Malvales Table

Malvales				Types on 2005 table:		Epidermal cells	
						Quadrilateral	
						2-D	3-D
						10	11
MU #	Collection #	Family	Species	Part	Extract Wt.		
1167	n.a.	Bixaceae	Bixa orellana L.	fruit/Ch	n.a.	R	R
1691	n.a.	Bixaceae	Bixa orellana L.	fruit/Ch	0.0003	VR	C
2638	n.a.	Bixaceae	Bixa orellana L.	fruit/Ch	no extract		
2904	n.a.	Bixaceae	Bixa orellana L.	fruit/As	n.a.		
2637	n.a.	Bixaceae	Bixa orellana L.	seeds/Ch	0.0209		
2903	n.a.	Bixaceae	Bixa orellana L.	seeds/As	n.a.		
52	n.a.	Bombacaceae	Ceiba pentandra (L.) Gaertn.	inflo/Ch	no extract		
2129	UMO 131614	Bombacaceae	Ceiba pentandra (L.) Gaertn.	inflo/Ch	no extract		
51	n.a.	Bombacaceae	Ceiba pentandra (L.) Gaertn.	leaf/Ch	no extract		
2128	UMO 131614	Bombacaceae	Ceiba pentandra (L.) Gaertn.	leaf/Ch	no extract		
2866	n.a.	Bombacaceae	Ceiba sp.	wood/As	n.a.		
1372	MO 2213254	Bombacaceae	Huberodendron patinoi Cuatrec.	leaf/Ch	n.a.		
1373	MO 2213254	Bombacaceae	Huberodendron patinoi Cuatrec.	inflo/Ch	n.a.		
811	3286897	Bombacaceae	Matisia cf. alata Little	leaf/Ch	trace		
812	3286898	Bombacaceae	Matisia cf. alata Little	fruit/Ch	present		
809	MO 1782626	Bombacaceae	Matisia coloradorum Benoist	leaf/Ch	n.a.	R	
810	MO 1782626	Bombacaceae	Matisia coloradorum Benoist	inflo/Ch	n.a.		
1369	MO 3638639	Bombacaceae	Matisia cordata Bonpl.	leaf/Ch	n.a.		
2126	n.a.	Bombacaceae	Matisia cordata Bonpl.	leaf/Ch	0.0003		
2127	n.a.	Bombacaceae	Matisia cordata Bonpl.	leaf/Ch	0.0006		
1366	MO 2678892	Bombacaceae	Matisia longipes Little	leaf/Ch	n.a.		C
1406	MO 2678892	Bombacaceae	Matisia longipes Little	inflo/Ch	n.a.		
1370	MO 2925059	Bombacaceae	Ochroma pyramidalis (Cav. ex Lam.) Rub.	leaf/Ch	n.a.		
1371	MO 2925059	Bombacaceae	Ochroma pyramidalis (Cav. ex Lam.) Rub.	fruit/Ch	n.a.		
1367	MO 2595391	Bombacaceae	Pachira aquatica Aubl.	leaf/Ch	n.a.		
1368	MO 2595391	Bombacaceae	Pachira aquatica Aubl.	fruit/Ch	n.a.		
763	n.a.	Bombacaceae	Pseudobombax millei (Standl.) A. Robyns	inflo/Ch	no extract		
814	MO 3413288	Bombacaceae	Pseudobombax millei (Standl.) A. Robyns	inflo/Ch	n.a.		
813	MO 3413288	Bombacaceae	Pseudobombax millei (Standl.) A. Robyns	leaf/Ch	n.a.		
E1079	E1079	Bombacaceae	Quararibea cf. grandifolia Little	leaf/As	n.a.		
E995	E995	Malvaceae	Bastardia cf. parvifolia H. B. K.	leaf, inflo/As	n. a.		
E1022	E1022	Malvaceae	Gossypium sp.	leaf/As	n. a.		

Malvales Table

	Non-quadrilateral					Short Cells	Hairs and bases	
	Discrete	Frag.	Seed	occluded	blocky		Trichomes	Hair
	20	21	22	23	24	30	40 I, II	40 III
Species								
Bixa orellana L.		M	VR ^{f}22IBd		R			
Bixa orellana L.			C ^{f}22IBd		R			
Bixa orellana L.								
Bixa orellana L.			R ^{f}22IBd					
Bixa orellana L.								
Bixa orellana L.		R	R ^{f}22IBd	A				
Ceiba pentandra (L.) Gaertn.								
Ceiba pentandra (L.) Gaertn.								
Ceiba pentandra (L.) Gaertn.								
Ceiba pentandra (L.) Gaertn.								
Ceiba sp.					VA			
Huberodendron patinoi Cuatrec.	M							VR
Huberodendron patinoi Cuatrec.								VR
Matisia cf. alata Little	R	M			M			
Matisia cf. alata Little		M			M			
Matisia coloradorum Benoist	R ^{d}20IBa	C		R	M			
Matisia coloradorum Benoist	C	C		R	C			
Matisia cordata Bonpl.		A						
Matisia cordata Bonpl.	VR	M		R	M			
Matisia cordata Bonpl.	M, M ^{d}20IBa	M	R ^{f}22IBd		A			
Matisia longipes Little		VR						R *40IIIAa202Ba2
								C *40IIIAb200Ab2
Matisia longipes Little			C ^{f}22IBd					
Ochroma pyramidalis (Cav. ex Lam.) Rub.								VR
Ochroma pyramidalis (Cav. ex Lam.) Rub.	C	C						
Pachira aquatica Aubl.	C *20VD	C						R
Pachira aquatica Aubl.		C						VR
Pseudobombax millei (Standl.) A. Robyns								
Pseudobombax millei (Standl.) A. Robyns								
Pseudobombax millei (Standl.) A. Robyns							C *40IIBc3	
Quararibea cf. grandifolia Little	M ^{d}20IAa							M *40IIIBa203A
Bastardia cf. parvifolia H. B. K.		R	M ^{f}22IBd	C			VR	R
Gossypium sp.				VA				A, M *40IIIBb

Malvales Table

			Spheres				
	Hair base	Honeycomb	Smooth	Rugulose	Nodular	Spinulose	Angled
	40 IV	70	80 IA	80 IB	80 IC	80 ID	80 IE
Species							
Bixa orellana L.							
Bixa orellana L.				R			
Bixa orellana L.							
Bixa orellana L.							
Bixa orellana L.							
Bixa orellana L.		C					
Ceiba pentandra (L.) Gaertn.							
Ceiba pentandra (L.) Gaertn.							
Ceiba pentandra (L.) Gaertn.							
Ceiba pentandra (L.) Gaertn.							
Ceiba sp.							
Huberodendron patinoi Cuatrec.	M *40IVBa201C			M			
Huberodendron patinoi Cuatrec.							
Matisia cf. alata Little				M			
Matisia cf. alata Little				R	M *80ICa1		
Matisia coloradorum Benoist		C					
Matisia coloradorum Benoist				M			
Matisia cordata Bonpl.							
Matisia cordata Bonpl.		M			VR *80ICa1		
Matisia cordata Bonpl.		M			VR *80ICa1		
Matisia longipes Little	M			C			
Matisia longipes Little			R 80IAe				
Ochroma pyramidalis (Cav. ex Lam.) Rub.							
Ochroma pyramidalis (Cav. ex Lam.) Rub.				M	VR *80ICa1		
Pachira aquatica Aubl.	R *40IVAa300						
Pachira aquatica Aubl.				R			
Pseudobombax millei (Standl.) A. Robyns							
Pseudobombax millei (Standl.) A. Robyns				C	A *80ICc		
Pseudobombax millei (Standl.) A. Robyns				A	VA *80ICc VA *80ICa1		
Quararibea cf. grandifolia Little	M *40IVAa201Aa						
Bastardia cf. parvifolia H. B. K.		M					
Gossypium sp.							

Malvales Table

				Crystalline Bodies			Sclereids	Stomata
	Ciliate	Faceted	Conical Bodies	Cystoliths	Raphides	CaC03		
	80 Ii	80 IF	80III	[a]100 I	100 II	100 IV	[a]110	120
Species								
Bixa orellana L.								
Bixa orellana L.							M	
Bixa orellana L.								
Bixa orellana L.								
Bixa orellana L.								
Bixa orellana L.								
Ceiba pentandra (L.) Gaertn.								
Ceiba pentandra (L.) Gaertn.								
Ceiba pentandra (L.) Gaertn.								
Ceiba pentandra (L.) Gaertn.								
Ceiba sp.				VA				
Huberodendron patinoi Cuatrec.							VR	A
Huberodendron patinoi Cuatrec.				VR		C		R
Matisia cf. alata Little								
Matisia cf. alata Little					C			
Matisia coloradorum Benoist								
Matisia coloradorum Benoist								
Matisia cordata Bonpl.						A		
Matisia cordata Bonpl.							R	
Matisia cordata Bonpl.			R *80IIIB				A	R *120IIA
Matisia longipes Little		VR *80IFb202		A		VA		P *120IIA
Matisia longipes Little								VR *120IIA
Ochroma pyramidalis (Cav. ex Lam.) Rub.				VR		C	VR	
Ochroma pyramidalis (Cav. ex Lam.) Rub.						VA		
Pachira aquatica Aubl.						VA	C	M *120IIA
Pachira aquatica Aubl.						A		
Pseudobombax millei (Standl.) A. Robyns								
Pseudobombax millei (Standl.) A. Robyns		M *80IFb202		R			R	
Pseudobombax millei (Standl.) A. Robyns		C *80IFb202		A			A	
Quararibea cf. grandifolia Little				VA			C	
Bastardia cf. parvifolia H. B. K.				VA		VA		
Gossypium sp.				C		C		

Malvales Table

		2008 Additional Types:							
	Tracheids	Quadrilateral							
		occluded	Trough	Crystalline			Parenchyma	Transport	
		12	80 II	100 V	100 Vb	100 VI	130I	[f]140I	140II
Species									
Bixa orellana L.								VR	M
Bixa orellana L.									M
Bixa orellana L.									
Bixa orellana L.		VA							
Bixa orellana L.			VR						
Bixa orellana L.		C						VA	
Ceiba pentandra (L.) Gaertn.									
Ceiba pentandra (L.) Gaertn.									
Ceiba pentandra (L.) Gaertn.									
Ceiba pentandra (L.) Gaertn.									
Ceiba sp.		A		VA			R		
Huberodendron patinoi Cuatrec.									
Huberodendron patinoi Cuatrec.									
Matisia cf. alata Little									
Matisia cf. alata Little									R
Matisia coloradorum Benoist									
Matisia coloradorum Benoist									
Matisia cordata Bonpl.									
Matisia cordata Bonpl.									C
Matisia cordata Bonpl.									A
Matisia longipes Little									
Matisia longipes Little									
Ochroma pyramidalis (Cav. ex Lam.) Rub.									R
Ochroma pyramidalis (Cav. ex Lam.) Rub.									
Pachira aquatica Aubl.									
Pachira aquatica Aubl.									
Pseudobombax millei (Standl.) A. Robyns									
Pseudobombax millei (Standl.) A. Robyns									
Pseudobombax millei (Standl.) A. Robyns									
Quararibea cf. grandifolia Little		C							
Bastardia cf. parvifolia H. B. K.		C							
Gossypium sp.		M							R

Malvales Table

		Secretory
	Fibers	cells
	[f]150 I	160
Species		
Bixa orellana L.		
Bixa orellana L.		
Bixa orellana L.		
Bixa orellana L.		
Bixa orellana L.	M	
Bixa orellana L.		
Ceiba pentandra (L.) Gaertn.		
Ceiba pentandra (L.) Gaertn.		
Ceiba pentandra (L.) Gaertn.		
Ceiba pentandra (L.) Gaertn.		
Ceiba sp.		
Huberodendron patinoi Cuatrec.		
Huberodendron patinoi Cuatrec.		
Matisia cf. alata Little		
Matisia cf. alata Little		
Matisia coloradorum Benoist		
Matisia coloradorum Benoist		
Matisia cordata Bonpl.		
Matisia cordata Bonpl.		
Matisia cordata Bonpl.		
Matisia longipes Little		
Matisia longipes Little		
Ochroma pyramidalis (Cav. ex Lam.) Rub.		
Ochroma pyramidalis (Cav. ex Lam.) Rub.		
Pachira aquatica Aubl.		
Pachira aquatica Aubl.		
Pseudobombax millei (Standl.) A. Robyns		
Pseudobombax millei (Standl.) A. Robyns		
Pseudobombax millei (Standl.) A. Robyns		
Quararibea cf. grandifolia Little		
Bastardia cf. parvifolia H. B. K.		
Gossypium sp.		

Malvales Table

Malvales				Types on 2005 table:		Epidermal cells	
						Quadrilateral	
						2-D	3-D
						10	11
OS638	n.a.	Malvaceae	Gossypium sp.	leaf, pod/As	n. a.		
2665	n.a.	Malvaceae	Gossypium barbadense L.	capsule/Ch	0.0385		
2666	n.a.	Malvaceae	Gossypium barbadense L.	fiber/Ch	no extract		
2667	n.a.	Malvaceae	Gossypium barbadense L.	seeds/Ch	0.0425		
49	2224179	Malvaceae	Hespesia populnea L.	leaf/Ch	no extract		
50	2224179	Malvaceae	Hespesia populnea L.	inflo/Ch	no extract		
E1004	E1004	Malvaceae	Malachra alceifolia Jacq.	leaf, inflo/As	n. a.		
798	n.a.	Sterculiaceae	Guazuma ulmifolia Lam.	inflo/Ch	0.0004		
2247	n.a.	Sterculiaceae	Guazuma ulmifolia Lam.	inflo/Ch	n.a.		
E1038	E1038	Sterculiaceae	Guazuma ulmifolia Lam.	leaf/As	n.a.	R	
797	n.a.	Sterculiaceae	Guazuma ulmifolia Lam.	leaf/Ch	0.0023	A	
2246	n.a.	Sterculiaceae	Guazuma ulmifolia Lam.	leaf/Ch	n.a.	C	
2870	E 486	Sterculiaceae	Guazuma ulmifolia Lam.	wood/As	n.a.	M	
2250	n.a.	Sterculiaceae	Herrania sp.	leaf/Ch	n.a.		
2249	UMO RK 98-8-2-2	Sterculiaceae	Sterculia columbiana Sprague	leaf/Ch	no extract		
2248	n.a.	Sterculiaceae	Sterculia sp.	inflo/Ch	no extract		
3137	n.a.	Sterculiaceae	Theobroma cacao L.	fruit/As	0.11		
2623	n.a.	Sterculiaceae	Theobroma cacao L.	fruit/Ch	0.0011		
3136	n.a.	Sterculiaceae	Theobroma cacao L.	seed/As	0.08		
3143	n.a.	Sterculiaceae	Theobroma cacao L.	stem, inside/As	n.a.		VR
3138	n.a.	Sterculiaceae	Theobroma cacao L.	stem/As	n.a.	VR	R
Clark33/Ch	Clark33	Sterculiaceae	Waltheria americana	composite/Ch	n.a.		
Clark33/As	Clark33-ashed	Sterculiaceae	Waltheria americana	composite/As	n.a.	M	M
2552/2	MO5003468	Tiliaceae	Apeiba aspera Aubl.	leaf/Ch			
2553Dup	MO5003468	Tiliaceae	Apeiba aspera Aubl.	inflo/Ch	discarded		
2550/2	MO 4402512	Tiliaceae	Heliocarpus americanus L.	leaf/Ch			
2551Dup	MO 4402512	Tiliaceae	Heliocarpus americanus L.	inflo/Ch	discarded		
2475Dup	MO 2591531	Tiliaceae	Trichospermum grewiaefolium (A. Rich.) Kosterm	leaf/Ch	separate		
2476Dup	MO 2591531	Tiliaceae	Trichospermum grewiaefolium (A. Rich.) Kosterm	inflo/Ch	separate		
As=ashed							
Ch=chemically oxidized							
n.a.=not available							

Malvales Table

	Non-quadrilateral					Short Cells	Hairs and bases	
	Discrete	Frag.	Seed	occluded	blocky		Trichomes	Hair
	20	21	22	23	24	30	40 I, II	40 III
Gossypium sp.				M				
Gossypium barbadense L.		M		M	M-C			
Gossypium barbadense L.								
Gossypium barbadense L.		R						
Hespesia populnea L.								
Hespesia populnea L.								
Malachra alceifolia Jacq.				A	M		VR	C, R *40IIIBb
Guazuma ulmifolia Lam.	M	C						
Guazuma ulmifolia Lam.								
Guazuma ulmifolia Lam.				A	M			VR
Guazuma ulmifolia Lam.	VA [d]20IBa			R				
Guazuma ulmifolia Lam.		C			M			
Guazuma ulmifolia Lam.				R				
Herrania sp.					R			R
Sterculia columbiana Sprague								
Sterculia sp.								
Theobroma cacao L.								
Theobroma cacao L.					VR			
Theobroma cacao L.			VR					
Theobroma cacao L.				C				
Theobroma cacao L.		R		R				
Waltheria americana		M						R *40IIIAb200Bd
Waltheria americana		A	M	M				VR *40IIIAb200Bd
Apeiba aspera Aubl.								
Apeiba aspera Aubl.								
Heliocarpus americanus L.								
Heliocarpus americanus L.								
Trichospermum grewiaefolium (A. Rich.) Kosterm								
Trichospermum grewiaefolium (A. Rich.) Kosterm								

Malvales Table

			Spheres				
	Hair base	Honeycomb	Smooth	Rugulose	Nodular	Spinulose	Angled
	40 IV	70	80 IA	80 IB	80 IC	80 ID	80 IE
Gossypium sp.							
Gossypium barbadense L.							
Gossypium barbadense L.							
Gossypium barbadense L.							
Hespesia populnea L.							
Hespesia populnea L.							
Malachra alceifolia Jacq.							
Guazuma ulmifolia Lam.		C					
Guazuma ulmifolia Lam.	P *40IVAa202						
Guazuma ulmifolia Lam.	M *40IVAa202		M *80IAa1				
Guazuma ulmifolia Lam.	A *40IVAa202	C	C *80IAa1				
Guazuma ulmifolia Lam.		C	R *80IAa1				
Guazuma ulmifolia Lam.		C	A *80IAa1	C			
Herrania sp.							
Sterculia columbiana Sprague							
Sterculia sp.							
Theobroma cacao L.		C					
Theobroma cacao L.							
Theobroma cacao L.		C					
Theobroma cacao L.		VA					
Theobroma cacao L.		VA					
Waltheria americana							
Waltheria americana		VA					
Apeiba aspera Aubl.							
Apeiba aspera Aubl.							
Heliocarpus americanus L.							
Heliocarpus americanus L.							
Trichospermum grewiaefolium (A. Rich.) Kosterm							
Trichospermum grewiaefolium (A. Rich.) Kosterm							

Malvales Table

				Crystalline Bodies			Sclereids	Stomata
	Ciliate	Faceted	Conical Bodies	Cystoliths	Raphides	CaC03		
	80 Ii	80 IF	80III	[a]100 I	100 II	100 IV	[a]110	120
Gossypium sp.								
Gossypium barbadense L.						VR		
Gossypium barbadense L.								
Gossypium barbadense L.								
Hespesia populnea L.								
Hespesia populnea L.								
Malachra alceifolia Jacq.				A				
Guazuma ulmifolia Lam.								
Guazuma ulmifolia Lam.								
Guazuma ulmifolia Lam.				VA		VA		A
Guazuma ulmifolia Lam.								M
Guazuma ulmifolia Lam.					M	M		
Guazuma ulmifolia Lam.								
Herrania sp.								
Sterculia columbiana Sprague								
Sterculia sp.								
Theobroma cacao L.				VA	M			
Theobroma cacao L.								
Theobroma cacao L.				VA	A			
Theobroma cacao L.				A		M		
Theobroma cacao L.				VA				
Waltheria americana				M	R	R		
Waltheria americana				VA		M		
Apeiba aspera Aubl.								
Apeiba aspera Aubl.								
Heliocarpus americanus L.								
Heliocarpus americanus L.								
Trichospermum grewiaefolium (A. Rich.) Kosterm								
Trichospermum grewiaefolium (A. Rich.) Kosterm								

Malvales Table

		2008 Additional Types:							
	Tracheids	Quadrilateral							
		occluded	Trough	Crystalline			Parenchyma	Transport	
		12	80 II	100 V	100 Vb	100 VI	130I	[f]140I	140II
Gossypium sp.									
Gossypium barbadense L.								A	
Gossypium barbadense L.									
Gossypium barbadense L.									
Hespesia populnea L.									
Hespesia populnea L.									
Malachra alceifolia Jacq.		A						R	C
Guazuma ulmifolia Lam.									
Guazuma ulmifolia Lam.									
Guazuma ulmifolia Lam.								M	M
Guazuma ulmifolia Lam.									
Guazuma ulmifolia Lam.									
Guazuma ulmifolia Lam.		C			VA	VA	C		
Herrania sp.									
Sterculia columbiana Sprague									
Sterculia sp.									
Theobroma cacao L.									
Theobroma cacao L.									
Theobroma cacao L.									
Theobroma cacao L.		A							
Theobroma cacao L.		VR			C				
Waltheria americana									
Waltheria americana		C					M		
Apeiba aspera Aubl.									
Apeiba aspera Aubl.									
Heliocarpus americanus L.									
Heliocarpus americanus L.									
Trichospermum grewiaefolium (A. Rich.) Kosterm									
Trichospermum grewiaefolium (A. Rich.) Kosterm									

Malvales Table

		Secretory
	Fibers	cells
	[f]150 I	160
Gossypium sp.		
Gossypium barbadense L.		R-M *160II
Gossypium barbadense L.		
Gossypium barbadense L.		
Hespesia populnea L.		
Hespesia populnea L.		
Malachra alceifolia Jacq.		
Guazuma ulmifolia Lam.		
Guazuma ulmifolia Lam.		
Guazuma ulmifolia Lam.		
Guazuma ulmifolia Lam.		
Guazuma ulmifolia Lam.		
Guazuma ulmifolia Lam.		
Herrania sp.		
Sterculia columbiana Sprague		
Sterculia sp.		
Theobroma cacao L.		
Theobroma cacao L.		
Theobroma cacao L.		
Theobroma cacao L.		
Theobroma cacao L.		
Waltheria americana		
Waltheria americana		
Apeiba aspera Aubl.		
Apeiba aspera Aubl.		
Heliocarpus americanus L.		
Heliocarpus americanus L.		
Trichospermum grewiaefolium (A. Rich.) Kosterm		
Trichospermum grewiaefolium (A. Rich.) Kosterm		

Malvales Table

Malvales				Types on 2005 table:		Epidermal cells	
						Quadrilateral	
						2-D	3-D
						10	11
*=category contains a diagnostic type							
lost: these samples were mixed in the lab							
a=generalized arboreal indicator							
d=generalized dicot indicator							
f=generalized fruit/seed indicator							
P=present							
VR=very rare							
R=rare							
M=moderate							
C=common							
A=abundant							
VA=very abundant							
green font: specimen has not been examined							
red font: duplicated number							
P, indistinctive=silica present, but no distinctive forms							
MO: Missouri Botanical Garden Herbarium							
UMO: University of Missouri Herberium							
FBG: Fairchild Botanical Garden							
RK: Robin Kennedy collection							
E: Pearsall Ecuadorian collection							
Peru/P: Pearsall Peruvian collection							
separate: a duplicated number that can perhaps be separated							
by slide-mounting each extract; one specimen is a grass.							

Malvales Table

	Non-quadrilateral					Short Cells	Hairs and bases	
	Discrete	Frag.	Seed	occluded	blocky		Trichomes	Hair
	20	21	22	23	24	30	40 I, II	40 III
orms								
separated								
grass.								

Malvales Table

			Spheres				
	Hair base	Honeycomb	Smooth	Rugulose	Nodular	Spinulose	Angled
	40 IV	70	80 IA	80 IB	80 IC	80 ID	80 IE
orms							
separated							
grass.							

Malvales Table

				Crystalline Bodies			Sclereids	Stomata
	Ciliate	Faceted	Conical Bodies	Cystoliths	Raphides	CaC03		
	80 Ii	80 IF	80III	[a]100 I	100 II	100 IV	[a]110	120
orms								
separated								
grass.								

Malvales Table

		2008 Additional Types:							
	Tracheids	Quadrilateral							
		occluded	Trough	Crystalline			Parenchyma	Transport	
		12	80 II	100 V	100 Vb	100 VI	130I	[f]140I	140II
orms									
separated									
grass.									

Malvales Table

		Secretory
	Fibers	cells
	[f]150 I	160
orms		
separated		
grass.		