

CHARLOTTE LINDQVIST AND VICTOR A. ALBERT. 2002. Origin of the Hawaiian endemic mints within North American *Stachys* (Lamiaceae). *American Journal of Botany* 89(10): 1709-1724.

**APPENDIX 1.** The *rbcL* sequences used in this study of Lamiaceae and outgroup taxa obtained from GenBank.

<b>Taxon</b>	<b>GenBank accession no.<sup>a</sup></b>	<b>Reference</b>
<i>Ajuga reptans</i>	GBAN-U32163	Wagstaff and Olmstead, 1997
<i>Caryopteris incana</i>	GBAN-U28869	Wagstaff and Olmstead, 1997
<i>Clerodendrum fragrans</i>	GBAN-L11689	Olmstead et al., 1992
<i>Elsholtzia stauntonii</i>	GBAN-U28872	Wagstaff and Olmstead, 1997
<i>Glechoma hederacea</i>	GBAN-L14292	Olmstead et al., 1993
<i>Holmskioldia sanguinea</i>	GBAN-U28874	Wagstaff and Olmstead, 1997
<i>Lamium purpureum</i>	GBAN-U75702	Wagstaff and Olmstead, 1997
<i>Marrubium vulgare</i>	GBAN-U28875	Wagstaff and Olmstead, 1997
<i>Mentha rotundifolia</i>	GBAN-U28876	Wagstaff and Olmstead, 1997
<i>Oncinocalyx betchei</i>	GBAN-U31458	Wagstaff and Olmstead, 1997
<i>Petitia domingensis</i>	GBAN-U28878	Wagstaff and Olmstead, 1997
<i>Petrea racemosa</i>	GBAN-U28879	Wagstaff and Olmstead, 1997
<i>Physostegia virginiana</i>	GBAN-L14405	Olmstead et al., 1993
<i>Plectranthus barbatus</i>	GBAN-U28882	Wagstaff and Olmstead, 1997
<i>Pogostemon patchouli</i>	GBAN-L14406	Olmstead et al., 1993
<i>Prasium majus</i>	GBAN-U31459	Wagstaff and Olmstead, 1997
<i>Salvia divinorum</i>	GBAN-L14407	Olmstead et al., 1993
<i>Scutellaria bolanderi</i>	GBAN-L01954	Albert, Williams, and Chase, 1992
<i>Teucrium parvifolium</i>	GBAN-U78715	Wagstaff et al., 1998
<i>Teucrium fruticans</i>	GBAN-L14411	Olmstead et al., 1993
<i>Tinnea zambesiaca</i>	GBAN-U28886	Wagstaff and Olmstead, 1997
<i>Trichostema dichotomum</i>	GBAN-U28887	Wagstaff and Olmstead, 1997
<i>Verbascum thapsus</i>	GBAN-L36452	Olmstead and Reeves, 1995
<i>Vitex agnus-castus</i>	GBAN-U78716	Wagstaff et al., 1998

<sup>a</sup>The prefix GBAN- has been added to link the online version of *American Journal of Botany* to GenBank but is not part of the actual accession number.

**APPENDIX 2.** Voucher and locality information and GenBank accession numbers for the sequences used in this study.

Taxon	Voucher information <sup>a</sup>	Geographic locality <sup>b</sup>	GenBank accession no. <sup>c</sup>		
			<i>rbcL</i>	<i>trnL</i>	5S-NTS
<i>Ballota nigra</i> L.	Nielsen 11687b (C)	Greece			GBAN-AF501914
<i>Eremostachys labiosa</i> Bunge	V. Goloskokov s.n., 15 May 1963 (C)	Kazachstan	GBAN-AF501985	GBAN-AF502027	
<i>Gomphostemma javanicum</i> Benth.	R.G. Olmstead 93-38	unknown (Indonesia, Java)	GBAN-AF501986	GBAN-AF502028	GBAN-AF501915
<i>Haplostachys haplostachya</i> (A. Gray) St. John	S. Perlman 14328 (NY)	Hawaii, Hawai'i	GBAN-AF501987	GBAN-AF502029	GBAN-AF308173
<i>Haplostachys linearifolia</i> (Drake) Sherff	J.F. Rock 14025 (NY)	Hawaii, West Moloka'i			GBAN-AF308174
<i>Marrubium peregrinum</i> L.	A. Strid 33875 (C)	Greece			GBAN-AF501916
<i>Otostegia tomentosa</i> A. Rich.	O. Ryding et al. 1654 (C)	Ethiopia	GBAN-AF501988	GBAN-AF502030	GBAN-AF501917
<i>Phlomidioschema parviflorum</i> (Benth.) Vved.	J. S. Andersen & I.C. Petersen 394 (C)	Afghanistan			GBAN- F501918
<i>Phyllostegia ambigua</i> (A. Gray) Hillebr.	R. Hobdy 3023 (BISH)	Hawaii, East Maui			GBAN-AF308176
<i>Phyllostegia brevidens</i> A. Gray	K. Wood 3200 (BISH)	Hawaii, East Maui			GBAN-AF308179
<i>Phyllostegia floribunda</i> Benth.	J.D. Jacobi 1326 (BISH)	Hawaii, Hawai'i			GBAN-AF308181
<i>Phyllostegia glabra</i> (Gaud.) Benth.	K. Wood 3962 (NY)	Hawaii, West Maui	GBAN-AF501989	GBAN-AF502031	GBAN-AF308185
<i>Phyllostegia kahiliensis</i> St. John	W.L. Wagner 5217 (BISH)	Hawaii, Kaua'i	GBAN-AF501990	GBAN-AF502032	GBAN-AF308197
<i>Phyllostegia macrophylla</i> (Gaud.) Benth.	S. Perlman 14184 (NY)	Hawaii, Hawai'i	GBAN-AF501991	GBAN-AF502033	GBAN-AF308201
<i>Phyllostegia racemosa</i> Benth.	F.R. Warshauer 1447 (BISH)	Hawaii, Hawai'i			GBAN-AF308205
<i>Phyllostegia stachyoides</i> A. Gray	F.R. Warshauer 1856 (BISH)	Hawaii, Hawai'i			GBAN-AF308210
<i>Phyllostegia velutina</i> (Sherff) St. John	J. Giffin s.n., Spring 1992 (BISH)	Hawaii, Hawai'i			GBAN-AF308212
<i>Phyllostegia wawrana</i> Sherff	S. Perlman 13690 (NY)	Hawaii, Kaua'i	GBAN-AF501992	GBAN-AF502034	GBAN-AF308216
<i>Prasium majus</i> L.	A. Strid et al. 39091 (C)	Greece, Kithira		GBAN-AF502035	GBAN-AF501919
<i>Sideritis dasygnaphala</i> Clos	J. Barber 196 (TEX)	Canary Islands, Gran Canaria	GBAN-AF501993		
<i>Sideritis gomeraea</i> Bolle ssp. <i>gomeraea</i>	J. Barber 256 (TEX)	Canary Islands, La Gomera	GBAN-AF501994	GBAN-AF502036	
<i>Sideritis hyssopifolia</i> L.	J. Barber 202 (TEX)	Spain, Picos de Asturien	GBAN-AF501995	GBAN-AF502037	

<i>Sideritis macrostachys</i> Poir.	<i>J. Barber 254</i> (TEX)	Canary Islands, Tenerife	GBAN-AF501996	GBAN-AF502038	GBAN-AF501920
<i>Sideritis montana</i> L.	<i>J. Barber 212</i> (TEX)	Romania	GBAN-AF501997	GBAN-AF502039	
<i>Sideritis raeseri</i> Boiss. & Heldr.	<i>A. Strid 33784</i> (C)	Greece			GBAN-AF501921
<i>Sideritis romana</i> L.	<i>J. Barber 209</i> (TEX)	Italy, San Bartolomeo al Mare	GBAN-AF501998	GBAN-AF502040	GBAN-AF501922
<i>Sideritis syriaca</i> L.	<i>J. Barber 210</i> (TEX)	Greece, Mt. Dirfys	GBAN-AF501999		GBAN-AF501923
<i>Stachys aculeolata</i> Hook. f.	<i>Y.B. Harvey, G. Mungai &amp; K. Vollesen 7</i> (C)	Kenya, Naivasha Distr.			GBAN-AF501924
<i>Stachys affinis</i> Bunge	<i>C. Lindqvist &amp; V.A. Albert 359</i> (UNA), from Companion Plants	cultivated, unknown source (East Asia)	GBAN-AF502001	GBAN-AF502041	GBAN-AF501925
<i>Stachys agraria</i> Schlecht. & Cham.	<i>G. Nesom 6113</i> (TEX)	Mexico, Tamaulipas			GBAN-AF501926
<i>Stachys albens</i> A. Gray	<i>G. Baird 1630</i> (RM)	Utah, Washington Co.			GBAN-AF501928
<i>Stachys albotomentosa</i> Ramamoorthy	<i>H. Rubio 1984</i> (TEX)	Mexico, Landa Mun.	GBAN-AF502003	GBAN-AF502043	GBAN-AF501929
<i>Stachys argillicola</i> Sebsebe	<i>I. Friis, M. Tadesse &amp; K. Vollesen 3104</i> (C)	Ethiopia, Neghelle	GBAN-AF502004	GBAN-AF502044	GBAN-AF501930
<i>Stachys arvensis</i> L.	<i>O. Ryding 2394</i> (C)	Canary Islands, Tenerife			GBAN-AF501931
<i>Stachys aspera</i> Michx.	<i>J.B. Nelson 1326</i> (UNA)	Florida, Leon Co.			GBAN-AF501932
<i>Stachys baicalensis</i> Fisch. ex Benth.	<i>H. Takahashi 2950</i> (C)	Japan, Hokkaido			GBAN-AF501933
<i>Stachys bigelovii</i> A. Gray	<i>A. McDonald &amp; G. Nesom 2519</i> (TEX)	Mexico, Chihuahua			GBAN-AF501935
<i>Stachys boraginoides</i> Schlecht. & Cham.	<i>P. Cruz M. s.n.</i> , 28 Apr. 1982 (LL)	Mexico, Vera Cruz			GBAN-AF501936
<i>Stachys bullata</i> Benth.	<i>M.R. Crosby &amp; N. Morin 14355</i> (RM)	California, Monterey Co.	GBAN-AF502005	GBAN-AF502045	GBAN-AF501937
<i>Stachys byzantina</i> C. Koch	<i>C. Lindqvist &amp; V.A. Albert 356</i> (UNA), from Companion Plants	cultivated, unknown source (Greece)	GBAN-AF502006	GBAN-AF502046	GBAN-AF501938
<i>Stachys chamissonis</i> Benth.	<b>1.</b> <i>H.N. &amp; A.L. Moldenke 32097</i> (LL)	Oregon, Marion Co.	GBAN-AF502000	GBAN-AF502050	GBAN-AF501944
	<b>2.</b> <i>S. Jennings 218</i> (UTC)	Washington, Skamania Co.	GBAN-AF502009	GBAN-AF502049	GBAN-AF501946
	<b>3.</b> <i>R.R. Halse 2906</i> (UTC)	Washington, Mason Co.			GBAN-AF501945
<i>Stachys</i> cf. <i>chamissonis</i> Benth.	<i>R.E. Brooks 20248</i> (RM)	Oregon, Clackamas Co.	GBAN-AF502014	GBAN-AF502055	GBAN-AF501960

<i>Stachys chrysantha</i> Boiss. & Heldr.	<i>Bergmeier 95-317</i> (C)	Greece, Arkadias	GBAN-AF502007	GBAN-AF502047	GBAN-AF501939
<i>Stachys coccinea</i> Ort.	1. <i>G.M. Ferguson s.n.</i> , 30 Mar. 1986 (LL)	Arizona, Santa Cruz Co.			GBAN-AF501940
	2. <i>J. Ricketson &amp; L. Raechal 4274</i> (TEX)	New Mexico, Grant Co.			GBAN-AF501941
	3. <i>M.A. Franklin 5407</i> (RM)	Arizona, Santa Cruz Co.			GBAN-AF501942
	4. <i>R.A. Bye 5331</i> (RM)	Mexico, Chihuahua			GBAN-AF501943
	5. New York Botanical Garden 911/97A, LVA 355	cultivated; unknown source	GBAN-AF502008	GBAN-AF502048	GBAN-AF308172
<i>Stachys crenata</i> Raf.	<i>B. Ertter 5638</i> (UTC)	Texas, Nueces Co.			GBAN-AF501947
<i>Stachys cretica</i> L.	<i>A. Strid et al. 42603</i> (C)	Greece, Thasos			GBAN-AF501948
<i>Stachys drummondii</i> Benth.	1. <i>C.J. Ferguson 72</i> (TEX)	Texas, Aransas Co.			GBAN-AF501949
	2. <i>B. Ertter 5530</i> (UTC)	Texas, Cameron Co.			GBAN-AF501950
<i>Stachys eriantha</i> Benth.	<i>A. McDonald &amp; G. Nesom 2495</i> (TEX)	Mexico, Chihuahua			GBAN-AF501951
<i>Stachys floridana</i> Shuttlw. ex Benth.	<i>M. Kortright 102</i> (UNA)	Alabama, Tuscaloosa Co.			GBAN-AF501952
<i>Stachys grahamii</i> Benth.	<i>G.B. Hinton et al. 24399</i> (TEX)	Mexico, Nueva Leon	GBAN-AF502010	GBAN-AF502051	GBAN-AF501953
<i>Stachys langmaniae</i> Rzed. & Calderón	1. <i>McDonald 1620</i> (TEX)	Mexico, Nueva Leon			GBAN-AF501955
	2. <i>J.A. Villarreal 5084</i> (TEX)	Mexico, Nueva Leon	GBAN-AF502011	GBAN-AF502052	GBAN-AF501954
<i>Stachys latidens</i> Small	<i>J.A. Churchill 83034</i> (RM)	North Carolina, Mitchell Co.			GBAN-AF501956
<i>Stachys lavandulaefolia</i> Vahl.	<i>J.A. Andersen &amp; A.G. Jensen 7032</i> (C)	Iran, Semnan	GBAN-AF502012	GBAN-AF502053	GBAN-AF501957
<i>Stachys lindenii</i> Benth.	1. <i>R. Torres C. 4602</i> (TEX)	Mexico, Oaxaca	GBAN-AF502013	GBAN-AF502054	GBAN-AF501959
	2. <i>P. Tenorio L. 11084</i> (TEX)	Mexico, Oaxaca			GBAN-AF501958
<i>Stachys nepetifolia</i> Desf. ex Pers.	<i>I. Diaz V. 44</i> (TEX)	Mexico, Hidalgo			GBAN-AF501961
<i>Stachys nuttallii</i> Shuttlw. ex Benth.	<i>J.B. Nelson 14361</i> (UNA)	South Carolina, Richland Co.			GBAN-AF501962
<i>Stachys officinalis</i> Franch.	<i>C. Lindqvist &amp; V.A. Albert 357</i> (UNA), fom Companion Plants	cultivated, unknown source (Eurasia)	GBAN-AF502015	GBAN-AF502056	
<i>Stachys pacifica</i> B.L. Turner	1. <i>M. Fishbein et al. 2133</i> (TEX)	Mexico, Sonora			GBAN-AF501964
	2. <i>G. Flores F. 2344</i> (TEX)	Mexico, Nayarit			GBAN-AF501963

<i>Stachys pilosa</i> Nutt.	1. <i>T. Cramer</i> 1909 (RM)	Wyoming, Sublette Co.	GBAN-AF502017	GBAN-AF502058	GBAN-AF501968
	2. <i>G.E. Larson</i> 10569 (RM)	South Dakota, Pennington Co.	GBAN-AF502016	GBAN-AF502057	GBAN-AF501966
	3. <i>M. Curto</i> 1494 (UTC)	Utah, Box Elder Co.			GBAN-AF501965
<i>Stachys pilosissima</i> Mart. & Gal.	<i>M.H. Mayfield</i> 2086 (TEX)	Mexico, Hidalgo	GBAN-AF502018	GBAN-AF502059	GBAN-AF501969
<i>Stachys quercetorum</i> A. Heller	1. <i>G.K. Helmkamp</i> 2153 (UTC)	California, Mendocino Co.	GBAN-AF502002	GBAN-AF502042	GBAN-AF501927
	2. <i>R.F. Thorne</i> 61281 (RM)	California, Riverside Co.	GBAN-AF502020	GBAN-AF502061	GBAN-AF501973
<i>Stachys radicans</i> Epling	<i>D.E. Breedlove</i> 51924 (TEX)	Mexico, Chiapas	GBAN-AF502019	GBAN-AF502060	GBAN-AF501970
<i>Stachys rigida</i> Nutt. ex Benth.	<i>H.N. Moldenke et al.</i> 32116 (LL)	Oregon, Lane Co.			GBAN-AF501972
<i>Stachys rivularis</i> A. Heller	<i>A. Tiehm</i> 12609 (UTC)	Sierra Nevada, Washoe Co.			GBAN-AF501971
<i>Stachys rothrockii</i> A. Gray	<i>E. Neese et al.</i> 15716 (RM)	Utah, Cane Co.			GBAN-AF501974
<i>Stachys rotundifolia</i> Moc. & Sesse ex Benth.	<i>D.E. Breedlove</i> 55575 (TEX)	Mexico, Chiapas			GBAN-AF501975
<i>Stachys setifera</i> C.A. Mey.	<i>J.S. Andersen &amp; I.C. Petersen</i> 115 (C)	Iran, Minayah			GBAN-AF501976
<i>Stachys</i> cf. <i>stricta</i> Greene	<i>L. Ahart s.n.</i> , 16 Aug. 1983 (TEX)	California, Butte Co.			GBAN-AF501967
<i>Stachys swainsonii</i> Benth.	<i>A. Strid et al.</i> 39692 (C)	Greece	GBAN-AF502021	GBAN-AF502062	GBAN-AF501977
<i>Stachys sylvatica</i> L.	<i>C. Lindqvist &amp; V.A. Albert</i> 358 (UNA), from Companion Plants	cultivated, unknown source (Eurasia)	GBAN-AF502022	GBAN-AF502063	GBAN-AF501978
<i>Stachys tenuifolia</i> Willd.	1. <i>R.L. McGregor</i> 31847 (RM)	Kansas, Montgomery Co.			GBAN-AF501980
	2. <i>T.W. Nelson &amp; J.P. Nelson</i> 6719 (RM)	South Dakota, Pennington Co.			GBAN-AF501981
	3. <i>P.H. Raven &amp; T.E. Raven</i> 27692 (TEX)	Missouri, Jefferson Co.			GBAN-AF501979
<i>Stachys torresii</i> B.L. Turner	<i>A. McDonald</i> 2927 (TEX)	Mexico, Oaxaca			GBAN-AF501982
<i>Stachys tymphaea</i> Hausskn.	<i>A. Strid</i> 33777 (C)	Greece	GBAN-AF502023	GBAN-AF502064	GBAN-AF501983
<i>Stachys vulnerabilis</i> Rzed. & Calderón	<i>G.B. Hinton et al.</i> 24774 (TEX)	Mexico, Nueva Leon			GBAN-AF501984
<i>Stachys</i> cf. <i>vulnerabilis</i> Rzed. & Calderón	<i>G.B. Hinton et al.</i> 19781 (TEX)	Mexico, Nueva Leon			GBAN-AF501934
<i>Stenogyne angustifolia</i> A. Gray	<i>R. Hobdy</i> 2451 (BISH)	Hawaii, Hawai'i			GBAN-AF308218
<i>Stenogyne calaminthoides</i> A. Gray	<i>C. Lindqvist &amp; V.A. Albert</i> 42 (NY)	Hawaii, Hawai'i			GBAN-AF308222

<i>Stenogyne haliakalae</i> Wawra	<i>G.E. Olson 5</i> (BISH)	Hawaii, Maui			GBAN-AF308226
<i>Stenogyne kaalae</i> Wawra	<i>K. Nagata 1617</i> (NY)	Hawaii, O'ahu			GBAN-AF308227
<i>Stenogyne kamehamehae</i> Wawra	<i>P.K. Higashino 9461</i> (BISH)	Hawaii, Moloka'i			GBAN-AF308228
<i>Stenogyne macrantha</i> Benth.	<i>W. Mull &amp; M. Mull s.n.</i> , 17 June 1980 (BISH)	Hawaii, Hawai'i			GBAN-AF308233
<i>Stenogyne microphylla</i> Benth.	<i>F.R. Warshauer 2682</i> (BISH)	Hawaii, Maui	GBAN-AF502024	GBAN-AF502065	GBAN-AF308234
<i>Stenogyne purpurea</i> H. Mann	<i>K. Wood 1772</i> (BISH)	Hawaii, Kaua'i	GBAN-AF502025	GBAN-AF502066	GBAN-AF308237
<i>Stenogyne rugosa</i> Benth.	<i>C. Lindqvist &amp; V.A. Albert 40</i> (NY)	Hawaii, Hawai'i	GBAN-AF502026	GBAN-AF502067	GBAN-AF308240
<i>Stenogyne sessilis</i> Benth.	<i>S.G. Weller 821</i> (BISH)	Hawaii, Hawai'i			GBAN-AF308242

<sup>a</sup>Herbaria abbreviations follow Holmgren, Holmgren, and Barrett (1990).

<sup>b</sup>In some cases where provenance is unknown, the geographic distribution is given in parentheses.

<sup>c</sup>The prefix GBAN- has been added to link the online version of *American Journal of Botany* to GenBank but is not part of the actual accession number.

**LITERATURE CITED IN THE APPENDICES**

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