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THE FUTURE OF HAUSTORIUM

At present, we have no financial support for our newsletter. IPPC has generously printed this issue for us and postage is being paid out of residual grant funds at Old Dominion University. Old Dominion University, in collaboration with IPPC, has submitted a proposal to USAID to fund **HAUSTORIUM** for three years. This proposal is pending. Support would provide an expanded newsletter with as exhaustive a review of the ***Striga*** literature as possible. In addition, the **1956 USDA** annotated bibliography on ***Striga*** would be reprinted.

Although this issue is late, it is a special one. There is a great deal *of* activity to report regarding meetings on parasitic weeds. Sherwin Carlquist has written a special article on the remarkable feat *of* culturing ***Hydnora africana***, surely one *of* the strangest plants on earth.

STRIGA FORBESII AND STRIGA ASIATICA IN SOUTHEAST ZAIRE

A farming systems team consisting of IITA researchers and their Zairean counterparts from the Programme National Mais (PNM) working for the USAID/Zaire Project de Rechereche Agronomique Appliquee et Vulgarisation (RAV) have observed ***Striga forbesii*** and ***S. asiatica*** in Shaba region, southeast Zaire during **a** study of maize production constraints.

Striga forbesii was first observed in October **1987** in Kaponda, 35 **km** southwest of Lubumbashi. Three off-season maize fields of about 0.5 ha along a river bank were completely infested. Because of the location, the parasite appears to be distributed **by** flood water. Losses in these fields were estimated a 70-100%. ***Striga forbesii*** was also found in two neighboring villages and among weedy ***Brachiaria, Setaria***, and ***Cyperus.*** *Striga* ***asiatica*** was found in five villages north of Lubumbashi where maize and sorghum were attacked as well as on roadside grasses and in a residence compound. In cases where maize and sorghum were intercropped, the sorghum appeared to be more severely affected with yield losses of 40-60%. ***Striga asiatica*** has been known from the area since 1962 but ***Striga*** species appear to be only in isolated pockets. However, with the increase of areas under continuous maize culture and with declining soil fertility, ***Striga*** may become a major constraint in maize production in the region.

- **T. Berhe, W. Vogel (both IITA), and**
- **M. Mutanda, M. Kabwe (both PNM)**

AFRICAN TASK FORCE OF STRIGA

A workshop was held in early December in The Gambia to review work on witchweed in Africa and to recommend further work, especially the development of control packages for the small farmer. A more detailed report will appear in the next issue of HAUSTORIUM.

HYDNORA IN MY GARDEN!

During 1973, I spent six months in South Africa collecting wood for anatomical studies; I wished to see other plant wonders of the region and chose ***Hydnora*** over other plants such as ***Welwitschia***. Herbarium study revealed that a fine population of ***H. africana*** could be seen north of Ceres, at the entrance of the Karoo Desert, and I visited that population in October. In December, a visit to the Karoo Garden in Worcester revealed that on a nearby hillside, some of the older ***Euphorbia mauritanica*** shrubs **were** yellowish, and I thought their decline might be the result of parasitism. ***Hydnora africana*** was fruiting abundantly on the roots of one such shrub, and I collected fruits in the hope of cultivating them upon my return to the United States the last week of December.

Shortly **after** arrival back in California, I bought several rooted cuttings of ***Euphorbia caputmedusae*** in the hope of germinating seeds of the ***Hydnora;*** the fruits were still in, fresh condition and intact. ***Euphorbia mauritanica*** is not in cultivation in California, but ***E. caputmedusae***, most commonly cultivated here, was judged suitable because it is the host of a small population of ***H. africana*** at Houtbaai on the Cape Peninsula. I tapped the ***Euphorbia*** plants from their pots, lined the pots thickly with masses of the seeds, and reinserted the plants ***so*** that ***Euphorbia*** roots would be in intimate contact with ***Hydnora*** seeds. About a year later, I removed the ***Euphorbia*** plants, noted no apparent infection, and planted them in a larger ceramic pot. Three years from the time **of** original sowing, removal of the plants revealed no apparent infection. I assumed I had been unsuccessful, and planted the ***E. caputmedusae*** plants in **a** convenient sunny corner of my garden as a way of using the ***Euphorbia*** merely as an ornamental. Early in July **1979,** five and one-half years after the attempted inoculation of the ***Euphorbia*** plants, I was startled to see a single ***Hydnora*** flower emerge from the soil surface. When the flower opened, on July **29,1979,** I dug up the colony and made a specimen (Carlquist 15635, located in the Rancho Santa Ana Botanic Garden herbarium), photographing and preserving portions in liquid. Evidently two large plants of the ***Hydnora*** had developed ***(Hydnora*** roots were radiating from two centers); a small nodule about 5 mm in diameter with the same surface characteristics as ***Hydnora*** roots was also attached to the ***Euphorbia*** roots, and I assumed this might have been a young seedling of ***Hydnora.*** I have not yet studied liquid-preserved portions, including that nodule but I do plan anatomical studies.

I replanted the *Hydnora*-infected ***Euphorbia*** plants before they could dry out, and, during the years that followed, I added two additional ***Euphorbia*** species, ***E. aitonii*** and ***E. hexagona*** (the latter name under which this plant is commonly known in cultivation; the correct name may be different, and possibly this plant is a hybrid of ***E. bubalina*** according to Dr. Daryl Koutnik.) As a result of thinning out excess ***Euphorbia*** plants, I have found root connections of this ***Hydnora*** to all three *Euphorbia* species. The ***E. aitonii*** has now been killed by frost, so the ***Hydnora*** colony is now nourished by two species of ***Euphorbia.***

Each year since **1981** the colony has yielded two or more flowers, and various botanists have witnessed the flowering, which occurs during July and August. Large dermestid beetles have been found in the flowers as visitors, much as the dermestids that are known to pollinate the flowers in South Africa according to Marloth, but no fruits have ever been formed. The colony has not expanded greatly in size since 1979, but it appears in no danger of dying out. Conditions for cultivation are not ideal with respect to soil, for my garden **is** composed of an adobelike clay. For this reason, the ***Hydnora*** roots may grow closer to the surface than they would in a sandier soil (judging by my excavation of wild-occurring plants in the Karoo locality). Southern California is **a** favorable site because frosts are sufficiently mild **so** that various succulent species of ***Euphorbia*** can **be** cultivated with little or no damage.

I would encourage others to attempt cultivation of this and other species of *Hydnora*--lack of host specificity would seem to favor cultivation. Obviously, considerable patience is involved, judging from the interval between sowing seeds and flowering that I experienced. Although seeds may well be capable of dormancy, one is well advised when cultivating any species not hitherto attempted to begin with seeds taken directly from fresh fruits.

- **S. Carlquist, Rancho Santa Ana Botanic Garden**

OROBANCHE IN NEPAL A survey trip in January **1988** to assess the *Orobanche* problem in ***Brassica*** oilcrop-growing areas of Nepal was sponsored by IDRC, Canada, and Nepal Agricultural Association. ***Orobanche*** was widespread in the **"terai"** (plains between the Churia range **and** the Indian border) and the "inner-terai" (plains between the Churia and the Mahabharat ranges) on ***Brassica*** oilcrops, tobacco, tomato, faba beans and other crops. **We** could not actually see ***Orobanche*** in the high **hills** though we found reports of its occurrence in hills as high **as** 3800 m in Manang district. ***Orobanche aegyptiaca*** was the predominant species on the ***Brassica*** oilcrops; the same species was in tobacco along with O. *solmsii* (a first record for Nepal). Toria ***(Brassica campestris*** var. *toria)* parasitized by ***Orobanche*** had a 20% yield **loss** according to the National Oilseed Development Project at Nawalpur. In the farmer's fields, toria following rice apparently had less ***Orobanche*** than toria following maize or jute.

- **M. J. Vasudeva Rao, ICRISAT,**
- **M. L. Jayaswal, National Oilseed Development Project, and**
- **Jagat Devi Ranjit, Agronomy Division**

CONTROL OF STRIGA WITH A SYSTEMIC HERBICIDE We have found excellent result with the system herbicide dican (3,6-dichloro-2-methoxybenzoic acid) in controlling *Striga asiatica.* The herbicide is applied as a folia **spray** to corn or sorghum at the time of incipient attachment of the parasite to the h root system. The material translocates thr leaf to roots and kills unemerged *Striga* up cm long. Adil Eisa Awad, graduate studen North Carolina State University, has demonstrated movement of dicamba from t host into the parasite with radioactive trace The treatment provides 45 days of protectic the crop. This procedure of using a relative inexpensive herbicide to systematically con ***Striga*** in cereal crops opens up new avenu of control.

- **R. Eplee, USDA, Whiteville Metho Development Center**

COMBATING STRIGA IN AFRICA WORKSHOP AT IITA. AUGUST 1988 About fifty. scientists from many nations mi at **the** Internatior Institute of Tropi Agriculture (IITA) in Ibadan, Nigeria, the las few days of August **1988** for the purpose of developing research priorities and collabora among ***Striga*** researchers. A series **of** sessions reviewed present research and research planned for the future. **A** series of recommendations on priority areas of resea was developed. These have been publishe as "Combating ***Striga*** in Africa: Opportunitie for Research Collaboration." This 24 page booklet is available from Publications, IITA, Oyo Road, **PMB** 5320, Ibadan, Nigeria. On the recommendations involves information networking and states that **HAUSTORIUM** should be supported as well as developing a directory of *Striga* workers and a catalog of literature.

EARLY SELECTION OF SUNFLOWER SEEDLINGS FOR BROOMRAPE (OROBANCHE CUMANA WALLR.) RESISTANCE

Orobanche cumana, broomrape, is one of the important problems in sunflower culture in Hungary so that effective control methods are constantly being sought. Two methods appear promising: the use of phytophagous insects or hyperparasitic microorganisms; and the selection of resistant sunflower lines and the production of resistant hybrids. Both methods have been the subject of study for many years at the Bacsalmas Sunflower Producing System (BNR). For the early diagnosis of broomrape infection, a new testing method has been developed using potted sunflower seedlings for inoculation with broomrape seed. The frequency of infection within a sunflower line has been made on the basis of histological changes at the host-parasite interface, the resistant plants showing secondary lignin accumulation near the site of penetration. The induction of lignin seems to prevent the establishment of parasitic contact between vessels of the two plants. As lignin accumulation is associated with brown necrotic lesions of the host tissue accompanied with dead broomrape plants in a number of cases, the response of sunflower to infection can be easily assessed by means of a dissecting microscope. As a result, the sunflower populations (lines) can be divided into four phenotypic groups: 1- Plants showing broomrape knots yellow in color and detectable with the naked eye; 2- plants with very small, undeveloped knots; 3- plants with necrotic lesions; 4- plants with neither necrosis nor parasite. Groups 3 and 4 are considered resistant to broomrape:

4 Z. Horvath, Bacsalmas Sunflower Producing System, Bacsalmas

CUSCUTA IN PULSES AFTER RICE IN ANDHRA PRADESH

Cuscuta reflexa has been noted in pulses and certain other crops in Andhra Pradesh, India. The infestation is severe in pulse cro under a rice-pulse relay cropping system wl pre-soaked pulse seed is broadcast into a standing paddy crop a week before harvest November and December. Pulse crops utili the residual soil moisture and mature in 90 1.10 days. Seed contamination through manure/compost/cattle dung and human activity appears to be the major sources of infestation in new areas. *Cuscuta* germinat was not observed during the rainy season i paddy either on crops or on weeds because the water. One week to ten days after germination of the pulse, the *Cuscuta* germinates and attaches to the nearest crop seedling either directly or by becoming established first on a weed. The cooler weather and cloudy skies apparently help germination of the *Cuscuta.* If the infestatio heavy, the entire crop may be lost. Suscept crops include ***Vigna mungo, V. radiata, V. aconitifolia, Cicer arietinum, Cajanus cajan, Medicago sativa, Crotolaria juncea, Glycine max*** and the non-legumes: ***Guizotia abyssinica, Sesamum indicum, Hibiscus sabdariffa, Lycopersicon esculentum, Capsicum annuum, Allium cepa,*** and ***Coriandrum sativum.*** Tolerant crops include ***Vigna unguiculata, Cyamopsis tetragonolob*** Resistant crops are ***Macrotyloma uniflorum, Gossypium spp, pomoea batatas,*** and ***Abelmoschus esculentus.*** In addition, man) weed species are potential hosts.

4 K. Narayana Rao and R. S. N. Rao
Andhra Pradesh Agricultural Unlversity, Bapatla

INTERNATIONAL WORK-SHOP ON OROBANCHE RESEARCH

Orubanche is a serious root parasitic weed in many areas whe may be a major factor in yield reduction of legumes and vegetables. A better understanding of the biology of *Orobanche* and especially the physiological and biochemical host-parasite relations may lead to new means of control. Accordingly, a workshop is planned 19-22

August 1989 in Obermarchtal, West Germany. All aspects of the biology and biochemistry of *Orobanche* will be considered with special emphasis on germination, haustorial initiation, host specificity, genetics, and host crop resistance. The venue of the meeting is the former Premonstrant Abbey. Obermarchtal is located halfway between Stuttgart and Lake Constance. The fee for the workshop is DM400 which includes all expenses including accomodation and meals. We plan to produce a published proceedings of the workshop. For more information contact one of the organizers, K. Wegmann, Institute of Chemical Plant Physiology, University of Tubingen, Corrensstrasse 41, D-7400 Tubingen, West Germany; telephone 07071-296396, telex 7262867 UTZV D/attn Wegmann, or L. Musselman (address below).

COPIES OF THE 4th PARASITE SYMPOSIUM PROCEEDINGS STILL AVAILABLE

Some copies of the Proceedings of the Marburg symposium are still available. This is a large, well produced volume crammed with information on a diversity of parasitic plants. To order a copy, send a check in the amount of DM1.25 made payable to Hans Christian Weber and send it to him at Fachbereich Biologie Botanik, Phillipps-Universitat, Lahnberge, 3550 Marburg, West Germany

LITERATURE

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Gawler, S. C., D. M. Waller, and E. S. Menges. 1987. Environmental factors affecting establishment and growth of *Pedicularis furbishiae*, a rare endemic of the St. John River Valley, Maine. Bulletin of the Torrey Botanical Club 114(3): 280-292. (*Pedicularis furbishiae* is a root parasite and one of the rarer plants in North America. It prefers a distinct habitat along the St. John River which is disturbed each year by winter ice scouring).

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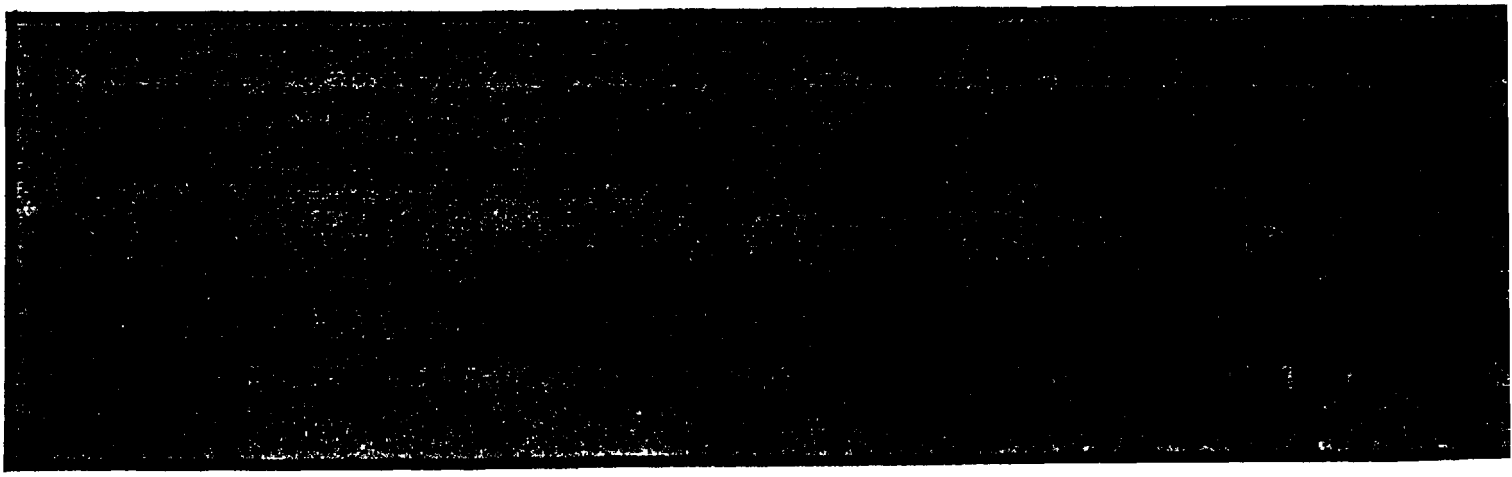

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