

## CHAPTER III

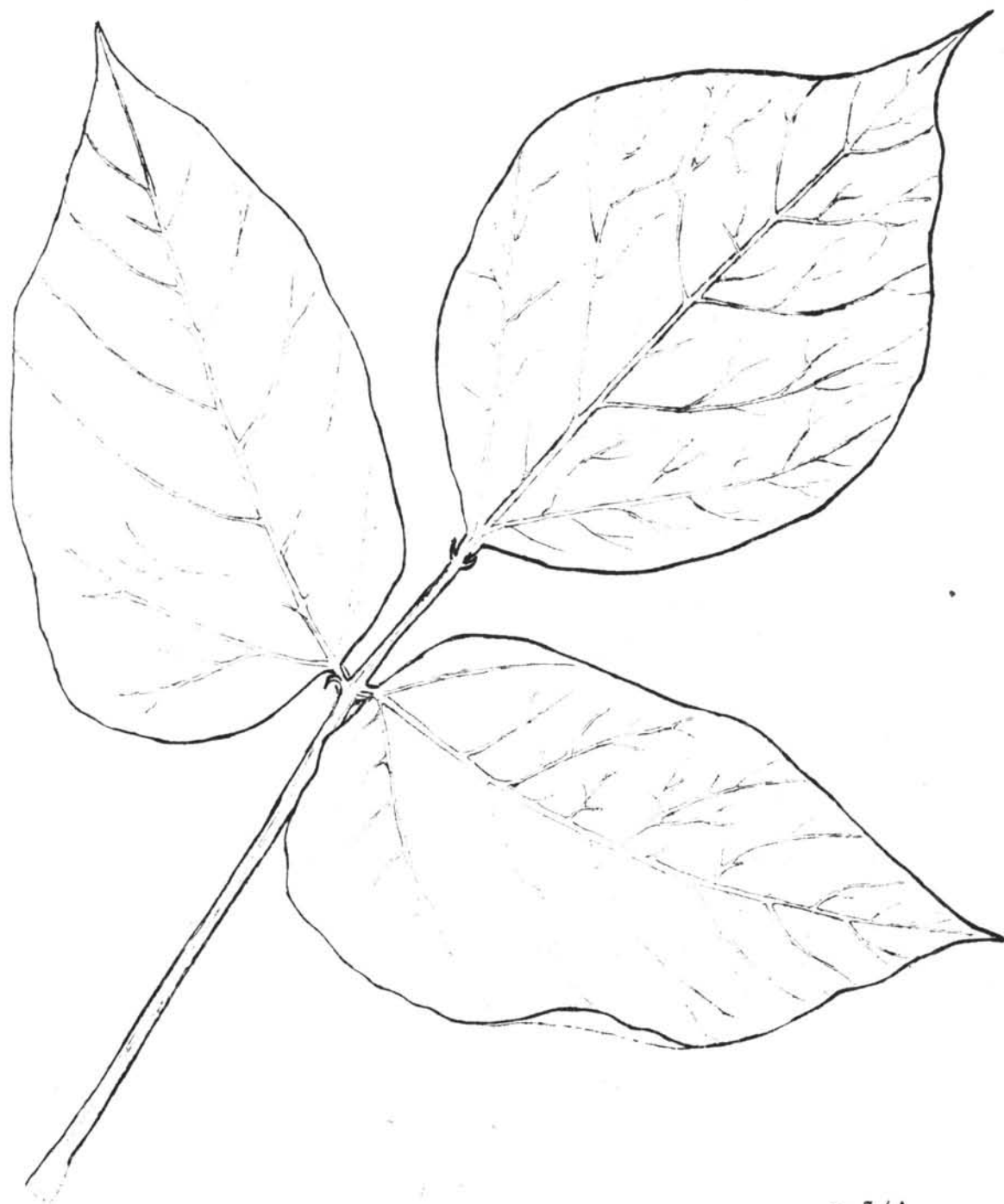
RESULTS & DATADescriptions of Plants :

Pueraria mirifica Airy Shaw et Suyatabandhu (Guao Krüa) is a woody vine, roots bearing tubers, leaves pinnately 3-foliolate, stipulate; terminal leaflet, rhomboid and the lateral, ovate in shape, acute apex, membranous texture with soft hairs lay flat to the lamina (Fig. 10, 11). The description of flowers is obtained from the former record that the flower is small, about 8 mm long and 2 mm wide, blue purple, in long and dense axillary racemes, bracts and bracteoles small, caducous, calyx campanulate, with unequal lobes<sup>(4)</sup>.

Roots, tuberous, nearly round, or ellipsoid, one or being chain of 3-4 tubers (moniliform), vary in size from small to about 20 cm in diameter, white pulp containing starch, with lumen and whitish sap (Fig. 12, 13, 14).

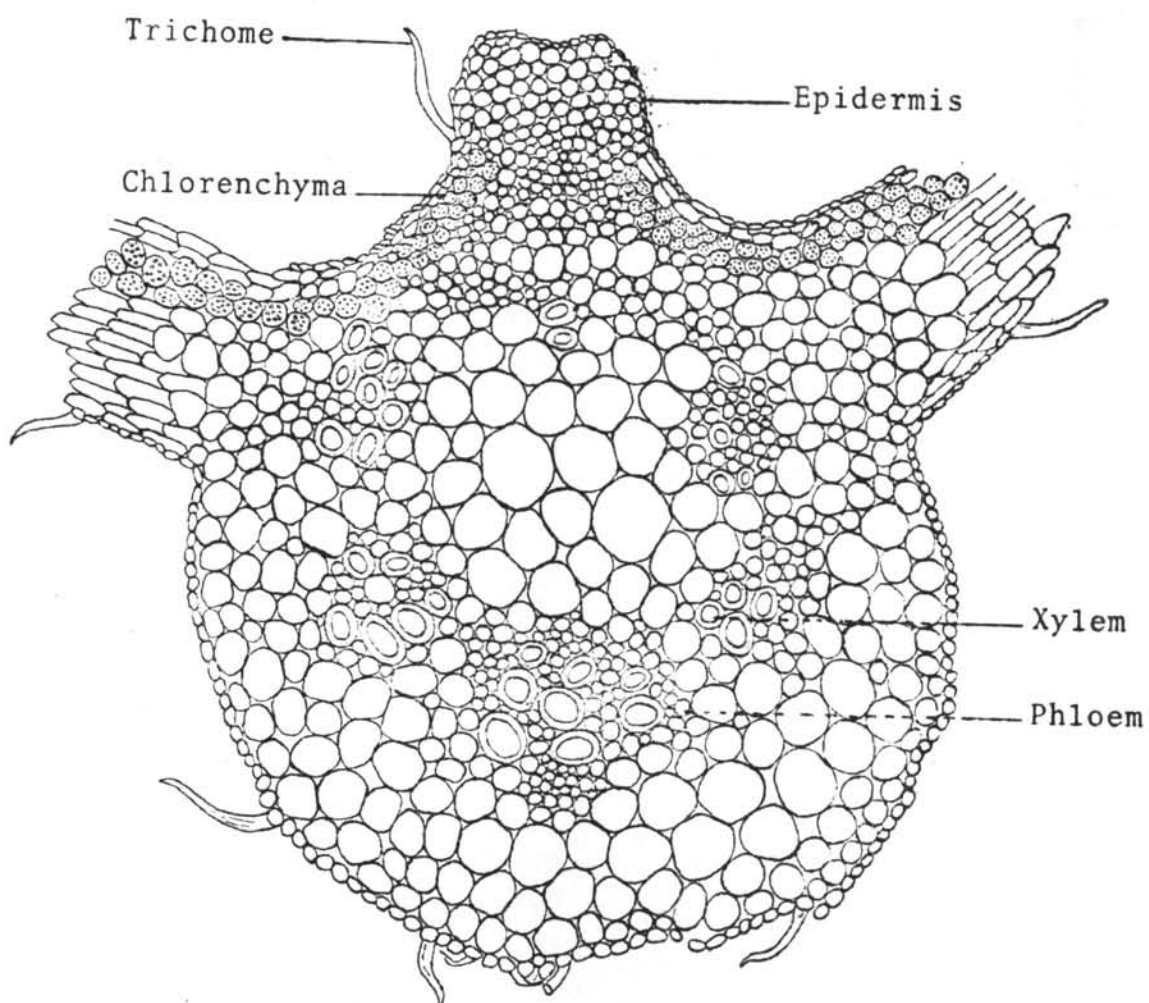
Butea superba Roxb. is a woody climbing plant, root bearing tubers, leaves pinnately 3-foliolate, leaflets large thick in texture, stouter midrib and frequently retuse at apex, terminal leaflet larger than the lateral ones (Fig. 16).

Root is tubular and tapering in shape with sticky bloody mass between the layers of peel, pulp pale yellow, fibrous, starchy, the cut surface turns brown soon after cutting (Fig. 17, 18).



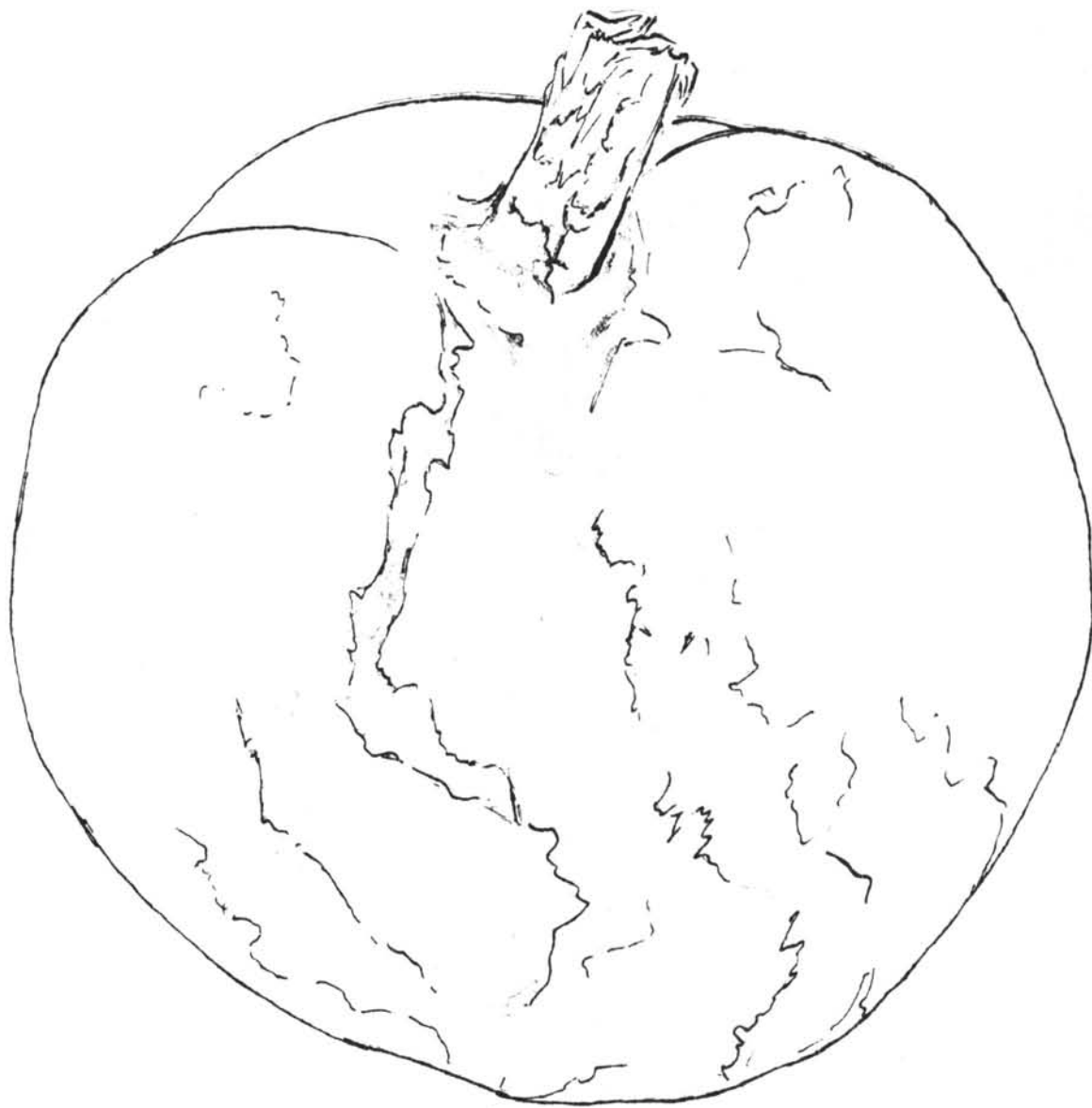
x 3/4

Fig. 10. Pueraria mirifica leaf



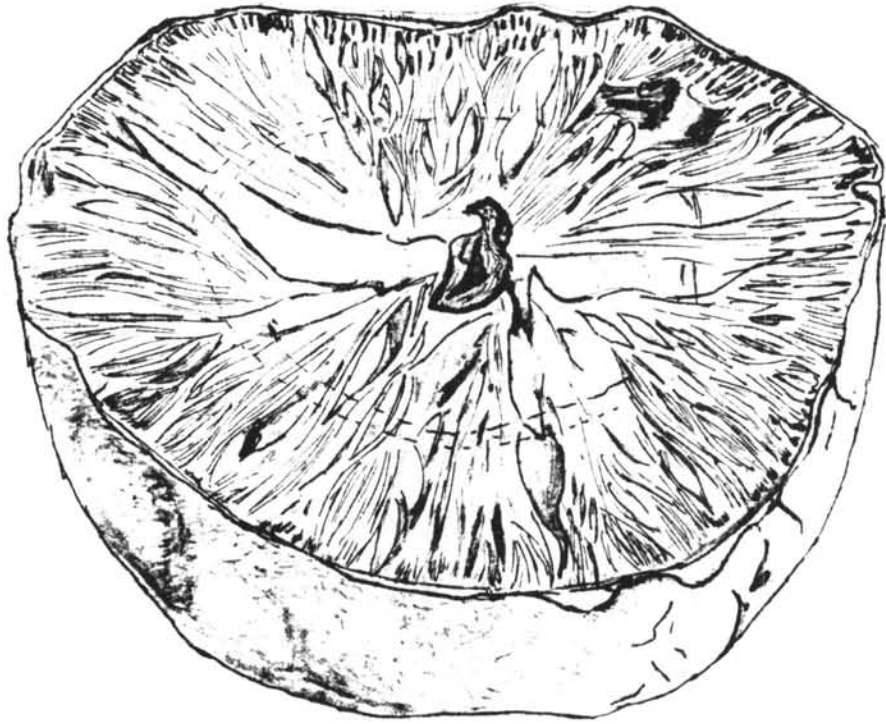
x 90

Fig. 11. Transverse section at the midrib of Pueraria mirifica leaf



x 1

Fig. 12. Tuberous root of Pueraria mirifica



x 1

Fig. 13. Transverse section of Tuberous root  
of Pueraria mirifica

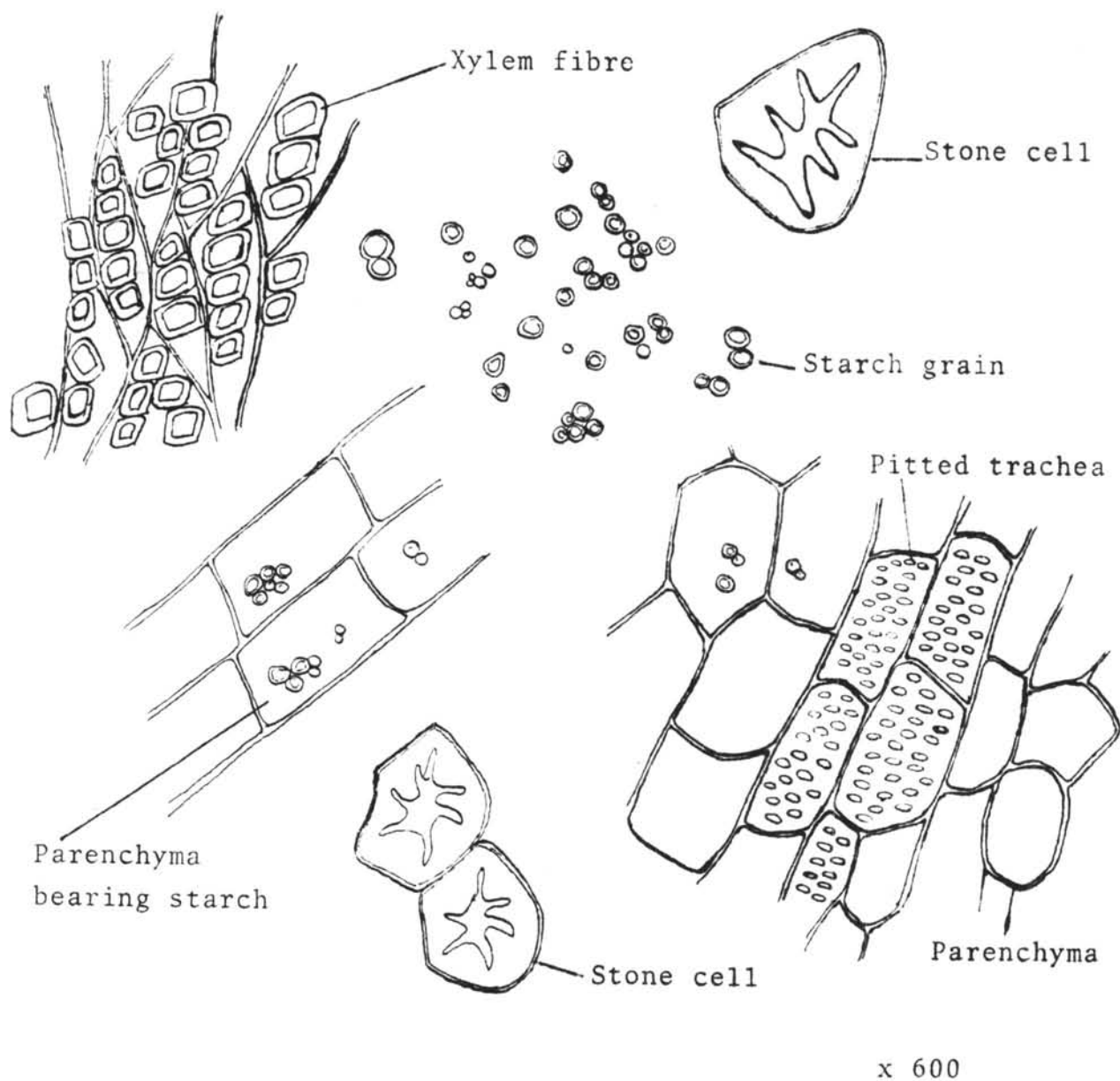
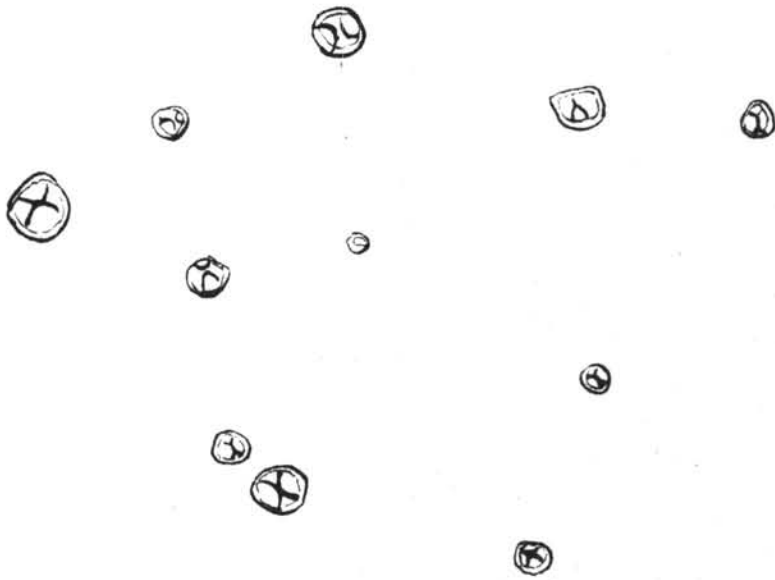


Fig. 14. Powder Tuberos root elements of Pueraria mirifica

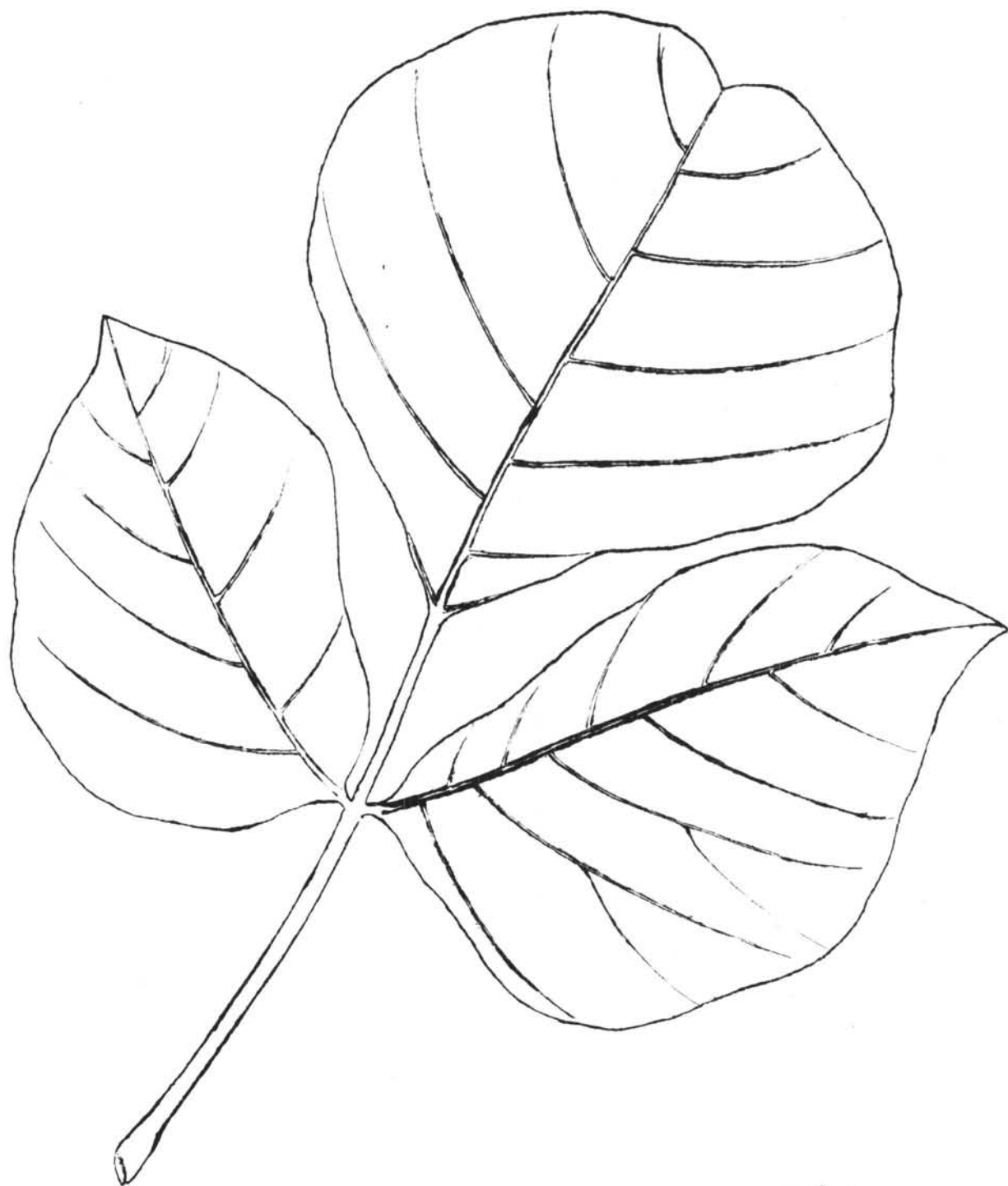


x 600

Fig. 15. Starch grains of Tuberos root of Pueraria mirifica under polarised light

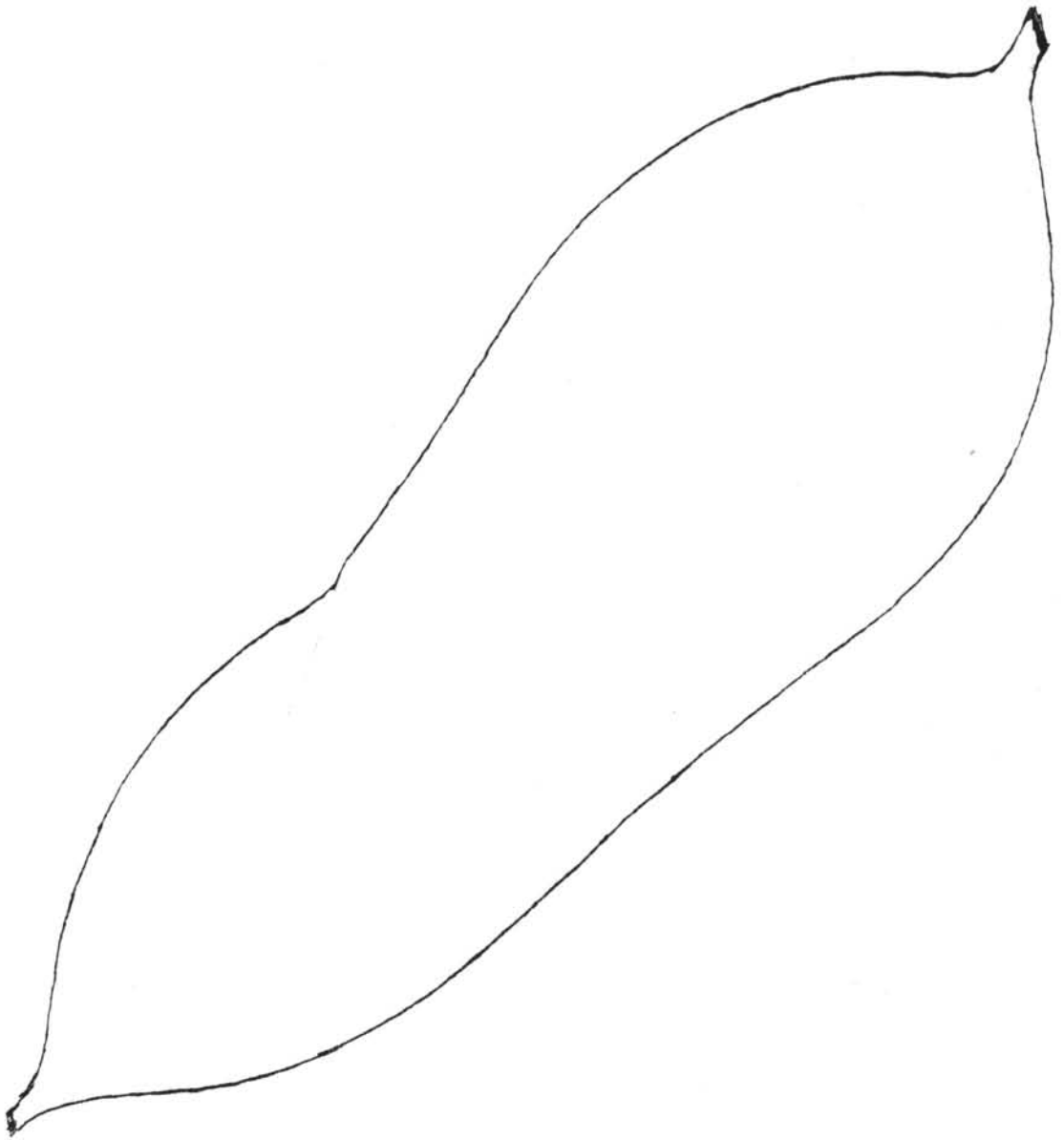
Size of starch grain 1.8-11  $\mu$





x 0.3

Fig. 16. Butea superba leaf



x 1/3

Fig. 17. Tuberous root of Butea superba

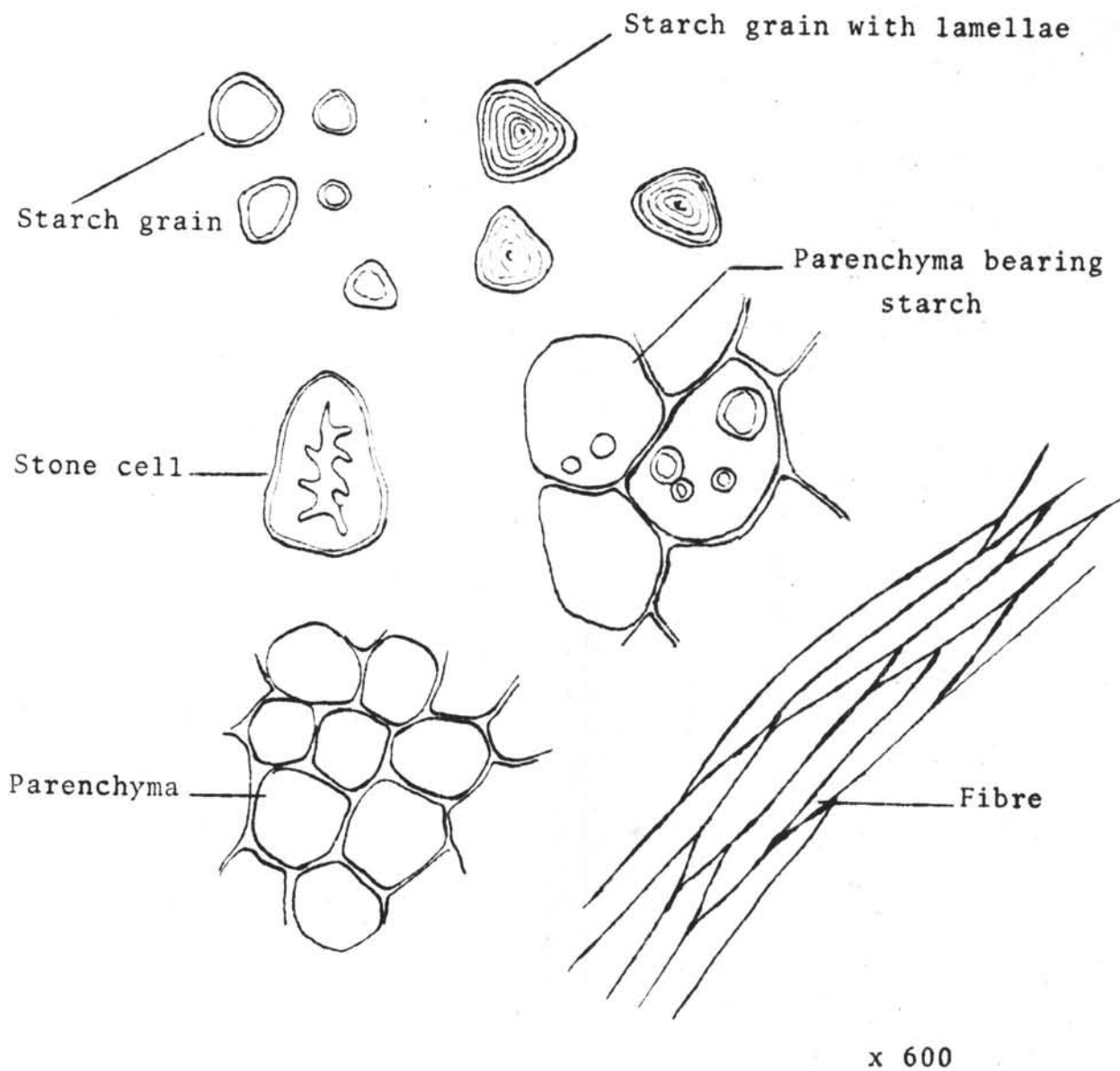
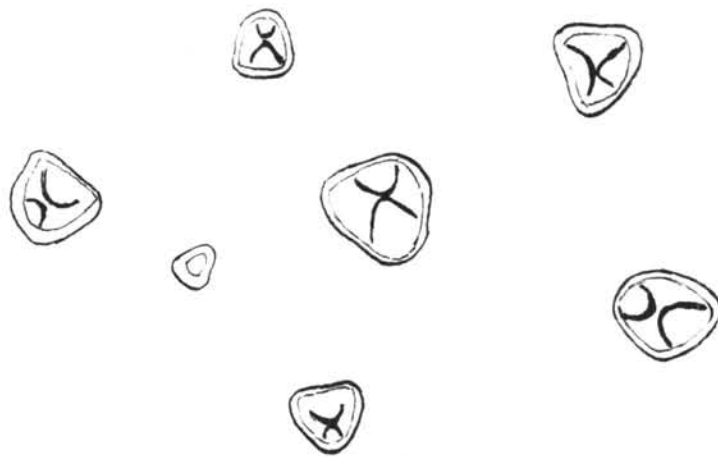


Fig. 18. Powder Tuberous root elements of Butea superba



x 600

Fig. 19. Starch grains of Tuberos root of Butea superba under polarised light

Size of starch grain 32-12.7  $\mu$

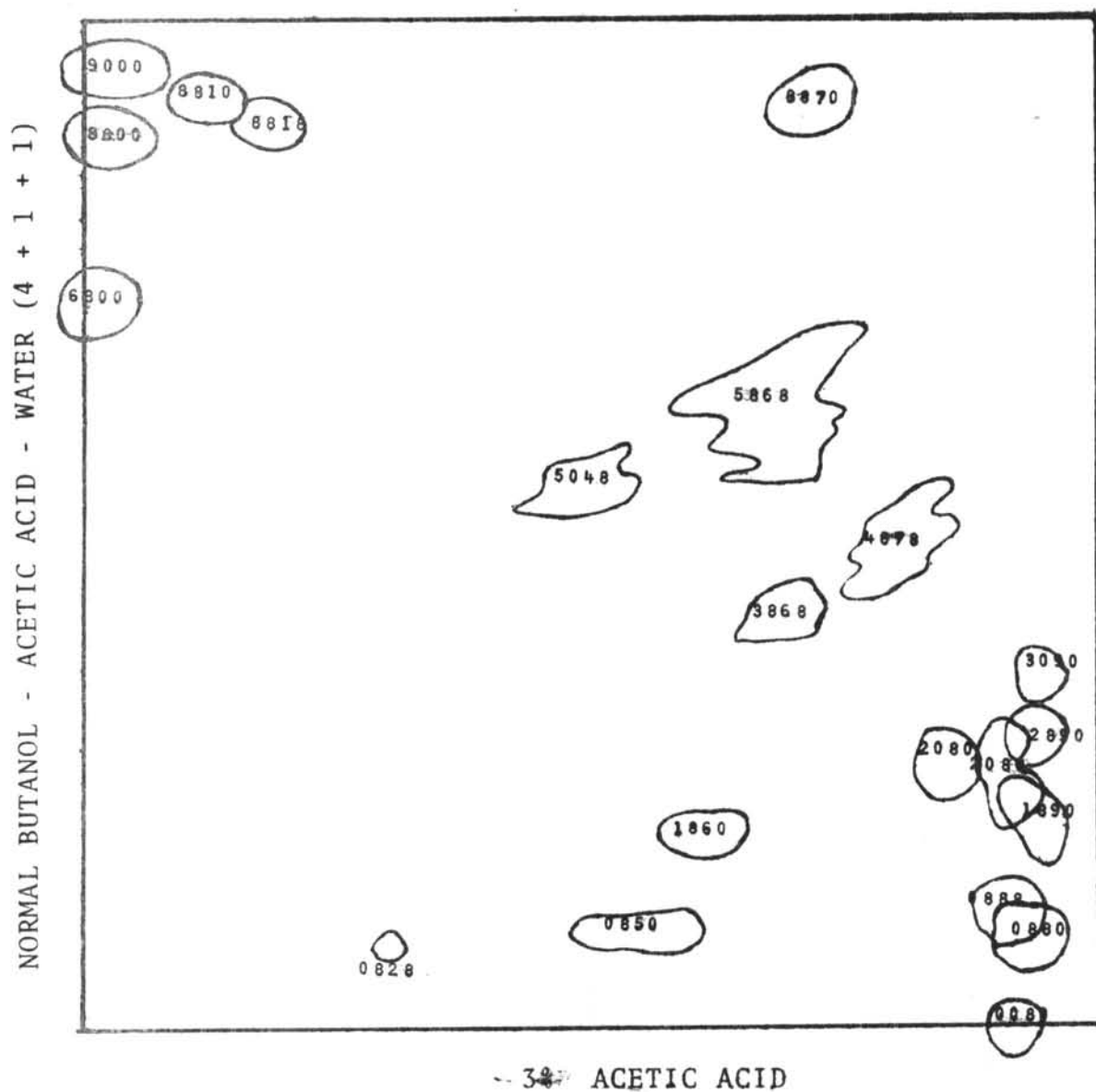


Fig. 20. Two-dimensional chromatogram of Tuberous root of Pueraria mirifica

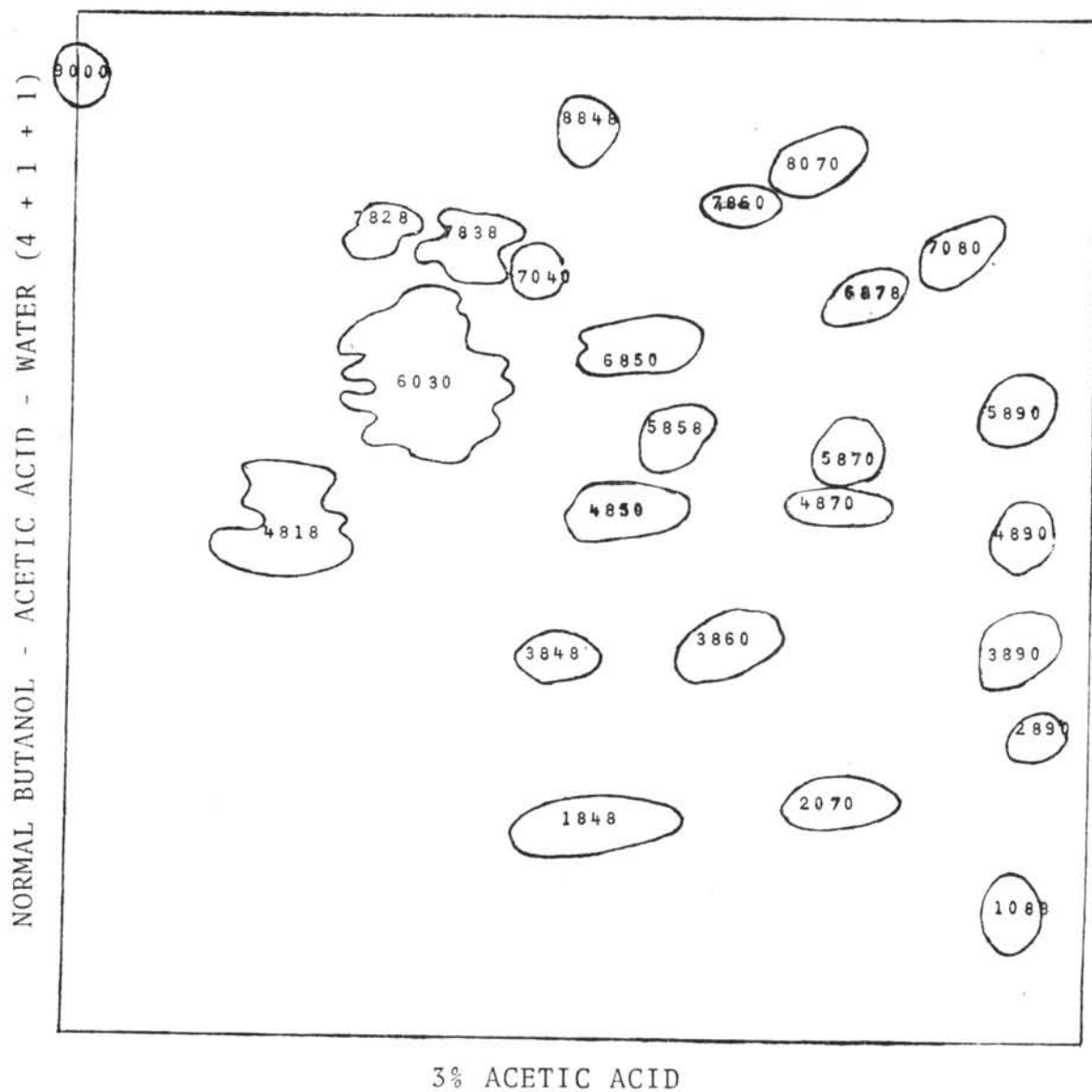


Fig. 21. Two-dimensional chromatogram of Pueraria mirifica leaf

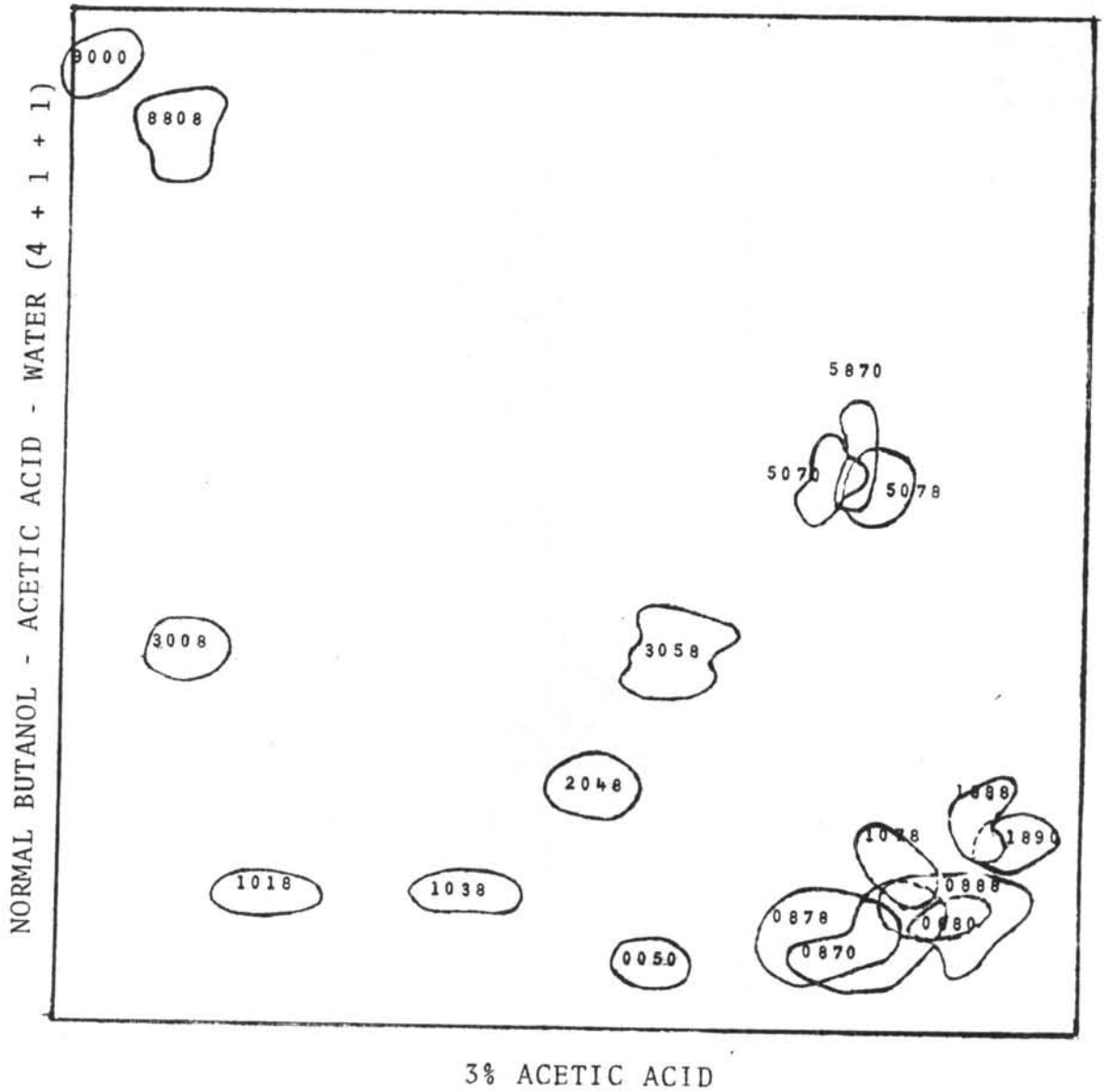


Fig. 22. Two-dimensional chromatogram of  
Tuberous root of Butea superba

TABLE 1

Data on Palisade Ratio Determination of *Pueraria mirifica*

Number of Palisade cells to four epidermal cells	Palisade Ratio	D	D <sup>2</sup>
37	9.25	-0.89	0.7921
35	8.75	-1.39	1.9321
40	10.00	-0.14	0.0196
40	10.00	-0.14	0.0196
40	10.00	-0.14	0.0196
40	10.00	-0.14	0.0196
39	9.75	-0.39	0.1521
42	10.50	0.36	0.1296
49	12.25	2.11	4.4521
47	11.75	1.61	2.5921
40	10.00	-0.14	0.0196
34	8.50	-1.64	2.6896
48	12.00	1.86	3.4596
45	11.25	1.11	1.2321
42	10.50	0.36	0.1296
44	11.00	0.86	0.7396
42	10.50	0.36	0.1296
42	10.50	0.36	0.1296
38	9.50	-0.64	0.4096
43	10.75	0.61	0.3721
38	9.50	-0.64	0.4096
40	10.00	-0.14	0.0196
38	9.50	-0.64	0.4096
38	9.50	-0.64	0.4096
40	10.00	-0.14	0.0196
39	9.75	-0.39	0.1521
38	9.50	-0.64	0.4096
42	10.50	0.36	0.1296
40	10.00	-0.14	0.0196
37	9.25	-0.89	0.7921

Mean of Palisade Ratio = 10.14

Standard deviation = 1.189

D = Deviation from mean





TABLE 2

Stomatal Number and Stomatal Index Determination of *Pueraria mirifica*

Number of Stomata		Number of Epidermal Cells		Stomatal Number		Stomatal Index		Ratio of L/U.
L.	U.	L.	U.	L.	U.	L.	U.	
8	1	50	50	254.55	31.82	13.79	1.96	8
8	1	42	39	254.55	31.82	16.00	2.50	8
9	1	49	38	286.36	31.82	15.52	2.56	9
8	1	40	31	254.55	31.82	16.67	3.13	8
8	1	40	37	254.55	31.82	16.67	2.63	8
7	1	43	43	222.73	31.83	14.00	2.27	7
8	2	45	42	254.55	63.64	15.09	4.55	4
6	1	41	36	190.91	31.82	12.76	2.70	6
6	2	41	42	190.91	63.64	12.76	4.55	3
9	2	45	49	286.36	63.64	16.67	3.92	4.5
6	1	42	37	190.91	31.82	12.50	2.63	6
8	1	46	36	254.55	31.82	14.81	2.56	8
9	1	46	39	286.36	31.82	16.36	2.50	9
9	2	47	40	286.36	63.64	16.07	4.76	4.5
7	1	39	36	222.73	31.82	15.22	2.70	7
7	1	39	31	222.73	31.82	15.22	3.20	7
11	2	55	44	350.00	63.64	16.67	4.35	5.5
6	1	39	43	190.91	31.82	13.33	2.27	6
10	1	57	48	318.18	31.82	14.93	2.04	10
8	1	44	38	254.55	31.82	15.38	2.56	8
8	1	42	37	254.55	31.82	16.00	2.63	8
8	1	41	35	254.55	31.82	16.33	2.78	8
9	2	43	43	286.36	63.64	17.50	4.44	4.5
7	1	43	34	222.73	31.82	14.00	2.86	7
10	1	47	41	318.18	31.82	17.54	2.38	10
6	1	43	42	190.91	31.82	12.24	2.33	6
9	1	52	35	286.36	31.82	14.75	2.78	9
11	1	55	38	350.00	31.82	16.67	2.56	11
12	1	52	43	381.82	31.82	18.75	2.27	12
9	1	42	37	286.36	31.82	17.65	2.63	9

L. = lower surface of the leaf; U. = upper surface of the leaf  
 Area of determination = 0.0314 mm<sup>2</sup>  
 Mean of Stomatal Number of lower surface = 261.97  
 Mean of Stomatal Number of upper surface = 38.18  
 Mean of Stomatal Index of lower surface = 15.40  
 Mean of Stomatal Index of upper surface = 2.93  
 Mean of Ratio of the number of stomata on the lower surface to that on the upper surface = 7.37

TABLE 3

Vein-islet Number Determination of *Pueraria mirifica*

Number of Vein-islet to 4 mm <sup>2</sup>	Vein-islet Number	Deviation from mean (D)	D <sup>2</sup>
102	25.50	0.04	0.0016
86	21.25	-4.21	17.7241
89	22.25	-3.21	10.3041
84	21.00	-4.46	19.8916
88	22.00	-3.46	11.9716
101	25.25	-0.21	0.0441
86	21.50	-3.96	15.6816
99	24.75	-0.71	0.5041
86	21.50	-3.96	15.6816
85	21.25	-4.21	17.7241
102	25.50	0.04	0.0016
102	25.50	0.04	0.0016
102	25.50	0.04	0.0016
102	25.50	0.04	0.0016
80	20.00	-5.46	29.8116
110	27.50	2.04	4.1616
113	28.25	2.79	7.8141
106	26.26	0.79	0.6241
95	23.75	-1.71	2.9241
117	29.25	3.79	14.3641
112	28.00	2.54	6.5416
115	28.75	3.29	10.8241
115	28.75	3.29	10.8241
103	25.75	0.29	0.0841
119	29.75	4.29	18.4041
119	29.75	4.29	18.4041
122	30.50	5.04	25.4016
122	30.50	5.04	25.4016
95	23.75	-1.71	2.9241
100	25.00	-0.46	0.2116

Mean of Vein-islet Number = 25.46

Standard deviation = 4.381

TABLE 4

Veinlet Termination Number Determination of  
Pueraria mirifica

Numbers of Veinlet Termination to 4 mm <sup>2</sup>	Veinlet Termination Number	Deviation from mean (D)	D <sup>2</sup>
24	6.00	-0.46	0.2116
20	5.00	-1.46	2.1316
31	7.75	1.29	1.6641
32	8.00	1.54	2.3716
20	5.00	-1.46	2.1316
24	6.00	-0.46	0.2116
24	6.00	-0.46	0.2116
25	6.25	-0.21	0.0411
23	5.75	-0.71	0.5041
22	5.50	-0.96	0.9216
20	5.00	-1.46	2.1316
25	6.25	-0.21	0.0441
28	7.00	0.54	0.2916
22	5.50	-0.96	0.9216
25	6.25	-0.21	0.0441
27	6.75	0.29	0.0841
29	7.25	0.79	0.6241
23	5.75	-0.71	0.5041
19	4.75	-1.71	2.9241
30	7.50	1.04	1.0816
32	8.00	1.54	2.3716
29	7.25	0.79	0.6241
30	7.50	1.04	1.0816
23	5.75	-0.71	0.5041
27	6.75	0.29	0.0841
30	7.50	1.04	1.0816
33	8.25	1.79	3.2041
26	6.50	0.04	0.0016
22	5.50	-0.96	0.9216
31	7.75	1.29	1.6641

Mean of Veinlet Termination Number = 6.46

Standard deviation = 1.404

TABLE 5

The percentage of foreign organic matters in dried tuberous root powder of Pueraria mirifica

Powdered of dried tuberous root	Ash remained after ignition	Percentage
2.2890	0.2254	9.84
2.1056	0.2060	9.82
2.3439	0.2410	10.28
2.1949	0.2142	9.76
2.2803	0.2270	9.95
2.2314	0.2171	9.72
2.1751	0.2150	9.88
2.0817	0.2004	9.62
		Mean = 9.97

TABLE 6

The percentage of acid insoluble ash in dried tuberous root powder of Pueraria mirifica

Powdered of dried tuberous root	Acid insoluble ash	Percentage
2.2890	0.0233	1.06
2.1949	0.0174	0.79
2.2803	0.0257	1.12
2.3439	0.0226	0.96
2.2314	0.0312	1.39
2.1751	0.0315	1.44
2.0817	0.0287	1.38
		Mean = 1.16

TABLE 7

Palisade Ratio of Butea superba

Palisade cells to four epidermal cells	Palisade ratio	Deviation from mean (D)	D <sup>2</sup>
57	14.25	-0.38	0.1444
61	15.25	0.62	0.3844
61	15.25	0.62	0.3844
55	13.75	-0.88	0.7744

Mean of Palisade Ratio = 14.63

Standard deviation = 0.918

TABLE 8

Stomatal Number and Stomatal Index of Butea superba

Number of stomata in 0.0314 mm <sup>2</sup>	Number of epidermal cells	Stomatal Number	Stomatal Index
16	67	509.09	19.28
17	75	540.91	18.49
17	73	540.91	18.89
17	70	540.91	19.20

Mean of Stomatal Number = 538.96

Mean of Stomatal Index = 19.20

TABLE 9  
 Vein-islet Number and Veinlet Termination Number of  
Butea superba

Number of Vein-islet to 4 mm <sup>2</sup>	Number of Veinlet Termination to 4 mm <sup>2</sup>	Vein-islet Number	Veinlet Termination Number
122	36	30.50	9.00
115	45	28.75	11.25
117	39	29.25	9.75
120	43	30.00	10.75

Mean of Vein-islet Number = 29.63

Mean of Veinlet Termination Number = 10.19

TABLE 10

Basic Plant Data of Tuberos Root of Pueraria mirifica Airy Shaw et Suvatabandhu

Plant Identification

PHY.	CL.	ORD.	FAM.	Plant Name	TRT.	X Y C	X Y C	X Y C	X Y C	X Y C	X Y C
24	2	32	02	01	01						
					02	900060	880075	680075	881050	085060	887060
						189060	289060	309060			
					03	082860	186060	208060	386860	487860	586860
						504860	008860	881860			
					04						
					05						
					06						
					07						
					08	088855	208855				
					09						
					10	089040	189040				

TABLE 11

Basic Plant Data of the Leaves of Pueraria mirifica Airy Shaw et Suwatabandhu

Plant Identification

PHY.	CL.	ORD.	FAM.	Plant Name	TRT.	X Y C	X Y C	X Y C	X Y C	X Y C	X Y C
24	2	32	02	01	01						
					02	900060	807075	786060	783875	782860	708075
						687860	603035	589060	585860	489060	487060
						485060	481860	384860	383860	389060	289060
						184860					
					03	884875	704060	685060	603050	587075	481840
						386060	384840	207060	108875		
					04						
					05						
					06						
					07						
					08	603055					
					09						
					10	900040					



TABLE 12

Basic Plant Data of Tuberous Root of Butea superba Roxb.

Plant Identification											
PHY.	CL.	ORD.	FAM.	Plant Name	TRT.	X Y C	X Y C	X Y C	X Y C	X Y C	X Y C
24	2	32	02	02	01						
					02	900060	507860	507050	305860	300860	204860
						189060	107860	103860	101860	088060	087060
						005060					
					03	880850	507075				
					04						
					05						
					06	587885					
					07						
					08	188855	088855				
					09	087885					
					10						