

C RUTIN

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*Unless otherwise noted all references are to Duke, James A. 1992. Handbook of phytochemical constituents of GRAS herbs and other economic plants. Boca Raton, FL. CRC Press.

Plant	Part	Low PPM	High PPM	StdDev	Reference
Acacia catechu	Plant	--	--		--
Acacia decurrens	Plant	--	--		--
Acacia farnesiana	Leaf	--	--		Wealth of India.
Achillea millefolium	Plant	--	--		Tunon, H., Thorsell, W., and Bohlin, L. 1993. Mosquito Repelling Activity of Compounds Occurring in Achillea millefolium L. (Asteraceae). Economic Botany 48(2): 111-120, 1994.
Adiantum capillus-veneris	Leaf	--	--		--
Aesculus hippocastanum	Flower	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Aesculus hippocastanum	Plant	--	--		Jim Duke's personal files.
Agathosma betulina	Essential Oil	--	--		CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
Agathosma betulina	Leaf	--	--		--
Agrimonia eupatoria	Inflorescence	1700	1700		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Agrimonia eupatoria	Leaf	--	--		Wealth of India.
Alisma plantago-aquatica	Leaf	--	--		--
Allium cepa	Bulb	--	14000		--
Allium sativum var. sativum	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
Amaranthus sp.	Plant	--	--		--
Amaranthus spinosus	Leaf	--	--		Wealth of India.
Ammi visnaga	Flower	--	--		--
Ammi visnaga	Leaf	--	--		--
Anastatica hierochuntica	Plant	--	--		--
Anethum graveolens	Leaf	--	1400	-0.9176299796056019	Varnaite, R. 1988. Rutin Content in Capsicum, Capsella, Urtica, Primula, Lepidium, Lactuca, Brassica, Anethum, Beta, Petroselinum, Allium Genera Representatives. Liet Tsr Mokslu Akad Darb Ser C, 4: 29-32.
Apium graveolens	Plant	--	170	-0.6792061954574901	--
Apium graveolens	Shoot	--	170	-0.5604271785023887	--
Arachis hypogaea	Plant	--	--		--
Araucaria bidwillii	Flower	--	--		Rizk, A.F.M. and Al-Nowaihi, A.S., The Phytochemistry of the Horticultural Plants of Qatar, Scientific and Applied Research Centre, University of Qatar.
Artemisia abrotanum	Plant	--	--		--
Artemisia absinthium	Plant	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Artemisia dracunculus	Shoot	100	560	-0.5313186017977898	--
Artemisia dracunculus	Leaf	--	--		--
Artemisia vulgaris	Plant	--	--		Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp.
Aspalathus linearis	Shoot	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Asparagus officinalis	Root	--	--		--
Azadirachta indica	Leaf	--	--		--
Barosma betulina	Essential Oil	--	--		--
Berberis vulgaris	Fruit	--	--		Jim Duke's personal files.
Brassica oleracea var. botrytis l.	Leaf	--	--		--
Brassica oleracea var. gemmifera	Shoot	20	20	-0.5716227849272344	--
Brassica oleracea var. italica	Leaf	--	--		Stitt, Paul. Why George should eat broccoli.
Caesalpinia pulcherrima	Flower	--	--		--
Calendula officinalis	Flower	--	--		--
Camellia sinensis	Leaf	1200	1580	-0.9064551745734906	--
Capparis spinosa	Flower	--	--		--
Capparis spinosa	Plant	--	--		--
Capparis spinosa	Shoot	--	--		--
Capsella bursa-pastoris	Plant	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Capsicum annuum	Fruit	--	3874	-0.21269509917042856	Varnaite, R. 1988. Rutin Content in Capsicum, Capsella, Urtica, Primula, Lepidium, Lactuca, Brassica, Anethum, Beta, Petroselinum, Allium Genera Representatives. Liet Tsr Mokslu Akad Darb Ser C, 4: 29-32.
Capsicum frutescens	Fruit	--	487	-0.597969170419332	Varnaite, R. 1988. Rutin Content in Capsicum, Capsella, Urtica, Primula, Lepidium, Lactuca, Brassica, Anethum, Beta, Petroselinum, Allium Genera Representatives. Liet Tsr Mokslu Akad Darb Ser C, 4: 29-32.
Centaurea calcitrapa	Plant	--	--		--
Chamaemelum nobile	Plant	--	--		--
Cichorium intybus	Seed	--	6400	0.07536225897017279	--
Cichorium intybus	Leaf	--	14000	-0.1353936273578098	--
Citrullus lanatus	Seed	15000	16500	1.606098941923909	--
Citrus limon	Fruit	1	2	-0.6531383244068485	--
Citrus limon	Leaf	--	--		Jim Duke's personal files.
Citrus sinensis	Leaf	--	9000	-0.44580487824979076	Jim Duke's personal files.
Citrus sinensis	Pericarp	--	6100		Jim Duke's personal files.
Cnicus benedictus	Plant	--	--		Jim Duke's personal files.
Convallaria majalis	Plant	--	--		--
Coriandrum sativum	Fruit	--	--		--
Coriandrum sativum	Shoot	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Cornus mas	Flower	--	--		Delaveau, P., Paris, R. R. 1961. Concerning the Presence of Rutoside and Gallic Derivatives from the Flowers of Cornus mas and Preliminary Research with C. sanguinea. Bull Soc Chim Biol, 43: 661-666.
Cornus mas	Leaf	--	--		Delaveau, P., Paris, R. R. 1961. Concerning the Presence of Rutoside and Gallic Derivatives from the Flowers of Cornus mas and Preliminary Research with C. sanguinea. Bull Soc Chim Biol, 43: 661-666.
Crataegus laevigata	Leaf	--	--		--
Crataegus laevigata	Flower	--	--		--
Crataegus laevigata	Bud	--	--		--
Crataegus laevigata	Plant	--	--		--
Crataegus monogyna	Flower	--	--		--
Crataegus monogyna	Inflorescence	--	--		--
Crataegus monogyna	Leaf	--	--		--
Crataegus pentagyna	Plant	--	--		Schussler, M., Fricke, U., Nikolov, N., and Holzl, J. 1991. Comparison of the Flavonoids Occurring in Crataegus species and Inhibition of 3',5'-Cyclic Adenosine Monophosphate Phosphodiesterase. Plant Medica 57: Suppl Issue 2. p.A-133.
Crataegus rhipidophylla	Inflorescence	--	--		--
Crataegus rhipidophylla	Leaf	--	--		--
Crataegus rhipidophylla	Bud	--	--		--
Cucumis melo	Plant	--	--		Stitt, Paul. Why George should eat broccoli.

Plant	Part	Low PPM	High PPM	StdDev	Reference
Cymbopogon citratus	Leaf	--	--		--
Cynara cardunculus	Leaf	--	--		Jim Duke's personal files.
Datura stramonium	Plant	--	--		--
Dictamnus albus	Leaf	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Dodonaea viscosa	Fruit	--	--		--
Dodonaea viscosa	Leaf	--	--		--
Echinacea purpurea	Leaf	--	--		Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Echinacea spp	Leaf	--	--		Economic & Medicinal Plant Research, 5: 253.
Eriobotrya japonica	Leaf	--	10500	-0.35268150298219647	Jim Duke's personal files.
Erythroxylum coca	Leaf	5000	5000	-0.6941338789633755	--
Erythroxylum novogranatense	Leaf	5000	5000	-0.6941338789633755	--
Eschscholzia californica	Flower	5000	50000	0.01608811490970148	--
Eschscholzia californica	Inflorescence	--	--		--
Eucalyptus citriodora	Leaf	--	12500	-0.2285170026254041	--
Eucalyptus globulus	Leaf	--	0	-1.0045451298553565	--
Eucalyptus macrorrhuncha	Plant	120000	200000	2.320921435804009	--
Eupatorium perfoliatum	Plant	--	--		--
Euphorbia pulcherrima	Leaf	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Euphrasia officinalis	Plant	--	--		--
Fagopyrum esculentum	Flower	40000	63700	0.2299159705378943	--
Fagopyrum esculentum	Leaf	11600	63700	2.950094206508481	--
Fagopyrum esculentum	Plant	1000	68300	0.3436567156061438	--
Fagopyrum esculentum	Stem	600	50600		--
Fagopyrum esculentum	Testa	--	43		--
Fagopyrum esculentum	Petiole	505	975		--
Fagopyrum esculentum	Seed	87	511	-0.8171633178530503	--
Fallopia japonica	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Ficus carica	Leaf	500	1000	-0.11676895230429095	--
Ficus carica	Fruit	--	--		--
Filipendula ulmaria	Plant	--	--		--
Filipendula ulmaria	Shoot	--	--		--
Foeniculum vulgare	Fruit	--	--		--
Foeniculum vulgare	Seed	--	--		--
Forsythia suspensa	Flower	1000	1000	-0.7486976460962438	--
Forsythia suspensa	Fruit	--	--		--
Galega officinalis	Shoot	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Ginkgo biloba	Leaf	6	30000	0.8579223754965293	Jim Duke's personal files.
Ginkgo biloba	Plant	--	--		Tyler, V.E.. 1982. The Honest Herbal. George F. Stickley Co., Philadelphia PA. 263 pp.
Glechoma hederacea	Plant	--	--		CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
Glycine max	Shoot	--	--		--
Glycyrrhiza uralensis	Leaf	--	53	-1.0012547705959014	--
Gossypium sp	Plant	--	--		--
Hedera helix	Stem	--	--		--
Hemidesmus indicus	Flower	--	--		--
Houttuynia cordata	Plant	--	--		--
Houttuynia cordata	Shoot	--	1200	-0.48355068105178134	--
Houttuynia cordata	Leaf	--	--		--
Houttuynia cordata	Root	--	--		--
Humulus lupulus	Fruit	--	--		CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
Humulus lupulus	Leaf	2000	2000	-0.8803806294985641	--
Hydrangea arborescens	Root	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Hydrangea paniculata	Flower	41000	41000	-0.12438273915261497	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Hyoscyamus niger	Leaf	--	--		--
Hypericum perforatum	Plant	--	16000	-0.4415440806455522	--
Hypericum perforatum	Shoot	--	10000	0.17325822920583467	--
Hypericum perforatum	Stem	--	--		--
Hypericum perforatum	Leaf	2000	3000	-0.8182983793201679	--
Hypericum perforatum	Flower	1000	2800	-0.7206034752837803	--
Ilex paraguariensis	Leaf	--	--		--
Illicium verum	Fruit	--	--		--
Juniperus communis	Leaf	--	--		--
Juniperus communis	Fruit	--	--		--
Laurus nobilis	Leaf	--	--		--
Leonurus cardiaca	Plant	--	--		Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.
Ligustrum lucidum	Leaf	--	--		--
Lycium chinense	Leaf	--	--		--
Lycopersicon esculentum	Fruit	--	--		--
Lycopersicon esculentum	Leaf	24000	24000	0.4854288744261521	--
Maclura pomifera	Wood	--	--		Smith, J. L. and Perino, J. V. 1981. Osage Orange (Maclura pomifera): History and Economic Uses. Economic Botany 35(1): 24-41

Plant	Part	Low PPM	High PPM	StdDev	Reference
Magnolia denudata	Flower	--	--		--
Magnolia kobus	Flower	500	500	-0.7565015824330391	--
Malus domestica	Fruit Epidermis	--	--		--
Malus domestica	Pericarp	--	--		--
Malus domestica	Leaf	0	8885	-0.45294433702030634	--
Malus domestica	Fruit Juice	--	--		--
Malus domestica	Fruit	--	--		--
Matricaria recutita	Plant	--	--		--
Matricaria recutita	Flower	--	--		--
Melia azedarach	Leaf	--	--		--
Mentha x piperita	Plant	--	--		Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.
Menyanthes trifoliata	Leaf	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Mercurialis annua	Plant	--	--		--
Morinda citrifolia	Fruit	--	500	-0.5964904095908007	--
Morus alba	Fruit	--	--		--
Morus alba	Leaf	20000	60000	2.720389880848415	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Musa x paradisiaca	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Nasturtium officinale	Shoot	--	--		--
Nelumbo nucifera	Embryo	--	--		--
Nerium oleander	Leaf	--	--		--
Nicotiana glauca	Leaf	12000	21000	0.29918212389096355	--
Nicotiana tabacum	Leaf	10000	10000	-0.38372262807139457	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Nigella sativa	Seed	--	200	-0.8642978830410316	--
Ocimum basilicum	Leaf	--	--		--
Olea europaea	Pericarp	--	--		Rizk, A.F.M. and Al-Nowaihi, A.S., The Phytochemistry of the Horticultural Plants of Qatar, Scientific and Applied Research Centre, University of Qatar.
Opuntia ficus-indica	Flower	--	--		Rizk, A.F.M. and Al-Nowaihi, A.S., The Phytochemistry of the Horticultural Plants of Qatar, Scientific and Applied Research Centre, University of Qatar.
Opuntia ficus-indica	Pt	--	--		--
Origanum majorana	Shoot	--	--		--
Origanum vulgare	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
Passiflora incarnata	Plant	--	--		Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.

Plant	Part	Low PPM	High PPM	StdDev	Reference
Pastinaca sativa	Plant	--	--		--
Petroselinum crispum	Leaf	30000	30000	0.8579223754965293	--
Petroselinum crispum	Shoot	--	44480	2.746754959397039	Varnaite, R. 1988. Rutin Content in Capsicum, Capsella, Urtica, Primula, Lepidium, Lactuca, Brassica, Anethum, Beta, Petroselinum, Allium Genera Representatives. Liet Tsr Mokslu Akad Darb Ser C, 4: 29-32.
Phaseolus aborigineus	Shoot	--	--		--
Phaseolus vulgaris	Shoot	--	--		--
Phoenix dactylifera	Pollen Or Spore	--	--		Abstract (See species file)
Phyllanthus amarus	Shoot	1378.3	1378	-0.4702652280942977	--
Phyllanthus emblica	Fruit	--	4600	-0.13011199443859983	--
Phyllanthus emblica	Leaf	--	21000	0.29918212389096355	--
Phyllanthus niruri	Plant	--	--		Tramil
Physalis peruviana	Root	--	--		--
Pimpinella anisum	Fruit	--	--		--
Pimpinella anisum	Seed	--	--		--
Piper nigrum	Fruit	--	--		--
Plumeria acutifolia	Plant	--	--		--
Polygonum aviculare	Plant	--	--		--
Polygonum hydropiper	Leaf	25000	30000	0.8579223754965293	--
Prunella vulgaris	Plant	--	--		Chemical Constituents of Oriental Herbs (3 diff. books)

Plant	Part	Low PPM	High PPM	StdDev	Reference
Prunus armeniaca	Leaf	17700	17700	0.09431069830225612	--
Prunus armeniaca	Fruit	--	--		--
Prunus cerasus	Plant	--	--		--
Prunus spinosa	Flower	--	--		--
Pteridium aquilinum	Plant	--	--		--
Pueraria montana	Leaf	--	--		--
Punica granatum	Fruit Juice	--	--		--
Punica granatum	Leaf	--	--		--
Punica granatum	Plant	--	--		Seeram, N. P., Schulman, R. N., and Heber, D., eds. 2006. Pomegranates - Ancient Roots to Modern Medicine. Taylor & Francis. Boca Raton, FL. 244 pp.
Rheum officinale	Root	--	--		Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.
Rheum officinale	Plant	--	13000	-0.48658427928331677	--
Rheum rhabarbarum	Leaf	6000	6000	-0.6320516287849793	--
Ribes nigrum	Fruit	--	--		--
Ribes nigrum	Leaf	--	--		--
Ribes nigrum	Fruit Juice	--	--		--
Ricinus communis	Leaf	2000	2000	-0.8803806294985641	--
Rosa multiflora	Fruit	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Rubus idaeus	Plant	--	--		Newall, C. A., Anderson, L. A. and Phillipson, J. D. 1996. Herbal Medicine - A Guide for Health-care Professionals. The Pharmaceutical Press, London. 296pp.
Rumex acetosa	Leaf	12800	12800	-0.20989232757188522	--
Rumex acetosella	Shoot	5300	5300	-0.17753743877266479	--
Rumex crispus	Leaf	--	--		--
Ruscus aculeatus	Plant	300	400	-0.675753113561928	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
Ruscus aculeatus	Shoot	--	--		--
Ruscus aculeatus	Root	91	400		--
Ruta graveolens	Plant	20000	20000	-0.38149048246186607	--
Salix alba	Bark	--	--		Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
Salix alba	Leaf	--	--		--
Sambucus canadensis	Flower	7700	52000	0.047303860256882914	--
Sambucus canadensis	Leaf	35000	38000	1.3545803769236988	--
Sambucus nigra	Flower	19000	25000	-0.37410870193006646	--
Sambucus nigra	Leaf	210	9200	-0.43338842821411155	--
Scopolia carniolica	Leaf	--	--		CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
Selenicereus grandiflorus	Flower	--	--		CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses

Plant	Part	Low PPM	High PPM	StdDev	Reference
Serenoa repens	Fruit	--	--		--
Smilax china	Leaf	--	--		--
Solanum tuberosum	Shoot	--	--		--
Solanum tuberosum	Flower	--	--		--
Solidago gigantea	Leaf	--	--		--
Solidago virgaurea	Leaf	--	--		--
Sophora japonica	Bud	176000	229000		--
Sophora japonica	Flower	128000	140000	1.420796655532866	--
Sophora japonica	Fruit	0	25000	2.1904049980260094	--
Sophora japonica	Leaf	0	40000	1.4787448772804912	--
Sorbus aucubaria	Fruit	--	--		--
Spinacia oleracea	Leaf	170	170	-0.993991147325029	--
Spinacia oleracea	Shoot	--	--		--
Stellaria media	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Stevia rebaudiana	Tissue Culture	--	7		Kinghorn, A. D. (Ed.) 2002. Medicinal and Aromatic Plants - Industrial Profiles. Stevia. The genus Stevia. Taylor & Francis. New York, NY. 211 pp.
Syringa vulgaris	Plant	--	--		J.S. Glasby Dict.Pl. Containing 2ndary Metabolite. 1991.
Tephrosia purpurea	Leaf	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Terminalia chebula	Fruit	--	--		Polovyanov, G. G. 1974. Flavonoids from the Fruit of the Yellow Myrobalan Plum. Chem. Nat. Comp. 10 (5): 690-.
Teucrium scordium	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Teucrium scorodonia	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Theobroma cacao	Leaf	--	--		--
Tribulus terrestris	Shoot	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Trigonella foenum-graecum	Leaf	--	--		--
Tussilago farfara	Flower	3600	3600	-0.7081171771449077	--
Uncaria guianensis	Bark	--	--		Van Ginkel, A. 1996. Identification of the Alkaloids and Flavonoids from Uncaria tomentosa Bark by TLC in Quality Control. Phytotherapy Research, 10: S18-S19.
Uncaria tomentosa	Bark	--	--		Van Ginkel, A. 1996. Identification of the Alkaloids and Flavonoids from Uncaria tomentosa Bark by TLC in Quality Control. Phytotherapy Research, 10: S18-S19.
Urtica dioica	Shoot	500	6000	-0.12529127545671806	--
Urtica dioica	Inflorescence	--	--		Jim Duke's personal files.
Urtica dioica	Leaf	--	--		Jim Duke's personal files.
Urtica dioica	Flower	--	7000	-0.6550504100546993	Jim Duke's personal files.

Plant	Part	Low PPM	High PPM	StdDev	Reference
Urtica dioica	Root	--	--		Jim Duke's personal files.
Vaccinium corymbosum	Plant	--	--		--
Vaccinium myrtillus	Leaf	--	--		--
Vigna radiata	Sprout Seedling	--	--		--
Viola odorata	Flower	20000	20000	-0.45214806529802004	--
Viola tricolor	Flower	100000	230000	2.8255051961560307	--
Vitis vinifera	Leaf	--	--		--
Withania somnifera	Leaf	--	--		--
Xylopiya aethiopica	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Zizyphus jujuba	Leaf	15000	15000	-0.0733113771794136	--