# CHAPTER 6

# DISCUSSION

## 6.1 Field Survey

### 6.1.1. Rice production in Chiang Mai valley

The farmers in Chiang Mai generally choose to grow glutinous rice because most of people in this region consumed glutinous rice as their principle cereal. RD6 glutinous rice variety was most preferred by farmer in the main purpose for household consumption and the excess paddy was for sale. This result is similar to Shinawatra and Woodtikarn (1993). The finding from survey indicated that the average land ownership per household of this study area was 7.9 rai. as compared to the reporting from OAE (1998) which about 9.8 rai/ houshold

### 6.1.2 Agronomic practices

Transplanting was common method use in this study. Basilio and Romeo (1970) stated that the benefits derived from this practice are for facilitated top dressing of fertilizer and application of insecticide and herbicide. Moreover transplanting method can complete with weed efficiently.

Nitrogen is an essential nutrient for rice. Matsushima (1964) stated rice plants required as much nitrogen much as possible at the early and mid tillering stage to maximize the number of panicle and the rice plant still require nitrogen, even in the ripening stage. De Datta (1981) also reported that the accumulation of nitrogen in the vegetative organs is high in during the early growth stages and decreased with growth. After flowering, translocation of nitrogen in the vegetative organs to the grains

becomes significant. There is some translocation of carbohydrates in the vegetative plant parts to the grain.

This field survey result illustrated that most farmers split twice application of fertilizer in a rice production period. The first application occurred at tillering stage and the second was applied at the booting stage. De Datta (1978) supported this practices that the split application of nitrogen, with one dose at transplanting and another at the panicle initiation, is the best for obtaining the high yields. Nitrogen absorbed by the plant from tillering to panicle initiation tends to increase the number of tillers and panicles, and then absorbed during panicle development (from panicle initiation to flowering) increases the number of filled spikelet per panicle. Nitrogen absorbed after flowering tends to increase the 1000-grains weight.

The on-farm result showed that the farmer' practices in term of rate of nitrogen application and harvesting time can affect to the milling quality of rice grain. From the results, farmer fields of which applied more nitrogen fertilizer rate, it was shown in the higher a large number of percentage of head rice also. Nevertheless, nitrogen application did not showed significant effect on grain yield in this field survey. This could be due to the environment factor such as lodging problem at grain filling stage, rain during the maturity stage, grain lose due to bird., etc.

Early harvesting was caused primarily by lack of labour, especially during the harvest season. That was the serious problem of rice production in this study due to most of the rural labour has moved into the industrial sector. Thus, this result forced the farmers to harvest their rice whenever there was available labour. Timely harvesting related to moisture content in rice grain. The rice grains that harvest early, the moisture content was often high.

The field survey results was found that the moisture content of rice grain measured at the harvesting time ranged among 26.1% to 28.0%. Nangju and De Datta (1970) reported that in the Tropics, the suitable moisture content in rice grain should varied from 18-23% in wet season. As the moisture content in rice grain at harvesting time is more or less than this range, the result is appeared in an increase of broken rice grain because the milling yields are generally highest when paddy is fully mature. The high percentage of broken rice at early harvesting was primarily due to the presence of many immature, green and ckalky grains, which were easily broken during hulling and milling. From the survey results, the percentage of broken rice in various locations as well as the percent moisture content in rice grain was not significantly different.

### 6.1.3 The effect of potassium iodide application on yield, milling quality and nutritive values of rice grain

The on-farm results of potassium iodide application showed not significant difference on rice yield and nutritive values of rice grain among various location and varieties. However, milling quality of rice grain was found affecting by the potassium iodide application. Supporting results by Chankruayat (2000) that percentage of head rice of treatment which weekly spraying potassium iodide starting at panicle initiation till anthesis of rice plant was significantly greater than control treatment (not applied with KI).

## 6.2 Field Experiment

### 6.2.1 Effect of potassium iodide on growth, yield and yield component of rice

From the experiment results, it was shown that KDML105 and KDS varieties had the number of day to maximum culm and leave dry weight longer than CNT-1. Because those varieties are sensitive to photoperiod, they did not produce panicle primodia, or take a very long time to form panicle if the day lengths are longer than certain critical duration. Thus, the vegetative growth duration of both varieties was also longer. Compared to the CNT-1 variety that is the photoperiod insensitive variety, vegetative growth duration remained constant regardless of the length of photoperiod to which it exposed. Similar results was illustrated by Chankruayat (2000), it was found that KDML 105 variety had the number of day to maximum leave dry weight longer than CNT-1 variety in wet season, which was 86.9 and 76.7 days, respectively.

However, the number of day to maximum panicle dry weight was not different among varieties. Due to the duration of the reproductive and ripening phase are more or less constant regardless of the time of planting and variety. The expected date of maturity of any variety was approximately 70-75 from panicle initiation stage (Vergara, 1970).

Dry matter of all plant depended on both crop growth rate (CGR) and crop growth duration (CGD) (Sampet, 1999). Referred to this study, the crop growth rate of that all varieties was not much different, therefore the factor defined dry weight of those varieties is only crop growth duration. Straw or culm is the product of the growth during the vegetative phase. From the result, it was found that the number of maximum culm dry weight of KDML15 and KDS variety was longer than CNT-1, thus the dry matter of both variety should be greater than CNT-1 variety.

According to this study, the variety also effects on rice yields and yield component. The CNT-1 variety had the number of tiller per hill and number of panicle per hill greater than KDML105 and KDS variety. In contrast, the highest of filled- grain per panicle was record in KDML105 variety. However, it was found that the 1000-grain weight of those varieties showed did not significantly different. From these results, it can be explained that the number of filled-grain per panicle of CNT-1 was compensated by number of panicle per hill. Similar to the reported by Sampet (1999) which mentioned that rice plant has the ability to compensate their each component of yield to the others. For example, lower in number of tiller per area can be compensated by the other yield components such as number of filled grain per panicle or grain weight. The more or less efficiency of this compensation greatly depended on the amount of food or nutrient that they can produce, as well as the storage potential of each yield component. Moreover, Yoshida *et al.* (1984) stated that yield and yield component of rice are influenced by both genetic and environment factor.

However, the potassium iodide foliar application did not affected to yield and yield component of rice. Sithananthan *et al.* (1974) supported that the foliar fertilizer application should be considered in term of quality more than quantity of product.

### 6.2.2 Effect of potassium iodide on milling quality and nutritive values of rice

Foliar applied micronutrient is more readily available to the plant than applied into soil. Although all plant were not designed to take up nutrient through the leave and fruit. However, potassium is one of a few nutrients that easily enter the above ground parts of plant (Wenatchee, 1996).

In this study, the percentages of head rice, broken rice and grain hardness were responded to the potassium iodide application rate. It was found that the trend of

percent increasing of head rice and grain hardness of rice sample was positive to rate of potassium iodide application, however, the application in over rate will induce to lose in this result because of the toxicity of plant. Percent decreasing of broken rice was similar to the result of head rice but it was reported in the contrary way. Singh and Tripathi (1980) mentioned that as potassium fertilizer was applied by spraying method, the suitable rate of foliar application should be considered in order to get in the best quality and the highest yield.

Moreover, Sajwan and Kaplant (1990) stated that the increase in protein content induced grain hardness, which it was found to be greater resistance to abrasive action on milling and resulted in less broken rice and high head rice yield. Nangju and De Datta (1970) also mentioned that protein bodies functioned as a binder occupying the space between unpacked starch granule with resulted in increased resistance of rice grain to broken during milling. In this study, the result was similarly shown as both researches above.

In case of nutritive values of rice grain, Pattley and Stanley (1982) reported that the potassium and protein content in rice grain responded together in the positive correlation. In this study, the result supported this sentence that rice variety which produced a great deal of potassium content in grain, it was also measured the plenty of protein content. It was found that KDS variety produced the highest percent potassium content as well as the percent protein content in rice grain sample.

Even though percent iodine content in rice grain was not significantly different in the various potassium iodide application rates, nevertheless, those results applied with potassium iodide was still greater than that of control (not applied with KI), the similar results was found by Chankruayat (2000).