

## ABSTRACT

### **The value of fluorescence and grow-out tests in differentiating annual and perennial types of ryegrass**

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Both the fluorescence (FL) and the grow-out (GO) tests have been used to differentiate between annual ryegrass (*Lolium multiflorum* Lam.) and perennial ryegrass (*Lolium perenne* L.) for many years. There is a perception, however that the FL test over estimates the contamination of perennial ryegrass (PRG) with annual ryegrass (ARG), and that the GO test under estimates that contamination. This study was conducted at Oregon State University Seed Laboratory to measure the bias of FL and GO tests in distinguishing between annual and perennial types in 8,231 PRG samples representing 224 cultivars grown over a three-year period (2007-2009) in Oregon. The Varietal Fluorescence Level (VFL) value of each cultivar (i.e., the original fluorescent value of each cultivar that was described by the plant breeder who developed each cultivar) was used as a reference point to measure the bias of FL and GO tests. Standard deviations and T-Tests were used to measure the variation among VFL, FL and GO test results and to compare the means of tests. In 2007, the FL test results of 93% of the 3,452 PRG samples tested were within 3% of their respective VFL values. In 2008, the FL test results of 95% of the 3,372 PRG samples tested were within 3% of their respective VFL values. In 2009, the FL test results of 93% of the 1407 samples tested were within 3% of their respective VFL values. The 3% FL tolerance value (to account for random sampling and other systemic variation) used in this study was adapted from the Oregon Seed Certification quality standard. When a FL test result of a PRG sample exceeds the 3% tolerance value, the GO test is an option to verify the FL test results. The GO test results showed that 73 out of 84 PRG samples (87%) in 2007 were within the 3% of their respective VFL values. In 2008, 39 out of 46 PRG samples (85%) were found to be within the 3% of their respective VFL values. In 2009, GO tests were conducted on seven samples and all samples (100%) were within the 3% of their respective VFL values. These results indicated that 93.7% of the 8,231 PRG samples met Oregon quality standard by the FL test, whereas 86.9% of 137 PRG samples that exceeded the 3% FL tolerance, met Oregon standard using the GO test. The results showed that both FL and GO tests can be used as suitable options to distinguish between annual and perennial ryegrass types in most cases.

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