



## Bonnieblue—A New Bluegrass

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The story began on the second fairway of the Bellevue Country Club near Syracuse, N.Y., back in 1958. Thomas E. Topp, Superintendent, had just pointed out a handsome patch of bluegrass to Alexander M. Radko, USGA Green Section Agronomist. Close examination showed no apparent disease, the clone displayed vigorous growth and apparently had persisted for many years under the rigorous fairway conditions of close mowing and heavy use. This patch of bluegrass had an exceptionally pleasing, bright, medium green color, good density and texture and a growth habit similar to Merion Kentucky bluegrass.

The excitement of this discovery became even more apparent during subsequent consultations. There was no diminution in the quality of this clone; it appeared to be an unusual selection, indeed. The next obvious step was to get it to one of the agricultural experiment stations, one prominent in turfgrass research.

Immediately thoughts of another Merion raced through their minds. Would this be the beginning of a new bluegrass variety, one which would prove to be of significant value to the turfgrass industry? Only time would tell! Time to research the many variables that go to make up an improved turfgrass. Both men knew that it would take years of observation and testing before this question could be answered.

Plugs of this new bluegrass were then brought to Rutgers University. Ralph E. Engel, professor of turfgrass management and Elwyn Deal, a graduate student in turfgrass research, produced a small quantity of seed and established a turf plot of the new selection to compare it with standard varieties and other experimental selections. Performance of the new Bellevue selection continued to be outstanding. It was essentially equal to Merion in density, texture and resistance to the leaf spot and crown rot disease caused by *Helminthosporium vagans*. In addition, it showed excellent resistance to leaf rust and moderate resistance to the stripe smut disease. The most

outstanding attribute of the new Bellevue bluegrass was its extremely attractive color in late winter and early spring.

Tests by the Jacklin Seed Company, in Dishman, Wash., showed it to have good seed production potential. Unfortunately, the characteristic of producing a high percentage of reproductive tillers that made it look good for seed production also resulted in a rather stemmy turf during late spring and early summer. In addition, progeny tests showed the variety to reproduce only about 60 per cent of its seed by apomictic reproduction. The other 40 per cent of the seed results from sexual reproduction and produces plants quite different from the original selection.

The outstanding features of the Bellevue selection made it a prime candidate for use in the Kentucky bluegrass hybridization being developed at Rutgers University in the early 1960's. Another bluegrass from Penn State, which was subsequently released as the variety "Pennstar," had also performed well in test plots at Rutgers and at a number of other locations throughout the country. These two bluegrasses seemed to compliment each other in a number of ways. Pennstar was highly apomictic, had large seed, had excellent resistance to stripe smut and maintained a leafy turf during seed production time in late spring and early summer. These were characters needed to improve the Bellevue selection. The decision was made to hybridize these two elite bluegrasses and attempt to recombine the best characteristics of each parent into a highly apomictic, true-breeding hybrid.

During the summer of 1963, spaced plants of both Bellevue and Pennstar were established in space-planted nurseries at Rutgers. The following February the plants were brought into the greenhouse and the cross was made using the Bellevue selection as the female parent. Seed from this cross was germinated and the resulting seedlings were transplanted to a spaced-plant nursery in August of 1964. By June of 1965 each plant was examined to

determine whether it was a hybrid and of sufficient promise for additional testing. Seed was then harvested from the best hybrids and used to plant turf trials in September, 1965.

One of the hybrids, designated NJE P-106, showed consistently high performance under the stress of 3/4-inch mowing, periodic drought stress and conditions favorable to leaf spot and stripe smut. Jerry Pepin, a graduate student at Rutgers at the time, chose this hybrid as one to include in his Masters thesis study. P-106, later to be named "Bonnieblue," and the other hybrids chosen for this study were intensively evaluated for turf performance, disease reaction, apomictic reproduction, spaced-plant nursery performance, and cytological characteristics.

Chromosome studies showed that Bonnieblue had approximately 94 chromosomes. Thus, it has all 56 chromosomes of the Bellevue parent combined with about one half the chromosomes of Pennstar. An unreduced egg of Bellevue had been fertilized by a reduced sperm from the pollen of Pennstar.

The next question that needed an answer was; Could this promising new hybrid produce seed economically in the traditional seed producing area of the West? Repeated observations of Bonnieblue by George Burlingham, Robert Peterson and George Valentine of the E. F. Burlingham Seed Company of Forest Grove, Ore., convinced them that it was worth testing. In early July of 1968, a small quantity of seed was carefully harvested from ten plants of Bonnieblue and air mailed to Burlingham to establish a 1/2-acre seed evaluation block on the farm of Cliff Plagman near Albany, Ore. Mr. Plagman, one of the leading growers of quality turfgrass seeds, was very favorably impressed with the beautiful color and the excellent rhizome development of the new variety. The Oregon State certification officials agreed to carefully inspect the evaluation test so that it could be used for stock seed increase if the variety was released.

By the fall of 1970 favorable reports on the turf performance of P-106 were received from a number of turfgrass research centers throughout the country. Sufficient stock seed had been carefully harvested from the 1/2 acre increase test plot and the decision was made to seed a one hundred acre field for certified seed increase. The first seed was harvested from this field in July of 1972 and is being marketed by E. F. Burlingham and Sons.

Bonnieblue is a moderately low-growing, leafy, turf-type variety with good density and vigor and a medium texture. It has a very attractive, bright, moderately dark green color. Its pleasing, fresh green color is especially noticeable in early spring before most other bluegrasses become green and again in late fall

after most other varieties begin to lose color.

Bonnieblue has demonstrated excellent resistance to the leaf spot and crown rot disease caused by *Helminthosporium vagans* and the stripe smut disease caused by *Ustilago striiformis*. It also has moderately good resistance to leaf rust incited by *Puccinia poae-nemoralis* and Typhula snow mold.

Turf performance trials at Rutgers and a number of other locations throughout the country indicate that Bonnieblue should be well suited for quality lawns, parks and sports turf in areas where Kentucky bluegrass is well adapted. It should be compatible in blends with most other bluegrass varieties and in mixtures with fine fescues and the improved, fine-textured, turf-type varieties of perennial ryegrass.

Bonnieblue recombines two of the favorable characteristics of its two elite parents. From its Bellevue parent, Bonnieblue inherited its exceptional color in early spring and late fall, its stiffer, more upright leaf and its moderately good seed production potential. From the Pennstar parent, Bonnieblue obtained its moderately dark green color, its leafiness during seed head time in late spring, its excellent resistance to stripe smut, its large seed and its high degree of apomictic reproduction. From both parents, Bonnieblue received its turf-type growth habit, its good resistance to leaf spot and rust and its moderate tolerance to drought and close mowing.

The Rutgers University turfgrass breeding program is being supported in part by the U. S. G. A. Green Section Research and Education Fund, Inc., for the specific purposes of improving bluegrasses through selection and breeding. Hundreds of outstanding bluegrasses have been selected from golf courses and hybridization progenies and are being tested specifically for fairway use. Over the next decade we look forward to the development of several promising bluegrasses that are better suited to fairway use where bluegrasses can be grown. Sincere appreciation is also extended to the many observant superintendents, such as Tom Topp, who bring these grasses to our attention.

#### *Editor's Note*

Tom Topp has been golf course superintendent at Bellevue Country Club since 1955. His observations of a standout Kentucky bluegrass patch on his No. 2 fairway during droughty summers led to the selection that became known in the Rutgers University Kentucky bluegrass breeding program as the Bellevue selection. Subsequent selections that were made, which are similar to it, became known as "the Bellevue type."