

10.1071/FP15187\_AC

© CSIRO 2016

Supplementary Material: *Functional Plant Biology*, 2016, 43(3), 298–306.

## Supplementary Material

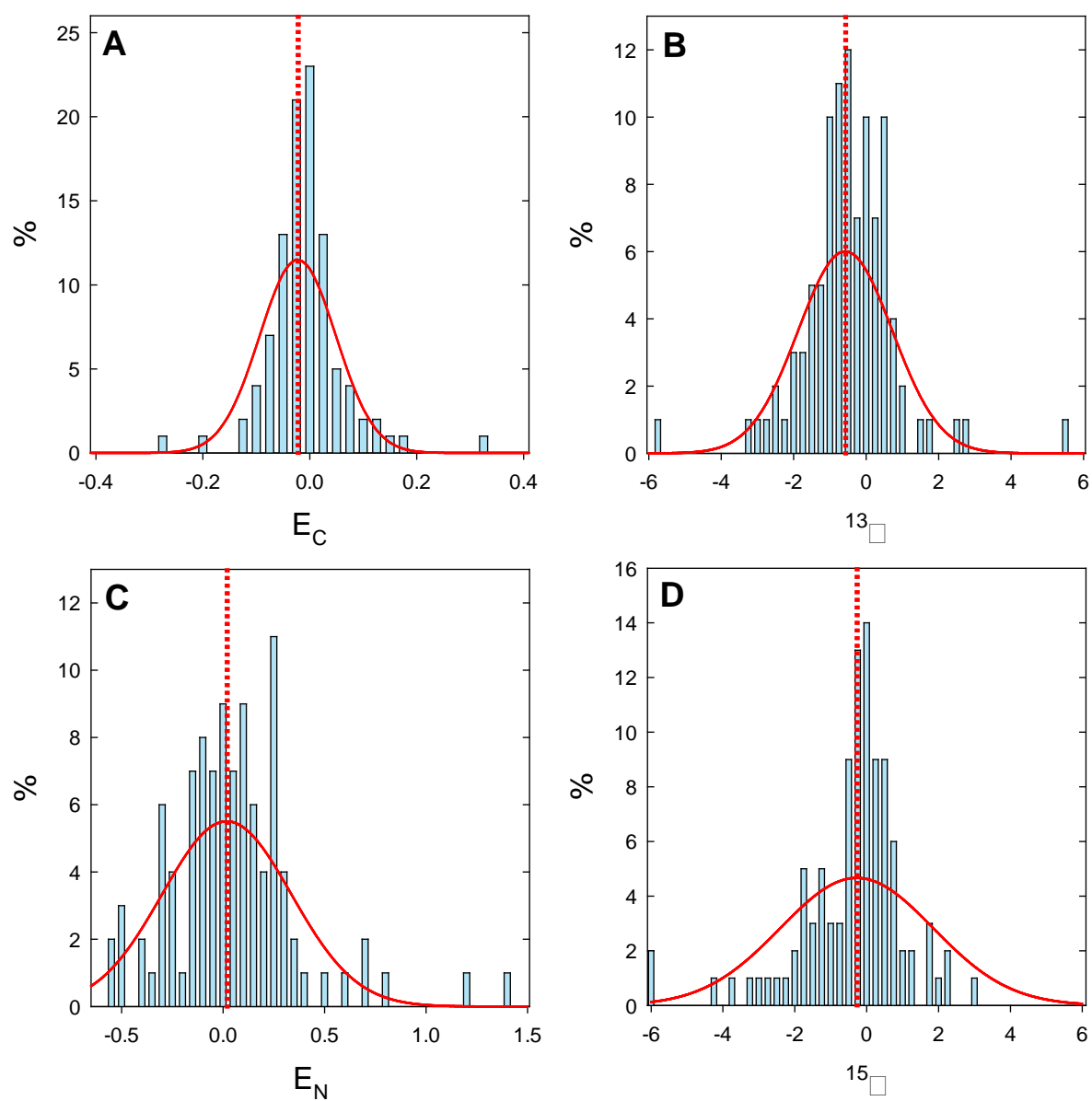
### **Isotopic evidence for nitrogen exchange between autotrophic and heterotrophic tissues in variegated leaves**

*Cyril Abadie<sup>A</sup>, Marlène Lamothe-Sibold<sup>B</sup>, Françoise Gilard<sup>B</sup> and Guillaume Tcherkez<sup>A,C</sup>*

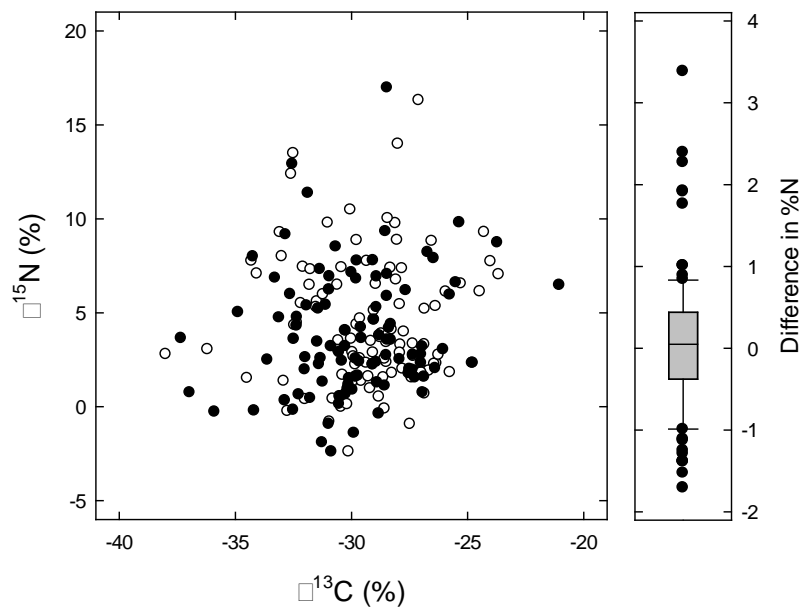
<sup>A</sup>Research School of Biology, ANU College of Medicine, Biology and Environment, Australian National University, Canberra, ACT 2601, Australia.

<sup>B</sup>Université Paris-Sud, Institute of Plant Sciences Paris-Saclay IPS2 (Bâtiment 630), UMR CNRS-INRA 9213, Université Paris-Saclay, 91405 Orsay, France.

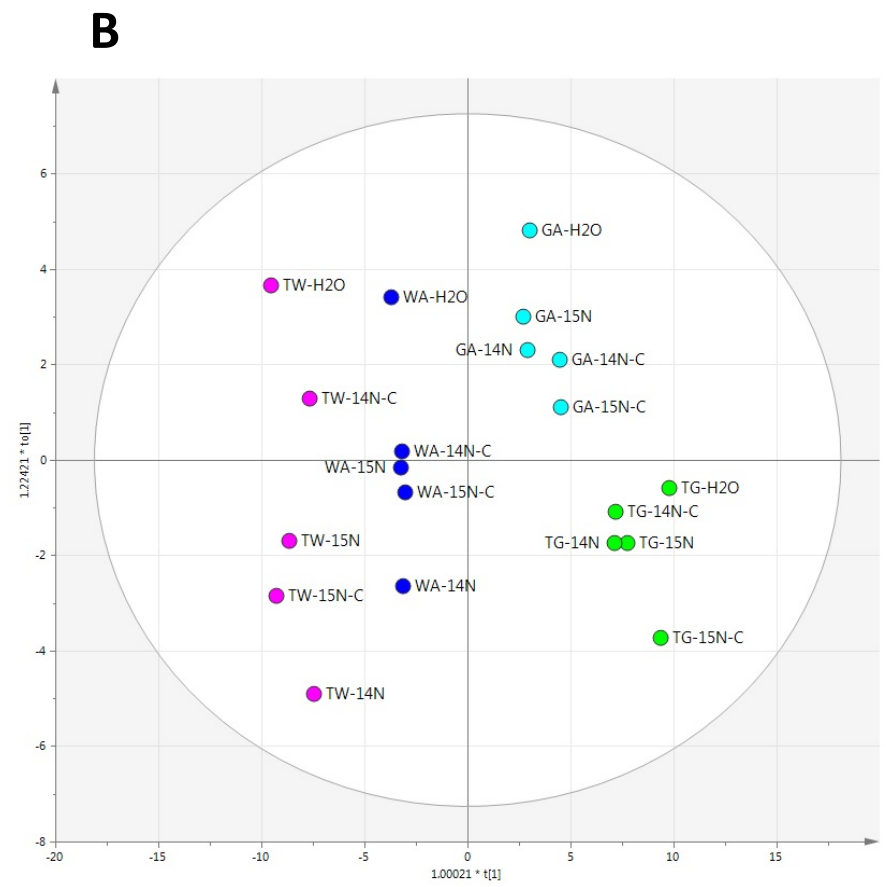
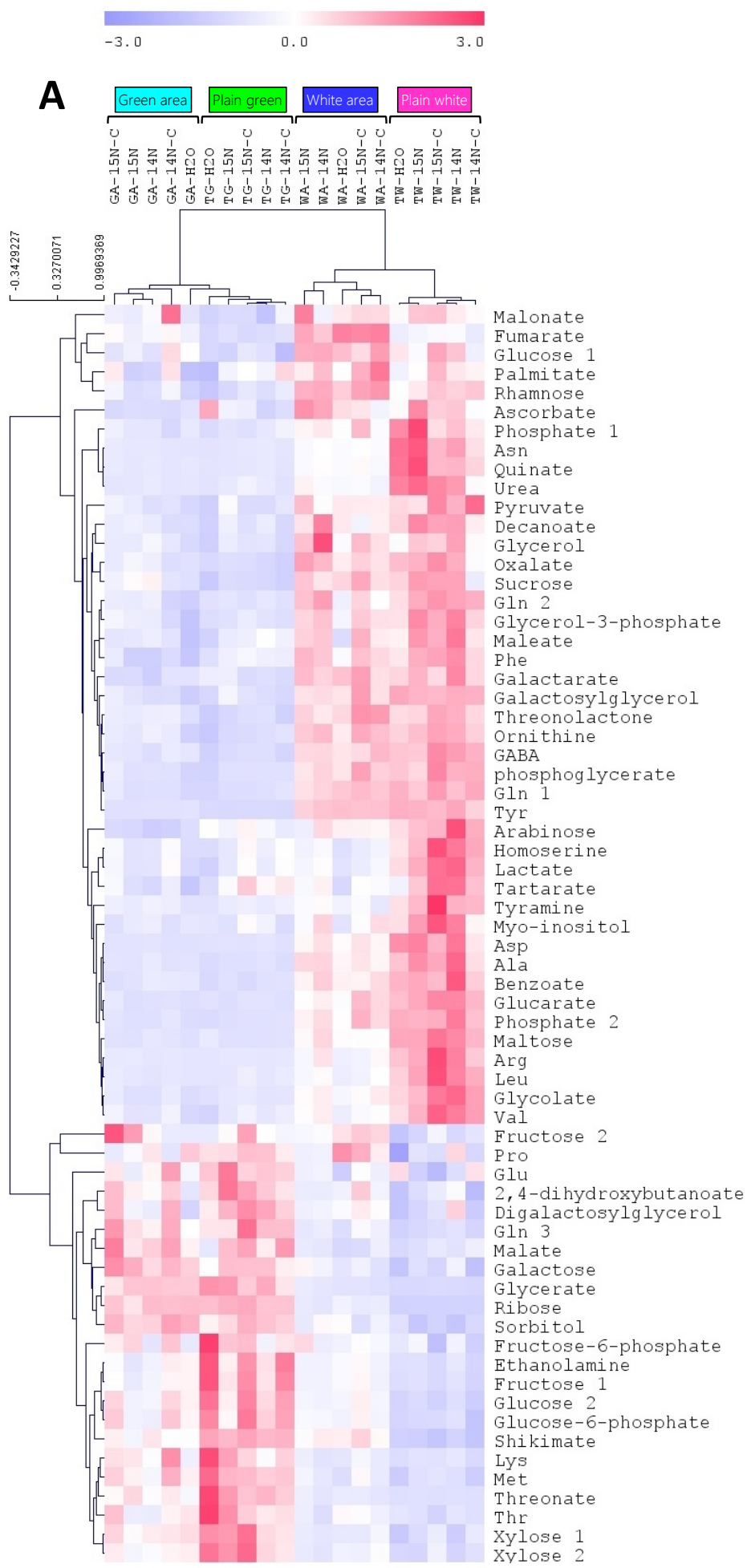
<sup>C</sup>Corresponding author. Email: [guillaume.tcherkez@anu.edu.au](mailto:guillaume.tcherkez@anu.edu.au)



**Fig. S1.** Frequency distribution of the relative difference in elemental composition ( $E_C$  and  $E_N$ , **A** and **C**) and apparent isotope fractionation ( $^{13}\Delta$  and  $^{15}\Delta$ , **B** and **D**) between green and white tissues of the same leaf, in different species and locations ( $n = 101$ ).



**Fig. S2.** Comparison of the natural isotope composition in white (open discs) and green (closed discs) tissues of variegated leaves collected in different species. Right, difference in %N between white and green tissues.



**Fig. S3.** Magnified version of Fig. 4 (panels A and B).

C

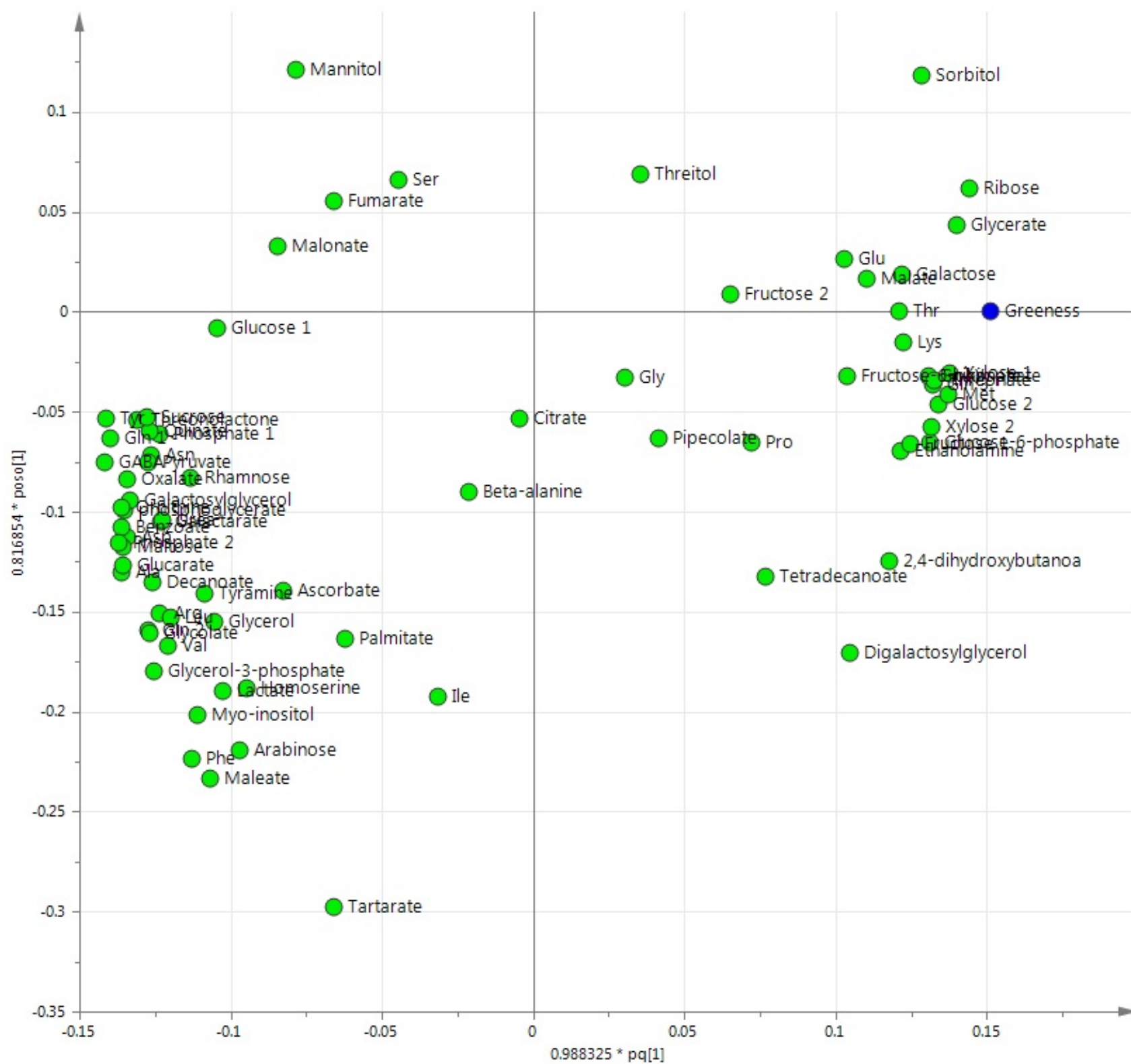


Fig. S3. Magnified version of Fig. 4 (panel C).

**Table S1. List of variegated leaf samples used in this study for elemental and isotopic measurements (Fig. 1)**

No.	French Name	Name/Variety	Scientific Name	Family	Order	Collection place	Town	Country	Sampling date DD/MM/YYYY
1	Pothos	Pothos	<i>Epipremnum aureum</i>	Araceae	Alismatales	Greenhouse	Elancourt	France	16/02/2012
2	Cyprès de Lawson	Lawson Cypress	<i>Chamaecyparis lawsoniana</i>	Juniperaceae	Coniferales	Public garden	Elancourt	France	16/02/2012
3	Misère	Rainbow Hill	<i>Tradescantia quadricolor</i>	Commelinaceae	Commelinales	Greenhouse	Elancourt	France	16/02/2012
4	Dieffenbechia	Tropic snow	<i>Dieffenbechia amonea</i>	Araceae	Alismatales	Greenhouse	Elancourt	France	16/02/2012
5	Arbre aux parapluies	Umbrella tree	<i>Shefflera arboricola</i>	Araliaceae	Apiales	Greenhouse	Elancourt	France	16/02/2012
6	Pléoméle	Pleomele	<i>Pleomele reflexa</i>	Asparagaceae	Asparagales	Greenhouse	Elancourt	France	16/02/2012
7	Figuier d'intérieur	Benjamin's fig	<i>Ficus benjamina</i>	Moraceae	Urticales	Greenhouse	Elancourt	France	16/02/2012
8	Fusain	Spindle tree	<i>Euonymus fortunei</i>	Celastraceae	Celastrales	Public garden, La Walk	Wissembourg	France	23/03/2012
9	Fusain	Spindle tree	<i>Euonymus fortunei</i> var. <i>Emerald</i>	Celastraceae	Celastrales	Botanic garden, University Paris-Sud	Orsay	France	19/04/2012
10	Fusain	Spindle tree	<i>Euonymus japonicus</i> var. <i>aureopectus</i>	Celastraceae	Celastrales	Botanic garden, University Paris-Sud	Orsay	France	19/04/2012
11	Cyprès de Lawson	Lawson Cypress	<i>Chamaecyparis lawsoniana</i>	Juniperaceae	Coniferales	Botanic garden, University Paris-Sud	Orsay	France	19/04/2012
12	Croton	Croton Gold Dust	<i>Codiaeum variegatum</i>	Euphorbiaceae	Malpighiales	Garden Les Filaos	Saly	Senegal	26/04/2012
13	Laurier-Rose	Oleander	<i>Nerium oleander</i>	Apocynaceae	Gentianales	Garden Les Filaos	Saly	Senegal	26/04/2012
14	Arbre aux parapluies	Umbrella tree	<i>Shefflera arboricola</i>	Araliaceae	Apiales	Lake Rethba	Niaga Peulh	Senegal	24/04/2012
15	Erable palmé	Maple	<i>Acer palmatum</i>	Aceraceae	Sapindales	Greenhouse of Gally	Versailles	France	1/07/2012
16	Figuier caoutchouc	Elastic fig	<i>Ficus elastica</i>	Moraceae	Urticales	Greenhouse of Gally	Versailles	France	1/07/2012
17	Troène du Japon	Privet	<i>Ligustrum japonicum</i>	Oleaceae	Lamiales	Greenhouse of Gally	Versailles	France	1/07/2012
18	Pépéromia	Radiator plant	<i>Peperomia</i> sp.	Piperaceae	Piperales	Greenhouse of Gally	Versailles	France	1/07/2012
19	Coleus	Coleus	<i>Solenastemon</i> sp.	Lamiaceae	Lamiales	Greenhouse of Gally	Versailles	France	1/07/2012
20	Plectranthus	Plectranthus	<i>Plectranthus coleoides</i>	Lamiaceae	Lamiales	Greenhouse of Gally	Versailles	France	1/07/2012
21	Plectranthus	Plectranthus	<i>Plectranthus coleoides</i>	Lamiaceae	Lamiales	Greenhouse	Elancourt	France	30/05/2012
22	Impatiens de Nouvelle Guinée	Touch me not	<i>Impatiens hawkeri</i>	Balsaminaceae	Ericales	Greenhouse	Elancourt	France	30/05/2012
23	Pittosporum à petites feuilles	Cheesewood	<i>Pittosporum tenuifolium</i> var. <i>variegatum</i>	Pittosporaceae	Apiales	Greenhouse	Elancourt	France	30/05/2012
24	Saule crevette	Japanese willow	<i>Salix integra</i>	Salicaceae	Salicales	Greenhouse	Elancourt	France	30/05/2012
25	Fusain	Spindle tree	<i>Euonymus fortunei</i>	Celastraceae	Celastrales	Greenhouse	Elancourt	France	30/05/2012
26	Troène du Japon	Privet	<i>Ligustrum japonicum</i>	Oleaceae	Lamiales	Greenhouse	Elancourt	France	30/05/2012
27	Unknown	Unknown	<i>Unknown</i>	Unknown	Unknown	Greenhouse	Elancourt	France	30/05/2012
28	Erable négundo	Boxelder maple	<i>Acer negundo</i>	Aceraceae	Sapindales	Greenhouse	Elancourt	France	30/05/2012
29	Cornouiller sanguin	Common dogwood	<i>Cornus sanguineum</i>	Cornaceae	Cornales	Potager du roi	Versailles	France	12/05/2012
30	Peucedanum	Peucedanum	<i>Peucedanum ostruthium</i>	Apiaceae	Apiales	Potager du roi	Versailles	France	12/05/2012
31	Weigela	Weigela	<i>Weigela florida</i> var. <i>variegata</i>	Caprifoliaceae	Dipsacales	Potager du roi	Versailles	France	12/05/2012
32	Abutilon	Chinese lantern	<i>Abutilon vitifolium</i>	Malvaceae	Malvales	Potager du roi	Versailles	France	12/05/2012
33	Fusain	Spindle tree	<i>Euonymus fortunei</i>	Celastraceae	Celastrales	Potager du roi	Versailles	France	12/05/2012
34	Géranium citronnelle	Rose geranium	<i>Pelargonium graveolens</i>	Geraniaceae	Geraniales	Potager du roi	Versailles	France	12/05/2012
35	Hosta	Plantain lily	<i>Hosta fortunei</i> var. <i>undulata</i>	Asparagaceae	Asparagales	Public garden	Arcachon	France	28/04/2012
36	Chalef	Silverberry	<i>Eleagnus pungens</i> var. <i>maculata</i>	Eleagnaceae	Rosales	Public garden	Arcachon	France	28/04/2012
37	Pittosporum	Cheesewood	<i>Pittosporum tobira</i> var. <i>variegatum</i>	Pittosporaceae	Apiales	Public garden	Arcachon	France	28/04/2012
38	Pittosporum à petites feuilles	Cheesewood	<i>Pittosporum tenuifolium</i> var. <i>variegatum</i>	Pittosporaceae	Apiales	Public garden	Arcachon	France	28/04/2012
39	Morelle	Nightshade	<i>Solanum jasminoides</i> var. <i>variegatum</i>	Solanaceae	Solanales	Public garden	Elancourt	France	22/07/2012
40	Géranium citronnelle	Rose geranium	<i>Pelargonium graveolens</i>	Geraniaceae	Geraniales	Public garden	Elancourt	France	22/07/2012
41	Chèvrefeuille rampant	Privet honeysuckle	<i>Lonicera pileata</i>	Caprifoliaceae	Dipsacales	Public garden	Elancourt	France	22/07/2012
42	Lierre	Ivy	<i>Hedera helix</i>	Araliaceae	Apiales	Public garden	Arcachon	France	28/04/2012
43	Cornouiller sanguin	Common dogwood	<i>Cornus sanguineum</i>	Cornaceae	Cornales	Public garden	Maurepas	France	22/07/2012
44	Spirée du Japon	Japanese spiraea	<i>Spiraea japonica</i> var. <i>Anthony Waterer</i>	Rosaceae	Rosales	Public garden	Brumath	France	18/08/2012
45	Eulalie	Chinese silver grass	<i>Miscanthus sinensis</i> var. <i>Cabaret</i>	Poaceae	Poales	Lake Chamboux	Peyrelevalde	France	31/07/2012
46	Houx	Holly	<i>Ilex aquifolium</i>	Aquifoliaceae		Public garden	Murat	France	15/08/2012
47	Sauge officinale	Sage	<i>Salvia officinalis</i>	Lamiaceae	Lamiales	Greenhouse of Gally	Versailles	France	26/08/2012
48	Lysimaque	Yellow loosestrife	<i>Lysimachia vulgaris</i>	Primulaceae	Primulales	Greenhouse of Gally	Versailles	France	26/08/2012
49	Erable négundo	Boxelder maple	<i>Acer negundo</i>	Aceraceae	Sapindales	Greenhouse	Elancourt	France	24/08/2012
50	Véronique arbustive	Hebe	<i>Hebe franciscana</i> x <i>andersonii</i>	Plantaginaceae	Lamiales	Greenhouse	Elancourt	France	24/08/2012
51	Gaura	Gaura	<i>Gaura chinensis</i>	Onagraceae	Myrtales	Greenhouse	Elancourt	France	24/08/2012
52	Coréopsis	Large-flowered tickseed	<i>Coreopsis grandiflora</i>	Asteraceae	Asterales	Greenhouse	Elancourt	France	24/08/2012

53	Pervenche	Periwinkle	<i>Vinca major</i>	Apocynaceae	Gentianales	Public garden André Citroën	Paris	France	21/08/2012
54	Bambou nain doré	Dwarf golden bamboo	<i>Pleioblastus fortunei</i> var. <i>variegata</i>	Poaceae	Poales	Public garden André Citroën	Paris	France	21/08/2012
55	Laîche japonaise	Japanese sedge	<i>Carex morrowii</i> var. <i>variegata</i>	Cyperaceae	Cyperales	Public garden André Citroën	Paris	France	21/08/2012
56	Vigne-vierge à fruits bleus	Porcelain berry	<i>Ampelopsis brevipedunculata</i>	Vitaceae	Rhamnales	Public garden André Citroën	Paris	France	21/08/2012
57	Iris	Iris	<i>Iris germanica</i>	Iridaceae	Asparagales	Public garden	Elancourt	France	7/10/2012
58	Lierre	Ivy	<i>Hedera helix</i>	Araliaceae	Apiales	Public garden	Elancourt	France	7/10/2012
59	Bugle	Bugle	<i>Ajuga reptans</i>	Lamiaceae	Malvales	Greenhouse of Maurepas	Maurepas	France	22/09/2012
60	Osmanthus	Chinese osmanthus	<i>Osmanthus heterophyllus</i> var. <i>tricolor</i>	Oleaceae	Lamiales	Greenhouse of Maurepas	Maurepas	France	22/09/2012
61	Phormium	Flax lily	<i>Phormium tenax</i>	Xanthorrhoeaceae	Asparagales	Greenhouse of Maurepas	Maurepas	France	22/09/2012
62	Ciste à feuille de sauge	Rockrose	<i>Cistus salviifolius</i> var. <i>rospico</i>	Cistaceae	Malvales	Greenhouse of Maurepas	Maurepas	France	22/09/2012
63	Abélia	Glossy abelia	<i>Abelia x grandiflora</i>	Caprifoliaceae	Dipsacales	Greenhouse of Maurepas	Maurepas	France	22/09/2012
64	Pieris	Japanese andromeda	<i>Pieris japonica</i>	Ericaceae	Ericales	Greenhouse of Maurepas	Maurepas	France	22/09/2012
65	Euphorbe Héléna	Spurge	<i>Euphorbia milii</i> x <i>lophogona</i>	Euphorbiaceae	Malpighiales	Greenhouse of Maurepas	Maurepas	France	22/09/2012
66	Pépéromia	Radiator plant	<i>Peperomia</i> sp.	Piperaceae	Piperales	Greenhouse	Elancourt	France	2/12/2012
67	Géranium panaché	Variegated pelargonium	<i>Pelargonium x hortorum</i>	Geraniaceae	Geraniales	Public Town Greenhouse	Elancourt	France	27/04/2013
68	Lierre terrestre	Ground ivy	<i>Glechoma hederacea</i>	Lamiaceae	Lamiales	Public Town Greenhouse	Elancourt	France	27/04/2013
69	Tulipe	Tulip	<i>Tulipa</i> sp.	Liliaceae	Liliales	Greenhouse of Gally	Versailles	France	1/05/2013
70	Laurier-Rose	Oleander	<i>Nerium oleander</i>	Apocynaceae	Gentianales	Public garden	Narrabri	Australia	16/11/2012
71	Millepertuis	Saint John's wort	<i>Hypericum perforatum</i>	Hypericaceae	Theales	Meadow	Burra	Australia	15/11/2012
72	Arbre corail	Coral tree	<i>Erythrina numerosa</i>	Fabaceae	Fabales	Mount Annan Bot. Garden	Cambden	Australia	15/05/2013
73	Syngonium auriculé	Arrowhead vine	<i>Syngonium auritum</i>	Araceae	Alismatales	Public garden	Saint-Pierre	Martinique	15/02/2013
74	Dragonnier	Dragon tree	<i>Dracaena</i> sp.	Asparagaceae	Asparagales	Public garden	Saint-Pierre	Martinique	15/02/2013
75	Feuillage fleur	Breynia	<i>Breynia nivosa</i>	Phyllanthaceae	Malpighiales	Botanic garden	Balata	Martinique	16/02/2013
76	Aglaonema	Dumbcane	<i>Aglaonema pseudobracteatum</i>	Araceae	Alismatales	Botanic garden	Balata	Martinique	16/02/2013
77	Aglaonema	Dumbcane	<i>Aglaonema</i> sp. var. <i>Silver queen</i>	Araceae	Alismatales	Botanic garden	Balata	Martinique	16/02/2013
78	Gazon de Saint Augustin	St Augustine Grass	<i>Stenotaphrum secundatum</i>	Poaceae	Poales	Botanic garden	Balata	Martinique	16/02/2013
79	Manteau de Jacob	Beefsteak plant	<i>Acalypha wilkesiana</i>	Euphorbiaceae	Malpighiales	Public garden	Fort de France	Martinique	17/02/2013
80	Ananas requin	Red pineapple	<i>Ananas bracteatus</i> var. <i>Striatus</i>	Bromeliaceae	Poales	Botanic garden	Balata	Martinique	16/02/2013
81	Hibiscus	Hibiscus	<i>Hibiscus rosa-sinensis</i>	Malvaceae	Malvales	Public garden	Schoelcher	Martinique	18/02/2013
82	Heuchera	Jill of the rocks	<i>Heuchera maxima</i>	Saxifragaceae	Rosales	Public garden	Schoelcher	Martinique	18/02/2013
83	Bougainvillee	Bougainvillea	<i>Bougainvillea spectabilis</i>	Nyctaginaceae	Caryophyllales	Public garden	Le Diamant	Martinique	19/02/2013
84	Croton	Croton Gold Dust	<i>Codiaeum variegatum</i> var. <i>narrow-leaved</i>	Euphorbiaceae	Malpighiales	Public garden	Fort de France	Martinique	17/02/2013
85	Graptophylle	Caricature plant	<i>Graptophyllum pictum</i> var. <i>tricolor</i>	Acanthaceae	Lamiales	Public garden	Fort de France	Martinique	17/02/2013
86	Croton	Croton Gold Dust	<i>Codiaeum variegatum</i> var. <i>large-leaved</i>	Euphorbiaceae	Malpighiales	Public garden	Fort de France	Martinique	17/02/2013
87	Arbre aux parapluies à grandes feuilles	Large-leaved umbrella tree	<i>Shefflera actinophylla</i>	Araliaceae	Apiales	Public garden	Fort de France	Martinique	17/02/2013
88	Croton	Croton Gold Dust	<i>Codiaeum variegatum</i> var. <i>small-leaved</i>	Euphorbiaceae	Malpighiales	Public garden	Fort de France	Martinique	17/02/2013
89	Marantha	Prayer plant	<i>Calathea ornata</i>	Maranthaceae	Zingiberales	Public garden	Fort de France	Martinique	17/02/2013
90	Ananas requin	Red pineapple	<i>Ananas bracteatus</i> var. <i>Striatus</i>	Bromeliaceae	Poales	Botanic garden	Balata	Martinique	16/02/2013
91	Piléa	Aluminium plant	<i>Pilea cadierei</i>	Urticaceae	Urticales	Botanic garden	Balata	Martinique	16/02/2013
92	Bambou	Bamboo	<i>Bambusa variegata</i>	Poaceae	Poales	Botanic garden	Balata	Martinique	16/02/2013
93	Alpinia	Alpinia	<i>Alpinia sanderae</i>	Zingiberaceae	Zingiberales	Botanic garden	Balata	Martinique	16/02/2013
94	Bambou	Bamboo	<i>Bambusa variegata</i>	Poaceae	Poales	Botanic garden	Balata	Martinique	16/02/2013
95	Liane à barrique	Dalbergia	<i>Dalbergia escataphyllum</i>	Fabaceae	Fabales	Public garden	Saint-Pierre	Martinique	15/02/2013
96	Impatience	Touch-me-not	<i>Impatiens bicornuta</i>	Balsaminaceae	Ericales	Public garden	Fort de France	Martinique	17/02/2013
97	Herbe dure	Mallow	<i>Malvastrum coromandelianum</i>	Malvaceae	Malvales	Parc Anse Coulevre	Saint-Pierre	Martinique	20/02/2013
98	Arbre aux parapluies	Umbrella tree	<i>Shefflera arboricola</i>	Araliaceae	Apiales	Public garden	Saint-Pierre	Martinique	15/02/2013
99	Dragonnier	Dragon tree	<i>Dracaena</i> sp.	Asparagaceae	Asparagales	Public garden	Saint-Pierre	Martinique	15/02/2013
100	Croton	Croton Gold Dust	<i>Codiaeum variegatum</i> var. <i>narrow-leaved</i>	Euphorbiaceae	Malpighiales	Public garden	Saint-Pierre	Martinique	15/02/2013
101	Micocoulier	Hackberry tree	<i>Celtis occidentalis</i>	Ulmaceae	Urticales	Public garden	Rouen	France	9/08/2013