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Red-rice control in direct-sown paddy field

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Advances in weed control technology have played an important role in the development of rice cultivation. However, direct-seeding acreage has not been increasing any more at 7% in Korea from the difficulties of weeds/red rice control. Red rices are the most notorious weeds in direct-sown paddy field in the world. In Korea, the potential acreage for direct-seeding of rice is 540,000ha(loam) and 270,000ha(sandy loam) of all possible rice field (1,200,000ha). We developed the best weed control technic by ridge seeding and water management (RS) which focused on demolishing of the ridge with germinated/germinating weeds together after seedling establishment of rice by permanent deep flooding which was named as herbicide independent direct-sown rice cropping system. We applied that technic for the control of red rice in direct-sown rice cropping system. The main plot was laid out with 1) pre-seeding of red rice or not, 2) ridge seeding and partial tilled direct-seeding(PTDS), 3) soil shattering ratio (>1cm, 50, 80%). Red rice density remarkably decreased by 50% compared to the PTDS. Grain yield of rice (Daeanbyeo) was about 90% compared to transplanted rice, in spite of, direct-sown condition and almost two weeks delayed planting time in Suwon, Korea. The best management, even though not clearly controlled red-rice, was RS with 80% of soil shattering in view of the control effect of red rice and the minimum yield loss of normal rice cultivar.

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The optimum N application level for the production of high quality rice at different agricultural zones in Korea

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To estimate the optimum N application level for the production of high quality rice, we carried out the experiment at 4 agricultural zones and 23 experimental sites around the country for two years. For the assumption of the optimum level, we used the partial regression line of path coefficient. After calculating the predicted rice yield at each nitrogen fertilizer level by the line, an optimum nitrogen fertilizer level was calculated by the average of the fertilizer level without significant difference between the predicted appropriate and the standard(11kg/10a) nitrogen fertilizer levels in rice yield within $\pm 5\%$ of the significance level. According to the results, for example, the optimum N application levels for the early, medium and mid-late maturing varieties in the plain area of the central region were 9.5, 8.9 and 9.1kg/10a, respectively. When rice quality-related factors were compared between the results at the optimum and standard nitrogen fertilizer levels, the rice quality was fairly improved at the optimum condition compared with the standard, although rice and head rice yields decreased merely about 1~3% points. We strongly recommend, therefore, that the standard N application level must be decreased from 11 to 9kg/10a, which resulted in a considerable improvement in the rice quality with a minimum decrease in the rice yield.