

## Grain Quality Variation with the Degree of Lodging at Different Ripening Stages of Rice

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### Objectives

- To compare the grain quality with lodging times and grades at ripening of rice.

### Materials and Methods

- Lodging grade(0~9)
  - 0 : Normal
  - 5 : Lodging of plants at 45° angle from the ground
  - 9 : Lodging of perfection on the field
- Methods : milling and polished rice quality, physicochemical characteristics, sensory evaluation.

### Results and Discussion

- Head rice yields and 1000-grain weights were decreased with the severity and earliness of lodging occurrence in rice.
- The number of spikelets, as well as protein, and amylose contents of grains were higher in the completely lodged rice than those of 45° angle lodging or normal standing.
- Brown and white rice yields were high in the rice lodged to 45° angle from the ground than completely lodged rice, whereas chalky, cracked and damaged grains were higher in the latter.
- Palatability and sensory evaluation scores were higher in the rice lodged to 45° angle from the ground than completely lodged rice.

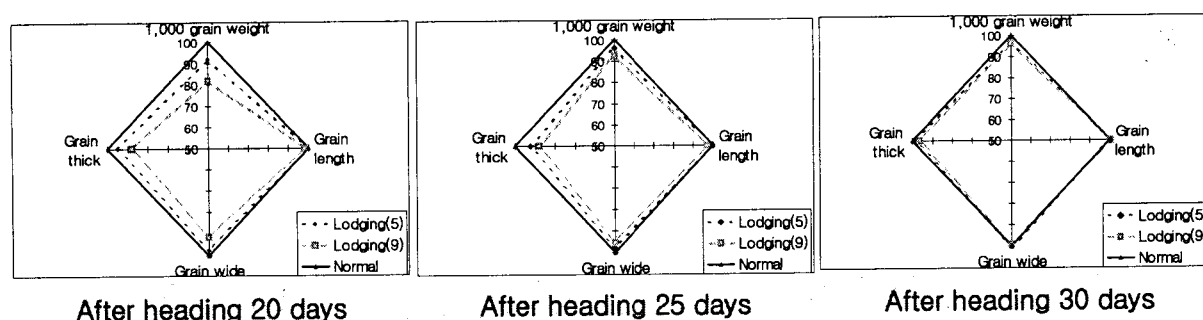


Fig 1. Grain development of rice lodged at different stage after heading.

Table 1. Milling yields and milled rice qualities with lodging grades of rice at different ripening stages.

Ripening stage	Lodging (0-9)	Milling yield (%)			Milled rice quality(%)			
		Brown/rough rice ratio	Milled/brown rice ratio	Milled/rough rice ratio	Head rice	Chalky rice	Cracked rice	Damage grain
20 days after heading	9	75.0	88.2	66.1 b	34.6 d	11.6	25.4	10.7
	5	80.0	90.4	72.3 a	47.2 c	11.2	18.6	4.9
25 days after heading	9	74.8	90.2	67.4 b	44.3 c	10.4	16.7	7.2
	5	81.7	91.8	75.0 a	57.2 b	7.8	13.5	2.5
30 days after heading	9	82.1	90.5	74.2 a	56.1 b	10.9	6.3	7.1
	5	82.7	90.5	74.9 a	60.7 a	8.4	4.2	3.4
Normal (0)		82.3	91.8	75.5 a	63.0 a	6.3	4.7	3.0

\* Number with the same letter are not significantly different from each other according to DMR test.

Table 2. Physicochemical characteristics of milled rice with lodging grades of rice at different ripening stages.

Ripening stage	Lodging (0-9)	Whiteness	Protein content (%)	Amylose (%)	Palatability <sup>1)</sup>	Sensory evaluation (-3~+3)
20 days after heading	9	38.1	7.6	21.0	69.2	0.4
	5	38.0	6.5	20.0	72.9	0.8
25 days after heading	9	39.9	7.7	19.2	71.6	0.7
	5	40.4	6.2	18.3	77.1	1.3
30 days after heading	9	38.8	6.7	20.2	74.2	1.1
	5	38.3	6.2	19.8	76.3	1.3
Normal (0)		40.1	6.2	18.7	78.8	1.4

\* Number with the same letter are not significantly different from each other according to DMR test.

<sup>1)</sup> Analyzed by Toyo's rice taste measuring system.