



Appendix

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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Table appendix 1 Climatological data for 4 plantation area for crop season of 2004-2006.

Months	Temperature (°C)			Relative Humidity (%)			Rain fall	
	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Number of rainy day	Monthly total rainfall
Nakhonphanom								
May-04	33.9	24.4	29.2	80	59	69	14	122.8
Jun-04	32.7	24.4	28.6	88	64	73	19	154.3
Jul-04	31.2	23.9	27.6	84	65	74	24	249.0
Aug-04	31.0	24.2	27.6	91	69	77	29	466.3
Sep-04	31.0	22.9	27.0	89	68	79	14	442.2
Oct-04	31.3	19.1	25.2	75	63	72	1	6.4
Nov-04	31.3	17.1	24.2	83	64	70	0	0.0
Dec-04	29.3	12.7	20.7	74	63	68	0	0.0
Jan-05	30.1	14.8	22.5	72	62	68	0	0.0
Feb-05	34.3	19.7	27.0	77	60	69	0	0.0
Mar-05	32.7	19.8	24.8	78	59	70	5	29.7
Apr-05	34.8	23.0	28.9	86	63	73	6	111.4
May-05	34.2	24.7	25.0	92	66	81	18	112.2
Jun-05	31.5	24.7	28.1	98	80	87	21	400.7
Jul-05	31.4	24.5	28.0	99	79	89	21	382.0
Aug-05	29.4	24.0	26.7	96	80	87	29	619.3
Sep-05	32.1	23.9	28.0	96	75	81	16	348.4
Oct-05	31.4	21.1	26.3	92	68	76	4	18.4
Nov-05	31.2	19.0	25.1	83	67	73	2	1.0
Dec-05	27.7	14.6	21.2	75	50	68	1	0.2
Jan-06	30.5	14.6	22.6	73	60	67	0	0.0
Feb-06	31.3	18.0	24.7	82	58	66	3	58.6
Mar-06	33.3	21.2	27.3	91	62	69	6	147.1
Apr-06	34.4	23.3	28.9	80	58	73	5	89.9
Phrae								
May-04	34.5	25.0	29.7	85.0	49.6	67.3	10	228.6
Jun-04	32.3	24.5	28.4	87.2	66.0	76.6	13	292.9
Jul-04	31.1	24.5	27.8	93.3	67.3	80.3	12	174.9
Aug-04	32.4	24.8	28.6	89.8	65.0	77.4	6	41.2
Sep-04	31.7	24.2	27.9	92.0	67.0	79.5	13	235.7
Oct-04	32.5	22.2	27.3	91.2	62.2	76.6	1	2.7
Nov-04	31.6	19.7	25.6	92.8	60.2	76.5	2	14.1
Dec-04	29.6	14.15	21.86	92.8	60.2	76.5	1	10.2
Jan-05	31.5	16.1	23.8	92.2	46.4	69.3	2	2.5
Feb-05	35.0	18.1	26.5	87.7	37.5	62.6	0	0.0
Mar-05	35.3	20.8	28	81.3	35.8	58.5	3	51.7
Apr-05	36.8	23.5	30.1	79.6	44.8	62.2	5	31.4
May-05	36.3	24.5	30.4	82.0	47.6	64.8	5	61.2
Jun-05	32.5	23.3	27.9	88.2	59.1	73.6	11	107.3
Jul-05	32.5	23.5	28	86.4	57.3	71.8	12	222.4
Aug-05	32.2	23.4	27.8	90.3	66.0	78.1	10	173.8
Sep-05	31.9	21.1	26.5	91.7	72.6	82.1	18	408.4
Oct-05	32.6	21.6	27.1	91.2	64.2	77.6	1	52.0
Nov-05	31.4	17.4	24.4	92.7	62.0	77.3	3	27.1
Dec-05	29.1	14.5	21.8	92.7	62.0	62.0	1	12.3
Jan-06	31.3	13.3	22.3	92.0	45.0	68.5	0	0.0
Feb-06	33.5	19.3	26.4	88.6	37.7	63.1	0	0.0
Mar-06	36.8	23.1	29.9	83.5	57.0	70.2	1	23.2
Apr-06	36.7	24.6	30.6	83.7	52.8	68.2	8	76

Table appendix 1 (Continued)

Months	Temperature (°C)			Relative Humidity (%)			Rainfall	
	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Number of rainy day	Monthly total rainfall
Phurua								
May-04	27.1	25.9	26.5	97.2	95.3	96.2	17	299.3
Jun-04	26.4	19.3	22.8	97.5	88.8	93.1	20	340.2
Jul-04	26.9	19.8	23.3	95.3	94.7	95.0	23	330.2
Aug-04	26.5	19.8	23.1	97.3	96.1	96.7	22	218.3
Sep-04	26.9	18.7	22.8	98.9	91.5	95.2	21	321.9
Oct-04	27.4	15.9	21.6	94.3	88.8	91.5	0	0.0
Nov-04	27.2	13.9	20.5	95.8	83.0	89.4	0	0.0
Dec-04	25.5	9.3	17.4	92.7	76.7	84.7	0	0.0
Jan-05	27.4	10.6	19.0	96.7	79.9	88.3	1	4.4
Feb-05	26.9	14.6	20.7	94.4	82.4	88.4	1	1.5
Mar-05	29.5	14.9	22.2	92.1	72.6	82.3	5	33.4
Apr-05	31.3	17.6	24.4	92.6	79.6	86.1	12	163.2
May-05	30.1	20.0	25.0	96.1	92.3	94.2	10	84.6
Jun-05	27.5	20.5	24.0	98.1	95.0	96.5	25	271.9
Jul-05	27.4	20.0	23.7	96.0	94.8	95.4	20	307.7
Aug-05	26.2	19.9	23.0	96.0	92.7	94.3	25	197.8
Sep-05	26.3	18.9	22.6	95.5	95.2	95.3	27	691.2
Oct-05	27.7	17.6	22.6	92.2	88.5	90.3	12	74.2
Nov-05	26.6	15.4	21.0	97.0	87.3	92.1	9	89.7
Dec-05	32.0	11.8	21.9	90.2	82.0	86.1	1	0.1
Jan-06	27.6	9.8	18.7	96.0	84.8	90.4	0	0.0
Feb-06	25.6	14.0	19.8	95.7	79.5	87.6	4	45.5
Mar-06	29.3	16.8	23.0	94.9	73.2	84.0	7	65.6
Apr-06	30.8	18.6	24.7	96.0	87.0	91.5	18	263.3
Macchonluang								
May-04	25.7	18.7	22.2	90.3	77.7	84.0	24	396.1
Jun-04	22.9	17.9	20.4	91.9	83.5	87.7	23	272.4
Jul-04	23.2	17.8	20.5	91.9	81.8	85.9	29	202
Aug-04	22.5	18.1	20.3	93.0	84.6	88.8	30	306.9
Sep-04	22.6	18.0	20.3	91.0	80.5	86.0	24	479.1
Oct-04	22.5	16.6	19.9	85.7	72.1	78.9	7	57.7
Nov-04	25.3	15.0	19.0	83.0	68.0	76.0	3	23
Dec-04	21.4	10.9	16.1	75.6	58.4	68.0	0	0.0
Jan-05	24.6	11.8	18.2	76.0	61.8	68.0	0	0.0
Feb-05	27.9	14.3	21.1	67.1	61.9	57.6	0	0.0
Mar-05	28.7	16.3	22.6	73.9	52.5	63.1	3	11.2
Apr-05	29.0	17.6	23.3	78.8	56.0	67.4	3	36.5
May-05	28.1	19.0	23.5	87.8	68.9	78.4	13	149.3
Jun-05	24.2	18.6	21.3	91.9	83.9	87.8	30	401
Jul-05	23.4	17.6	22.4	93.0	84.1	88.5	29	306.9
Aug-05	22.0	18.0	20.0	93.0	86.0	89.6	25	175.6
Sep-05	22.9	18.2	20.5	92.6	80.5	86.6	27	697.2
Oct-05	24.2	16.9	20.5	87.6	82.4	85.0	26	341.7
Nov-05	25.0	15.0	20.0	87.0	81.0	84.0	14	114.8
Dec-05	19.5	12.0	16.0	83.4	76.9	80.1	6	78.7
Jan-06	23.8	11.7	17.7	60.9	53.0	57.0	0	0.0
Feb-06	25.0	13.0	19.0	67.0	54.5	61.0	0	0.0
Mar-06	30.0	17.0	24.0	71.0	53.0	62.0	2	48.7
Apr-06	28.8	17.3	23.0	78.8	68.6	74.7	11	176.1

Table appendix 2 Plantation soil components of each area in crop season of 2005-2006.

Plantation area	Major element					pH	Organic matters	Soil component (%)			Soil texture
	N (%)	P (ppm)	K (ppm)	Ca (ppm)	Mg (ppm)			Sand	Silt	Clay	
Nakonphanom	0.054 b	154.93 a	49.33 b	728.00 b	54.00 b	5.53 b	1.09 b	45.43 a	41.39 a	24.52 ns	Sandy loam, Loam, Silt loam
Phare	0.073 b	29.73 b	151.67 ab	1,264.00 a	189.00 a	6.32 a	1.46 b	43.43 a	36.05 a	20.52	Sandy loam- Loam
Phurua	0.096 b	5.41 b	243.33 a	144.00 c	34.33 b	4.08 c	1.93 b	28.76 b	32.05 a	35.18	Clay loam-clay
Meachonluang	0.210 a	11.02 b	294.00 a	378.67 c	107.33 b	4.38 c	4.18 a	57.43 a	12.05 b	30.52	Sandy clay loam-Sandy clay
Mean	0.108	50.275	184.58	628.67	96.17	5.08	2.16	43.76	30.39	27.68	
SD	0.070	66.66	123.10	467.68	76.02	0.97	1.40	12.50	13.23	10.94	
CV%	33.52	44.49	47.81	29.40	52.68	5.25	33.50	17.60	24.70	39.13	

Mean within the same column with different common letters differ significantly by DMRT; * = $p < 0.05$, ** = $p < 0.01$, ns = non-significance

* Mid-rainy season was late July 2003, whereas late-rainy season was early October 2003.

§ The planting soil of 4 plantation area in crop season of 2005-2006 were analysed

Table appendix 3 Leaf mineral contents of Krachai-Dam by each factors studied in crop season of 2005-2006.

Factor	Major element contents (%)					Minor element contents (ppm)				
	N	P	K	Ca	Mg	Zn	Mn	Fe	Cu	
Cultivar (factor 1)										
Nam-Juang	0.201 ns	0.245 ns	3.680 ns	0.804 ns	0.395 ns	34.39 ns	316.83 ns	698.06 ns	24.39 ns	
Rom-Klao	0.193	0.246	3.708	0.767	0.378	34.28	317.22	593.33	17.39	
Kheg-Noi#2	0.209	0.228	3.870	0.881	0.399	31.94	407.67	528.33	16.17	
Collecting time (factor 2)										
Mid-rainy season	0.194 ns	0.208 b	3.756 ns	0.786 ns	0.395 ns	31.15 b	369.93 ns	414.48 b	8.26 b	
Late-rainy season	0.208	0.272 a	3.877	0.848	0.387	35.93 a	324.56	798.67 a	30.37 a	
tx2	*	ns	ns	ns	ns	ns	ns	ns	ns	

Mean within the same column with different common letters differ significantly by DMRT; * = $p < 0.05$, ** = $p < 0.01$, ns = non-significance

* Mid-rainy season was late July 2003, whereas late-rainy season was early October 2003.

Table appendix 4 Factor combination between cultivars and collecting times on Leaf mineral contents of Krachai-Dam in crop season of 2005-2006.

Factor combination		Major element contents (%)					Minor element contents (ppm)				
Cultivar	Collecting time	N	P	K	Ca	Mg	Zn	Mn	Fe	Cu	
Nam-Juang	Mid-rainy season	0.181 c	0.201 ns	3.557 ns	0.793 ns	0.398 ns	29.78 ns	346.78 ns	462.11 ns	9.33 ns	
	Late-rainy season	0.220 a	0.289	3.805	0.815	0.392	39.00	286.89	934.00	39.44	
Rom-Klao	Mid-rainy season	0.200 abc	0.224	3.908	0.729	0.383	32.22	299.33	397.11	8.11	
	Late-rainy season	0.186 bc	0.268	4.015	0.804	0.374	36.33	335.11	789.56	26.67	
Kheg-Noi#2	Mid-rainy season	0.201 abc	0.198	3.804	0.837	0.405	31.44	463.67	384.22	7.33	
	Late-rainy season	0.217 ab	0.258	3.810	0.925	0.394	32.44	351.67	672.44	25.00	
Mean		0.201	0.240	3.817	0.817	0.391	33.54	347.24	606.57	16.35	
SD		0.033	0.075	0.397	0.020	0.051	8.71	150.78	380.78	25.27	
CV%		15.49	29.02	10.24	24.09	13.50	25.42	41.91	55.00	120.74	

Mean within the same column with different common letters differ significantly by DMRT; * = $p < 0.05$, ** = $p < 0.01$, ns = non-significance

* Mid-rainy season was late July 2003, whereas late-rainy season was early October 2003.

Table appendix 5 Vegetative growth of Krachai-Dam plants which were grown in crop season of 2003-2004 at Phurua area.

Cultivar	Survival percentage	Bunch circle (cm)	Height (cm)
Nam-Juang	66.85 ab	25.62 b	27.31 b
Rom-Klao	17.57 b	23.64 c	25.38 c
Kheg-Noi#2	74.28 a	30.30 a	29.64 a
Mean	52.90	26.90	27.70
SD	35.91	5.49	3.90
CV%	52.45	17.67	17.80

Table appendix 6 Vegetative growth of Krachai-Dam plants which were grown in crop season of 2004-2006 (2 crop cycle) and 2005-2006 (1 crop cycle) by each factor studied.

Factor	Vegetative growth	
	Bunch circle (cm)	Height (cm)
Areas (factor 1)		
Nakonphanom	24.84 c	29.05 c
Phrae	24.26 c	33.88 a
Phurua	26.74 ab	27.94 c
Machonluang	28.51 b	32.44 b
Crop season (factor 2)		
1 season	25.36 b	29.85 b
2 season	28.68 a	34.81 a
1x2	**	**

#Mean within the same column with different common letters differ significantly by DMRT; * = $p < 0.05$, ** = $p < 0.01$, ns = non-significance

Table appendix 7 Factor combination between plantation area and crop cycle on vegetative growth of Krachai-Dam plants.

Factor combination		Vegetative growth	
Area	Crop cycle	Bunch circle (cm)	Height (cm)
Nakonphanom	1 season	22.68 d	28.05 cd
	2 season	27.00 bc	30.06 bc
Phrae	1 season	23.30 d	32.13 b
	2 season	25.22 c	35.62 a
Phurua	1 season	26.03 c	27.61 d
	2 season	28.87 b	28.14 cd
Machonluang	1 season	25.42 c	30.69 b
	2 season	34.70 a	35.96 a
Mean		25.85	31.31
SD		5.69	6.39
CV%		19.23	17.96

#Mean within the same column with different common letters differ significantly by DMRT; * = $p < 0.05$, ** = $p < 0.01$, ns = non-significance

Table appendix 8 Wine Appreciation chart

No.Date :.....						
Name :Surname.....						
Sex.....Age.....						
Wine qualities		Wine code				
1. Appearance (x2) (turbid, clear, brilliant)						
2. Color (x1) (lighter, normal, darker)						
3. Varietal aroma & Bouquet (x6)						
4. Flavor (x3)						
5. Acidity (x2) (lower, right, over)						
6. Defects (x2) (acetic, oxidized, moldy, oaky, sulfury, sulfide, bad after-taste, bitter)						
7. General Quality (x4) (body, astringency, age, balance, after-taste)						
Total						

Remarks: Score each parameter 0 → 5 ; then multiply by

Rating : 100 – 96 superior

95 – 86 excellent

85 – 71 good

70 – 56 standard

55 – 41 below standard

40 – 0 unacceptable

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Curriculum vitae**Name** Mrs. Siriporn Pojanagaroon**Date of Birth** October 27, 1979**Education record**

Certificate / Degree	Institute	Academic year
Mathayom 6	Maechanwitthayakom School, Chiang Mai	1994
B.S. (Agriculture)	Faculty of Agriculture, Chiang Mai University, Chiang Mai	1998
M.S. (Horticulture)	Faculty of Agriculture, Chiang Mai University	2000

Present Position Horticulturist 4**Present Address** Official of Agricultural and Development Region 1 (Chiang Mai), Department of Agriculture, Ministry of Agriculture and Cooperatives.

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