

벼 분얼경의 해부생태학적 특성이 등숙에 미치는 영향

II. 수량성 향상을 위한 적정 분얼경수의 품종간 비교

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Morpho anatomical Characters of Tiller Orders within a Hill Affecting Spikelet Filling in Rice

II. Morpho-anatomical Characters of Optimum Tillers for High Yield

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Objective

To determine the number of the optimum tillers for high yield and clarify its morpho anatomical characters in various cultivars having different tillering ability.

Materials and Methods

Eight rice cultivars having different tillering ability were used in the green house experiment at IRRI in 1989 dry season. One 10 day old seedling was transplanted per 1/5000 a pot. The experiment was conducted in completely randomized design with 18 replications for yield contribution of tiller orders and 8 replications for assessment of anatomical difference.

Results and Discussion

The optimum tiller number, i.e. tillers which produced heavy panicles was found to be around five to eight tillers per plant, although wider range may be possible if more cultivars were tested or under different growth conditions. Optimum tillers emerged within a shorter time after transplanting compared with the other tillers. They exhibited longer tiller duration, produced higher number of spikelets and filled spikelets, more vascular bundles, and were taller with larger leaf area. However, the 1000 grain weight and fertility varied with cultivars and showed no general trend. Of these morpho-anatomical features, the total number of spikelet per plant was considered as the potential criterion for determining the optimum tiller number.

Position of optimum tillers based on spikelet number within a hill of different types of cultivars. IRRI, 1989 DS.

TYPE	CULTIVARS	NO. OF TILLERS Mean Optimum	OPTIMUM TILLERS												
			1	2	3	4	5	6	7	8	9				
Indica	IR30	22	M	P1	P2	P3	P4	P5	P6	S1P1					
	IR47/05	11	M	P1	P2	P3	P4	P5	P6	S2P1					
	Rewa	7	M	P1	P2	P3	P4	P5	P6	S2P1					
Japonica	Unbong	11	M	P1	P2	P3	S1P1	S2P1							
	SR14/53	8	M	P2	P3	P4	P5	P6	S2P1						
	M.83	14	M	P2	P3	P4	P5	S2P1	P6	S1P1					
Javaica	Silewah	8	M	P1	P2	P3	P4								
	IR30/IR47/05	14	M	P2	P3	P4									
	Hybrid	5	M	P1	P2	P3	P4								

Days to initial tillering and heading after germination, and growth duration of optimum tillers versus lesser tillers. IRRI, 1989 DS.

CULTIVAR	TILLER ORDER	DAYS TO INITIAL TILLERING	DAYS TO HEADING	GROWTH DURATION**	
				(Days)	(Days)
IR30	Optimum	29	78	49	
	Others	40	82	41	
M.83	Optimum	29	72	44	
	Others	36	74	38	
Hybrid	Optimum	26	81	55	
	Others	36	82	46	
Unbong	Optimum	36	58	23	
	Others	48	64	16	
IR47/05	Optimum	29	96	67	
	Others	37	96	59	
Rewa	Optimum	31	72	41	
	Others	40	75	35	
Silewah	Optimum	26	82	56	
	Others	35	80	45	
IR14/53	Optimum	31	60	29	
	Others	43	65	21	

Comparison of morphological differences of plant growth in different tiller orders. IRRI, 1989 DS.

CULTIVARS	TILLER ORDER	NO. OF TILLERS	PLANT HEIGHT (cm)	PANICLE LENGTH (cm)	LEAF AREA (cm ² /tiller)	NO. OF BRANCH/PANICLE	
						Primary	Secondary
IR30	Optimum	8	79	21	136	10	13
	Others	14	69	19	130	8	9
M.83	Optimum	9	79	18	214	11	27
	Others	5	68	16	163	10	17
Hybrid	Optimum	5	175	33	218	16	38
	Others	9	159	29	166	14	27
Unbong	Optimum	6	73	20	66	8	16
	Others	5	63	17	42	7	10
REWA	Optimum	7	169	34	363	12	53
	Others	4	156	32	298	11	33
IR47/05	Optimum	6	147	30	282	14	15
	Others	5	142	29	240	13	11
Silewah	Optimum	5	195	31	291	14	26
	Others	8	190	29	221	13	20
Average							
Optimum			131	27	224	11	27
Others			121	25	180	10	18

Yield and yield components of different tiller orders in different types of cultivars. IRRI, 1989 DS.

CULTIVAR	TILLER ORDER	NO. SPIKELET /PANICLE	FERTILITY (%)	1000-GRAIN WEIGHT (g)	NO. FILLED SPIKELET/PANICLE	WT. GRAINS /PANICLE (g)
	Others	65	88	18.4	57	1.04
M.83	Optimum	154	85	16.2	130	2.05
	Others	105	79	16.1	84	1.33
Hybrid	Optimum	231	82	24.4	189	4.59
	Others	173	84	24.0	145	3.47
Unbong	Optimum	92	92	24.5	94	2.11
	Others	66	87	24.8	62	1.49
Rewa	Optimum	271	82	23.1	222	5.08
	Others	176	81	23.5	146	3.42
IR47/05	Optimum	126	89	29.2	112	3.27
	Others	104	90	29.3	94	2.74
Silewah	Optimum	141	57	28.5	80	2.26
	Others	110	59	29.3	64	1.86

Varietal differences of number of vascular bundle for different tiller orders. IRRI, 1989 DS.

CULTIVAR	INNER VASCULAR BUNDLE (no.)		OUTER VASCULAR BUNDLE (no.)	
	Optimum tiller	Other tiller	Optimum tiller	Other tiller
IR30	22	20	19	17
M.30	21	18	21	18
Hybrid	29	25	26	23
Unbong	9	8	17	15
Rewa	27	21	23	19
IR47/05	22	20	30	28
Silewah	27	16	29	24

** Duration of tillers from initiation to heading.

* Lesser tillers which occurred in at least 50 percent of the sampled plants.