

Inabenfide 處理에 따른 벼의 生産構造, 穗相, 登熟 및 米粒質의 變化

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Effects of Inabenfide Application on Productive Structure, Ear Characteristics, Ripening Characteristics and Grain Quality in Rice Plant.

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試驗目的

水稻 倒伏輕減劑로 活用性이 높은 Inabenfide의 處理에 따른 生産構造, 穗相, 登熟 및 米粒形質의 變化, 種實 蛋白質의 電氣泳動樣相 등을 살펴보고자함.

材料 및 方法

東津벼를 1990年 5月 30日 全羅北道農村振興院 畚圃場에 손移秧하고 窒素施肥는 10a당 11Kg, 20Kg을 施肥하고 Inabenfide(4%)를 出穗前 45日에 10a당 3Kg을 使用하여 生産構造, 穗相, 登熟 및 米粒形質의 變化, 種實 蛋白質의 電氣泳動樣相 등을 調查하였다.

實驗結果 및 考察

1. 生産構造는 無處理區에 있어서는 上層에 同化和 非同化系가 分布하는데 比하여 處理區는 中, 下層에 同化系가 下層에 非同化系가 많이 分布하였으며 透光率도 無處理區는 80cm의 葉群 上層部에 50%程度인데 比해 處理區는 50%가 높고 60cm의 葉群 中層에 있었으며 多肥區에서 그 程度가 컸다.
2. 穗相은 無處理區 對比 處理區에서 弱勢枝梗인 2次枝梗 着生이 적고 退化率이 높으며 着生類花數가 적어 Inabenfide 處理는 弱勢類花着生을 抑制하는 效果가 있음을 알수 있었다.
3. 登熟特性은 無處理區에 比하여 處理區에서 登熟期間이 多少 짧아지고 登熟 速度가 높았으며 施肥水準에서는 小肥區보다 多肥區에서 登熟速度가 若干 높은 傾向을 보였다.
4. 米粒形質은 玄米粒厚는 無處理區(2.01 - 2.11mm)에 比하여 處理區는 0.1 - 0.2mm의 粒厚增加를 보였으며 玄米成分은 處理區에서 無處理區에 比하여 Protein은 약간 낮아지는 경향이었지만 큰차는 없었고 Amylose 含量, K, Mg/K 比率은 적었으나 Ca, Si는 많은 傾向을 보였다.
5. 種實蛋白質의 電氣泳動的 差異는 窒素 施肥量 增加에 의한 Band의 peak面積은 增加했었으나 Inabenfide의 處理 有無에 따른 Band pattern과 Band의 量的 差異는 發見할수 없었다.
6. 炊飯特性은 吸收率과 부피 팽창비는 處理區에서 無處理區 對比 낮았고 炊飯速度는 無處理區 보다 處理區에서 4 - 6分 길어지는 變化를 보였다.

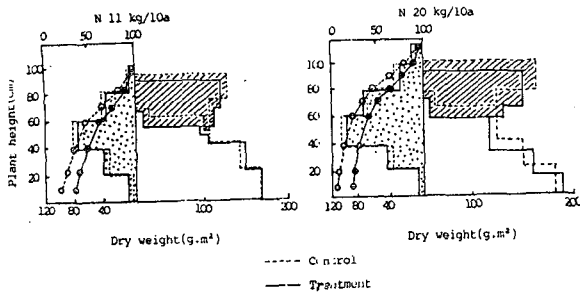


Fig. 1 Effect of Inabenfide application on the productive structure of rice plant under the conditions of 11kg/10a and 20kg/10a nitrogen levels

Leaf blade Panicle Leaf sheath+culm

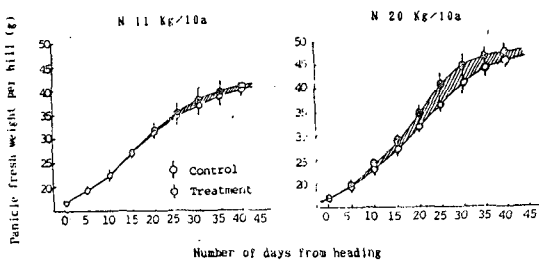


Fig. 4 Effect of Inabenfide application on the fresh weight increase of panicles per hill from days after heading

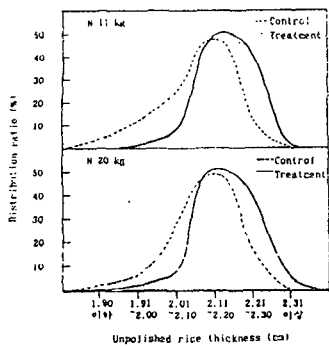


Fig. 5 Effect of Inabenfide application on the distribution of unpolished rice thickness

Table 2 Variation of grain quality distribution by Inabenfide application

| Nitrogen level (kg/10a) | Inabenfide application | Complete rice rate (%) | Incomplete rice rate (%) | | |
|-------------------------|------------------------|------------------------|--------------------------|-----------|-------|
| | | | Green rice | Dead rice | Total |
| 11 | Control | 96.1 | 1.1 | 2.8 | 3.9 |
| | Treatment | 98.5 | 0.2 | 1.3 | 1.5 |
| 20 | Control | 94.6 | 3.2 | 2.2 | 5.4 |
| | Treatment | 97.0 | 1.3 | 1.7 | 3.0 |

Table 4 effect of Inabenfide application on Cooking quality of rice

| Nitrogen level (kg/10a) | Inabenfide Application | Water absorption rate (%) | Volume swelling rate (%) | Cooking rate (minutes) |
|-------------------------|------------------------|---------------------------|--------------------------|------------------------|
| 11 | Control | 5.1 | 2.79 | 30 |
| | Treatment | 5.7 | 2.78 | 34 |
| 20 | Control | 5.6 | 2.67 | 28 |
| | Treatment | 4.8 | 2.45 | 35 |

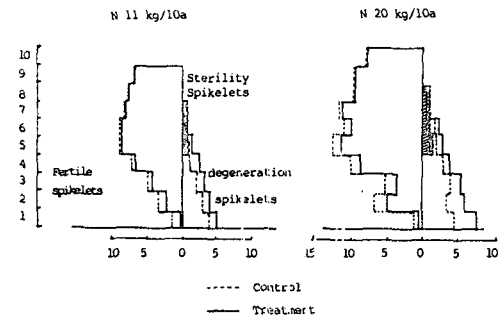


Fig. 3 Effect of Inabenfide application of the Panicle Character of rice plant under the conditions of 11 kg/10a and 20 kg/10a nitrogen levels

Table. Effect of Inabenfide application on the spikelets of rice plant under the conditions of 11kg/10a and 20kg/10a nitrogen levels.

| Nitrogen level (kg/10a) | Inabenfide Application | Rachis No. of Application | No. of Present Spikelet | No. of degeneration spikelet | No. of differentiation ratio | |
|-------------------------|------------------------|---------------------------|-------------------------|------------------------------|------------------------------|----------|
| | | | | | Spikelet | Spikelet |
| 11 | Control | PRB | 5.3 | 0.1 | 5.5 | 3.6 |
| | | SRB | 8.4 | 2.7 | 11.1 | 24.0 |
| | | Total | 71 | 12 | 83 | 14.5 |
| | Treatment | PRB | 5.4 | 0.2 | 5.6 | 3.6 |
| | | SRB | 7.2 | 3.1 | 10.7 | 32.7 |
| | | Total | 64 | 15 | 79 | 19.0 |
| 20 | Control | PRB | 6.8 | 0.4 | 7.2 | 5.6 |
| | | SRB | 12.5 | 5.4 | 17.9 | 30.2 |
| | | Total | 76 | 15 | 92 | 17.4 |
| | Treatment | PRB | 6.6 | 0.6 | 7.2 | 8.3 |
| | | SRB | 10.3 | 6.2 | 16.5 | 37.6 |
| | | Total | 67 | 21 | 87 | 23.0 |

Note PRB = Primary rachis branch
SRB = Secondary rachis branch

Table 1 Grain filling duration and grain filling rate by Inabenfide application.

| Nitrogen level | Filling duration | | Filling rate | |
|----------------|------------------|-----------|--------------------|-----------|
| | Control | Treatment | Control | Treatment |
| Kg-10a | - days - | | - kg/panicle/day - | |
| 11 | 28.5 | 27.2 | 73.6 | 82.4 |
| 20 | 27.0 | 25.5 | 78.3 | 88.0 |

Table 3 Effect of Inabenfide application on the composition of rice

| Nitrogen level (kg/10a) | Inabenfide Application (%) | T-N (%) | Protein (%) | Amylose (%) | Ca (ppm) | K (ppm) | Hg (ppm) | Si (%) | Hg/k (%) |
|-------------------------|----------------------------|---------|-------------|-------------|----------|---------|----------|--------|----------|
| 11 | Control | 1.36 | 7.63 | 19.8 | 7.356 | 1547 | 521.5 | 0.860 | 0.34 |
| | Treatment | 1.31 | 7.35 | 18.5 | 7.736 | 1501 | 464.5 | 1.452 | 0.31 |
| 20 | Control | 1.42 | 7.95 | 21.4 | 7.471 | 1467 | 485.8 | 0.790 | 0.32 |
| | Treatment | 1.37 | 7.69 | 19.0 | 7.586 | 1454 | 473.3 | 1.140 | 0.33 |

