

# The Performance of *Phleum* and *Cynosurus* Species on Sports Fields<sup>1</sup>

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## ABSTRACT

In the Federal Republic of Germany the usual winter playing season (September-May) puts traffic tolerance, winter color, shoot growth initiation, cold tolerance, and drought resistance of turfgrasses to a severe test. Because of the climatic conditions, selection of the most appropriate seed mixtures for Bavarian soccer fields is a special problem. Observations of the sports turf fields of the Munich Universities Sports Center (ZHS) over several years have lead to the conclusion that turf timothy (*Phleum bertolonii* DC) behaves very aggressively under limited traffic conditions and provides good winter color due to early shoot growth initiation. However, its drought resistance is only moderate and it cannot tolerate intense traffic. Under intensive culture crested dogtail grass (*Cynosurus cristatus* L.) is not wear tolerant and competitive enough to become a major component of sports turfs.

*Additional index words:* Perenniality, Wear tolerance, *Phleum bertolonii* DC, *Cynosurus cristatus* L., *Poa pratensis*.

## INTRODUCTION

After improving drainage on soccer fields through standardization of field construction techniques, it was decided in 1970 (3) to recommend only two sports turf seed mixtures for future use in the Federal Republic of Germany. One seed mixture was for maritime and moist inland locations while the second mixture was for dry inland locations. The climatic region of southern Bavaria has considerable rain because of continental influences. Therefore, the "moist" seed mixture was selected for the newly constructed turf fields to be used for the 1972 Olympic Games held in Munich. Later most of the sports turf fields became part of the Munich Universities Sports Center.

The winter playing season in West Germany finds the soccer field turfs in a very disadvantageous condition due to slow growth and unfavorable weather. Except during the growing season, these turfs, particularly those in southern Bavaria, are stressed by frequent, rapid freezing and thawing because they are nearly always on moist soils.

Until 1970, there were no publications discussing the suitability of turf timothy (*Phleum bertolonii* DC) and crested dogtail grass (*Cynosurus cristatus* L.) as soccer turfs for this region. Reports from the Netherlands

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(4) noted that "*Cynosurus cristatus* withstands wear well, *Phleum bertolonii* only fairly well." These comments were supplemented in 1974 with the finding that "the results with cultivars of *Phleum* spp. under artificial wear were so poor that interest in these species is very low at present (5)." Under conditions in France crested dogtail grass has shown less resistance to heavy wear than turf timothy and Kentucky bluegrass (*Poa pratensis* L.) (1).

The purpose of this research was to determine the adaptation of crested dogtail grass, turf timothy, and Kentucky bluegrass to the actual conditions encountered on soccer fields in southern West Germany.

### MATERIALS AND METHODS

Fifteen sports turf fields at the Munich Universities Sports Center (ZHS) were available for the investigation. They were constructed in 1970-71 in accordance with regulation DIN 18 035 B1.4, (1) and were

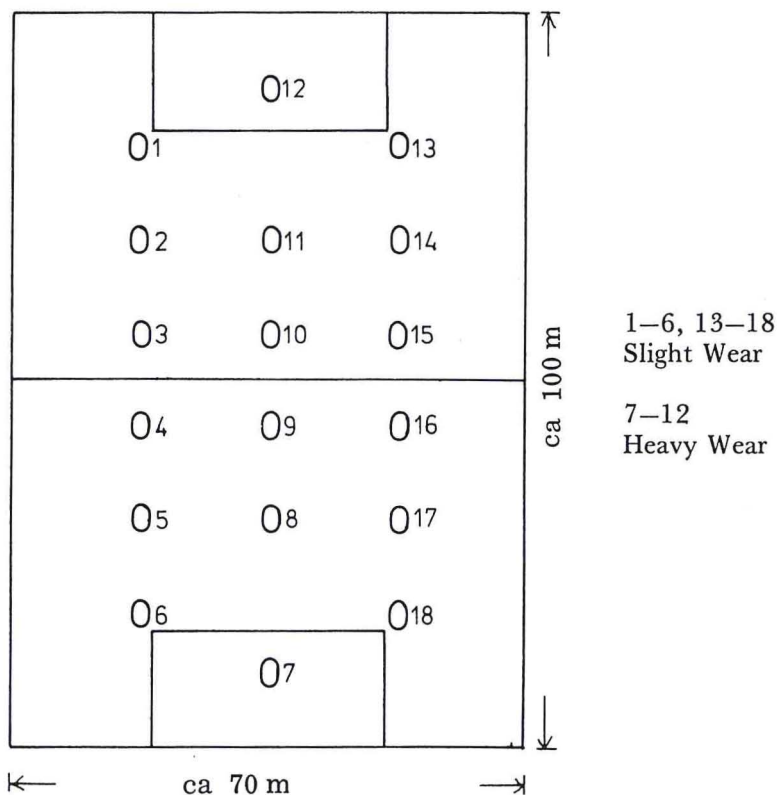


Fig. 1. Position of the plots where botanical composition assessments were done.

seeded with the following mixture: 75% 'Merion' Kentucky bluegrass; 15% 'Credo' crested dogtail grass; 10% 'S 50' turf timothy.

From field 'RA 4', which was representative of all other sports turf fields, the relative proportions of the species in the turf were estimated twice in 1973 and three times yearly from 1974 to 1976 following Klapp (2). Figure 1 shows the position of the 18 plant stands from which the measurements were made during May, July, and October. The locations are ordered in such a way that areas of intense and light traffic could be demonstrated. Traffic stress of field RA 4 was slight in 1973 and 1974, but intense in 1975 and 1976 (2). Fertilization was maintained at an adequate level in accordance to the traffic. The thatch level was between 1 and 2 cm thick in 1976.

## RESULTS AND DISCUSSION

One year after the Olympics the stand composition showed a clear dominance of Kentucky bluegrass (Table 1). However, a severe rust infection of *Puccinia poae-nemoralis* in August and September of 1973 weakened the Merion Kentucky bluegrass so much that its proportion of the turf community was reduced. The resultant voids in the light traffic zones were covered relatively quickly by turf timothy. Annual bluegrass (*Poa annua* L.) showed a substantial increase in zones of intense traffic. Crested dogtail grass was unable to compete with Kentucky bluegrass. Essentially, its proportion of the turfgrass community remained at an insignificant level.

In the course of the next 3 years, the differences in turfgrass composition caused by different traffic intensities became even more evident (Table 2). Merion Kentucky bluegrass did not recover from the severe rust infection in 1973 and was continually subjected to rust during the summer months of the following years. Merion did not occupy more than 20% of the turfgrass community without fungicide treatment. The crested dogtail grass stand composition decreased from year to year, regardless of the intensity of traffic stress. In contrast, turf timothy spread into zones of lighter traffic and became a dominant component of the turf. In the intense traffic zones its persistence was minimal and thus annual bluegrass

Table 1. Composition of the sports turf community before and after a rust attack as influenced by two traffic intensities.

Species	June 1973		October 1973	
	Slight traffic	Intense traffic	Slight traffic	Intense traffic
	%			
<i>Poa pratensis</i>	93	96	32	72
<i>P. annua</i>	3	2	9	19
<i>Phleum bertolonii</i>	2	1	56	3
<i>Cynosurus cristatus</i>	2	1	3	6
Ground cover	100	96	88	68

Table 2. Changes in botanical composition of the sports turf community caused by two traffic intensities.

Species	1974		1975		1976	
	Slight traffic	Intense traffic	Slight traffic	Intense traffic	Slight traffic	Intense traffic
	%					
<i>Poa pratensis</i>	8	19	3	6	8	20
<i>P. annua</i>	26	62	18	81	9	59
<i>P. trivialis</i>	+	0	1	0	2	0
<i>Phleum bertolonii</i>	61	10	76	10	81	6
<i>Cynosurus cristatus</i>	4	4	2	2	+	0
<i>Lolium perenne</i> †	1	5	+	1	+	15
Ground cover	96	73	98	90	98	95

† Overseeded.

replaced it. Turf timothy is much more drought-resistant than annual bluegrass and has the added advantage of earlier shoot growth initiation.

Turf timothy, when mixed with Kentucky bluegrass cultivars appropriate to the locations (e.g. 'Sydsport'), did not show the same aggressiveness on barren substrata. This was attributed to the lack of water which inhibited its development. Improvement of winter color, if any, was therefore according to zones. The color contrasts between zones of intense and light traffic remained throughout the entire year. Because of these characteristics there is no reason to use this species on soccer fields in southern Bavaria.

Crested dogtail grass, in spite of its substantial proportion in the original seeding, never formed a significant component of the turfgrass community. It is therefore difficult to make statements about its traffic tolerance due to its lack of competitiveness under intensive culture. In any event, its use in sports turfs is not to be advised.

Turf timothy and crested dogtail grass have been largely removed from the 1977 mixture recommendations and replaced very successfully by cultivars of perennial ryegrass (*Lolium perenne* L.).

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