

## 寒地型イネ科牧草の花粉生産量

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Short Report

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Pollen Yield and Its Components in Eight Temperate Grasses

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Introduction

Many forage grasses are adapted to cross-pollination by wind. Anemophilous flowers have feathery stigma and produce very large amounts of pollen grains which are small in size, smooth and dry on the surface, and low in specific gravity. Knowledge of pollen production in forage grasses is important for scientists working on seed production, and cell or tissue culture. The objective of this paper was to elucidate total pollen yield and four components of pollen yield in eight temperate grasses.

**Key words** : pollen production, temperate grass.

Materials and Methods

Eight species of temperate grasses shown in Table 1 were investigated. Inflorescences were collected just prior to anthesis (mid-June to mid-July) from the plants growing by the roadside of Obihiro University of Agr. and Veterinary Medicine, which is located at 42° N latitude. Thirty panicles or spikes, fifty florets and fifteen anthers of each species were measured. All pollen grains in an anther were counted under light microscopy after fixing with FAA (Formalin Acetic Alcohol). Total amount of pollen grains per inflorescence was obtained from the products of measurements mentioned above.

Results and Discussion

Orchard grass (*Dactylis glomerata*) produced  $14.03 \times 10^6$  pollen grains per panicle, which was the largest among the eight species and about eight times produced by redtop (*Agrostis alba*) which was the lowest. The large amount of pollen grains produced by orchard grass was due to larger number of florets per spikelet and more pollen grains per anther compared with the other species. All species had three anthers per floret. The number of florets per spikelet ranged from three to nine in the species of *Festuceae* (meadow fescue, smooth

Table 1. Total amount of pollen grains per inflorescence, and four yield components of eight temperate grasses.

Species (Common name)	A	B	C	D	E
	( $\times 10^6$ )				
<i>Festuca elatior</i> L. (Meadow fescue)	4.27	36	6.3 <sup>a)</sup> (4~9) <sup>b)</sup>	3	6,200
<i>Bromus inermis</i> Leyss (Smooth brome grass)	5.02	46	5.3 (3~8)	3	6,900
<i>Poa pratensis</i> L. (Kentucky bluegrass)	5.70	205	3.6 (3~4)	3	2,600
<i>Dactylis glomerata</i> L. (Orchard grass)	14.03	289	4.2 (3~5)	3	3,900
<i>Phalaris arundinacea</i> L. (Reed canarygrass)	9.99	676	1.0 <sup>c)</sup>	3	4,900
<i>Agrostis alba</i> L. (Redtop)	1.83	453	1.0	3	1,400
<i>Phleum pratense</i> L. (Timothy)	3.94	625	1.0	3	2,100
<i>Alopecurus pratensis</i> L. (Meadow foxtail)	6.59	396	1.0	3	5,600

A=Total pollen grains per inflorescence, B=No. of spikelets per inflorescence, C=No. of florets per spikelet, D=No. of anthers per floret, E=No. of pollen grains per anther.

<sup>a)</sup> Mean values, <sup>b)</sup> Ranges, <sup>c)</sup> Reed canarygrass had three florets in a spikelet of which the fertile one was used for calculation, since the other two are sterile.

brome grass, Kentucky bluegrass and orchard grass), while that of *Agrosteae* (redtop, timothy and meadow foxtail) was only one. Reed canarygrass (*Phalaris arundinacea*) had one fertile and two sterile florets in a spikelet. In this case, the single fertile floret per spikelet was considered for calculating total amount of pollen grains. It was interesting to note that four species, meadow fescue, smooth brome grass, orchard grass and meadow foxtail which propagate mainly by cross-pollinated reproduction produced more pollen grains per floret than redtop and Kentucky bluegrass, the former propagates by seeds and rhizomes, while the latter mainly by apomixis. Reed canarygrass which propagates by rhizomes produced large amounts of pollen grains per floret. This seems to be associated with the fact that the anthers of reed canarygrass dehisce by punctuating at the tips, while those of the other species dehisce by splitting longitudinally. Comparing the data obtained in this experiment with those of other cross-pollinated Graminae, rye (*Secale cereale*)<sup>3)</sup> produces about 19,000 grains per anther, while maize (*Zea mays*)<sup>3)</sup> is known to produce about 3,400 grains per anther which is similar to most of the eight species studied. But all of the eight species produced more pollen grains per anther than wheat (*Triticum aestivum*)<sup>2)</sup> and rice (*Oryza sativa*)<sup>4)</sup> which are self-pollinated species.

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