

Varietal Difference in Morpho-physiological Characters of Different Tillers within a Hill Affecting Spikelet Filling in Rice.

I. Varietal Difference in Morpho-anatomical Characters of Different Tillers

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Objective :

To find out tillering and heading patterns, and the relative contribution of different tiller orders on grain yield.

Materials and Methods:

Eight rice cultivars having different tillering ability in different groups were used in the green house experiment at IRRI in 1989 (Table .1)

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 different tiller orders and 8 replications for assessment of anatomical differences.

Results and Discussion

1. While all indicas except IR30 were characterized by a distinct vegetative and reproductive phases, the two growth phases tended to overlap in the japonicas (unbong and SR14453). This overlap is probably the result of short growth duration of the japonica when grown in the tropics
2. Although the tiller occurred with a long period, heading occurred over a short duration so that tiller growth duration varied. The main culm was always not the first to head except in IR30 and unbong cultivars.
3. The number of inner vascular bundle (IVB) was higher than outer vascular bundle(OVB) in IR 30, M83 Rewa and Hybrid rice, however IR47705, Silawah, Unbong and SR14453 had more OVB than IVB.
4. The maximum contribution to filled spikelet weight was from primary tillers in low-tillering cultivars but from secondary tillers in high-tillering cultivars.

Table General morphological characters of entry plant materials.

GROUP	ENTRY	TILLERING ABILITY	NO. OF TILLERS	PLANT HEIGHT
Indica	IR30	High	22	short
Indica	IR47705**	Low	8	tall
Indica	Rewa 353	Low	8	tall
Japonica	Unbongyeo	Moderate	11	short
Japonica	SR 14453**	Low	8	short
Javanica	Silewah	Low	8	tall
Tongli*	Milyang 83	Moderate	14	short
Hybrid	Hybrid**	Moderate	14	tall

*Indica/Japonica
**IR47705: IR47705-ACS
**SR14453: SR14453-ICP/767-20
**Hybrid: IR30/IR47705-ACS

Table Filled spikelet weight and its components for different tiller orders in eight rice cultivars, 1989 DS.

CULTIVAR	TILLER ORDER	SPIKELET (NO./PANICLE)	FERTILITY (%)	1000-GRAIN WT. (g)	FILLED SPIKELET WT (g/PANICLE)
IR30	M	98 ± 5.6	89.1 ± 1.5	19.60 ± .12	1.71 ± .07
	P	86 ± 2.1	88.0 ± 0.8	19.11 ± .42	1.43 ± .03
	S	67 ± 1.4	87.3 ± 0.6	18.40 ± .10	1.07 ± .02
M.83	M	178 ± 10.8	84.7 ± 1.9	17.32 ± .36	2.58 ± .13
	P	156 ± 5.5	85.6 ± 2.2	16.06 ± .22	2.06 ± .06
	S	113 ± 4.7	80.0 ± 1.2	16.02 ± .20	1.44 ± .06
Hybrid	M	232 ± 6.9	79.9 ± 1.6	24.81 ± .29	4.57 ± .14
	P	215 ± 5.1	82.6 ± 0.7	24.22 ± .13	4.32 ± .09
	S	171 ± 3.9	84.4 ± 0.6	23.96 ± .15	3.45 ± .08
Unbong	M	108 ± 3.8	93.0 ± 1.4	24.54 ± .57	2.34 ± .15
	P	88 ± 2.8	91.5 ± 2.0	24.82 ± .43	1.90 ± .07
	S	69 ± 1.9	87.5 ± 2.0	24.82 ± .43	1.47 ± .09
Rewa	M	327 ± 7.8	84.1 ± 1.5	23.66 ± .30	6.50 ± .22
	P	264 ± 6.1	81.3 ± 1.2	23.25 ± .37	4.93 ± .12
	S	193 ± 9.3	81.2 ± 1.6	22.95 ± .58	3.59 ± .19
IR47705	M	140 ± 7.6	88.7 ± 1.4	30.11 ± .14	3.71 ± .18
	P	123 ± 2.7	89.3 ± 0.8	29.06 ± .17	3.18 ± .07
	S	102 ± 2.8	89.7 ± 1.2	29.24 ± .15	2.08 ± .07
Silewah	M	169 ± 8.5	53.3 ± 4.0	27.78 ± .29	2.52 ± .23
	P	128 ± 3.1	57.3 ± 1.2	26.99 ± .14	2.12 ± .08
	S	110 ± 5.0	58.7 ± 2.6	26.25 ± .20	1.84 ± .12
SR14453	M	83 ± 4.0	93.7 ± 1.6	25.55 ± .33	2.00 ± .10
	P	61 ± 1.7	89.7 ± 1.4	25.72 ± .28	1.43 ± .04
	S	43 ± 2.1	76.0 ± 6.6	22.19 ± 1.74	0.95 ± .10

* Mean ± standard error.

M: main culm, P: primary, S: secondary

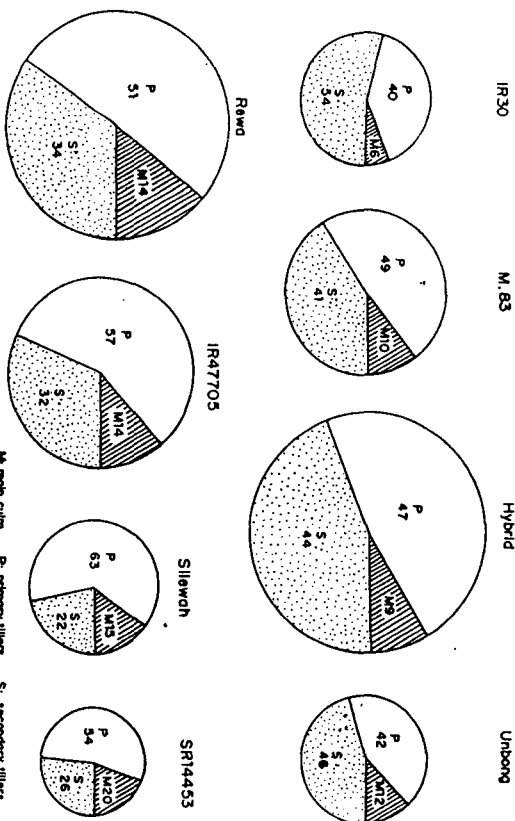


Fig. 5 Contribution to total panicle weight by different tiller orders in rice plant, 1989 DS.

M: main culm P: primary tillers S: secondary tillers

Table Varietal differences of number and size of vascular bundle in the peduncle of main culm in eight rice cultivars, 1989 DS.

CULTIVAR	INNER VASCULAR BUNDLE (no.)	OUTER VASCULAR BUNDLE (no.)	PEDUNCLE DIAMETER (mm)	PEDUNCLE THICKNESS (mm)
IR30	20.73 ± 0.35*	18.14 ± 0.27	1.64 ± .02	0.25 ± .002
M.83	19.92 ± 0.68	19.41 ± 0.40	1.90 ± .03	0.30 ± .003
Hybrid	26.22 ± 0.69	23.86 ± 0.64	2.10 ± .03	0.33 ± .005
Unbong	8.55 ± 0.13	15.90 ± 0.24	1.22 ± .02	0.27 ± .008
Rewa	24.40 ± 0.85	20.64 ± 0.71	2.37 ± .05	0.34 ± .007
IR47705	21.24 ± 0.43	29.04 ± 0.57	2.13 ± .03	0.39 ± .005
Silewah	16.44 ± 0.44	26.28 ± 0.70	1.90 ± .03	0.36 ± .005
SR14453	8.81 ± 0.25	14.67 ± 0.39	1.23 ± .02	0.33 ± .007

* Mean ± standard error.