Puerto Rico, and the Texas Agricultural Experiment Station.

The converted lines were developed through a backcross procedure in which tall, long-duration tropical sorghum varieties or cultivars were converted to short-duration combine-height sorghums. Conversion is accomplished by a crossing and backcrossing program using favorable short-day photoperiods during the winter in Puerto Rico, with selection for early, short genotypes within segregating populations under long-day, summer conditions at Chillicothe, Texas. All converted lines for release are derived from four backcrosses to the original exotic variety. The nonrecurrent parent used in all cases was a short-duration 4-dwarf Martin B line, BTx406, of US origin. The exotic varieties were used as male parents in all crosses and backcrosses until the third backcross when they were used as the females in order to recover the original cytoplasm in the converted line.

The converted lines are photoperiod-insensitive, will mature normally in USA, and are short statured, generally 3- or 4-dwarf. in height, but occasionally 2-dwarf. They represent new sources of germplasm from the World Sorghum Collection and are of suitable height and maturity for use in USA and other temperate-zone areas of the world. These materials should contain new sources of such desirable traits as disease and insect resistance, drought resistance, and improved grain quality, and should be useful to breeders and other sorghum researchers as germplasm sources in developing improved sorghum lines and hybrids. Table 1 provides information on the converted lines and the original exotic varieties.

Seed will be maintained and distributed by the Texas Agricultural Experiment Station at the Texas A&M University Agricultural Research and Extension Center at Lubbock, Route 3, Box 219, Lubbock, Texas 79401-9757, USA. It will be available in germplasm quantities only. Private companies will be charged a fee of US$250 for the complete set, or US$20 per individual line. Payments should be made to Texas Agricultural Experiment Station', and should be in US dollars. Genetic material of this release will be deposited with the National Plant Germplasm System, where it will be available for research purposes including development and commercialization of new varieties/cultivars. Those receiving seed are asked to agree to supply, upon request, information about breeding behavior, desirability, and usefulness of the material and to cite it as the origin of useful derived lines.

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Pathology

Host Range of Sorghum Downy Mildew in Africa

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Sorghum downy mildew [*Peronosclerospora sorghi* (Weston and Uppal) C.G. Shaw] is a major disease of both sorghum [*Sorghum bicolor* (L.) Moench.] and maize [*Zea mays* L.] crops grown in tropical and sub-tropical regions of the world. The grain yield loss resulting from systemic infection, which causes sterility, can be devastating (Williams 1984). Collateral hosts have been implicated in the between-season survival of *P. sorghi* in the Americas (Malaguti 1977). Only species in the tribes Maydae, Andropogonae and Panicae have been confirmed as susceptible (Bonde and Freytag 1979, Karunakar et al. 1994). In Zambia, Pande and Singh (1992) found *Sorghum halepense* (Johnson Grass) infected with *P. sorghi* adjacent to farmers' fields. This indicates wild grasses may play a role in the epidemiology of *P. sorghi* in Africa. The following experiment was undertaken to investigate the host range of an isolate of *P. sorghi* from Africa.

Seed of 24 species from 4 tribes of the Graminae and one species from the Cyperaceae were collected in Nigeria. The isolate of *P. sorghi* was collected from a

Table 1. The susceptibility of different species of Graminae and Cyperaceae to conidial inoculum of an isolate of *Peronosclerospora sorghi* from sorghum, Matopos, Zimbabwe.

Host family, tribe, and species	Host reaction	Systemically infected plants
Graminae		
Maydae		
Zea mays L. var. TZESR-W	S[1]	21/25
Coix lachryma-jobi L.	R	0/8
Andropogonae		
Sorghum bicolor (L.) Moench. var. DMS 652	s	24/25
S. arundinaceum (Desv.) Stapf.	s	20/23
Hyparrhenia rufa (Nees) Stapf.	R	0/14
Andropogon gayanus Kunth.	R	0/17
Rottboelia cochinchinensis L.	R	0/13
Panicae		
Brachiaria deflexa (Schumach.) C.E. Hubbard ex Robyns	R	0/21
B. distichophylla (Trin.) Stapf.	R	0/23
B. ramosa (L.) Stapf.	R	0/9
B. lata (Schumach.) C.E. Hubbard	R	0/10
Panicum maximum Jacq.	R	0/24
Setaria barbata (Lam.) Kunth.	R	0/16
Rhynchelytrum repens (Willd.) C.E. Hubbard	R	0/21
Echinocloa colona (Linn.) Link	R	0/17
Paspalum orbiculare Forst,	R	0/14
P. conjugatum Berg.	R	0/22
Axonopus compress us (Sw.) P. Beauv.	R	0/16
Digitaria horizontal is Willd.	R	0/23
Pennisetum pedicellatum Trin.	R	0/17
P. americanum (L.) K. Schum.	R	0/25
Eragrostidae		
Eragrostis tremula Hochst. ex Steud.	R	0/11
Eleusine indica (L.) Gaertn.	R	0/18
Dactyloctenium aegyptium Willd.	R	0/22
Cyperaceae		
Cyperus		
Cyperus digitatus Roxb.	R	0/9

1. S = susceptible; R = resistant. Susceptible indicates the development of systemic symptoms in inoculated seedlings.

systemically infected sorghum crop (var. Marupantse) at Matopos Research Station, near Bulawayo, Zimbabwe. Experiments were conducted under controlled-environment conditions in the plant disease containment facility at the Natural Resources Institute, UK. Seed of each species was pregerminated in petri dishes and 24- to 48-h-old seedlings sown in 15-cm containers. Soil was sprinkled over the seedlings until they were just covered. When their coleoptiles were 1-3 cm long, seedlings were spray inoculated with a suspension of mature conidia of *P. sorghi* ($1x10^4$ conidia mL^{-1}) using a hand-held sprayer. The conidia were produced by incubating systemically infected leaves in the dark in moist containers at 22°C (leaves previously exposed to light for 12 h). After inoculation the seedlings were transferred to an incubator at 22°C for 16 h, before transfer to a greenhouse held at 26°C. Assessments were made every 7 days for 4 weeks to record the development of systemic infection.

Results of the inoculation are shown in Table 1. Of the 25 species inoculated, only three developed systemic infection (species in the tribes Maydae and Andropogonae). These were maize, sorghum, and the wild sorghum, *S. arundinaceum* (False Johnson Grass). *Sorghum arundinaceum* is widespread in Africa and could act as a source of infection for *P. sorghi* to infect sorghum or maize crops. Several other wild sorghums that were not tested in this study also occur widely in Africa and have been shown to be susceptible to *P. sorghi* (Bonde and Freytag 1979, Karunakar et al. 1994). At some locations in Africa it may be expedient to rogue collateral hosts adjacent to areas of sorghum or maize cultivation, particularly if they act as a source of conidia early in the season. They might also produce oospores which can infest the soil and infect subsequent crops.

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Entomology

Incidence of Stem Borers on Postrainy-season Transplanted Sorghum in Cameroon, Nigeria, and Chad in 1995/96

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Introduction

Postrainy-season sorghum, known as *muskwari* in Cameroon, *masakwa* in Nigeria, and *berbere* in Chad, is a very important cereal crop in Chad where it constitutes about 10% of the total cereal production and 20% of the total sorghum (rainy season + dry season) (Lotar Mougabe, Head, Systeme de I'Information du Marche, personal communication, 12 Oct 1995). *Muskwari* represents about 25-30% of the sorghum production in northern Cameroon (Djonnewa and Dangi 1988). Although its proportional production, relative to rainy-season sorghum, in Nigeria has not been determined, it is frequently the only sorghum crop available to many farmers in Borno State where it fetches a higher price than rainy-season sorghum. The grains are used to prepare a stiff porridge known as *boule* (*tuwo* or *to* in western Africa) while the stems and leaves are fed to animals, or used for fencing and as firewood. Earlier surveys had revealed that stem borers are the only important insect pests of postrainy-season sorghum in Cameroon and Nigeria (Tabo et al. 1993). Little seems to be known about the insect pests of this crop in Chad, although Versteeg (1995) reported that farmers who were involved in a diagnostic survey in the Canton de Madiagho in 1995 ranked stem borers 5th among the constraints to the production of postrainy-season sorghum in the area. The more important constraints recognized by the farmers were birds, grasshoppers, shortage of water, and storage problems. A survey was, therefore, conducted from 5 to 9 Feb 1996, to determine the incidence of stem borers on postrainy-season sorghum in Chad and parts of Cameroon and Nigeria that had not been surveyed earlier.

Materials and methods

The survey involved counting 50 randomly chosen stands of sorghum per field, and recording the percentage of plants that were infested by stem borers. Observations were made on four farms in each of Cameroon and Chad, and one in Nigeria. Symptoms of stem borer infestation that were sought included: leaf feeding, deadhearts, holes, tunnelling, and the presence of frass, larvae, and pupae in the stems. Larvae and pupae were collected and reared to adulthood on fresh sorghum stems in Kilner® jars in the laboratory. The incidence of natural enemies, particularly parasitoids, was also noted. Pupae of natural enemies were collected and kept until adult emergence. Dead larvae and pupae of the stem borer were similarly treated.

Results and discussion

The incidence of stem borers on the nine farms surveyed is presented in Table 1. Stem borer incidence was often quite high, ranging from 10% at Zigi Chokrai in Chad to 100% at Maltam and Fotokol in Cameroon. In Chad, infested stems were usually bored at the base or in the peduncle; in Cameroon and Nigeria, the stem was often riddled with tunnels and up to 15 larvae and pupae were found per stem. Consequently, the stems frequently

Table 1. Incidence of stem borers on dry season sorghum in Cameroon, Nigeria, and Chad, 1995/96.

Country	Surveys	Locations	Mean % infected	Percentage range
Chad	4[1]	6	38.3	10-71
Cameroon	4[2]	4	72.3	13-100
Nigeria	1[2] 1	70		70

1. Conducted 5, 6, and 8 Feb 1996.
2. Conducted 10 Feb 1996.