

수도의 유관속 발육에 관한 연구

제1보. 수도 분얼경의 유관속 발육 및 이삭특성과의 관계

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Studies on the development of vascular bundles in rice.

1. Development of vascular bundles in the peduncle of different tillers and its relationship to panicle characteristics in rice plants.

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Objective:

To determine the vascular bundles development in the peduncle of different tillers and examine the relationship between number and cross sectional area of vascular bundles and panicle characteristics.

Materials and Methods:

IR58 and Unbong 7 were sown in seedling trays at 1 seed per cell of 1.0 by 1.0cm. Fourteen day-old seedlings were transplanted in 1/5,000a pot by completely randomized design (CRD) with 3 replications. Tiller production was monitored and sampling was by tiller order. For the observation of vascular bundles in peduncle, section just below the necknode were collected. The materials were fixed in FAA solution. The free-hand transverse sections were made. Hematoxylin was used for staining and the samples were mounted with canada balsam. The number and cross sectional area of vascular bundles were determined from the peduncle using a microscope.

Results and Discussion:

1) The main culm had more and bigger vascular bundles in the peduncle and those vascular bundle decreased with tiller order and tiller development.

2) The number of spikelets and grain yield per panicle were highest in the main culm followed by the order of their initiation or emergence.

3) The number of primary and secondary branches to be positive associated with the number and area of vascular bundles. Furthermore, the number of vascular bundles in the peduncle was highly correlated with the peduncle thickness which in turn was correlated with the number of primary and secondary branches on the panicle.

4) These results showed tillers that are initiated early and have relatively longer growth duration usually have more vascular bundles, larger peduncle, more spikelets per panicle, better spikelet filling and ultimately higher yield.

Table 1. Number of large (LVB) and small (SVB) vascular bundles in the peduncle of different tillers in IR58 and Unbong 7.

TILLER POSITION	NO. OF LVB		NO. OF SVB	
	IR58	Unbong 7	IR58	Unbong 7
M	22.7 a	12.0 a	21.0 a-c	24.7 a
P1	20.3 b-d	10.3 a-d	21.0 a-c	23.3 ab
P2	21.7 a-c	11.3 a-c	22.3 a	24.0 a
P3	20.0 b-d	11.0 a-d	20.0 a-c	23.7 a
P4	19.7 c-e	10.7 a-d	18.0 b-e	22.0 a-c
P5	19.7 c-e	9.0 cd	18.7 a-e	20.7 a-c
S1P1	20.3 b-d	9.3 b-d	20.3 a-c	19.3 bc
S2P1	19.0 d-e	9.7 a-d	17.3 c-e	21.3 a-c
S3P1	17.3 ef	9.0 cd	15.0 e	21.0 a-c
S4P1	16.3 f	9.3 b-d	14.7 e	18.0 c
S1P2	19.7 c-f	10.3 a-d	22.0 ab	23.0 ab
S2P2	19.7 c-f	11.0 a-d	19.3 a-d	21.7 a-c
S3P2	18.7 de	9.7 a-d	15.3 de	20.7 a-c
S1P3	18.3 d-f	8.7 d	17.0 c-e	19.3 bc
S2P3	18.7 de	10.3 a-d	15.7 de	20.7 a-c
S1P4	18.3 d-f	9.3 b-d	17.0 c-e	19.3 bc

F-value Cultivars 1,223.80**
 Tiller position 5.92**
 Interaction 1.44ns

46.29**
 5.54**
 0.99ns

** means are significantly different at 1% level.
 Means followed by common letter in a column are not significantly different at the 5% level by DMRT.

Table 2. Correlation coefficients between thickness and number of large vascular bundles (LVB) in the peduncle and panicle characteristics in IR58 and Unbong 7.

CHARACTERS	NO. OF PRIMARY BRANCHES		NO. OF SECONDARY BRANCHES		NO. OF SPIKELETS
	CULTIVARS	IR58	Unbong 7	IR58	
LVB/peduncle	IR58	0.524**	0.553**	0.573**	
	Unbong 7	0.645**	0.520**	0.604**	
Peduncle thickness	IR58	0.654**	0.788**	0.814**	
	Unbong 7	0.689**	0.707**	0.790**	

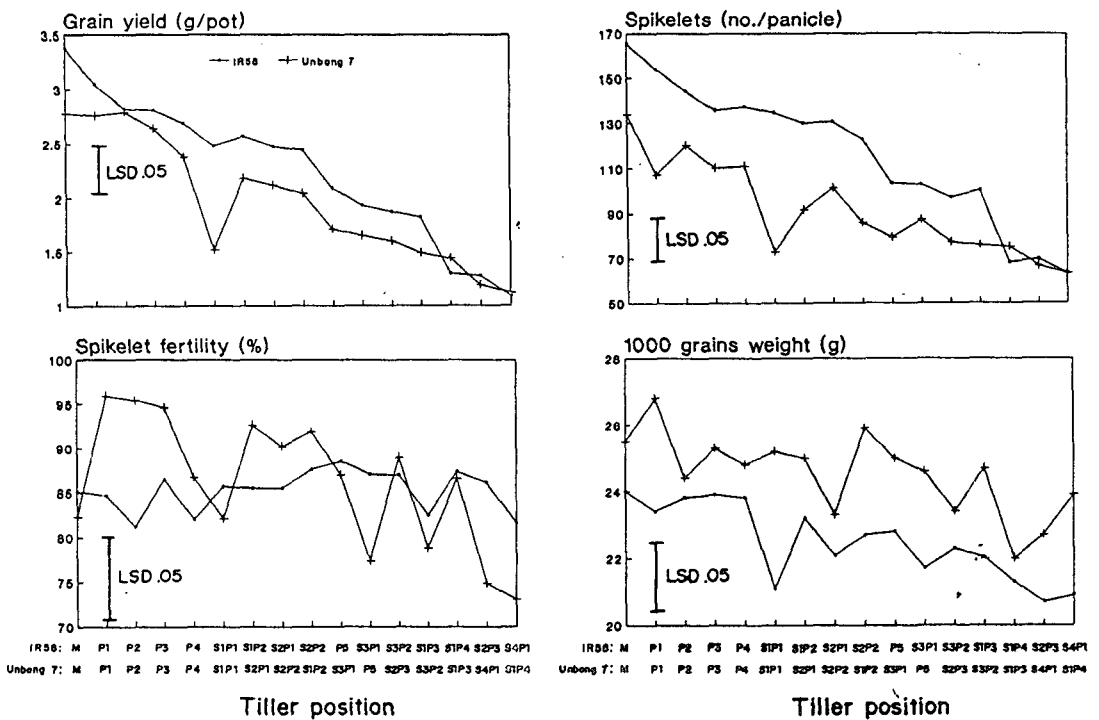


Figure 1. Yield and yield components in different tillers (arranged in development order) in IR58 and Unbong 7.