996. GC/MS evaluation of compounds in dry and conditioned *Striga* species seeds. Journal of Agricultural and Food Chemistry 44: 3977-3982.
- Ruso, J., S. Sukno, J. Dominguez-Gimenez, J. M. Melero-Vara and J. Fernandez-Martinez. 1996. Screening of wild *Helianthus* species and derived lines for resistance to several populations of *Orobanche cernua*. Plant Disease 80: 1165-1169. (All 26 perennial spp. and some of 18 annuals resistant to 'highly virulent' races of *O. cernua*.)
- Sahm, A., H. Pfanz, M. Grunsfelder, F. C. Czygan and P. Proksch. 1995. Anatomy and phenylpropanoid metabolism in the incompatible interaction of *Lycopersicon esculentum* and *Cuscuta reflexa*. Botanica Acta 108: 358-364. (Demonstrating collapse of cells and development of lignified and suberized cell walls, along with accumulation of soluble phenolic compounds and stimulation of peroxidases.)
- Salonen, V. and S. Puustinen. 1996. Success of a root hemiparasitic plant is influenced by soil quality and by defoliation of its host. Ecology 77: 1290-1293, [Growth of *Rhinanthus serotinus* on *Agrostis capillaris* (in Finland) is reduced in sandy soil, and by partial defoliation of the host.]
- Sarpe, N., I. Moga, M. Pocacaen, I. Lungulescu, C. Roibu and G. H. Buroi. 1996. Control of annual weeds, *Elymus repens* and *Cuscuta* species in alfalfa crops. In: H. Brown, G. W. Cussans, M. D. Devine, S. O. Duke, C. Fernandez-Quintanilla, A. Helweg, R. Labrada, M. Landes, P. Kudsk and S. C. Streibeig (Eds.) Proceedings, 2nd International Weed Control Congress, Copenhagen, Denmark, 1996, pp 1065-1069. (Imazethapyr showing promise for *Cuscuta* control at 100 g/ha pre- or post-emergence.)
- Sauerborn, J., I. Dorr, A. Abbasher, H. Thomas, and J. Kroschel. 1996. Electron Microscopic Analysis of the Penetration Process of *Fusarium nygamai*, a Hyperparasite of *Striga hermonthica*. Biological Control 7: 53-59.
- Sauerborn, J. and J. Kroschel. 1996. Underrated methods of weed control, and their use in the agriculture of developing countries. In: H. Brown, G. W. Cussans, M. D. Devine, S. O. Duke, C. Fernandez-Quintanilla, A. Helweg, R. Labrada, M. Landes, P. Kudsk and S. C. Streibeig (Eds.) Proceedings, 2nd International Weed Control Congress, Copenhagen, Denmark, 1996, pp. 611-621. (Includes reference to *Striga* and other parasitic weeds.)

- Schaller, G., K. Urech and M. Giannattasio. 1996. Cytotoxicity of different viscotoxins and extracts from the European subspecies of *Viscum album* L. *Phytotherapy Research* 10: 473-477.
- Schmitz, U. and R. Lvsch. 1995. (Occurrence and plant sociology of *Cuscuta* species in the riverside vegetation of the lower Rhine area.) (in German) *Tuexenia* No 15, pp. 373-385. (*Cuscuta lupuliformis* and *C. europaea* common, *C. gronovii* rare.)
- Schnell, H., M. Kunisch, M.C. Saxena and J. Sauerborn. 1996. Simulation of the seed bank dynamics of *Orobanche crenata* Forsk. in some crop rotations common in Northern Syria. *Experimental Agriculture* 32: 395-403. (Results suggest growing a susceptible crop every third year leads to high infestation, while growing it only every 12 years and replacing otherwise with *Vicia villosa* ssp. *dasycarpa* allows only low infestation.)
- Seel, W.E. and M.C. Press. 1996. Effects of repeated parasitism by *Rhinanthus minor* on the growth and photosynthesis of a perennial grass, *Poa alpina*. *New Phytologist* 134: 495-502. (*Poa alpina* infested in first season suffered at least 50% loss of biomass: effects of re-infestation in a second year, or infestation delayed to the second year also studied. Few direct effects on photosynthesis or root:shoot ratio.)
- Serafini, M., A. di Fabbio, S. Foddai, M. Bollero and F. Poli 1995. The occurrence of phenylpropanoid glycosides in Italian *Orobanche* spp. *Biochemical Systematics and Ecology* 23: 855-858.
- Shan-Ting Chiu. 1996. Notes on the genus *Taxillus* Van Tieghem (Loranthaceae) in Taiwan. *Taiwania* 41: 154-167. (Discussing relationship of the genus *Taxillus* to *Scurrula* and *Loranthus* and recording 10 species of *Taxillus* including one new species, one newly recorded and several previously included in *Scurrula*.)
- Shivamurthy, G.R. 1996. The floral biology and pollination in *Balanophora fungosa*. *Journal Swamy Botany* 13: 19-22.
- Showler, A. 1996. Mistletoe in Berkshire and Buckinghamshire. *Botanical Society of the British Isles News* 73: 31-32. (Noting some association of *Viscum album* with river valleys and water, also with old estates.)
- Silva, A. and C.M. del Rio. 1996. Effect of the mistletoe *Tristerix aphyllus* (Loranthaceae) on the reproduction of its cactus host *Echinopsis chilensis*. *Oikos* 75: 437-442. (The mistletoe is considered a phloem-tapping parasite with little photosynthetic capacity, hence more damaging to host than most mistletoes.)
- Smith, M. C. and M. Webb. 1996. Estimation of the seedbank of *Striga* spp. (Scrophulariaceae) in Malian fields and the implications for a model of biocontrol of *Striga hermonthica*. *Weed Research* 36: 85-92. (New data suggest that *Smicronyx* spp. could be somewhat more effective than was concluded in the earlier paper by Smith et al., 1993)
- Smith, C.E., T. Rutledge, Zeng ZhaoXian, R.C. O'Malley and D.G. Lynn. 1996. A mechanism for inducing plant development: the genesis of a specific inhibitor. *Proceedings of the National Academy of Sciences of the United States of America* 93: 6986-6991. (Cyclopropyl-p-benzoquinone is shown to be a specific inhibitor of haustorial development.)
- Smith, I.M. and A.S. Roy. 1996. Illustrations of Quarantine Pests for Europe. OEEP/EPPO/CABI, 241 pp. (This companion volume to 'Quarantine Pests for Europe' published in 1992, includes illustrations of *Arceuthobium douglasii* and *A. vaginatum* ssp. *cryptopodium*. All non-European species of *Arceuthobium* are prohibited, the only genus of weeds affected by European regulations.)
- Snyder, M. A., B. Fineschi, Y. B. Linhart and R. H. Smith. 1996. Multivariate discriminator of host use by dwarf mistletoe *Arceuthobium vaginatum* subsp. *cryptopodium*: inter- and intra-specific comparisons. *Journal of Chemical Ecology* 22: 295-305. (Parasitism on the primary host, *Pinus ponderosa* and the occasional host *P. contorta* is to some degree correlated with chemical charac-

- teristics of oleoresins in the host phloem.)
- Sprole, A. 1996. Impact of dwarf mistletoe on some aspects of the reproductive biology of jack pine. *Forestry Chronicle* 72: 303-306. (*Arceuthobium americanum* shown to reduce seed production of *Pinus banksiana* by up to 76%.)
- Sprole, A. 1996. Branch age in jack pine at the time of dwarf mistletoe infection. *Forestry Chronicle* 72: 307. (Studies of *Arceuthobium americanum* on *Pinus banksiana*.)
- Stewart, H. M., S. C. Stewart and J. M. Canne-Hilliker. 1996. Mixed mating system in *Agalinis neoscotica* (Scrophulariaceae) with bud pollination and delayed pollen germination. *International Journal of Plant Science* 157: 501-508.
- Stockey, R.A., H. Ko and P. Woltz. 1995. Cuticle micromorphology of *Parasitaxus de Laubenfels* (Podocarpaceae). *International Journal of Plant Science* 156: 723-730. (Cuticle of *P. ustus* is compared with that of *Falcatifolium taxoides*, the host, and that of other genera, all in Podocarpaceae.)
- Stoffel, B., J. Beuth and G. Pulverer. 1996. Effect of immunomodulation with galactoside-specific mistletoe lectin on experimental listeriosis. *Zentralblatt für Bacteriologie* 284: 439-442.
- Striga Newsletters Number 6 (March 1996) and Number 7 (September 1996). FAO/PASCON. (Two further issues of this valuable newsletter, with an abundance of news items on the latest activities of research groups around Africa and elsewhere and extended summaries of selected literature items.)
- Suwa, H., Y. Suzuki, Zhang YunHui, N. Murofushi and Y. Takeuchi. 1995. Endogenous gibberellins in *Aeginetia indica*, a parasitic plant, and its host, *Miscanthus sinensis*. *Bioscience, Biotechnology and Biochemistry* 59: 1712-1715.
- Tada, Y., M. Sugai and K. Furuhashi. 1996. Haustoria of *Cuscuta japonica*, a holoparasitic flowering plant, are induced by the cooperative effects of far-red light and tactile stimuli. *Plant and Cell Physiology* 37: 1049-1053.
- Takeuchi, Y., K. Yoenyama, M. Ogasawara, Y. Omigami, M. Konnai, T. Takematsu and A.D. Worsham. 1995. Effect of brassinosteroids on seed germination of weeds. *Proceedings, 15th Asian-Pacific Weed Science Society, Tsukuba, Japan, 1995*. pp. 781-786. (Brassinosteroids reduced time needed for conditioning, and increased germination of *Orobancha minor*; and increased germination of *Aeginetia indica*, a parasite of upland rice in Japan.)
- Taylor, A., J. Martin and W. E. Seel. 1996. Physiology of the parasitic association between maize and witchweed (*Striga hermonthica*): is ABA involved? *Journal of Experimental Botany* 47: 1057-1065. (Infection by *S. hermonthica* caused drastic reduction in stomatal conductance but increases in ABA in 3 maize varieties were inconsistent.)
- Taylor, J. E. 1995. Western larch dwarf mistletoe and ecosystem management. In: *Ecology and Management of Larix Forests: a look ahead*. *Proceedings of an International Symposium, Whitefish, Montana, 1992*. USDA Forest Service General Technical Report - Intermountain Research Station No INT-GTR-319. pp. 310-313. (Commenting that, in the context of ecosystem management, larch dwarf mistletoe should be valued as an individual biological species and recognized as a functional component of western larch forest ecosystems.)
- Tennakoon, K. U. and J. S. Pate. 1996. Effects of parasitism by a mistletoe on the structure and function of branches of its host. *Plant, Cell and Environment* 19: 517-528. (Studying the mineral and water relations between *Amyema preissii* and *Acacia acuminata* as the distal parts of the host branch atrophy and the proximal parts are enhanced in thickness.)
- Tennakoon, K. U. and J. S. Pate. 1996. Heterotrophic gain of carbon from hosts by the xylem-tapping root hemiparasite *Olex phyllanthi* (Olacaceae). *Oecologia* 105: 369-376. (Results varied depending on the hosts involved- *Portulaca oleracea*, *Amaranthus caudatus* and

- Acacia littorea*; parasite growth greatest on the N-fixing *Acacia*.)
- Teryokhin, E. S. 1996. Weed Broomrapes. Systematics, Ontogenesis, Biology, Evolution. Afsteig-Verlag, Beyreuth Germany*
- Thankamma, L. and J. G. Maratukalam. 1995. Dodder (*Cuscuta campestris* Yuncker) infestation in rubber plantations. Rubber Board Bulletin 27(2): 15-18. (The ground cover *Pueraria phaseoloides* was extensively, and the rubber and *Mucuna bracteata*, sporadically infested.)
- Thijssen, R. 1995. Weeds and trees. ILEIA Newsletter 11(3): 20-21. (Noting suppression of *Striga* in maize in Kenya by use of the leguminous shrub *Calliandra calothyrsus* as a green manure.)
- Thomson, A.J. and G.A. Sickle. 1996. Forest insect and disease diagnosis and management using expert system-guided hypermedia. A.I. Applications 10(2): 23-32. (Systems for pest and disease problems, including dwarf mistletoes in Canada.)
- Thuring, J.W.J.F., N.W.J.T. Heinsman, W.A.W.M. Jacobs, G.H.L. Nefkens and B. Zwanenburg. 1997. Asymmetric synthesis of **all** stereoisomers of demethylsorgolactone. Dependence of the stimulatory activity of *Striga hermonthica* and *Orobanche crenata* seed germination on the absolute configuration. Journal of Food and Agricultural Chemistry 45: 507-513..
- Tidwell, T. E. 1996. Index of phanerogamic parasites of California. Parts I and II. California Plant Pest and Disease Report 15(1-2): 23-64 and 15(3-4): 97-139. (This unique compendium of **all** the parasites in the large and diverse state of California could be a model for other states. All the parasites are listed but there is also what appears to be an exhaustive list of hosts based on information from herbaria, literature and quarantine intercepts the latter seldom being documented).
- Traore, D., C. Vincent and R.K. Stewart. 1996. Life history of *Smicronyx guineanus* and *Sm. umbrinus* (Col: Cucurionidae) on *Striga hermonthica* (Scrophulariaceae). Entomophaga 40: 211-221. (Valuable basic information and means of distinguishing these two species, almost equally frequent in the study area of Burkina Faso.)
- Tuquet, C. and G. Salle. 1996. Characteristics of chloroplasts isolated from two mistletoes originating in temperate (*Viscum album*) and tropical (*Tapinanthus dodoneifolius*) areas. Plant Physiology and Biochemistry 34: 283-292.
- Uhlich, H., J. Push, K. Barthel. 1996. Die Sommerwurzarten Europas. Gattung *Orobanche*. Westarp Wissenschaften, Magdeburgh, Germany
- U.S. National Research Council. 1996. Lost Crops of Africa. Volume 1. Grains. National Academy Press, Washington D.C., 383 pp. (Including a very poor section on *Striga* in sorghum.)
- Vannini, A., D. Cecca, L. Monaci and N. Anslemi. 1995. Main tree pathogens of western Himalayan forests in Nepal: description and risk of introduction. Bulletin Oepp/Eppo Bulletin 25: 455-461. (*Arceuthobium minutissimum* listed as occurring on *Pinus wallichiana* and risk of introduction to Europe noted.)
- Veenendaal, E.M., I.K. Abebrese, M.F. Walsh and M.D. Swaine. 1996. Root parasitism in a West African rainforest tree *Okoubaka aubrevillei* (Santalaceae). New Phytologist 134: 487-493. (Effects recorded on a range of host trees: *Pterygota macrocarpa* and *Pericopsis elata* most seriously affected.)
- Vogler, R.K., G. Ejeta and L.G. Butler. 1995. Integrating biotechnological approaches for the control of *Striga*. In: Environmental Impact and Biosafety: Issues of Genetically Engineered Sorghum. Nairobi, 1995 (Ed. by R. Frederiksen, S. Shantharam and K.V.J. Raman). African Crop Science Journal 3(2): 217-222.
- Vogler, R.K., G. Ejeta and L.G. Butler. 1996. Inheritance of low production of *Striga* germination stimulant in sorghum. Crop Science 36: 1185-1191. (Concluding that low stimulant production in SRN-39 is associated with a single recessive gene, largely additive in action.)

- Wang Changzeng and Jia Zhongjian. 1997. Lignan, phenylpropanoid and iridoid glycosides from *Pedicularis torta*. *Phytochemistry* 45: 159-166.
- Webb, M. and M. C. Smith. 1996. Biology of *Striga hermonthica* (Scrophulariaceae) in Sahelian Mali: effects on pearl millet yield and prospects of control. *Weed Research* 36: 203-211.
- Westwood, J. H. and C. L. Foy. 1995. Effect of sulfonyleurea herbicides on Egyptian broomrape (*Orobanchae aegyptiaca*) seed germination and development. *Proceedings Southern Weed Science Society* 48: 265.
- Westwood, J. H. and C. L. Foy. 1996. Using PCR/RAPD fingerprinting to characterise infestations of small broomrape (*Orobanchae minor*) in the US. *Proceedings. Southern Weed Science Society* 49: 156
- Wiens, D., D.L. Nickrent, C.G. Shaw III, F.G. Hawksworth, P.E. Hennon and E.J. King. 1996. Embryonic and host-associated skewed adult sex ratios in dwarf mistletoe. *Heredity* 77(1): 55-63. (In *Arceuthobium tsugense* ssp. *tsugense* embryonic ratio was 1:1, but adult populations on *Tsuga heterophylla* were female-skewed. On secondary host *Abies procera* embryonic and adult ratios both 1:1, while on *Pinus contorta* adult ratio male-biased.)
- Wu, A.M., Song ShuhChyung, Hwang PeiYi, J.H. Wu and U. Pfuller. 1995. Interaction of mistletoe toxic lectin-1 with sialoglycoproteins. *Biochemical and Biophysical Research Communications* 214:396-402.
- Wyckoff, P.H. and S.L. Webb. 1996. Understorey influence of the invasive Norway maple (*Acer platanoides*). *Bulletin of the Torrey Botanical Club* 123: 197-205. (*Epifagus virginiana* less abundant under *A. platanoides* than under either *Fagus grandifolia* or *Acer saccharum*.)
- Xi Qian. 1996. (Studies of the biological characteristics and control of *Cuscuta chinensis* in soyabean fields in the reclamation area of north Jiangsu.) (in Chinese) *Soybean Science* 15(1): 62-68. (Good control from dibutalin pre-emergence; linuron, diuron, glyphosate and alachlor also tested.)
- Yan, Z. and N. Reid. 1995. Mistletoe (*Amyema miquelii* and *A. pendulum*) seedling establishment on eucalypt hosts in eastern Australia. *Journal of Applied Ecology* 32: 778-784. (Germination high regardless of host; 5 month survival on dead branches; maximum 60% establishment; much predation by rosella parrot; desiccation in summer an important mortality factor.)
- Yilmaz, H. A. and S. H. Emiroglu. 1995. [Broomrape resistance, yield, yield components and some chemical characteristics in breeding sunflower (*Helianthus annuus* L.)] (in Turkish) *Turkish Journal of Agriculture and Forestry* 19: 397-406.
- Yohe, J. 1995. INSTORMIL-1995 Annual Report. 171 pages.
- Yohe, J., J. Frederick and D. Stoner. 1996. INSTORMIL-1996 Annual Report. 179 pages. (Some reference to *Striga* research in each report.)
- Yong, J. W. H. and C. S. Hew. 1995. A report of mistletoes on pigeon orchids in Singapore. *Lindleyana* 10: 131-132. (*Dendrophthoe pentandra* on *Dendrobium crumenatum*.)
- Yoon TaekJoon, Yoo YungChoon, Hong EunKyung, Cho YoungHo, Lee SukWon, I Azuma, Yoo BoIm and Kim JongBae. 1994. (Effect of Korean mistletoe extracts on the induction of IL-1 and TNF-a from mouse macrophages.) (In Korean) *Korean Journal of Pharmacognosy* 25: 132-139.
- Yoon TaekJoon, Yoo YungChoon, Choi OkByung, Do MyoungSool, Kng TaeBong, Lee SukWon, I. Azuma and Kim JongBae. 1995. Inhibitory effect of Korean mistletoe (*Viscum album* var. *coloratum*) extract on tumour angiogenesis and metastasis of haematogenous and non-haematogenous tumour cells in mice. *Cancer Letters* 97(1): 83-91.
- Zaitoun, F. M. F., M. E. Saleh and S. J. ter Borg. 1996. Effect of some trace elements on germination and seedling development of *Orobanchae*. In: H. Brown, G. W. Cussans, M. D. Devine, S. O. Duke, C. Fernandez-Quintadla, A.

Helweg, R. Labrada, M. Landes, P. Kudsk and S. C. Streibeig (Eds.) Proceedings, 2nd International Weed Control Congress, Copenhagen, Denmark, 1996, pp. 735-742. (Some indication of toxic effects of copper on *O. crenata*, *O. aegyptiaca* and *O. oxyloba*.)

Zerman, N. and A.R. Saghir. 1995. (The genus *Cuscuta* in Algeria.) (In Arabic) Arab Journal of Plant Protection 13(2): 69-75. (12 species reported, including *C. campestris*, now widespread.)

ZOMO, M.C., M. Vurro, R. Capasso, A. Evi-

dente, A. Cutignano, J. Sauerborn and H. Thomas. 1996. Phytotoxic metabolites produced by *Fusarium nyagamai* from *Striga hermonthica*. In: V.C. Moran and J.H.J. Hoffman (Eds), Proceedings, 9th International Symposium on Biological Control of Weeds, Stellenbosch, 1996. pp. 223-226. (Main phytotoxins, fusaric and 9,10- dehydrofusaric acids, reduced germination at 10-6 M.)

++++
HAUSTORIUM is edited by L. J. Musselman, Parasitic Plant laboratory, Department of Biological Sciences, Old Dominion University, Norfolk, Virginia 23529-0266USA, E-mail: ljm100f@viper.mgb.odu.edu, fax 757 683 5283 and C. Parker, C/O, Long Ashton Research Station, University of Bristol, Bristol, BS18 9AF , ENGLAND, E-mail 10330.2663@compuserve.com, fax (44) 1275 394007. It is usually published twice yearly by Old Dominion University. Subscriptions are free of charge. A grant from the Food and Agriculture Organization of the United Nations supports HAUSTORIUM. Unsigned articles and literature reviews are by the editors. Send material for publication to either editor. Complete sets of HAUSTORIUM are available for US\$30 postpaid. Make checks payable to Lytton J Musselman and drawn on an American bank. HAUSTORIUM is also available electronically, send an E-mail request to either E-mail address above.

++++

Haustorium 31 was mailed 9 December 1995