Fig. 2. Mounted specimens.

be removed with a razor blade by cutting down the middle of each wrinkle and allowing the edges to overlap and seal off the air space.

Each mount should be properly labeled and trimmed to the desired size. Typewritten plant labels may later be attached to the mount by cutting another plastic sheet to a size larger than the label and adhering it to the mount. Plastic mounting sheets and stored collections are illustrated in Figures 1 to 3.

Conclusions

Plants mounted by the described method have successfully held true color for more than 4 years. The moisture encountered with the freshly collected plants diffuses out slowly through the plastic and has not caused a molding problem. The size of the mounts may be varied according to the collector's desire. For large plants, the plastic may be purchased in rolls. For smaller specimens, handy pocket-size mounts can be made either by placing the plants between two 3 x 5-inch plastic sheets or between index cards and plastic sheets. Mounts can also be punched and stored in three-ring notebooks. This mounting method may answer some of the problems encountered with the storing, identifying, and re-identification of plants.

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Fig. 3. Stored collections.

Seed Destruction in Indigobush Amorpha by a Seed Beetle

C. E. ROGERS AND J. C. GARRISON

Highlight: The seed pods of indigobush amorpha (*Amorpha fruticosa* L.) in Knox County, Texas, are heavily infested with a bruchid (*Acanthoscelides collus* Fall). Although *A. collus* may destroy about half of the amorpha seeds, its potential for maximum seed destruction is lowered by a parasitoid, *Horismenus productus* (Ashmead). About 5% of the immature seed beetles are parasitized.

Indigobush amorpha (*Amorpha fruticosa* L.) (Fig. 1), is a native legume found growing along streams

from Massachusetts south through central Texas. Its well-developed root system permits it to tolerate extreme drought as well as periodic inundation. Twelve accessions of this plant are being evaluated at the Soil Conservation Service Plant Materials Center at Knox City, Texas, for field evaluation for use on watershed structures to control erosion caused by wave action.

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Fig. 1. Seed pods of indigobush amorpha, *Amorpha fruticosa*.

Table 1. Natural infestation of *Amorpha fruticosa* seed pods by a bruchid, *Acanthoscelides collus*, and a parasitoid, *Horismenus productus*, near Knox City, Texas (winter-spring 1972-73).

Collection date	Accession origin	No. of pods collected	Pods containing		Infestation of pods (%) ^a	Parasitization of bruchids (%) ^a
			bruchids	parasitoids		
March 19, 1973	Mixed	191	106	11	61	9
March 20, 1973	Hugo, Oklahoma	557	1	0	0	0
March 20, 1973	Jacksboro, Texas	666	375	17	59	4
March 20, 1973	Gainesville, Texas No. 1	833	230	20	30	8
March 20, 1973	Gainesville, Texas No. 2	516	435	16	87	4

^aData to nearest whole number.

Historically, plant ecologists have largely ignored the effects of insects in determining the composition of plant communities (Bullock, 1967). Yet it appears that in some cases, insects are the prime factor in regulating the abundance of flowering plants (Huffaker, 1962). Insects may play a key role in reversing the competitive advantage that one plant species may have over another.

From the viewpoint of reducing the reproductive potential of plants, the group of small insects known as bruchids or seed beetles very effectively reduce viable seed production. Most of these beetles are found in the seed of leguminous plants (Swan and Papp, 1972). The devastation which the cowpea weevil, *Callosobuchus maculatus* (Fabricius), and common bean weevil, *Acanthoscelides obtectus* (Say) bring upon seed production in commercial legumes is well known (Metcalf et al., 1962). *Algarobius bottimeri* Kingsolver and *A. prosopis* Le Conte are important seed destroyers of mesquite (*Prosopis glandulosa* var *glandulosa* Torr.) in Texas (Kingsolver, 1972).

This note discusses the impact of *Acanthoscelides collus* Fall (Fig. 2) on seed production in indigobush amorphia in Knox County, Texas.

Materials and Methods

Seed pods (a pod contains one seed) harboring overwintering beetles were randomly collected from indigobush on the Soil Conservation Service Plants Materials Center, Knox City, Texas, on March 19 and 20, 1973. Those collected on March 19 were taken to the laboratory and dissected under a stereoscope microscope. Pods collected on March 20 were segregated according to accession origin, placed into pupation chambers in a protected site in the natural environment, and held for subsequent emergence of beetles and their parasitoids. Records were kept on percent seed infestation, percent parasitization of beetles, developmental stage of beetles and their parasitoids at dissection, and emergence dates of beetles and their parasitoids from seed pods.

Results and Conclusions

Sixty-one percent of the 191 dissected seed pods contained immature seed beetles or their parasitoids (Table 1). The infestation rate of seeds of plants from the Texas accessions ranged from 30 to 87% ($\bar{X}$ = 58.75%). Seed pods from plants of the Oklahoma accession contained very few beetles. This is thought to have

been caused by lack of seed development in the plants in the Oklahoma accession. Most of these pods were flattened and contained poorly developed or no seed.

Parasitization of immature bruchids from Texas ranged from 3.54 to 9.40% (Table 1). The parasitoid involved was determined to be *Horismenus productus* (Ashmead) (Hymenoptera: Eulophidae). Although parasitization of the bruchids was not extremely high, its effects would almost certainly reduce the bruchid's efficiency as a regulative agent of indigobush amorphia.

Evidence gathered during the dissections indicated that members of both the bruchid and its parasitoid (*H. productus*) populations pass the winter predominantly as pupae. Of the 106 immature beetles recovered on March 19, 70 were pupae and 36 were larvae. Likewise, 10 parasitoid pupae and one larva were recovered. Adult weevils began emerging on April 18 and continued to emerge through August 1. Although emergence of the bruchids covered a 4.5 month period, 55.55% and 99.84% of 648 beetles had emerged before May 1 and June 1, respectively. Initial and maximum emergence of the parasitoid lagged about 2 weeks behind those of its host. Emergence of parasitoids terminated on July 1, compared with August 1 for the weevils. A total of 36 parasitoids emerged.

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Fig. 2. Adult seed beetle, *Acanthoscelides collus*, resting on seed pod of indigobush amorphia following emergence.