and attractive red in color with fruit weight ranging from 4.0-11.2 gms. The average number of fruits per plant is 37 and yields up to 189.5 gms. per plant. It has been found to be a very suitable dessert variety. The data on important features of this variety are presented in Table 1.

3. **Chaubattia-Manjul:** It is a late flowering hybrid variety evolved from the cross Red Coat x Albritton (Fig. 3). The fruits are very big in size with elongated shape, attractive red color and delicious taste. The fruit weight ranges from 4.5-13.8 gms. with average yield 245 gms. per plant. The average number of fruits per plant is 35. This variety is very suitable for dessert purposes.

All these three hybrid varieties compared fairly well with the existing cultivars of strawberry in respect to ascorbic acid content total soluble solids, and acidity.

BREGGER STUDENT AWARD PAPER (1978): Ah-oon-ye-ya-pa, The Sand Cherry: Its Origin, Improvement and Nomenclature

BRUCE GARLEY[1]

INTRODUCTION

The Teton Sioux name for the Sand Cherry is Ah-oon-ye-ya-pa which means "with the wind." They said that when the berry was picked with the wind the fruit would be sour. But when picked against the wind the cherries would be sweet. Perhaps this is an apt description of the variety in quality and flavor that can be found in the Sand Cherry.

For many years controversy has centered around the separation of North American Microcerasus into species. Microcerasus is a term used to indicate a relatively primitive group of Prunus species in the Cerasus subgenus (19) including *Prunus Besseyi, P. pumila* and *P. susquehanae.* These plants are an important group in the development of new fruit varieties since they are able to perform as a genetic bridge whereby wide interspecific crosses can be accomplished. Selections within the Microcerasus also constitute an important class of home fruits called Cherry-plum as well as several ornamental types like Nanking Cherry, and Cistena Sand Cherry.

In North America, after a lapse of forty years, there has been renewed interest in *P. Besseyi* and other Microcerasus. This is because they can possibly act as a bridge to incorporate the hardiness of Pin Cherry *(Prunus pensylvanica)* into Apricot *(P. armeniaca)* or Peach *(P. persica).*

This paper is meant to acquaint the reader with the Western Sand Cherry (*Prunus Besseyi* Bailey). The recent history of Sand Cherries and the evolution of Microcerasus are dealt with in the main essay. In the appendices will be found descriptions of the Prunus species involved in the Microcerasus nomenclature controversy as well as a list of cultivars derived from *Prunus Besseyi.*[1]

HISTORY OF THE SAND CHERRY

The first description of any Sand Cherry was by H. L. Duhamel du

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Ed. Note: Appendices including botanical terms and cultivars and selection of Prunus *besseyi* and hybrids with pedigrees available from author.

Monceau, in 1755 (6). It appears as a Cerasus, but without a binomial name. It was also included by a man named Miller in the 1759 edition of the Gardeners Dictionary. Miller says the seeds were sent to him from Paris, under the title of "Ragouminier," which was the name given them in Canada. The seeds were sent to Miller by Bernard de Jussieu, and were planted in the Chelsea Garden. Linnaeus, in his second edition of the Species Plantarum erroneously quoted Duhamel's description under *Prunus canadensis L.* (21).

The first cultivated form of *Prunus Besseyi* was the "Improved Dwarf Rocky Mountain Cherry," introduced by Charles E. Pennock, Bellvue, Colorado, in 1892. He claimed he first saw the plant in 1878, along the Cache la Poudre River. However, it appears to have been cultivated in gardens along the river for at least a few years prior to his discovery. After its general introduction this fruit suffered the fate of most novelties by being praised beyond its merits, in being sold at exorbitant prices, and in the substitution of other fruits upon delivery to the purchaser (11, 21).

The first hybrid introduced was the "Utah Hybrid Cherry." Although at first given species distinction, *Prunus utahensis* was later determined by L. H. Bailey to be a cross of *P. Besseyi* with *P. angustifolia*, based on botanical characters. The plant, introduced in 1870, never won much favor since it lacked size and quality (3).

The next hybrid to attract attention was the "Compass Cherry," originated by H. Knudsen of Springfield, Minnesota. The cross was made in 1891—*P. Besseyi* x *P. hortulana mineri*—and the first fruit was obtained in 1894. (10). The hybrid plant proved to be an early, abundant bearer of small, plum-like fruit with a pleasant, sprightly flavor.

Excitement grew to a fever pitch among Midwest fruit communities as their horizons expanded. Dubbed by Professor L. H. Bailey "the battle of the plums," it led to predictions like these from Mr. Niels E. Hansen, plant breeder at the South Dakota State Agriculture College, Brookings, S.D., in 1904:

1. The Western Sand Cherry will be found of great value in the commercial propagation of some stone fruits.
2. From the Western Sand Cherry will be developed by selection a race of bush fruits with fruit equal to California cherries in size and of a quality acceptable for table use.
3. From the Western Sand Cherry will be developed a race of hybrid fruits of new type by hybridizing with choicer fruits. These "new creations" will be hardy and fruitful on the most exposed prairies (11).

In the late 1890s and early part of the next century, agricultural stations all over the Midwest began work on Sand Cherries. In 1892 Dr. J. L. Budd, at the Iowa Experiment Station, began large scale work on Sand Cherries as a rootstock (11). Other active stations were in Minnesota, North Dakota, Wyoming, Ontario and Manitoba.

Seventy years after Hanson's statement, the only prediction that has fruited is the third. Sand Cherries are most popular when they have been hybridized with plums to improve fruit size and quality. The results, though a small tree about 3 m. tall, and not the bush predicted in #2, was a new class of fruit called Cherry-plums.

Early hybridizing attempts were frustrating. The season of bloom for Plums and Sand Cherries didn't overlap and outdoor crossing wasn't very successful. Following trips to leading

American and European horticultural centers in 1894 and 1897, Mr. Hansen decided to duplicate Luther Burbank's California climate by using greenhouses to force plums into flowering earlier. His hybridizing program began in 1901 and the first of his "new creations" was introduced in 1907. In addition, Mr. Hansen, in 1908, introduced fruit resulting from *P. Besseyi* crosses *P. americana, P. armeniaca, P. munsoniana, P. salicina, P. simonii* and *P. persica* (9).

Since that time *P. Besseyi* has been crossed with a remarkable number of species, including *P. nigra, P. tomentosa, P. japonica, P. dasycarpa, P. pensylvanica, P. sibirica,* and *P. domestica* to name a few. Probably the most intensive program of hybridizing has been going on in Russia where Eremin, Kostina and Uljanishev have made extensive use of hybrids with *P. armeniaca, P. persica* and *P. avium* to obtain cold hardiness or drought tolerance (2, 7, 8). Uljanishev reports that 3-4 generations are necessary to recover acceptable apricot cultivars for severe climates (2). In Minnesota it was found that using a Cherry-plum rather than straight *P. Besseyi* resulted in better F_1 progeny in crosses with *P. armeniaca,* although fertility was still low (1). There appears to be potential for using *P. Besseyi* as a genetic bridge in order to cross diverse Prunus species.

The reason *P. Besseyi,* and other Microcerasus, are able to accomplish the bridging role lies in the evolution of the genus Prunus. The following section charts the flow of changes in Prunus.

EVOLUTION

The genus Prunus is part of the subfamily Prunoideae in the family Rosaceae. The basic chromosome number is x = 8. Rehder (16) classified Prunus into 77 species. Subgenera and sectiary are shown in Table 1 as well as the most frequently achieved hybridizations with other species (14, 16).

The first diploid Prunus likely appeared in Central Asia. The Eucerasus section, containing Sweet and Sour Cherries, likely was an early derivative of ancestral Prunus types. The Microcerasus species are probably closer to the ancestral types than commercial cherries (Eucerasus). The reason usually given for this determination is the ability of these species to form a genetic bridge for hybridization purposes between Eucerasus and the subgenera Amygdalus and Prunophora (see Table 1).

For purposes of genetic transfer Amygdalus and Prunophora form one group, although within this group Almonds *(P. amygdalus)* and Damson Plums *(P. institia)* are somewhat isolated from the mainstream of genetic transfer. However, this may merely reflect less attention by fruit breeders rather than intrinsic isolation. Transfer between the Amygdalus-Prunophora group and the Eucerasus section is only rarely direct. Most often it has been via Microcerasus (14). The Amygdalus part of the group appears to be more loosely connected to the microcerasus than the Prunophora. It would appear that the North American species, *Prunus Besseyi* and *P. pumila,* arose from their Central Asian center of origin fairly recently due to the high degree with which they still fulfill a bridging role. *Prunus tomentosa,* of Chinese origin, is also an important present day bridge (14). This species may prove to be a link between the North American Microcerasus and the Prunus center of origin.

Plums have the greatest genetic diversity of any subgenus in Prunus. They have multiple centers of origin that include: Europe for *Prunus domestica*; Western Asia for *P. institia*; China for *P. salicina*; and North America for *P. americana.* Man's attention

in early historic times in the various centers of origin ensured retention of more genetic diversity than if selection had occurred in only one area (19).

Prunus americana and other plums in Prunocerasus have a North American center of origin. They appear closely related to the Asian and European species in the section Euprunus (14). The separation of these two groups seems to have a geographic rather than genetic basis. The Prunocerasus plums were probably established in North America at about the same time as *P. Besseyi* and *P. pumila.* This is because more divergence is likely to have occurred if the separation had happened earlier.

Prunus persica (subgenus Amygdalus) has a center of origin close to where most of the Asian Microcerasus occur. It appears that Peaches are closer to the genetic center of Prunus and thus closer to Microcerasus and the Cherry group, than *P. amygdalus. Prunus amygdalus* has a center of origin west of where the Microcerasus occur (18).

Growing cherry-like fruits in the prairie states and provinces was made possible by Upper Midwest and Canadian breeding programs. Continued use will be made of interspecific hybrids to combine the disease resistance, drought tolerance and hardiness of native species with commercially desirable fruit and tree characters.

Table 1. Subgenera, Sections and Major Crops in Prunus with most frequently used hybridizations.

Subgen.	**PRUNOPHORA**
Sect.	Euprunus (6 spp; 2x-6x; Europe to China) P. domestica, European plum (hybridizes with Euprunus, Prunocerasus, Cerasus, *Microcerasus,* and Euamygdalus); P. salicina, Japanese plum (hybridizes with Euprunus, Prunocerasus, Armeniaca, Cerasus, *Microcerasus* and Euamygdalus).
Sect.	Prunocerasus (13 spp; 2x; North America) P. americana, Wild plum (hybridizes with Euprunus, Prunocerasus, Cerasus, *Microcerasus* and Euamygdalus).
Sect.	Armeniaca (6 spp; 2x, 3x; Europe to Korea) P. armeniaca, Apricot (hybridizes with Euprunus, Prunocerasus, Armeniaca, Cerasus, *Microcerasus* and Euamygdalus).
Subgen.	**AMYGDALUS**
Sect.	Euamygdalus (6 spp; 2x, 8x; Western Asia to China) P. persica, Peach (hybridizes with Euamygdalus, Chamaemygdalus, Prunophora, Euprunus, Cerasus, *Microcerasus,* Prunocerasus and Armeniaca); P. amygdalus Almond.
Sect.	Chamaemygdalus (1 sp; 2x, 3x; Southeastern Europe to Siberia).
Subgen.	**CERASUS**
Sect.	Microcerasus (8 spp; 2x; North Temperate) P. Besseyi, Western Sand Cherry (hybridizes with most Prunophora, Cerasus and Amygdalus).
Sect.	Eucerasus (3 spp; 2x, 3x, 4x, 5x; Europe to Central Asia) P. avium, sweet cherry and P. cerasus, sour cherry (both hybridizes with *Microcerasus,* Pseudocerasus Eucerasus and Maheleb).
Sect.	Maheleb (3 spp; 2x; Europe, Western Asia, North America).
Subgen.	**PADUS** (11 spp; 4x; Europe, North America).
Subgen.	**LAUROCERASUS** (2 spp; 8x, 22x; Europe to Western Asia).

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