

CHAPTER 5

CONCLUSION

Conclusion on the plants response to sulfuric acid in simulated rainwater can be drawn from this study as follows;

1. With regard to the sensitivity of plants to acidic rainwater determined from the percentage of seed germination, the highest was found in pole beans while the lowest was found in tobacco (p value = 0.05). The lowest percentage of seed germination was found in simulated rainwater of pH of 2.0 while the highest was found at pH of 5.0 and control treatment.

2. Simulated acid rainwater with lower pH (pH 2.0) produced obvious effects on the seed germination and growth performances of all plants, but no different degrees.

3. With regard to the effect of acidic rainwater on nutrient uptake and visual impact on plants, it was found that acidic rainwater caused damaged plant tissues by necrosis, white spots and brown spots on leaves, stem and reduced yields. The effect depends upon how acidic the precipitation is and the sensitivity of the plants.

4. Different plant species grow best at different pH ranges. For example, tomato treated with acidic conditions, especially when exposed to simulated rainwater at pH's lower than 2.5 and when grown in soils with pH below 5.5. Rice, cucumber, pole bean and tobacco had high survival at the same condition of treated tomato. However, the appearance in total plants to suffer from acidic condition or nutrients deficiencies cause by acidic condition were found at lower pH treatment.

5. The analysis of acidic substances accumulated in rainwater, soil and plants showed that SO_4^{2-} was higher in most samples than other chemical species, due to with sulfuric acid concentrations adjusted in rainwater and SO_4^{2-} accumulating in the soil. This substance accumulated in most rainwater, soil samples and plant tissues at the highest rate, and penetrated plant foliage and soil property. The rates of penetration into plants and soil depended on the acidity of the simulated acid rainwater and plant species.

6. Tomato was the most sensitive plant species to acidic rainwater because it could not grow to mature stage as rice, pole bean, cucumber and tobacco.

7. Natural rainwater in Chiang Mai was weakly acidic in year 2001, and this study found the precipitation will probably not harm plants, especially crop plants. In particular, it will be not reduce percent germination, plant growth or have visible impact on plant tissue including production. Because the pH of natural rainwater in Chiang Mai was not strongly acid and it was neutral.

8. Minimum threshold of plant which tolerant to acidic was found at rainwater pH higher than 3.0, soil pH higher than 6.0.

In conclusion, further studies of the impact on crop and its production should be carried out in the chamber treated with acidic condition, especially on the adverse effects of crop that argued with many industries or power plants. Because they are major sources of acid precursors i.e. sulfur dioxide and nitrogen dioxide. In particularly, orange farm located in South of Bangkok and Pathumthani area where pH of precipitation has been observed by the Pollution Control Department, to be decreasing during the past five years.