Chapter 6

CONCLUSION

Different responses to B deficiency among wheat genotypes were observed in field study. In genotypes of sensitive to B deficiency, low B supply caused yield reduction through impaired development of anther and pollen grain, and seed set failure, but not in genotypes of tolerant to B deficiency. In this study, the genotypes, previously defined as moderately sensitive to B deficiency, performed as genotypes that are tolerant to B deficiency, since no lime was applied; except in Kanchan. In pot study, the effect of B supply on grain set correlated with field responses.

Pollen viability was depressed by B deficiency. Internal and external B supply was essential to pollen germination. The percentage of germinated pollen and length of pollen tube *in vitro* were markedly increased as medium B supply increased. Germination was poor at M0 and M10, regardless of B supply to the plants. With high medium B supply, the percentage of germinated pollen and length of pollen tube responded strongly to B supply to the plant. Pollen germination was more severely affected by B deficiency as temperature was increased from 25°C (field temperature) to 30°C.

No differences in pollen viability examined *in vitro* were found between Sonora 64 and SW 41. However, grain set in SW 41 depressed by low B supply, but not in Sonora 64. It indicated that fertilization *in vivo* depressed by B deficiency was more severe in SW 41 than that in Sonora 64. The variation between both genotypes might be due to

differences in either B concentration in stigma and style or sugar supply during pollen tube growth.

The relationship between grain set and B concentration in developing ear was established in SW 41 and BL 1022, and Kanchan, namely, [B] in developing ear was less than or equal to 4.5 mg Bkg^{-1} dry wt, causing poor grain set. In Sonora 64, KUHR 12, CMU 26 and CMU 285, however, grain set was not affected by low [B] in developing ear (3.8-4.2 mg Bkg^{-1} dry wt).

The results from field and pot study indicate that difference in responses to B deficiency among wheat genotypes might be through: 1) the different internal B requirement; 2) the different capacity for B uptake; and 3) the different distribution of B, *e.g.* getting B into the developing spike and/or into pollen, stigma and style during booting. There is a possibility that higher internal B requirement in SW 41, BL 1022 and Kanchan, but with poor ability of uptake B (BL 1022) and with poor distribution of B into the reproductive tissue (SW 41 and Kanchan) may be the cause of sensitivity to B deficiency.

It is unclear on how the effect of B on pollen germination and fertilization was influenced by air temperature and humidity. With pollen developing under low temperature (20°C) and high humidity(60-80%) (sowing date 1), the percentage of germinated pollen *in vitro* was higher than that under high temperature (25°C) and low humidity (50-60%) (sowing date 2); whereas, grain set in B0 plants for SW 41 was better at sowing date 2 than that at sowing date 1.