

FLUORESCENCE (from page 26)

dividuals responsible for formulating and making recommendations.

One of the techniques that can be very useful is the fluorescence test. It provides seed analysts a means of detecting inferior ryegrass contaminants in certain improved turf-type varieties. Among the ryegrasses presently available, the fluorescence test can be very useful in detecting contamination in the variety Manhattan which is gaining widespread recognition for its superior performance. Seedlings of annual ryegrass as well as certain perennial ryegrasses give a positive test when subjected to the fluorescence test. Fortunately, Manhattan ryegrass seedlings are different in this respect in that they do not produce a fluorescence when subjected to the test. Therefore, by this test, a means is provided by which contamination of the Manhattan seed with inferior types could be easily detected.

The inclusion of the percentage of fluorescence on the seed label that is required by state and Federal seed laws would prove to be very useful. Seed analysts would be able to readily detect contaminating ryegrasses in varieties that do not produce the fluorescence test. It would provide very useful information to individuals in the extension service responsible for making recommendations of varieties of superior performance. And perhaps most importantly, it would provide the purchaser an assurance of the genetic quality of the seed.

Flourescence And Ryegrass Breeding

By Dr. C. Reed Funk

The plant breeder is charged with the responsibility of developing the best variety attainable, using present genetic resources and plant breeding techniques. Thus, he is concerned that the merits of the variety are not lost by improper standards of seed in increase and distribution. It is therefore necessary for the plant breeder to work very closely with quality-conscious seed producers, certification specialists and seed control officials to see that quality seed of a new variety is made available to the consuming public.

The maintenance of high standards of seed production are especially important in a cross-pollinated species such as perennial rye-

grass. Ryegrass seed is often produced in fields badly contaminated with annual ryegrass or stemmy, hay-type perennial ryegrass or adjacent to areas shedding pollen of these inferior types. Even a slight mixture of these coarse, tall-growing ryegrasses can cause a serious reduction in the turf performance of an improved, fine-textured, lower-growing, turf-type variety.

The improved, turf-type ryegrasses are basically poor seed producers in comparison with the annual and hay-type, perennial ryegrasses. Thus, natural selection will cause a further rapid deterioration of the turf performance potential of the improved variety as such seed fields continue to remain in production.

To insure quality seed production of improved varieties the plant breeder in cooperation with the seed producers and the certification agency places strict standards on field selection, isolation requirements, stand life and generation interval.

In the case of a synthetic variety such as Manhattan perennial ryegrass, Breeders seed is produced from vegetatively propagated parental clones grown in a clean, isolated crossing field at Rutgers under the direct supervision of the breeder. This Breeders seed is used to establish an isolated "Foundation" increase field in Oregon which is grown under constant supervision of official state inspectors and hand rogued to remove any objectionable plant.

Certified seed must be grown only from Foundation seed in isolated fields. These fields must be essentially free from contamination by other ryegrasses and weeds and maintained according to certification standards.

The fluorescence test has been widely used in seed-testing laboratories for many years to distinguish between annual and perennial ryegrass. The seedling roots of annual ryegrass normally secrete a substance which shows a brilliant fluorescence under ultraviolet light. This characteristic results from a single dominant gene present in most annual ryegrass plants. Because this

dominant gene can also be found in occasional plants of common perennial ryegrass and many of our older varieties, seed analysts and control officials have not been able to use this test as precisely as desired in their efforts to detect annual ryegrass contamination of perennial ryegrass seed (Nyquist 1963).

Breeders of some of the new fine-textured varieties of perennial ryegrass such as Pennfine and Manhattan realized the importance of being able to precisely detect any contamination of seed lots by unsightly annual ryegrass. With the helpful cooperation of seed analysts, these new varieties have been bred to be completely free of the dominant gene causing fluorescent seedlings. Any fluorescent seedling appearing in a seed lot of Pennfine or Manhattan immediately signals contamination. Therefore, plant breeders, quality conscious seed producers, certification agencies and seed control officials have one more tool to use in their joint efforts to provide the buying public with a superior product."

Flourescence In Ryegrass Certification

By E. E. Hardin

After a variety has been developed through selection and/or breeding, production and market development are the next steps a variety must take on its way to the consumer. In order to grow a certified variety of perennial ryegrass in Oregon, the grower must plant Foundation seed stock on land which has not grown nor been seeded to any other perennial, ryegrass during the previous five years, unless the previous crop was of the same variety and passed the certification requirements. The field must also be free of *L. multiflorum*, and there must be adequate isolation to prevent crossing from outside pollen sources. A certified seed field must pass a Seedling inspection within sixty days after the initial planting, and a Seed Crop inspection prior to harvest of each crop.

The certification inspector looks for out of place and off-type seedlings of other ryegrass as well as isolation infractions during the pollination period. After harvest, a lot of seed must meet the mechanical purity requirements as established by the Seed Certification Service.

It is the intent of all concerned
(continued on page 52)

REFERENCES

1. Funk, C. R., R. E. Engel and P. M. Halisky. 1969. Registration of Manhattan perennial ryegrass. *Crop Science* 9:679-680.
2. Nyquist, W. E. 1963. Fluorescent perennial ryegrass. *Crop Science* 3:223-226.