

Evaluation of Rust Resistant Half Runner Bean Breeding Lines

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Introduction

'White Half Runner' green beans are popular in the mid and Southern Appalachian area due to their excellent flavor. 'Mountaineer' and 'State' are popular cultivars of white half runner beans. Plants are similar to indeterminate (pole) beans in growth habit, but produce less growth, thus the name "half-runner". Like pole beans, pods continue to mature over an extended period and several harvests can be obtained if pods are removed as they mature. However, pods can be once-over machine harvested if lower yields are accepted and pod breakage can be tolerated or managed.

Standard production practices have been ground culture, similar to bush bean production. Recently some growers have been staking and using black plastic mulch to enhance yields, increase pod quality, and facilitate harvest.

White half runner bean pods have strings which must be removed prior to cooking. Pods are tender, even with a large seed and pod rots are a problem when pods touch the soil. Pods have a short storage life and must be cooled and handled with care to avoid loss. An ideal situation would be to obtain the white half runner flavor in a bush stringless selection.

All named cultivars of white half runners are susceptible to rust. Peanut stunt and other viruses often damage white half runner plants and sometimes destroy the crop.

With all the production problems, why is there interest in half runner beans? The answer might best be summed up - excellent flavor.

Breeding and Selection

Rust resistant parent lines were available and rust resistance was being incorporated into bush snap beans in USDA breeding activities. White half runner beans were included in the study and for about 10 years, crosses and evaluation of crosses and selections have occurred. Crosses were made at Beltsville, MD and most of the evaluations have been made at Crossville, TN. Selection for flavor has been a major focus of the study. Three breeding lines were released from the program in 1995. Several remaining selections are under evaluation and are considered as potentials for future release. Rust resistance has been incorporated into the selections and homozygous resistance to common bean mosaic virus has been transferred via the I gene. Variable responses to other viruses were noted among the selections in 1997 plantings at Crossville TN, but a comprehensive evaluation of the virus resistance has not been made.

Evaluation

In 1994, 1995, and 1996, evaluations were made and advanced lines were selected for rust resistance, high yields, half runner type pods, and flavor. Larger plantings of some of the most promising selections were made in 1997. Field tests at The University of Tennessee Tobacco Experiment Station (TES) at Greenville and Plateau Experiment Station (PES) at Crossville have been completed. The Greenville test was planted in early May and the Crossville test in early July. Cultural practices were standard for white half runner beans and harvest was once-over by hand. Since the seed supply was short, 10 ft rows were planted. The test at Greenville had two replications and the test at Crossville had one replication. Most of the selections tested had acceptable yields compared to 'Mountaineer White Half Runner' (Table 1).

An informal taste panel of 5 to 6 members in 1995 and 1996 and 11 members in 1997 evaluated the flavor of cooked pods of the selections at Crossville. BelTenn-RR-2 was rated as having the best flavor with 12053 and 12028 rated as having excellent flavor.

Selection and evaluation of the white half runner breeding lines will continue. Rust resistance has been incorporated and hopefully virus resistance has been increased in the lines as compared to current white half runner cultivars in which the I gene is not homozygous. The released breeding line, BelTenn RR-2 has considerable promise and hopefully a selection from this line or other lines will be developed into a named cultivar.

Table 1. Pod yields and taste panel ranking of white half runner selections grown at TES and PES, 1995-1997.

Selection	1997 Yields - bu/A*		1995	Taste ranking**	
	TES	PES		1996	1997
BelTenn-RR-2	283	337	1	-	1
12053	161	402	-	1	2
12063	203	348	5	6	3
State HR	---	324	-	-	3
12064	181	436	4	5	4
12028	215	494	2	2	5
12046	186	445	-	4	6
Mountaineer HR	208	528	3	3	7
BelTenn-RR-3	179	455	3	5	8

* 30 lb/ bu.

** Informal taste panel mean ranking of 5 to 6 members in 1995 and 1996 and 11 members in 1997.