

USDA SOYBEAN GERMPLASM COLLECTION REPORT

February 1993

In 1992, a total of 10,470 seedlots were distributed from the USDA Soybean Germplasm Collection in response to 417 requests from 40 states and 30 foreign countries. There were 318 domestic seed orders for 7,153 seedlots and 62 foreign requests for 2,623 seedlots. Numerous publications were sent in response to 28 domestic and 7 foreign requests for information about the collection. Additionally, 697 accessions were sent to the National Seed Storage Laboratory at Ft. Collins, Colorado as back-up samples for the collection.

Of the approximately 13,000 *Glycine max* strains in the Collection in 1992, 196 were grown in 4-row plots in Stoneville and 1,614 were grown in 4-row plots in Urbana for seed replacement. Of the 656 pureline and comparison plant rows grown in 1992, 131 were grown at Stoneville and 525 were grown at Urbana. Approximately 160 new *G. max* lines were added to the collection and are now available for distribution, as is a listing of these accessions. These additions are from the USSR, China, Japan, and Taiwan. New *G. max* and *G. soja* accessions received to date that will be planted in 1993 include accessions from Argentina, China, Japan, Korea and the Russian Federation. Included in this group are 79 accessions from the Institute of Crop Germplasm Resources in Beijing, China. These lines are from the list of accessions released by IBPGR as being available from the Institute of Crop Germplasm Resources. We requested these lines in 1989.

Maturity group X accessions have been purelined in Puerto Rico. Single plants of all group X accessions were harvested during the winter of 91-92. In early May, we planted 813 plant rows in order to complete the purelining process in one year. Some of the accessions ripened as expected in August and September but others did ripen until late December. The seed set on the late maturing lines was extremely poor. There is no obvious correlation between maturity date with a September planting date and maturity date with a May planting date. Until we better understand the environmental requirements of this material, we will not attempt to grow groups IX or X in the summer in Puerto Rico. We did select 298 purelines to be added to the collection. Because of the seed production problems last summer, seed increases from some accessions will be planted next winter and seed will not be available for those lines until 1994.

The 153 group IX accessions and 194 new introductions received in 1991 from the Malang Research Institute for Food Crops, Indonesia, were planted in October 1992 in Puerto Rico. Also planted with this group were an additional 5 new Chinese accessions received in 1992 from W.J. Kaiser of the USDA/ARS Regional Plant Introduction Station, Washington State University. These lines were collected in different provinces of the People's Republic of China in 1990 by W.J. Kaiser and F.J. Muehlbauer. Single plants were harvested this month and will be planted in rows in the Fall of 1993 to complete the pureline process.

In 1992, 500 germplasm accessions were sent from the Institute of Crop Germplasm Resources in Beijing. This was the result of an agreement signed between the USDA and Chinese Ministry of Agriculture and supported financially by the Illinois Agricultural Experiment Station, the Illinois Soybean Program Operating Board, the Iowa Agriculture and Home Economics Experiment Station, the Iowa Soybean Promotion Board, and USDA-Agricultural Research Service. The seeds arrived in Urbana on May 7 and were planted on May 15. Heavy rain and very cold temperatures immediately after planting caused some stand problems. Plants were harvested from all accessions but seeds from nine accessions were planted in greenhouse this winter to provide additional plant rows for 1993. The request was for primitive cultivars and the phenotypes confirmed that that criterion was met. We also requested that we be able to grow them to maturity at Urbana and that these accessions not come from Heilongjiang, Jilin, and Liaoning provinces. Table 1 lists the provincial origin, as best as we can determine it, of the previous accessions from China. Approximately 85% of the Chinese accessions in the Collection had come from these three provinces. Table 2 lists the origin of the 500 new accessions and the number of accessions previously obtained from these provinces. All new accessions did mature at Urbana but most are in maturity group IV. Chen Yiwu, an assistant professor in the Institute of Crop Germplasm Resources, Chinese Academy of Agricultural Sciences in Beijing, also arrived in May and will spend one year learning about the operation of the USDA Soybean Germplasm Collection and doing germplasm research.

An additional 153 new accessions were grown for the first time at Urbana and another 55 at Stoneville. These originated from the Japan, China, Taiwan, Korea, Vietnam and the Russian Federation. The following institutions donated germplasm to our collection this year: National Institute of Agrobiological Resources, Tsukuba, Ibaraki, Japan; Yamagata University, Yamagata prefecture, Japan; Queensland Department of Primary Industries, Gatton Research Station, Queensland, Australia; Asian Vegetable Research and Development Center, Taiwan; Institute of Crop Germplasm Resources, Chinese Academy of Agricultural Sciences, Beijing, China; Agricultural University, Hanoi, Vietnam; Institute of Plant Genetics and Crop Plant Research, Gatersleben, Germany; Vavilov Institute, Leningrad,

Russian Federation; All-Russian Soybean Institute, Blagoveshchensk, Russian Federation. Three cultivars of unknown origin were provided by Johnny's Selected Seeds, Albion, Maine, USA. The following people helped to obtain these new accessions, and their assistance is greatly appreciated: Bai Xin Xue, Chinese Academy of Agricultural Sciences; R.L. Bernard, University of Illinois; T. Carter, USDA-ARS, North Carolina State University; G. Li, Washington State University; P. Hanelt, Institute of Plant Genetics and Crop Plant Research; T. Hymowitz, University of Illinois; W. J. Kaiser, USDA-ARS, Washington State University; Dr. Kawaguchi, National Institute of Agrobiological Resources; Y.T. Kiang, University of New Hampshire; J. Konovsky, Washington State University; S.M Lim, University of Arkansas; R. McMahon, Queensland Department of Primary Industries, E.D. Nafziger, University of Illinois; R.L. Palmer, USDA-ARS, Iowa State University; V.I. Sichar, Odessa, Ukraine; Tong Diaxing, Institute of Crop Germplasm Resources; and S. Wyrstek, Johnny's Selected Seeds.

Sixty-seven plots of *Glycine soja* were grown in Stoneville and 36 plots were grown in Urbana for seed increase in 1992. Only one new line was added to the wild soybean collection this year. The accession is from China and was provided by the Heilongjiang Academy of Agricultural Sciences, Harbin, Heilongjiang China, with the assistance of M. Rangappa, Virginia State University. The current inventory of the USDA Wild Soybean Germplasm Collection is 1035 accessions. Three new accessions of wild soybean from the were grown for the first time in 1991. All three were donated by R. Palmer, USDA-ARS, Iowa State University, who obtained them from V.I. Sichar, Odessa, Ukraine.

This year we began the general evaluation of 812 accessions of group VI at Stoneville. These lines will be evaluated again in 1993. These data will be summarized and published in a USDA Technical Bulletin in 1994. Evaluation data for PI 490.765 through PI 507.573 (groups 000 to IV) was published in USDA Technical Bulletin 1802 in 1991. This publication was distributed in July, 1992 to approximately 400 researchers throughout the world. Included in this mailing were updated versions of non-published information about the soybean collection. Data from L.D. Young's soybean cyst nematode screening study, L. Lambert's soybean looper study and T.C. Eldon's Mexican bean beetle study have been added to the GRIN database. The new data format allows the methods used in each study to be linked with the results. We have been working with the Database Management Unit in Beltsville, Maryland concerning structure and design of the GRIN3 database.

When the National Seed Storage Laboratory (NSSL) at Ft. Collins, Colorado built a new facility two silica-gel dehumidifiers became excess property. For the cost of shipping, the soybean collection obtained these units and they have been installed on two cold rooms at Urbana. The NSSL recommends 25% relative humidity (RH) for long-term storage. With the addition of this equipment we can keep the collection and seeds waiting to be processed into collection at 50° C and 25% RH. We are hoping that this improvement will increase both the longevity and vigor of the seeds in the collection. Seeds samples have been placed in storage at both 25% and 45% RH. Germination and vigor will be measured on these samples during the next 15 years.

The current inventory of the USDA Perennial *Glycine* Germplasm Collection consists of 856 accessions representing 15 species. During the year, 4 accessions, collected in Australia, were received from CSIRO in Canberra, Australia. Fifty seeds of 61 accessions were sent to the National Seed Storage Laboratory, and an additional set containing 10 seeds per packet was sent to the USDA Soybean Germplasm Collection in 1992. Of the 856 accessions, 641 currently have sufficient seed for distribution, and a 50 seed packet is stored at the National Seed Storage Laboratory for about 538 accessions. During 1992, 1,012 seed packets were sent in response to 18 requests from 9 states and 4 foreign countries. Most packets shipped had 5 to 10 seeds per packet. PI numbers have yet to be assigned to many of the perennial accessions which are being multiplied. This collection is maintained through a cooperative agreement with Ted Hymowitz, University of Illinois.

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