Department of Agriculture, Trade and Consumer Protection
Division of Marketing
Agricultural Development & Diversification Program (ADD)
2001 Grant Project Final Report

Contract Number: 15104

Grant Project Title: Plum Breeding- The Development of New Adapted Commercial Cultivars for the Wisconsin Grower
Project Beginning Date: 9/1/00 Project End Date: 9/l/01

Amount of Funding Awarded: $10,785.00

Name of Principal Contact Person: Dr. Brian R. Smith

Address: Department of Plant and Earth Science. UW-RF

City, State and Zip Code: River Falls, WI 54022

Telephone: (715) 425-3851 Fax Number: (715) 425-3785

E-Mail or WEB Address: brian.r.smith@uwrf.edu

Submitted by: Brian Smith Date: 9/5/01

To the Grantee:

Please include this page as a cover sheet to your final report or create a cover sheet with similar information.

We have listed some guideline questions on the back of this sheet. You may find them helpful when writing your final report.

Information submitted in the final report will be a public record, unless it contains trade secret information that you request (in writing) to be kept confidential.

Upon completion, mail to the ADD office along with your final invoice. *After the ADD staff have analyzed and approved the final report, they will process vour final invoice payment.*

Mail to: DATCP - Marketing - ADD Grants
PO Box 8911
Madison, W1
53708-8911

A. Brief Description of the Original Intent of the Project and the Perceived Benefit to Wisconsin Agriculture:

Most commercial plums are unable to grow and thrive in areas of the U.S. where temperatures fall below
-16˚C. Fruit quality of plums shipped from California is poor and available growing areas there are being drastically reduced by "urban sprawl".

Better quality plums could be grown commercially in Wisconsin if new adapted varieties (cultivars) could be developed. A plum breeding program was therefore initiated at the University of Wisconsin-River Falls in 1991 with the goal of introducing new, productive winter-hardy high quality Wisconsin-adapted plum cultivars. It is the only program of this type in an 11-state and 3-province area. New cultivars are currently being developed with quality traits superior to California cultivars and with the added benefits of adaptation to our winters, and short growing seasons.

The objectives and techniques involved in this ongoing breeding program are and will be as follows:

1. Employ interspecific and/or interploidy hybridization techniques in order to transfer desirable characteristics from wild to cultivated forms. Once crosses among species with the same or different chromosome numbers have been accomplished, valuable trait transfer such as winter hardiness will also be complete.
2. Continue to screen and identify wild species and specific cultivars with unique qualities such as specific and general combining abilities, winter hardiness or high fruit quality. Employ all means at hand to collect large amounts of stone fruit species and cultivars from all over the world to incorporate respective unique traits.
3. Test new hybrid seedlings from the UW-River Falls breeding program for performance under field conditions. This will be accomplished according to discipline-accepted guidelines. Seedlings grown from hybrid seed will be transplanted to the field, grown to fruiting maturity and evaluated. Superior seedlings will be kept for further testing and inferior seedlings will be rogued out. Characteristics to be evaluated will include yield potential, winter hardiness, pest tolerance, fruit quality and growth habits.
4. Identify superior Wisconsin-adapted seedling genotypes and thoroughly test for possible release as new cultivars and/or for use in further breeding. Five years of further testing will occur to ensure superior performance over several years. If results remain positive, a new cultivar introduction is possible. Final tests planned before introduction will include the use of a sensory evaluation panel, state experiment stations and growers.

New plum cultivars will expand the market variety of fresh market fruit available to consumers. Additionally, these cultivars are targeted to improve the profitability of Wisconsin fruit enterprises and help growers maintain a competitive edge against imported products. This follows the ADD objectives to develop new agricultural products, diversify and expand production, improve the competitive position of Wisconsin's agricultural industry, provide a high return crop for efficient use of farmland and enhance

economic returns to farmers. Estimated short (3-5 years) and long (up to 20 years) term economic benefits to Wisconsin fruit growers are very difficult to estimate, but based on the current respectable fruit industry size and accompanying infrastructure existing in Wisconsin, a range of $200,000 and $750,000 short and long term, respectively, are likely conservative.

Summary of Project Achievements

This first year of the ADD Plum Breeding Project has been characterized by some encouraging progress towards our goal of new commercial plum cultivars.

Seedlings resulting from year 2000 crosses were field-planted in late July. These seedlings will fruit some time between 2003 and 2006.

A replicated performance trial was planted July 27, 2001 (4 replications/clone) with the objectives to compare our most elite advanced selections with other existing cultivars, and to provide for propagation material increase potential. The UW-River Falls selections in the trial are 98-95-21-1, 97-94-46-1 and 98-95-17-7. Comparison existing cultivars are 'Alderman', 'Compass', 'LaCrescent', 'Pembina', 'Pipestone', 'Superior', 'Toka', 'Underwood' and 'Waneta'. Data will be taken on winter hardiness, bloom time, pest resistance, ripening time, fruit quality and yield. Results from this trial will help us determine where improvement in cultivars is needed and to document the level of quality in our advanced selections slated for future release to commercial growers.

Harvest of fruit containing seed from hybridizations on parental potted trees in Spring 2001 greenhouse is near completion. Without pruning left a moderate number of seeds was stratified and some are beginning to germinate. Planting will commence in the greenhouse within a week.

Propagation of past advanced selections will occur in the next several months by budding on potted rootstocks outside and in the greenhouse.

Selections expected to be propagated (descriptions shortened) included are:

1. 98-95-21-1 5.75 cm W x 4.5 cm H x 5.75cm thick at suture Black-purple with typical P. salicina – Sweet dessert quality and texture. Reddish purple translucent flesh. Only slightly detectable skin astringency. Semi-freestone Ripens 8/4.

2. 98-95-21-3 3cm W x 3.5cm H x 3cm thick red – with sweet red flesh. Good quality. Not much skin astringency. Extremely productive. 'Oka'-type growth habit. Ripens 7/25.

3. 98-94-11-2 4.5cm W x 4 cm H x 4..5cm thick. Attractive red fruit with yellow marbled flesh (is 1/8 apricot). Very sweet with rich, excellent flavor. Good productivity. Ripens 8/15.

4. 98-96-16-2 3.5 cm W x 3.0cm H x 3.5cm thick. Purple w/prominent gray speckles. Black flesh (1/8 apricot) is very sweet with excellent flavor. Only slight skin astringency. Upright cherry plum growth habit. Ripens 8/10.

5. 98-95-17-7 5cm W x 5cm H x 4.75cm thick. Red-purple skin with juicy Japanese plum-flavored sweet yellow flesh. Very productive upright tree – 30 lbs fruit were on a 10'H x 4'W tree in its first fruiting season. Ripens 8/20.

6. 97-95-47-1 (3/8 plum, 5/8 apricot) 3.5cm W x 3cm H x 4cm thick. Medium-red blush over yellow base/ Yellow, sweet flesh has meaty texture and tends more towards plum in flavor. Good quality. Very productive. Ripens 8/12.

7. 98-95-17-11 5cm W x 5cm H x 4.75cm thick. Dark red over yellow base. Yellow, sweet meaty flesh with somewhat thick and astringent skin. Extremely productive – 70 lbs fruit from a 9'H x 6'W tree in its first fruiting season. Ripens 9/13.

8. 98-95-26-1 (1/8 apricot) 3.5cm W x 4cm H x 4cm thick at suture. 80% Red speckled/blush skin over yellow base. Yellow flesh is good texture with sweet, rich flavor. Small pit. Good productivity. Ripens 9/13.

9. 99-95-13-1 5cm W x 4cm H x 4 cm at suture. Large, blue ovoid fruit with very good plum flavor and meaty texture. Only moderate productivity. Ripens 8/29.

The remaining selections from 1992-2000 in the breeding program are currently under consideration only for breeding and not for potential cultivar status. We still have 10 breeding selections from 1993, 15 from 1994, 43 from 1995, 12 from 1996, 4 from 1997 and 2 from 1998.

Although we had a devastating hailstorm on May 1, which wiped out most of the developing fruits, there were some trees that still had light crops. We have made 11 selections so far this year and several promising trees still have fruit to ripen.

Inventory was taken this summer on plum-apricot seedling numbers remaining from 1992-2001. Approximately 1,450 seedlings are field-established and an estimated 85% have not fruited yet for the

first time. Juvenility lengths are different for every seedling since they are grown from seed. Apricot/apricot-plum hybrid seedlings are not quite as precocious as plums, so a higher percentage of those seedlings have not fruited yet.

In order to maintain a timely rotational schedule, we pulled out 220 wild plum seedlings from 1993 and 1994 that had been thoroughly evaluated for potentially important traits for the breeding program. Seven selections have been propagated from this particular block of seedlings.

Progress has been steady for the first year of the ADD project and we remain excited about the possibility of commercial plums in Wisconsin. We have planned a much larger number of hybridizations this coming winter/spring in the greenhouse, and hope to make many selections in the field next summer. Our greatest efforts, however, will concentrate on propagating our most promising current advanced selections for initial testing by interested growers. Feedback from growers will further our ability to determine the feasibility of commercial plum production in Wisconsin, using our cultivars.