

Chapter 2. Site Description

2.1. Location

The sampling site is located at the Royal Pang Da Agricultural Station, Sameong Tai Subdistrict, Sameong District, Chiang Mai Province, at approximately 18 ° 51' N, 98 ° 46' E. (Grid Reference : 757845, Sheet : 4746 I). The station was established in 1984, and it is now the supplier of seeds and seedlings of crops, vegetables and fruit trees to other research stations and farmers in the area. The station is also responsible for instructing the hilltribes in the area on agricultural cultivation. The whole area of the station is 500 rai (20 hectare) , and most of the area is used for cultivation. The sampling area was in the field which has the history of pesticide treatment since the station had been established. The surrounding areas are mountains and mixed deciduous forest with teak bearings.

2.2 Climate

Daily maximum and minimum temperatures, rainfall, and humidity were recorded by the Royal Pang Da Meteorological Station. Table 2.1. shows the monthly rainfall and mean temperature in the sampling year, 1994.

Table 2.1 Monthly rainfall and mean temperature in 1994.

Month	Monthly rainfall (mm)	Monthly mean temperature (°C)
January	0.0	20.0
February	0.7	23.6
March	128.2	27.4
April	21.6	27.7
May	257.5	26.7
June	294.9	25.6
July	198.7	26.4
August	293.3	29.6
September	260.3	25.6
October	116.1	23.0
November	0.0	22.0
December	30.0	20.0

The average temperature of 1994 was 24.8°C. The total rainfall was 1601.3 mm, it was 30.0% higher than the 30 year (1961-1990) average annual rainfall which was 1231.4 mm.

2.3 Soil Description

The physical and chemical characteristics of soil determine the nature of the environment in which microorganisms are found. These environmental characteristics in turn affect the composition of the microscopic community both qualitatively and quantitatively. So, it was necessary to describe the soil profile in the sampling field. A typical soil profile consists of three main horizons identified by the letters A, B, and C. The A horizon, which is the uppermost layer, is commonly called the surface soil. It is in this part of the soil that organic matter is most plentiful and life is most abundant. The B

horizon lies immediately below the A horizon and is often called the subsoil. Living organisms are fewer here than in the A horizon. The C horizon is the deepest of the three and frequently is the parent material from which the A and B horizons originated.

The soil was formerly described by Soil Survey Laboratory, Department of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University.

The soil was named as Pang Da series (tentative), and higher category classification was Humic Alisols (FAO), or Ultic Paleustalfs, fine clayey, illitic!, and hyperthermic (USDA).

Generally, the parent material of soil was residual material derived from shale and limestone. The soil was well drained, moist throughout, fairly stony and slightly rocky. The soil color was dark reddish brown in the A horizon and yellowish red to red in the B horizon. The texture was clay loam in the surface and clay with well - developed cutans in the subsurface horizon. The structure was very fine and strongly developed granular in the A horizon and moderately developed medium and coarse subangular blocky in the B horizon, friable in the upper 60 cm and slightly firm at depth.

Two one meter deep profile were made by soil auger in the sampling field and described in Table 2.2.

Table 2. 2. Soil profile description in the sampling field. *

Horizon	Depth	Description
Part I. Soybean Field		
Ap	0 - 14	Dark reddish brown, 5YR3/4; moist silty clay; fine and weak structure; friable when moist, sticky and plastic when wet;
AB	14 - 55	Dark reddish brown, 5YR3/4; moist clay; fine weak structure; friable when moist, sticky and plastic when wet; roots absent.
Bt1	55 -100 ⁺	Dark reddish brown, 5YR3/3, moist silty clay; fine and moderate structure; friable when moist, wery sticky and plastic when wet, roots absent.
Part II. Vegetable Field		
Ap1	0 - 3	Dark brown, 10YR3/2. Moist silty clay; fine and weak structure, friable when moist, slightly sticky and plastic when wet; roots absent.
Ap2	3 - 19	Dark brown, 7.5 YR3/2, moist silty clay; fine and weak structure; friable when moist, sticky and plastic when wet; roots absent.
AB	19 - 58	Dark reddish brown, 2.54YR3/2, moist clay, medium and moderate structure; friable when moist; sticky and plastic when wet.
Bt1	58 - 100 ⁺	Dark reddish brown, 2.5YR2/2; moist clay; medium and moderate structure; friable when moist sticky and plastic when wet; roots absent.

* The profiles were described according to the FAO's guidelines. (FAO,1977). The symbols are defined as follows:

A: A horizon;

B: B horizon;

AB: Transitional horizon between A and B horizons.

p: disturbed by plough;

t: illuvial accumulation of clay;

Arabic figures: vertical subdivisions of one horizon.

2.4. Usage of Pesticides

Generally, pesticides are applied to the field when it is necessary. The dosage of application follows the instruction on the label. Table 2.3 gives the list of pesticides by their common names which are used at the Royal Pang Da Agriculture Station.

Table 2.3. Pesticides used at Royal Pang Da Agricultural Station

Fungicide	Insecticide	Herbicide
Benomyl	Acephate	Alachor
Captan	<i>Bacillus thuringiensis</i>	Butachlor
Carbendazim	Calcium polysulfide	Glyphosate
Copper oxychloride	Carbaryl	Haloxifop
Cufraneb	Carbofuran	Paraquat
Dicloran	Chlorpyrifos	
Fosetyl	Endosulfan	
Iprodione	Lambda-cyhalothrin	
Mancozeb	Methamidophos	
Metalaxyl	Methomyl	
Oxycarboxin	Monocrotophos	
Procymidone	Oxamyl	
Quintozene	Permethrin	
Sulfur	Pirimiphos-methyl	
Triforine		