LEO BIRDSFOOT TREFOIL

Leo birdsfoot trefoil (*Lotus corniculatus* L.) was developed at Macdonald College. It has proved to be superior in its ability to tolerate winter conditions which kill or weaken the two varieties, Empire and Viking, currently licenced for sale in Canada.

Origin and Breeding Methods

Leo was produced by mass selection out of Morshansk 528.[1] This stock was selected as a result of observations on winter survival reported previously (1) and an extensive comparative trial of introductions evaluated in spaced plantings and observation rows. Initial selections were made in the spring of 1958 following field observations of differential winterkilling. Selection was based on vigor in the spring following the winter of 1957–58, plus strong root development at the time of transplanting in June, 1958, and vigor noted throughout the growing seasons of 1958 and 1959.

Agronomic Characteristics

Observations made on spaced plants indicate that Leo has slightly longer and thicker stems and a slightly darker color than the majority of other collections. It is of medium erectness (intermediate to Empire and Viking). It was rated among the most vigorous for early spring growth. Flowering started later than average (intermediate to Empire and Viking) but stopped earlier in the fall than with most other collections. Of all collections studied, plants of this variety were the first to become dormant in the fall. Between-plant variability was considerably higher within Leo than within Empire, Viking, and other named varieties studied.

Observations from plots seeded at various locations demonstrated the winterhardiness and yielding ability of Leo. Estimates of the percentage of plants which survived in trials where winter injury occurred are presented in Table 1. Additional confirmation of the superior winter survival of Leo was obtained at Caplan (Bonaventure Co.), Quebec, and at Lacombe, Alberta, but the percentages of surviving plants were not reported. Therrien (2) reported that laboratory freezing trials also confirm the hardiness of Leo. He estimated that temperatures 4° C lower were required to develop the same injury in Leo as in Viking, a difference which corresponds to the difference between hardy and non-hardy alfalfa varieties.

Forage yields are recorded in Table 2. These averages are based on all trials which were harvested. The data are, unfortunately, biased against Leo

[1]Obtained in 1956 from the All-Union Institute of Plant Industry, Leningrad, U.S.S.R.

TABLE 1. PER CENT SURVIVAL OF TREFOIL PLANTS ESTIMATED VISUALLY IN TRIALS WHERE WINTERKILLING OCCURRED

Location	Leo	Empire	Viking
Peribonca (Lake St. John), Que.	40	Trace	None
La Pocatière (Kamouraska Co.), Que.	75	30	None
Beaverlodge, Alta. (1960 seeding)	100	100	98
Beaverlodge, Alta. (1961 seeding)	100	95	65
Shelburne Pond, Vt., U.S.A.	90	70	20

TABLE 2. FORAGE YIELDS AS POUNDS OF DRY MATTER PER ACRE

Management, area, and number of crops	Leo	Empire	Viking
Hay in Eastern Canada and Vermont (11 crops)	6776	6382	6277
Hay in Western Canada (4 crops)	5010	4540	3740
Pasture in Eastern Canada (5 crops)	4873	5036	4882

NOTE: Total yields include associated grasses.
Averages include all trials harvested, some of which exhibited winter injury.

by the fact that some trials, in which Leo was the only variety to survive, were not harvested. In addition, the averages do not reflect the seasonal distribution of yield. Leo tends to produce a larger proportion of its yield earlier in the season, a fact which may be advantageous for haymaking.

Other observations include one trial in which Leo exhibited less leafhopper injury (due to *Empoasca fabae* (Harris)) than other varieties, and one trial in which superior root and crown development was recorded in the fall of the year of seeding.

Seed-yielding ability has not been extensively studied. At Beaverlodge, Alberta, Leo outyielded Empire which in turn outyielded Viking. The Breeder Seed nursery at Macdonald College produced at a rate of 900 lb per acre in one year, 1000 the next, but only 320 the next, based on careful hand-harvesting of seed.

Leo is believed to be a potential replacement for Empire, particularly for hay production. It may also permit a more extensive use of trefoil in areas where winterkilling has limited the use of trefoil and it may permit the development of a trefoil seed industry in western Canada.

References

1. BUBAR, J. S., and N. C. LAWSON. 1959. Note on inheritance of ability to survive winter-killing conditions in birdsfoot trefoil. Can. J. Plant Sci. **39**, 125–126.
2. THERRIEN, H. P. Personal communication.

—J. S. BUBAR
Department of Agronomy,
Macdonald College,
Macdonald College P.O., Quebec

Received July 26, 1963