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● ● ● THIS IS YOUR LAST ISSUE OF HAUSTORIUM UNLESS.. .. you return the enclosed sheet. See instructions on the enclosure.

● NOTE FROM THE EDITORS

Due to a lack of space we cannot include several notes, the report of the November 1993 Amsterdam *Orobanche* symposium, the Amman *Orobanche* workshop, the Zimbabwe *Striga* workshop, discussion of plans and venue for the next symposium, and considerable literature all of which will be in issue 29 which is planned for publication in March 1994.

● THE USES OF WITCHWEED (*STRIGA ASIATICA*) IN TRADITIONAL MEDICINE

Striga asiatica is a parasitic weed on roots of gramineous hosts. It is known as witchweed in many parts of the world, but in Malaysia it is called *Jarum Mas* or "Golden Needle." The yellow-flowered *Striga asiatica* is said to have medicinal value and is being used by some local people as a herbal medicine. In the literature there is a report by Alvins in 1897 that the Chinese used the leaves of *S. asiatica* for sores and ulcers. In this short communication I shall relate some of the purported medical uses of *S. asiatica* in Malaysia. Readers are warned that these reports have not been scientifically verified. One story is that local people learnt of the medicinal value of this herb by observing the behavior of the cat. After giving birth, the mother cat seeks out *Jarum Mas* to eat. This observation has led to the use of *S. asiatica* as an after-birth tonic. In Penang I was once perplexed by the many people bending and searching the grassy area along the road, as if they were searching for

some lost coins. They were looking for the "Golden Needles" (*S. asiatica*) which sells for RM 1.00 per plant. A kilogram of dried *Jarum Mas* can fetch between RM 600 - RM 800 (RM 2.50 = US \$1). I was first introduced to *S. asiatica* by a friend whose elderly mother takes this herb as a health tonic prepared by placing one dried plant in 2-3 tea cups full of water which is then boiled down to about a cup. The resultant brew appeared like plain tea. Taking it makes her feel "warm or heaty." In addition, it relieves pain of the joints. It is very important that the dosage taken is not excessive. One case is reported of someone making a cupful of brew and after **drinking** it being taken to the hospital because his body became rigid due to muscular spasm. Excessive dosage can also cause mouth ulcer or a tremendous increase in body temperature. *Striga asiatica* is also said to be toxic to the nervous system. *Jarum Mas* is used by both sexes for various ailments, such as kidney problem, loss of appetite and nerve disorders and is also used as an aphrodisiac and after-birth tonic to help in the contraction of the uterus. There are also claims that *Jarum Mas* is good for the relief of muscular cramps and fevers.

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● OROBANCHE CERNUA ON CUMIN IN RAJASTHAN

Orobanche cernua Loefl. is a common parasite on tomato, eggplant, and mustard in the arid western plain of Rajasthan. During the 1992 winter cropping season, cumin (*Cuminum cyminum* L.), an important spice and cash crop of the area, was infested at an incidence as high as 30%. In a nearby mustard crop, the rate of infestation was only 15-20%. More surveys are planned.

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● LITERATURE

- Appa Rao, S., E. S. Monyo, L. R. House, M. H. Mengesha and E. Negumbo. 1992. Collecting germplasm in Namibia. *FAO/IBPGR Plant Genetic Resources Newsletter* 90: 42-45, (Both *Striga asiatica* and *S. hennonhica* recorded on sorghum in Namibia, and *S. elegans* on wild grasses).
- Atokple, I. D. K., B. B. Singh and A. M. Emechebe. 1993. Independent inheritance of *Striga* and *Alectra* resistance in cowpea genotype B301. *Crop Science* 33: 714-715.
- Babiker, A. G. T., G. Ejeta, L. G. Butler and W. R. Woodson. 1993. Ethylene biosynthesis and strigol-induced germination of *Striga asiatica*. *Physiologia Plantarum* 88: 359-365. (Confirming the effect of strigol in enhancing the conversion of ACC to ethylene as a major step in germination in *S. asiatica*).
- Babiker, A. G. T., L. G. Butler, G. Ejeta and W. R. Woodson. 1993. Enhancement of ethylene biosynthesis by cytokinins and 1- amino cyclopropane-1-carboxylic acid in *Striga asiatica* seeds. *Physiologia Plantarum* 89: 21-26.
- Baker, F.A., M. Slivitsky and K. Knowles. 1992. Impact of dwarf mistletoe on jack pine forests in Manitoba. *Plant Disease* 76: 1256-1259. (On 12,000 ha surveyed, 9% was conspicuously infested with an estimated yield reduction of 4-8% overall).
- Ballmer, G. R. and G. F. Pratt. 1992. *Loranthomita*, a new genus of Eumaein (Lepidoptera: Lycaenidae: Theclinae). *Tropical Lepidoptera* 3: 37-46. (Five North American spp., previously in *Mitoura* now placed in new genus. The larvae all feed on *Arceuthobium*).
- Bar Nun, L. and A. M. Mayer. 1993. Preconditioning and germination of *Orobanche* seeds: respiration and protein synthesis. *Phytochemistry* 34: 39-45.
- Braby, M. F. and F. Douglas. 1992. Observations on the biology of *Delias harpalyce* (Donovan) (Lepidoptera: Pieridae) near Melbourne, Victoria Australian Entomological Magazine 19: 9-18. (Observations on the biology of *D. harpalyce* on mistletoes *Amyema miquelii*, *A. pendulum* and *Muellerina encalyptoides*).
- Bock, F. de and A. Fer. 1992. Effects of abscisic acid on the transfer of sucrose from host, *Pelargonium zonale* (L.) Aiton, to a phanerogamic parasite *Cuscuta reflexa* Roxb. *Australian Journal of Plant Physiology* 19: 679-691. (High levels of ABA in the haustorium are thought to increase transfer of sucrose from host to parasite).
- Cai, T., A. G. T. Babiker, G. Ejeta and L. G. Butler. 1993. Morphological response of witchweed (*Striga asiatica*) to in vitro culture. *Journal of Experimental Botany* 44: 1377-1384. (Different patterns of development in culture depending on initial access to sorghum root exudate).
- Castejon, M., F. Romero-Munoz and L. Garcia-Torres. 1993. Effect of planting date on broomrape (*Orobanche cernua* Loeffl.) infections in sunflower (*Helianthus annuus* L.), *Weed Research* 33: 171-176. (Increased infection and reduced crop yield with delay in planting after 1 March).
- Cechin, I. and M. C. Press. 1993. Nitrogen relations of the sorghum- *Striga hermonthica* host-parasite association: growth and photosynthesis. *Plant, Cell and Environment* 16: 237-247.
- Cechin, I. and M. C. Press. 1993. Nitrogen relations of the sorghum- *Striga hermonthica* host-parasite association: germination, attachment and early growth. *New Phytologist* 124: 681-687. (Providing further evidence for the effect of N in reducing exudation of stimulant from roots of sorghum; attachment and early growth were also reduced).
- Cudeny, D. W., S. B. Orloff and J. S. Reints. 1992. An integrated weed management procedure for the control of dodder (*Cuscuta indecora*) in alfalfa (*Medicago sativa*). *Weed Technology* 6: 603-606. (Recommending a combination of pre-emergence trifluralin granules, mid-season flail-mowing and late season spot burning).
- Dieringer, G. 1992. Pollinator effectiveness and seed set in populations of *Agalinis strictifolia* (Scrophulariaceae). *American Journal of Botany* 79: 1018-1023.
- Dinelli, G., A. Bonetti and E. Tibiletti. 1993. Photosynthetic and accessory pigments in *Cuscuta campestris* Yuncker and some host species. *Weed Research* 33: 253-260.
- Drennan, D. S. H. and A. G. Mohamed-Ahmed. 1992. Some effects of temperature on germination of *Orobanche ramosa* L. IXth International Symposium on the Biology of Weeds, Dijon, Sept. 1992. *COLUMA/EWRS*, pp. 117-120.
- Fessehaie, Rezene and C. Parker, (eds). 1992. Problems and control of parasitic weeds in Ethiopia.

- Proceedings of the Second Ethiopian Weed Science Workshop, Addis Abeba, September 1988. Ethiopian Weed Science Committee, 97 pp. (Includes 11 papers plus summaries of discussion on the major parasitic weed problems in Ethiopia),
- Feirabend, J. 1992. Conservation and structural diversity of organellar DNA and gene expression in non-photosynthetic plastids during ontogenetic differentiation and phylogenetic adaptation. *Botanica Acta* 105: 227-231. (Describing various patterns in the reduction of DNA, including that in the plastids of *Epifagus virginiana*).
- Fer, A., P. Simier, M. C. Arnaud, L. Ray and S. Renaudin. 1993. Carbon acquisition and metabolism in a root hemiparasitic angiosperm, *Thesium humile* (Santalaceae) growing on wheat (*Triticum vulgare*). *Australian Journal of Plant Physiology* 20: 15-24. (In spite of some photosynthesis *T. humile* is shown to be dependent on the host for additional reduced carbon. The end product from either source is mannitol).
- Foley, M. J. Y. 1993. *Orobanche reticulata* Wallr. populations in Yorkshire (north-east England). *Watsonia* 19: 247-257. (Discusses a species restricted to one small area of U.K.).
- Frolisek, M. 1992. [Chemical composition of dodder *Cuscuta epithymum* subsp. *trifolii* (Babingt. et Gibson) Berger and the study of *Medicago sativa* L. plant-parasite relationship]. *Ochrana Rostlin* 28: 299-311. (in Czech).
- Gao Zhaoyuan and Gan Jinge. 1992. (Biological control of dodder - a review on research progress of the bioherbicide "Lu Bao No 1"). *Chinese Journal of Biological Control* 8: 173-175. (In Chinese).
- Garcia-Torres, L., F. Lopez-Granados and R. Garcia-Ruiz. 1992. [Susceptibility of sunflower (*Helianthus annuus* L.) cultivars to broomrape (*Orobanche cernua* Loefl.)]. Proceedings, 1992 Congress of the Spanish Weed Science Society, pp. 373-378. (in Spanish -reporting the varied reaction of 6 cultivars at three sites).
- Gehring, C. A. and T. G. Whitham. 1992. Reduced mycorrhizae on *Juniperus monosperma* with mistletoe: the influence of environmental stress and tree gender on a plant parasite and a plant-fungal mutualism. *Oecologia* 89: 298-303. (High infestation by *Phorodendron juniperum* associated with low level of mycorrhiza. Under stress, female trees more infested than male; without stress both the same).
- Gibson, C. C. and A. R. Wilkinson. 1992. The role of the hemiparasitic annual *Rhinanthus minor* in determining grassland community structure. *Oecologia* 89: 62-68. (*Rhinanthus minor* influences species composition of grasslands by selective parasitization).
- Gressel, J. 1992. Addressing real weed science needs with innovations. *Weed Technology* 6: 509-525. (Strongly endorses the concept of genetic engineering of herbicide-resistant crops for control of parasitic weeds).
- Gworgwor, N. A. 1993. Studies on the Biology and Control of *Striga* Species (Scrophulariaceae). PhD Dissertation, Philipps University, Marburg, Germany.
- Gworgwor, N. A. and H. C. Weber. 1992. A preliminary observation on control of *Striga hermonthica* (Del.) Benth. by vesicular-arbuscular mycorrhiza in sorghum [*Sorghum bicolor* (L.) Moench]. IXth International Symposium on the Biology of Weeds, Dijon, Sept. 1992. COLUMA/EWRS. pp. 173-182.
- Harahap, Z., K. Ampong-Nyarko and J. C. Olela. 1993. *Striga hermonthica* resistance in upland rice, *Crop Protection* 12: 229-231. [Five lines show high resistance to *S. hermonthica*, including 4 indica types and Ble Chai - japonica. Also reported in International Rice Research Newsletter 17(4): 10-11. 1992].
- Hariri, E. B., B. Jeune, S. Baudino, K. Urech and G. Salle. 1992. (Development of a coefficient of resistance to mistletoe for oak). *Canadian Journal of Botany* 70: 1239-1246. (In French. Level of resistance in 100 samples of oak appeared to depend on bark thickness, density of polyphenol-containing cells and thickness of fiber layers and collenchyma).
- Harloff, H. J. and K. Wegmann. 1993. Evidence for a mannitol cycle in *Orobanche ramosa* and *Orobanche crenata*. *Journal of Plant Physiology* 141: 513-520.
- Hawksworth, F. G., D. Wiens and D. L. Nickrent. 1992. New western North America Taxa of *Arceuthobium* (Viscaceae). *Novon* 2: 204-211.
- Hawksworth, F. G., J. C. Williams-Cipriani, B. B. Eav, B. W. Geils, R. R. Johnson, M. A. Marsden, J. S. Beatty and G. D. Schubert. 1992. Interim dwarf mistletoe impact modelling system; users' guide and reference manual. USDA Forest Service Report MAG-91-3. 90 pp.
- Heap, J. W. 1992. Golden dodder and silverleaf nightshade, Study tour to U.S.A. Technical Report, Department of Agriculture, South Aus-

- tralia No 190, 34 pp. (Including observations on the control of *Cuscuta campestris* in California).
- Hess, D. E. and G. Ejeta. 1992. Inheritance of resistance to *Striga* in sorghum genotype SRN39. *Plant Breeding* 109: 233-241. (Results suggest additive and dominance components in inheritance of resistance, and that possible progress could be made with appropriate selection schemes).
- Hipkin, C. R. 1992. Host range and specificity of *Orobanche minor* Sm. on Crymlyn Burrows. *Watsonia* 19: 113-120. (One population could attack 15 host species. Some individuals were attached to three different species. Seed from parasites on *Eryngium* could attack *Hypochaeris* and *Trifolium* spp.).
- ICARDA. 1992. Annual Report 1991. (Reporting useful resistance of 3 faba bean lines, 18009, 18035, 18105, to *Orobanche crenata*).
- Jacobsohn, R. and E. Eldar. 1992. Imazethapyr for broomrape control in peas. *Phytoparasitica* 20: 345.
- Joel, D. M., D. Losner-Goshen, A. M. Mayer, G. Ben-Hod and A. Bargutti. 1992. News in *Orobanche* research. *Phytoparasitica* 20: 342. (Reporting the use of gibberellin inhibitor uniconazole to inhibit conditioning and thus protect tomato from infection by *Orobanche aegyptiaca*).
- Joel, D. M., D. Losner-Goshern and G. Herzlinger. 1992. Use of transgenic plants for control of *Orobanche*. *Phytoparasitica* 20: 346. (Confirming the effective selectivity of chlorsulfuron against *Orobanche* in transgenic sulfonylurea-resistant tobacco).
- Johnson, J. M. and J. S. Choinski Jr. 1993. Photosynthesis in the *Tapinanthus-Diporhynchus* mistletoe-host relationship. *Annals of Botany* 72: 117-122. (Chlorophyll was higher in *T. vittatus* than in the host *D. condylocarpon* but CO₂ assimilation was substantially lower. Host photosynthesis was also somewhat reduced by infection).
- Kelly, C. K. 1992. Resource choice in *Cuscuta europaea*. *Proceedings, National Academy of Sciences of the United States of America*, 89: 12194-12197. (*Cuscuta europaea* preferentially grew towards, and coiled round, host shoots of high nutritional status, and away from host shoots of low nutrient status).
- Kharrat, M., M. M. Halila, K. H. Linke and T. Had-dar. 1992. First report of *Orobanche foetida* on faba bean in Tunisia. *FABIS Newsletter* 30: 46-47. (Reporting damage from this red-flowered species on faba bean, including varieties resistant to *O. crenata*, around Beja. Also on chickpea).
- Kong, D. Y., H. T. Li and S. Q. Luo. 1992. (Studies on the chemical components of *Viscum coloratum*. Isolation and structure of 3-BBBBBB-D-glucopyranosyl oxy-butanol-2). *Acta Pharmaceutica Sinica* 27: 792-795. (in Chinese).
- Krishnamurty, G. V. G. 1992. Two new methods to control *Orobanche* in tobacco. *Indian Farming* 42: 7-8. (Repeating previous description of spear and vegetable oil techniques).
- Lagoke, S. T. O., S. Mboob, R. Hoevers and A. M. Emechebe. 1993(?) Combating *Striga* problem in Africa: Pan African *Striga* Control Network approach. In: J. N. Kuria (ed.) *Proceedings of the 13th Biennial Weed Science Conference, Nairobi, 1991*. Weed Science Society of Eastern Africa. pp. 14-29.
- Lane, J. A. and J. A. Bailey. 1992. Resistance of cowpea and cereals to *Striga*. *Euphytica* 63: 85-93.
- Logan, D. C. and G. R. Stewart. 1992. Germination of the seeds of parasitic angiosperms. *Seed Science Research* 2: 179-190.
- Lopez-Granados, F. and L. Garcia-Torres. 1993. Seed bank and other demographic parameters of broomrape (*Orobanche crenata* Forsk.) populations in faba bean (*Vicia faba* L.) *Weed Research* 33: 319-327. (A detailed study over 8 years records the build-up of seed bank to over 4 M seed per M². From the seed bank about 0.03% attached to root systems and less than 10% of these emerged).
- Lorche, E. 1993. (New investigations on flavonoids from *Viscum album* L. ssp. *abietis*, *album* and *austriacum*). *Zeitschrift fur Naturforschung, Section C. Biosciences* 48: 105-107. (in German • HPLC separation of flavonoids helped distinguish the 3 subspecies).
- Mangnus, E. M., F. J. Dommerholt, R. L. P. de Jong and B. Zwanenburg. 1992. Improved synthesis of strigol analogue GR24 and evaluation of the biological activity of its diastereomers. *Journal of Agricultural and Food Chemistry* 40: 1230-1235. (Diastereomers differed in their activity on both *Striga* and *Orobanche* species).
- Mangnus, E. M., L. A. van Vliet, D. A. L. Vandenput and B. Zwanenburg. 1992. Structural modifications of strigol analogues. Influence of the B and C rings on the bioactivity of the germination stimulant GR24. *Journal of Agricultural and Food Chemistry* 40: 1222-1229. (Concludes that the ABC part of the molecule is not essential to

- activity and a simple analogue derived from gamma-phenyl-gamma-butyrolactone was almost as active as GR24).
- Mangnus, E. M., P. L. A. Stommen and B. Zwanenburg. 1992. A standardized bioassay for evaluation of potential germination stimulants for seeds of parasitic weeds. *Journal of Plant Growth Regulation* 11:91-98.
- Mangnus, E. M. and B. Zwanenburg. 1992. Tentative molecular mechanisms for germination stimulation of *Striga* and *Orobanche* seeds by strigol and its synthetic analogues. *Journal of Agricultural and Food Chemistry* 40: 1066-1070. (Proposing a model scheme for activity based on an addition-elimination process involving a D-ring leaving group and a nucleophilic group at the receptor site).
- Marshall, J. D., T. E. Dawson and J. R. Ehleringer. 1993. Gender-related differences in gas-exchange are not related to host quality in the xylem-tapping mistletoe *Phorodendron juniperum* (Viscaceae). *American Journal of Botany* 80 (6): 641-645.
- Mbwaga, A. M., S. Pande, W. A. J. de Milliano and R. I. Karunakar. 1993. Diseases and parasitic weeds of sorghum in Tanzania: occurrence and incidence. *Crop Protection* 12: 183-188. (*Striga asiatica* is the most widespread, with *S. hermonthica* and *S. forbesii* occurring locally).
- Mele, P. van, Damme and D. C. Baner. 1992. A new technique to test germination response of *Striga* seeds using host plant roots. *Mededelingen van de faculteit landbouwwetenschappen, Universiteit Gent* 57 (3b): 993-999. (Using root segments placed in the center of a petri dish and assessing *Striga* germination in concentric zones).
- Mishra, S. 1992. Changes in Lipid Content and Lipid Metabolism of *Brassica campestris* upon Infection by *Cuscuta reflexa*. PhD Dissertation, University of Lucknow, Lucknow, India.
- Mitich, L. W. 1993. Intriguing world of weeds - *Orobanche* - the broomrapes. *Weed technology* 7: 532-535. (A curiously inaccurate and out-dated review, quoting no significant references later than 1969 and suggesting the existence of giant *Orobanche* up to 3.3 m high and with seed weight varying from 3 to 3,000 mg!).
- Monteiro, R. F., R. P. Martins and K. Yamamoto. 1992. Host specificity and seed dispersal of *Psittacanthus robustus* (Loranthaceae) in south-east Brazil. *Journal of Tropical Ecology* 8: 307-314. (Host range is believed to depend on the foraging habits and habitat selection of tanager birds).
- Muller, S., A. van der Merve, H. Schidknecht and J. H. Visser. 1993. An automated system for large-scale recovery of germination stimulants and other root exudates. *Weed Science* 41: 138-143. (Stimulants active on *S. asiatica*, *S. gesnerioides* and *Alectra vogelii* were separated by desorption on to macroreticular polymer resin XAD-4 and desorption with methanol).
- Muller, S., C. Hauck and H. Schildknecht. 1992. Germination stimulants produced by *Vigna unguiculata* Walp. cv Saunders Upright. *Journal of Plant Growth Regulation* 11: 77-84. (The stimulant 'alectrol' is shown to be very close to strigol in structure and to be highly active on both *A. vogelii* and *S. gesnerioides*).
- Murata, J. 1992. Female flowers in *Balanophora kiushiana*. *Journal of Japanese Botany* 67(1): 166-168.
- Mumera, L. M. 1992. Nitrogen and Genotype Effects on Assimilate Partitioning and Resistance to *Striga* in Maize. PhD Dissertation. University of Illinois, Champaign, Illinois.
- Musselman, L. J. 1993. Alien broomrapes (*Orobanche* species) of potential danger to American crops. Pages 244-247. Proceedings Southern Weed Science Society. Champaign, IL: Southern Weed Science Society.
- Nagl, W. 1992. The polytenic endosperm haustorium of *Rhinanthus minor* (Scrophulariaceae): functional ultrastructure. *Canadian Journal of Botany* 70: 1997-2004.
- Nassib, A. M., A. H. A. Hussein and M. A. El-Deeb. 1993. Faba bean pilot demonstration plots on *Orobanche* control in Middle Egypt. Proceedings 18th International Conference for Statistics, Computer Science, Scientific and Social Applications, Cairo, 1993, pp. 133-142. (Applications of glyphosate 64 g/ha, or 32 g/ha plus fertilizers, to 32 farmer demonstration plots reduced *O. crenata* by about 50% and increased bean yields by 56-75%).
- Njogu Njeru. 1993 (?). Experience with witch (*Striga*) weed in Kenya: facts and figures. In: J.N. Kuria (ed.) Proceedings of the 13th Biennial Weed Science Conference, Nairobi, 1991. Weed Science Society of Eastern Africa. pp. 10-13.
- Norris, R. S., M. Langston, T. English and R. E. Eplee. 1992. Basamid - a granular fumigant for control of witchweed and other weed seeds. Pages 308-312. Proceedings Southern Weed Science Society. Champaign, IL: Southern Weed Science Society. (Best results with daxomet at about 300 kg/ha were with surface application followed by

- at least **0.5** cm irrigation, applied in March/April).
- Obilana, A. T. and K. V. Ramaiah. **1992**. *Striga* (witchweed) in sorghum and millet: knowledge and future research needs. pp. **187-201** in de Miliano, W. A. J., R. A. Frederiksen and G. D. Bengston (Eds) Sorghum and Millet Diseases: a Second World Review. ICRISAT.
- Odhiambo, G. D. and J. K. Ransom. **1993(?)**. The effect of nitrogen and cowpea inter-cropping on *Striga* development in maize fields. In: J.N. Kuria (ed.) Proceedings of the 13th Biennial Weed Science Conference, Nairobi, **1991**. Weed Science Society of Eastern Africa. pp. **30-31**.
- Odhiambo, G. D. and J. K. Ransom. **1993(?)**. Effect of *Striga* parasitism on growth of cereal genotypes and on their yields. In: J. N. Kuria (ed.) Proceedings of the 13th Biennial Weed Science Conference, Nairobi, **1991**, Weed Science Society of Eastern Africa. pp. **37-41**.
- Olivier, A. and G. D. Leroux. **1992**. Root development and production of a witchweed (*Striga* spp.) germination stimulant in sorghum (*Sorghum bicolor*) cultivars. Weed Science **40**: **542-545**. (Resistance not well correlated with either root development or sorgoleone production).
- Olivier, A., K. V. Ramaiah and G. D. Leroux. **1992**. (Assessment of the resistance of sorghum (*Sorghum bicolor*) lines to the parasitic weed *Striga hermonthica* in Burkina Faso). Phytoprotection **73 (1)**: **13-23**. (in French - concludes that no line could be recommended and more sources of resistance are needed).
- Paine, L. K. and H. H. Harrison. **1992**. Mistletoe: its role in horticulture and human life. Hort-Technology **2**: **324-330**.
- Pare, J. **1993**. Aspects de la Dynamique de la Formation de la Grains chez le *Striga* (Scrophulariaceae) Parasite des Cereals Tropicales. Doctoral Thesis, Universite Pierre et Marie Curie, Paris, **208** pp. (Concerned especially with embryology and seed development in a range of *Striga* species but also evaluating the effects of herbicide on seed formation and viability).
- Parsons, W. T. and E. G. Cuthbertson. **1992**. Noxious weeds of Australia. Inkata Press, Melbourne. **692** pp. (Noting native *Cuscuta* spp. of little or no concern but *C. campestris* the main introduced weedy species plus *C. suaveolens* and *C. planiflora* more locally. No *Striga* spp. or Loranthaceae included).
- Polhill, R., Coordinator. The Golden Bough. A Newsletter to Foster the Biosystematics of Loranthaceae and Viscaceae. Number **12**. (This is the first appearance of this valuable newsletter for some time. The issue is dedicated to Frank Hawksworth and contains a description of 'HyperParasite', a computer system for storing, retrieving and manipulating information on parasites; numerous notes and current literature. Golden Bough is available from Polhill at Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AE England).
- Prys-Jones, O. E. and P. G. Willmer. **1992**. The biology of alkaline nectar in the purple toothwort (*Lathraea clandestina*): ground level defences. Biology Journal of the Linnean Society **45**: **373-388**.
- Ragupathy, S. and A. Mahadevan. **1992**. Additional host species for *Loranthus* and their localities in Thanjavur district, Tamil Nadu. Journal of the Bombay Natural History Society **89(1)**: **149-150**. (With information on economically significant hosts of *Dendrophthoe falcata*, *Viscum orientale* and *V. capitellatum*).
- Ramirez-Ortega, R. and L. Garcia-Torres. **1993**. Imazapyr for broomrape (*Orobanche crenata* Forsk.) control in faba bean. FABIS **31**: **33-36**. (Post-emergence applications of **2.5-5** g ai/ha give results comparable to glyphosate at **60** g ai/ha).
- Ramirez-Ortega, R., F. Lopez-Granados and L. Gracia-Torres. **1993**. Enhancement effect of N, P and K on glyphosate for broomrape (*Orobanche crenata* Forsk.) control in faba bean (*Vicia faba* L.). FABIS **31**: **37-39**. (3% ammonium sulphate and 2% potassium phosphate enhanced control by glyphosate **30-120** g ai/ha but increased damage and reduced crop yield).
- Ransom, J. K. and G. Odhiambo. **1992**. Development of *Striga hermonthica* on maize and sorghum in western Kenya. In: R. G. Richardson (ed.) Proceedings, 1st International Weed Control Congress, Melbourne, **1992**. Weed Science Society of Victoria, Melbourne. pp. **430-433**.
- Rao, N. N. R. and S. J. Singh **1991**. Betelvine - a new host record for *Dendrophthoe falcata*. Indian Phytopathology **44**: **419**.
- Reich, R. M., P. W. Meikle and F. G. Hawksworth. **1991**. Spatial analysis of ponderosa pine trees infected with dwarf mistletoe. Canadian Journal of Forest Research **21**: **1808-815**.
- Reid, N. **1992**. Coevolution of mistletoes and frugivorous birds? Australian Journal of Ecology **16**: **457-469**.

- Reid, N., D. M. S. Smith and W. N. Vsnables. 1992. Effect of mistletoes (*Amyema preissii*) on host (*Acacia victoriae*) survival. *Australian Journal of Ecology* 17: 219-222.
- Rey, L., A. Sadik, A. Fer and S. Renaudin. 1992. Etude de quelques aspects du métabolisme carbon chez l' *Arceuthobium oxycedri*, gui nain du genévrier. *Canadian Journal of Botany* 70: 1709-1716.
- Riches, C. R., K. A. Hamilton and C. Parker. 1992. Parasitism of grain legumes by *Alectra* species (Scrophulariaceae). *Annals of Applied Biology* 121: 361-370.
- Royer, J. M., F. Bugnois and J. F. Prost. 1992. (*Orobanche bartignii*, a little-known sp. from east central France). *Monde des Plantes* 87: 11-12. (in French - sometimes known as *O. milinskyana*, closely related to *O. alsatica*; morphological differences are tabulated).
- Sas Biswas and Sumer Chandra. 1992. An observation on teak (*Tectona grandis* Linn. f.) as a phorophyte. *Indian Forester* 118: 871. (Noting occurrence of *Dendrophthoe falcata* on teak).
- Sauerborn, J. 1992. Parasitic Flowering Plants: Ecology and Management. Verlag Josef Margraf. 127 pp. (Translation of a thesis dealing with *Striga* on cereals and *Orobanche* spp.).
- Scharpf, R. E., B. B. Kinloch and J. L. Jenkinson. 1992. One seed source of Jeffrey pine shows resistance to dwarf mistletoe. Research Paper PSW-RP-207. Pacific Southwest Research Station, US Forest Service, Albany, California.
- Scharpf, R. E. and L. F. Roth. 1992. Resistance of Ponderosa pine to western dwarf mistletoe in central Oregon. Research Paper PSW-RP-208. Pacific Southwest Research Station, US Forest Service, Albany, California.
- Seel, W. E., I. Cechin, C. A. Vincent and M. C. Press. 1992. Carbon partitioning in parasitic angiosperms and their hosts. In: C. J. Pollock, J. F. Farrar and A. J. Gordon (eds.) *Carbon partitioning within and between organisms*. Bios Scientific Publishers, London. pp. 193-223.
- Seel, W. E., A. N. Parsons and M. C. Press. 1993. Do organic solutes limit growth of the facultative hemiparasite *Rhinanthus minor* L. in the absence of a host? *New Phytologist* 124: 283-289. (Some effect of phosphorus but little or none from N, K).
- Shaw, C. G., III. 1993. First report of *Dendrophthoe falcata* on *Pinus kesiya*. *Plant Disease* 77: 847.
- Shomer-Ilan, A. 1992. Enzymes with pectinolytic and cellulytic activity are excreted by the haustorium of *Orobanche aegyptiaca*. *Phytoparasitica* 20: 343.
- Siame, B. A., Y. Weerasuriya, K. Wood, G. Ejeta and L. G. Butler. 1993. Isolation of strigol, a germination stimulant for *Striga asiatica*, from host plants. *Journal of Agricultural and Food Chemistry* 41: 1486-1491. (Confirming strigol as the main stimulant from maize and proso millet and a minor component from sorghum).
- Singh, B. B., A. M. Emechebe and I. D. K. Atokple. 1993. Inheritance of *Alectra* resistance in cowpea genotype B 301. *Crop Science* 33: 70-72. (Confirming duplicate dominant resistance genes *Rav1* and *Rav2*).
- Sloot, P. and A. Daelemans. 1992. Combating parasitic weeds: strategies and statistics for *Striga* control. *At Source* 20 (2): 30-33.
- Smith, I. M., D. G. McNamara, P. R. Scott and K. Harris (eds). 1992. Quarantine pests for the European Communities and for the European and Mediterranean Plant Protection Organization. CABI, Wallingford, 1032 pp. (Includes the one weed genus covered by quarantine regulations throughout EC - *Arceuthobium*).
- Smith, M. C., J. Holt and M. Webb. 1993. Population model of the parasitic weed (*Striga hermonthica*) (Scrophulariaceae) to investigate the potential of *Smicronyx umbrinus* (Coleoptera: Curculionidae) for biological control in Mali. *Crop Protection* 12: 470-476.
- Stewart, H. M. 1993. Evidence of selfing in *Agalinis neoscotia*. *American Journal of Botany* 80 (6): 179.
- Takeuchi, Y. 1992. (Studies on the physiology and application of brassinosteroids). *Chemical Regulation of Plants* 27 (1): 1-10. (A review in Japanese, referring to work on *Striga asiatica*, *Orobanche minor* and *Aeginetia indica*).
- Thalouarn, P. and A. Fer. 1993. Le *Striga*, un ravageur de cultures vivrières: le point sur les connaissances récentes et sur les méthodes de lutte. *Cahiers Agricultures* 2: 167-182. (A sound review of recent advances, in French but with an extended English summary.)
- Teryokhin, E. S., G. V. Schibakina, N. B. Szaphimovich, N. B. and T. J. Kravtsova. 1993. Determinator of Broomrapes of the USSR Flora. NAUKA: St Petersburg. 124 pages. In Russian with English summary. (The USSR flora is exceptionally rich in the *Orobanchaceae* and the family has been the subject of studies by these authors for many years. The book deals mainly

with morphology and includes helpful SEM pictures of seed and epidermal surfaces as well as fruit shape. A detailed taxonomic treatment is also included).

- Visser, P. L. 1992. Yield stability analyses of improved sorghums in Niger. *Sorghum Newsletter* 33: 19-20. (SRN39 outperformed controls in the presence of *Striga hermonthica* but was badly adapted to high rainfall - over 800 mm).
- Vogt, W. 1993. Entwicklung der wirt/parasit-beziehung *Sorghum bicolor/Striga hermonthica* unter dem einfluss verschiedener stickstoffformen und standortsfaktoren. *PLITS* 11 (3): 166 pp.
- Wanek, W. and A. Richter. 1993. L-Iditol: NAD⁺-oxidoreductase in *Viscum album* utilization of host-derived sorbitol. *Plant Physiology and Biochemistry* 31: 205-211.
- Weerasuriya, Y., B. A. Siame, D. Hess, G. Ejeta and L. G. Butler. 1993. Influence of conditions of genotype on the amount of *Striga* germination stimulants exuded by roots of several host crops. *Journal of Agricultural and Food Chemistry* 41: 1492-1496.
- Wimpee, C. F., R. Morgan and R. Wrobel. 1992. An aberrant plastid ribosomal RNA gene cluster in the root parasite *Conopholis americana*. *Plant Molecular Biology* 18: 275-185.
- Wolf, S. J. and M. P. Timko. 1994. Characteristics of actin-gene family members and their expression during development in witchweed (*Striga asiatica* L.). *Planta* 192: 61-68.

FRANK G HAWKSWORTH

Readers of HAUSTORIUM will be saddened to hear that Frank G. Hawksworth died on 8 January 1993 in Fort Collins, Colorado--his home for many years. Frank was born in 1926 in Fresno, California and received a BS in forestry from the University of Idaho in 1949, and MS and Ph.D. degrees from Yale. For most of his professional career he was with the US Forest Service's Rocky Mountain Forest and Range Experiment Station. Frank authored over 200 scientific publications on forest diseases and was the world's authority on dwarf mistletoes, the most damaging parasites in forests of western North America. Frank's work on these pests did not stop with the publication of scientific information. He maintained constant contact with foresters, scientists, and practitioners at all levels of government, industry, universities, and private practice to assist them with on-the-ground management problems. His kindness, concern for others, and quality work were especially appreciated by Mexican foresters, who affectionately knew him as "Dr. Frank." Frank's unique combination of brilliance, humility, and endless wit earned him a special place in the hearts of forest scientists and managers internationally.

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