and they should also be relatively easy to clean and flush with clear water.

Calibration of the Sprayer

Along with insuring the proper mechanical operation of the power sprayer, it is of great importance that it be calibrated properly. The importance of calibration and insuring the proper amount of material applied to a given area cannot be overemphasized. Several methods have been developed in determining the number of gallons of spray applied per acre.

One frequently used method is that of referring to prepared tables made available by nozzle and pump manufacturers. The tables provide the pressures, speed, various nozzle sizes needed, height of spray boom, etc. to obtain various gallons of spray per acre. The chief disadvantage of using prepared tables or charts is that of coordinating the required tractor speeds, spray rig pressures, height of boom, nozzle sizes, etc.

Another method of calibration requires special measuring devices plus certain charts or graphs to make the final determination. The spray solution is collected for a prescribed period of time or distance and the amount of solution is then measured. Prepared tables or charts are then entered in order to determine the gallons applied per acre. Occasionally, glass jars or containers with the tables printed directly on them are available for this purpose. The disadvantage of using this procedure is the same as outlined above.

Perhaps the most accurate method for calibrating a sprayer is to actually treat an area of known size. For example, by starting with a full tank and measuring the gallons required to refill the tank after spraying a known acre, the gallons per acre can be quickly calculated. Care must be taken that speed and pressure do not vary significantly from the test area to the actual spraying operation on the golf course. An ideal location for establishing a test area and calibrating the power sprayer may be the landing area of the driving range, a practice field or even a vacant parking lot.

The care and calibration of a power sprayer may not be the first or foremost thought on the mind of most superintendents during the month of January. But one thing is for sure; your success in spray applications next spring, summer and fall will depend on the active use of these principles.

A GREEN SECTION SUPPORTED RESEARCH PROJECT

Creeping Bentgrass and Sod Webworm Larvae

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Many members of the sod webworm complex *(Crambinae)* infest creeping bentgrass *(Agrostis palustris Huds.)* putting greens. Matheny (1971), for example, identified 32 species in Tennessee turfgrass. Although control of these is not difficult and has become a regular routine for golf course superintendents, a reduction in degree of infestation or frequency of necessary control procedures would be worthwhile.

Many selections of bentgrass have been made and are under test with the aim of combining turfgrass quality with resistance to hazards such as environmental stresses, wear, and diseases. Next in importance to these problems are insect pests. A high level of resistance or a low level of attractiveness to these would additionally simplify management and improve turfgrass quality.

As part of a selection program for resistance to heat stress (supported in part by USGA Green Section Research Funds), 26 bentgrass clones, along with the cultivars 'Penncross' and 'Seaside', were established vegetatively at Tucson, Ariz., in replicated 4-foot by 8-foot plots in 1973. All plots were maintained as a putting green with mowing at ¼-inch and nitrogen applied weekly in ammonium sulphate at ¼ pound per 1,000 square feet. The green was used by University of Arizona golf classes. No pesticides were applied in 1975. Cutworms and sod webworm larvae, primarily sod webworms *(Crambus spp.)*, began appearing in the sod in early June with gradual buildup partially held in check by predator wasps and birds. Counts were made in July and in August by the pyrethrum technique. A water solution of pyrethrum was poured slowly onto the center of each plot, spreading to form an approximate one-foot circle. Larvae appearing on the surface were counted and recorded. Three to four plots were treated at one time and counts were made sequentially at 5, 10, and 15 minutes after each application. Totals were summarized and the data from two sampling dates analyzed statistically.

RESULTS AND DISCUSSION

Recovered larvae averaged ½ inch to ¾ inch in length with few as large as one inch, evidence of biological controls by predators. Apparent damage was minimal in all but the most heavily infested plots. Plots with high counts were severely thinned by larval feeding.

Counts varied from plot to plot of the same selection, but certain clones were consistently infested and others virtually free of larvae. Five clones averaged less than four larvae per count (Table 1). Of these, (A6) is Old Orchard. The others are selections from seaside bentgrass greens. Seaside was in the low third while Penncross was in the high third, but because of plot to plot variability they could not be statistically separated. Of the low five, two were rated as lightly damaged, three had medium webworm damage in 1974. Of the four heaviest infested clones, significantly worse than the preceding, two were highly damaged and two had medium damage in 1974. All of these were selections from seaside. The mechanism behind differentials observed, whether attractiveness to adult moths or nutritive value to the larvae was not associated with degree of thatch buildup as shown by the scalping percentages (Table 1). Textural differences among clones were also unrelated to degree of infestation.

Although quality, vigor, and resistance to diseases and other stresses are primary criteria for selection among bentgrass clones and/or cultivars, these data add an additional selection potential to our arsenal. As new clones or cultivars become available this criterion may help our choices.

Literature cited: Matheny, E.L., Jr., 1971. Diss. Abstr. Int'l. B 32 (5):2777.

Table 1. Bentgrass selections, their origins, and data relative to differential worm infestation.

Selection	Origin(1)	Worms/ft.^{2} (2)	Worm Damage 1974(3)	% Scalping 1974(4)
A18	California (S)	13.3	M	20
A58	Arrowood	12.7	H	6
A37	Phoenix, Arizona (S)	12.0	H	67
A54	Mesa, Arizona (S)	12.0	M	47
A21	California (S)	9.5	L	15
A50	'Nimisilla'	8.3	H	20
A 7	'Toronto'	7.5	M	5
'Penncross'	—	6.5	M	25
A44	Phoenix, Arizona (S)	6.5	H	37
A13	USDA	6.3	M	8
A52	Fort Lauderdale, Florida	6.0	M	3
A61	Palm Springs, California (S)	6.0	L	8
A63	Palm Springs, California (S)	5.8	M	0
A 4	'Cohansey'	5.8	L	0
A24	Phoenix, Arizona (S)	5.7	M	12
A33	Tucson, Arizona (S)	5.3	H	30
A25	Mesa, Arizona (S)	5.2	L	90
A53	'Evansville'	5.2	H	20
A36	Tucson, Arizona (S)	4.8	M	63
A17	California (S)	4.7	H	25
'Seaside'	—	4.3	M	10
A12	'Springfield'	4.3	M	78
A39	Phoenix, Arizona (S)	4.0	H	53
A 6	'Old Orchard'	3.8	M	2
A16	USDA	3.7	M	6
A42	Phoenix, Arizona (S)	3.3	L	65
A48	New Zealand Browntop	3.0	M	17
A20	California (S)	2.8	L	15

(1) (S) indicates selection from bentgrass.

(2) Numbers which do not have a line in common differ statistically (19-1 odds).

(3) L = light M = medium H = heavy

(4) Greens mowed at 5/16", height dropped to 3/16". Generally heaviest mat, worst scalping. A25 upright grower and atypical.