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Occurrence of Gibberellins in Vascular Plants, Fungi, and Bacteria

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Abstract

The occurrence of GA_1 to GA_{126} in vascular plants, fungi, and bacteria is listed. The data are discussed with reference to criteria for identification and to the frequency of occurrence of GAs in vascular plants.

Key words: Gibberellins A_1-A_{126}; Natural occurrence; Vascular plants; Fungi; Bacteria

Introduction

Introductions to publications on gibberellins (GAs) often state that the GAs are of widespread or universal occurrence but are unable to provide evidence for this general statement. The purpose of this contribution to this special issue on GAs is to provide such evidence in the form of a compilation of the occurrence of the currently known GAs (126) in vascular plants, fungi, and bacteria. It is an updated and permanent hard-copy of information on the web:

(http://www.plant-hormones.bbsrc.ac.uk/gainplants/occurrence_of_gas_in_plants.htm;

http://www.plant-hormones.bbsrc.ac.uk/gainplants/gasinfungi.htm;

http://www.plant-hormones.bbsrc.ac.uk/gainplants/gasinbacteriai.htm).

In Table 1 the GAs are listed in numerical order. For each GA, the vascular plants in which that GA has been identified are listed in alphabetical order, together with the type of tissue in which the identification was made.

In Table 2 the vascular plants are listed in alphabetical order and the GAs that have been identified in the various types of tissue are listed.

In Tables 3 and 4, respectively, the occurrence of GAs in fungi and bacteria is provided for completeness.

All of the currently known 126 GAs have been fully chararacterized by isolation of the pure compound from a natural source or by direct comparison with a standard obtained by rational synthesis. Their structures have been unequivocably determined on chemical and spectroscopic evidence. The orderly allocation of GA numbers to the natural GAs, instigated by MacMillan and Takahashi (1968), is being continued by Hedden and Kamiya (for details see http://www.plant-hormones.bbsrc.ac.uk/gainplants/gibberellin_nomenclature.htm).

The natural occurrence of GAs in plants was initially established by their isolation, mainly from immature seeds in which the amounts are high, and often by Herculean efforts. Since the early 1970s their identification from natural sources has relied mainly upon combined gas chromatography–mass spectrometry (GC–MS) data from purified, derivatized extracts and a comparison with reference GC-

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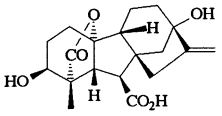
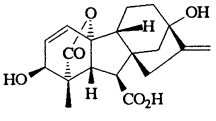
Table 1. Numerical List of Gibberellins and Their Occurrence in Tissues of Vascular Plants

GA_n	Plant species	Tissue	References
GA_1			
	Abelmoschus esculentus	immature seed	Koshioka and others 1996
	Agrostemma githago	shoots and leaves	Jones and Zeevaart 1980
	Allium cepa	leaf sheaths	Nojiri and others 1993
	Alnus tenuifolia	vegetative buds	Zanewich and Rood 1994
	Alstroemeria hybrida	leaves	Kappers and others 1997
	Althaea rosea	shoot apices	Harada and Nitsch 1967
	Arabidopsis thaliana	shoots	Talon and others 1990b
		seeds	Derkx and others 1994
	Aralia cordata	basal buds	Nishijima and others 1993
	Begonia x cheimantha	leaves	Oden and Heide 1988
	Betula pendula	vegetative buds	Zanewich and Rood 1994
	Brassica napus	stems	Rood and others 1987
		shoots	Hedden and others 1989
		immature siliques	Zanewich and Rood 1993
	Camellia sinensis	endosperm	Koshioka and others 1993
	Campanula isophylla	leaves and stems	Jensen and others 1996
	Carica papaya	fruits	Dathe and others 1991
	Carthamus tinctorius	stems	Potter and others 1993
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Citrus reticulata	developing fruit	Talon and others 1992
	Citrus sinensis	shoots	Poling and Maier 1988
		seeds	Turnbull 1989
		buds, ovaries, fruit, shoots	Talon and others 1990a
		immature fruit	Poling 1991
	Citrus unshiu	water sprouts	Kawarada and Sumiki 1959
		young fruit	Goto and others 1989
		developing fruit	Talon and others 1992
	Corylus avellana	seeds	Williams and others 1974
	Cucumis melo	mature seeds	Hemphill and others 1972
			Edelstein and others 1995
	Cucumis sativus	mature seeds	Hemphill and others 1972
	Cucurbita maxima	endosperm	Lange and others 1993a
		embryo	Lange and others 1993b
	Cyathea australis	sporophytes	Yamane and others 1985
	Daucus carota	somatic cell embryo cultures	Noma and others 1979
	Dalbergia dolichopetela	germinating seed	Moritz and Montiero 1994
	Dendranthema grandifloru	stem tips	Nishijima and others 1997
	Eucalyptus globulus	cambial region	Hasan and others 1994
			Ridoutt and others 1995
	Eustoma grandiflorum	shoots + floral buds	Hisamatsu and others 1998b
	Fragaria x ananassa Duch.	leaves - short day	Taylor and others 1994
		leaf exudate - short day	Taylor and others 2000b
		leaves - day neutral	Taylor and others 2000a
		immature fruit - day neutral	Blake and others 2000b
	Gentiana triflora	stems and leaves	Koshioka and others 1998
	Helianthus annuus	immature seeds	Hutchison and others 1988
	Hordeum vulgare	germinating grain	Yamada 1982
			Gaskin and others 1984

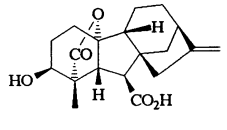
	developing grain	Gaskin and others 1984
		Boother and others 1991
	leaf sheaths	Croker and others 1990
	seedlings	Boother and others 1991
Ipomoea batatas	immature seed	Matsuo and others 1984
Ipomoea reptans	immature seed	Matsuo and others 1984
Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
Lactuca sativa	shoots	Waycott and others 1991
	seedlings	Toyomasu and others 1992
	mature seeds	Toyomasu and others 1993
Lathyrus odoratus	shoots	Ross and others 1990
Leucaena leucocephala	immature seed	Arigayo and others 1983
Lilium elegans	bulbs	Takayama and others 1993
Loliurn perenne	leaf tissue	Morvan-Bertrand and others 2001
Lolium temulentum	leaves	Gocal and others 1999
Lupinus albus	seeds	Gaskin and others 1992
Lycopersicon esculentum	cultured roots	Butcher and others 1988
	seeds, pericarp	Bohner and others 1988
	pollinated and parthenocarpic fruit	Koshioka and others 1994
	leaves + shoot tips	Grunzweig and others 1997
	unpollinated ovaries	Fos and others 2000
Malus domestica	immature seed	Lin and others 1991
		Hedden and others 1993
Mangifera indica	leaves	Davenport and others 2001
Marah macrocarpus	embryo	MacMillan and Gaskin 1996
Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
Orobanche minor	arial parts	Suzuki and others 1994
Oryza saliva	ears	Suzuki and others 1981
		Kobayashi and others 1984
Pennisetum glaucum	shoots	Devi and others 1994
Pharbitis tricolor	immature seeds	Matsuo and others 1984
Phaseolus coccineus	immature seeds	MacMillan and Suter 1958
		MacMillan and others 1960
		Durley and others 1971
	light-grown seedlings	Bowen and others 1973
	embryo and testa	Albone and others 1984
	cotyledonary embryo	Picciarelli and Alpi 1985
	suspensor	Picciarelli and Alpi 1986
Phaseolus lunatus	stems, root nodules	Dobert and others 1992a
Phaseolus vulgaris	immature seeds	West and Phinney 1959
		West 1961
		Hiraga and others 1974b
		Yamane and others 1977
	mature seeds	Hiraga and others 1974a,b
Phyllostachys bambusoides	shoots	Yanagisawa and others 1992
Phyllostachys edulis	shoots	Yanagisawa and others 1992
Picea abies	shoots	Oden and others 1987
		Moritz 1995
Picea sitchensis	shoots	Moritz and others 1989
Pimpinella anisum	somatic cell embryo cultures	Noma and others 1979
Pinus sylvestris	stem and needles	Wang and others 1996
Pisum sativum	shoot apices	Ingram and others 1983
	dark-grown shoots	Gaskin and others 1985
	pods, seeds parthenocarpic ovaries	Garcia-Martinez and others 1987a
	pollinated ovaries	Garcia-Martinez and others 1987a
		Santes and others 1995
	pods, ovules	Garcia-Martinez and others 1991

Table 1. *Continued*

GA_n	Plant species	Tissue	References
	Pithecellobum microcarpum	immature seeds	Koshioka and others 1986
	Polianthes tuberosa	corms	Chang and others 2001
	Populus tremuloides	vegetative buds	Zanewich and Rood 1994
	Prunus armeniaca	immature seeds	Bottini and others 1985
	Prunus avium	fruitlets	Blake and Browning 1994
		germinating seeds, apices ex 10-wk seedlings, apices ex mature plants	Blake and others 2000a
	Prunus spachiana	shoots	Kobayashi and others 1996
	Pseudotsuga menziesii	shoots	Doumas and others 1992
	Raphanus sativus	mature seed	Nakayama and others 1990
		leaves and stem	Nakayama and others 1995
	Rumex acetosa	shoots	Rijinders and others 1997
	Rumex palustris	shoots	Rijinders and others 1997
	Saccharum spp	leaves, shoot apical meristem	Kuhnle and others 1983
	Salix pentandra	shoots, catkins	Davies and others 1985
		roots	Olsen and others 1994
	Sasa kurilensis	shoots	Yanagisawa and others 1992
	Secale cereale	plants	Eckert and others 1978
	Sechium edule	endosperm, embryo, testa	Albone and others 1984
	Silene armeria	shoots	Talon and Zeevaart 1990
	Sonneratia apelata	leaves	Ganguly and Sircar 1974
	Spinacia oleracea	shoots	Talon and others 1991
	Thlaspi arvense	shoots	Metzger and Mardaus 1986
	Trifolium repens	arial parts	Suzuki and others 1994
	Triticum aestivum	leaves, roots	Eckert and others 1978
		leaves, stems	Jensen and Junttila 1987
		shoots	Appleford and Lenton 1991
		expanding internode, young ears	Webb and others 1998
	Vitis vinifera	seeds, seeded berries	Perez and others 2000
	Vigna unguiculata / sinensis	shoots	Garcia-Martinez 1987b
		stems and nodules	Dobert and others 1992b
		hypocotyls	Okatomoto and others 1995
	Zea mays	young tassels	Heupel and others 1985
		shoots	Fujioka and others 1988a
		pollen	Yamaguchi and others 1990
		seeds	Murofushi and others 1991
		callus ex embryo	Talo and others 1995
GA_3			
	Abelmoschus esculentus	immature seed	Koshioka and others 1996
	Althaea rosea	shoot apices	Harada and Nitsch 1967
	Arabidopsis thaliana	seeds	Derkx and others 1994
	Avena sativa	inflorescences	Kaufman and others 1976
	Brassica napus	stems	Rood and others 1987
		immature siliques	Zanewich and Rood 1993
	Calystegia soldanella	immature seeds	Matsuo and others 1984
	Camellia sinensis	endosperm	Koshioka and others 1993
	Carica papaya	fruits	Dathe and others 1991
	Carthamus tinctorius	stems	Potter and others 1993
	Citrus sinensis	fruitlets	Turnbull 1989

Cucumis melo	mature seeds	Hemphill and others 1972
		Edelstein and others 1995
Cucumis sativus	mature seeds	Hemphill and others 1972
Dalbergia dolichopetela	germinating seed	Moritz and Montiero 1994
Fragaria x ananassa Duch.	immature fruit - day neutral	Blake and others 2000b
	leaves - day neutral	Taylor and others 2000a
	leaf exudates - short day	Taylor and others 2000b
Hordeum vulgare	germinating grain	Yamada 1982
		Gaskin and others 1984
	leaf sheaths	Croker and others 1990
	developing grain, shoots	Boother and others 1991
Ipomoea batatas	immature seeds	Matsuo and others 1984
Ipomoea reptans	immature seeds	Matsuo and others 1984
Lactuca sativa	shoots	Waycott and others 1991
Lolium temulentum	leaves	Gocal and others 1999
Lycopersicon esculentum	cultured roots	Butcher and others 1988
	leaves + shoot tips	Grunzweig and others 1997
	unpollinated ovaries	Fos and others 2000
Lupinus albus	seeds	Gaskin and others 1992
Malus domestica	immature seeds	Lin and others 1991
		Hedden and others 1993
Mangifera indica	leaves	Davenport and others 2001
Marah macrocarpus	endosperm, embryo	MacMillan and Gaskin 1996
Pennisetum glaucum	shoots	Devi and others 1994
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Pharbitis tricolor	immature seeds	Matsuo and others 1984
Phaseolus coccineus	immature seeds	Durley and others 1971
Phaseolus lunatus	stems, root nodules	Dobert and others 1992a
Picea abies	shoots	Oden and others 1987; Moritz 1995
Picea sitchensis	shoots	Moritz and others 1989
Pinus attenuata	pollen	Kamienska and others 1976
Pinus sylvestris	stem and needles	Wang and others 1996
Pisum sativum	pods, ovules	Garcia-Martinez and others 1991
	pollinated ovaries	Santes and others 1995
Prunus avium	fruitlets	Blake and Browning 1994
	germinating seeds, apices ex 10-wk and mature plants	Blake and others 2000a
Prunus cerasus	immature seeds	Nakayama and others 1996
Prunus persica	immature seeds	Nakayama and others 2001
Pseudotsuga menziesii	shoots	Doumas and others 1992
Saccharum spp	leaves, shoot apical meristem	Kuhnle and others 1983
Secale cereale	plants	Eckert and others 1978
Sechium edule	endosperm, embryo, testa	Albone and others 1984
Triticum aestivum	leaves, roots	Eckert and others 1978
	leaves, stems	Jensen and Junttila 1987
	shoots	Appleford and Lenton 1991
	expanding internodes, young ears	Webb and others 1998
Vigna unguiculata /sinensis	leaves+petioles+ epicotyls	Garcia-Martinez and others 1987b
	stems	Dobert and others 1992b
Vitis vinifera	seeds, seeded berries	Perez and others 2000
Zea mays	shoots	Fujioka and others 1988b
	silk	Murofushi and others 1991

GA_4



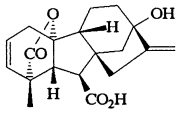
Abelmoschus esculentus	immature seed	Koshioka and others 1996

Table 1. *Continued*

GA_n	Plant species	Tissue	References
	Allium cepa	leaf sheaths	Nojiri and others 1993
	Alstroemeria hybrida	leaves	Kappers and others 1997
	Anemia phyllitidis	sporophytes	Oyama and others 1996b
	Arabidopsis thaliana	shoots	Talon and others 1990b
		seeds	Derkx and others 1994
	Aralia cordata	basal buds	Nishijima and others 1993
	Begonia x cheimantha	leaves	Oden and Heide 1988
	Brassica napus	immature siliques	Zanewich and Rood 1993
	Calystegia soldanella	immature seeds	Matsuo and others 1984
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Citrus reticulata	developing fruit	Talon and others 1992
	Citrus sinensis	immature fruit	Poling 1991
	Citrus unshiu	young fruit	Goto and others 1989
		developing fruit	Talon and others 1992
	Cucumis melo	mature seeds	Edelstein and others 1995
	Cucumis sativus	mature seeds	Hemphill and others 1972
	Cucurbita maxima	endosperm	Blechschmidt and others 1984
		embryo	Lange and others 1993b
	Cyathea australis	sporophytes	Yamane and others 1985
	Dalbergia dolichopetela	germinating seed	Moritz and Montiero 1994
	Daucus carota	somatic cell embryo cultures	Noma and others 1979
	Dicksonia antarctica	sporophytes	Yamane and others 1988a
	Dioscorea opposita	dormant bulbils	Tanno and others 1992
	Eucalyptus globulus	cambial region	Ridoutt and others 1995
	Helianthus annuus	seeds	Hutchison and others 1988
	Hordeum vulgare	developing grain	Gaskin and others 1984
	Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
	Lilium elegans	bulbs	Takayama and others 1993
	Lupinus albus	seeds	Gaskin and others 1992
	Lycopersicon esculentum	leaves + shoot tips	Grunzweig and others 1997
	Malus domestica	immature seeds	Lin and others 1991
			Hedden and others 1993
		developing seeds	Oyama and others 1996a
	Marah macrocarpus	endosperm	Beeley and others 1975
		endosperm, embryo	MacMillan and Gaskin 1996
	Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Orobanche minor	arial parts	Suzuki and others 1994
	Oryza sativa	ears	Kobayashi and others 1984
		spikelets	Kobayashi and others 1988
	Phaseolus coccineus	dark-grown seedlings	Crozier and others 1971
		light-grown seedlings	Bowen and others 1973
		cotyledonary embryo	Picciarelli and Alpi 1985
		suspensor	Picciarelli and Alpi 1986
	Phaseolus vulgaris	immature seeds	Durley and others 1971
			Hiraga and others 1974b
			Yamane and others 1977
	Picea abies	shoots	Moritz 1995
	Picea sitchensis	shoots	Moritz and others 1989
	Pimpinella anisum	somatic cell embryo cultures	Noma and others 1979
	Pinus attenuata	pollen	Kamienska and others 1976
	Pinus sylvestris	stem and needles	Wang and others 1996
	Pisum sativum	internodes	Poole and others 1995
		fertilized ovules	Rodrigo and others 1997

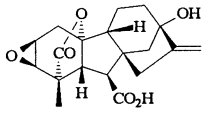
Pseudotsuga menziesii	shoots	Doumas and others 1992
Raphanus sativus	leaves, stem	Nakayama and others 1995
Rumex acetosa	shoots	Rijinders and others 1997
Rumex palustris	shoots	Rijinders and others 1997
Saccharum spp	apical meristem	Koshioka and others 1984
Sechium edule	endosperm, embryo	Albone and others 1984
Spinacia oleracea	shoots	Talon and others 1991
Trifolium repens	arial parts	Suzuki and others 1994
Triticum aestivum	leaves and stems	Jensen and Junttila 1987
	expanding internode	Webb and others 1998
	shoots	Appleford and Lenton 1991
Vigna unguiculata / sinensis	hypocotyls	Okamoto and others 1995
Vitis vinifera x V. rupestris	somatic embryos	Takeno and others 1983
Zea mays	shoots	Fujioka and others 1988b

GA_5



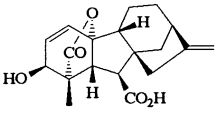
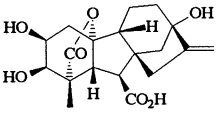
Dalbergia dolichopetela	germinating seeds	Moritz and Montiero 1994
Fragaria x ananassa Duch.	leaves - short day	Taylor and others 1994
	immature fruit - day neutral	Blake and others 2000b
Ipomoea batatas	immature and mature seeds	Matsuo and others 1984
Ipomoea reptans	immature and mature seeds	Matsuo and others 1984
Lactuca sativa	shoots	Waycott and others 1991
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Phaseolus coccineus	immature seeds	MacMillan and others 1958, 1960
		Durley and others 1971
	light-grown seedlings	Bowen and others 1973
	embryo and testa	Albone and others 1984
	cotyledonary embryo	Picciarelli and Alpi 1985
	suspensors	Picciarelli and Alpi 1986
Phaseolus vulgaris	immmature seeds	West and Phinney 1959
		West 1961
		Yamane and others 1977
Prunus armeniaca	immature seeds	Bottini and others 1985
Prunus avium	fruitlets	Blake and Browning 1994
	germinating seeds, apices ex 10-wk-old, apices ex mature plants	Blake and others 2000a
Prunus persica	immaure seeds	Yamaguchi and others 1975a,b
Raphanus sativus	mature seeds	Nakayama and others 1998
Quamoclit pennata	seeds	Matsuo and others 1984
Spinacia oleracea	shoots	Talon and others 1991
Zea mays	shoots	Fujioka and others 1988a

GA_6



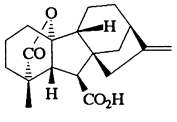
Phaseolus coccineus	immature seeds	MacMillan and others 1962
		Durley and others 1971
	embryo and testa	Albone and others 1984
	cotyledonary embryo	Picciarelli and Alpi 1985
	suspensors	Picciarelli and Alpi 1986

Table 1. *Continued*

GA_n	Plant species	Tissue	References
	Phaseolus vulgaris	immature seeds	Durley and others 1971 Yamane and others 1977
GA_7			
	Calystigia soldanella	seeds	Matsuo and others 1984
	Daucus carota	somatic cell embryo cultures	Noma and Others 1979
	Malus domestica	immature seeds	Lin and others 1991 Hedden and others 1993
		developing seeds	Oyama and others 1996a
	Marah macrocarpus	endosperm	Beeley and others 1975
		endosperm, embryos	MacMillan and Gaskin 1996
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Picea abies	shoots	Moritz 1995
	Pimpinella anisum	somatic cell embryo cultures	Noma and others 1979
	Pinus attenuata	pollen	Kamienska and others 1976
	Pisum sativum	fertilized ovules	Rodrigo and others 1997
	Pseudotsuga menziesii	shoots	Dumas and others 1992
	Sechium edule	endosperm, embryos, testa	Albone and others 1984
	Spinacia oleracea	shoots	Talon and others 1991
	Triticum aestivum	leaves + stems	Jensen and Junttila 1987
	Zea mays	shoots	Fujioka and others 1988b
GA_8			
	Abelmoschus esculentus	immature seed	Koshioka and others 1996
	Allium cepa	leaf sheaths	Nojiri and others 1993
	Alnus tenuifolia	vegetative buds	Zanewich and Rood 1994
	Alstroemeria hybrida	leaves	Kappers and others 1997
	Arabidopsis thaliana	shoots	Talon and others 1990b
	Betula pendula	vegetative buds	Zanewich and Rood 1994
	Brassica napus	shoots	Hedden and others 1989
		immature siliques	Zanewich and Rood 1993
	Calonyction aculeatum	immature seeds	Murofushi and others 1973
	Citrus reticulata	developing fruit	Talon and others 1992
	Camellia sinensis	endosperm	Koshioka and others 1993
		leaves, fruitlets	Turnbull 1989
	Citrus sinensis	shoots	Poling and Maier 1988
		leaves, fruitlets	Turnbull 1989
	Citrus unshiu	developing fruit	Talon and others 1992
	Cucumis melo	mature seeds	Edelstein and others 1995
	Cucurbita maxima	endosperm	Lange and others 1993a
	Dalbergia dolichopetela	germinating seed	Moritz and Montiero 1994
	Eucalyptus globulus	cambial region	Ridoutt and others 1995
	Fragaria x ananassa Duch.	leaves - short day	Taylor and others 1994
		leaves - day neutral	Taylor and others 2000a
		immature fruit - day neutral	Blake and others 2000b

Hordeum vulgare	developing grain	Gaskin and others 1984 Boother and others 1991
	leaf sheaths	Croker and others 1990
	shoots	Boother and others 1991
Juglans regia	pollinated ovaries	Tadeo and others 1994
	unpollinated ovaries	Tadeo and others 1994
Lactuca sativa	shoots	Waycott and others 1991
Lathyrus odoratus	shoots	Ross and others 1990
Leucaena leucocephala	immature seed	Arigayo and others 1983
Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
Lolium temulentum	leaves	Gocal and others 1999
Lycopersicon esculentum	seeds, pericarp	Bohner and others 1988
	pollinated and parthenocarpic fruit	Koshioka and others 1994
	leaves and shoot tips	Grunzweig and others 1997
	unpollinated ovaries	Fos and others 2000
Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
Malus domestica	immature seeds	Lin and others 1991
Pennisitum glaucum	shoots	Devi and others 1994
Pharbitis nil	immature seeds	Yokota and others 1971
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Phaseolus coccineus	immature seeds	MacMillan and others 1962 Durley and others 1971
	testa	Albone and others 1984
	suspensor	Picciarelli and Alpi 1986
Phaseolus vulgaris	immature seeds	Durley and others 1971 Hiraga and others 1974b Yamane and others 1977
	mature seeds	Hiraga and others 1974a
Pisum sativum	dark-grown shoots,	Gaskin and others 1985
	pods, seeds, parthenocarpic and pollinated ovaries	Garcia-Martinez and others 1987a
	pollinated ovaries	Santes and others 1995
	pods, ovules	Garcia-Martinez and others 1991
Populus tremuloides	vegetative buds	Zanewich and Rood 1994
Prunus avium	apices ex 10-wk-old seedings and apices ex mature plants	Blake and others 2000a
Raphanus sativus	mature seeds	Nakayama and others 1990
Salix pentandra	roots	Olsen and others 1994
Sechium edule	embryos and testa	Albone and others 1984
Silene armeria	shoots	Talon and Zeevaart 1990
Spinacia oleracea	shoots	Talon and others 1991
Thlaspi arvense	shoots	Metzger and Mardaus 1986
Triticum aestivum	shoots	Appleford and Lenton 1991
	mature grain	Lenton and others 1994
	expanding internodes young ears	Webb and others 1998
Vigna unguiculata / sinensis	stems	Dobert and others 1992b
Zea mays	young tassels	Heupel and others 1985
	shoots	Fujioka and others 1988a,b
	immature seeds	Murofushi and others 1991

GA_9



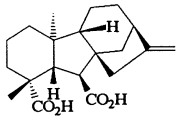
Abies alba	needles	Christmann and Doumas 1998

Table 1. *Continued*

GA_n	Plant species	Tissue	References
	Allium cepa	leaf sheaths	Nojiri and others 1993
	Alstroemeria hybrida	leaves	Kappers and others 1997
	Althea rosea	shoot apices	Harada and Nitsch 1967
	Anemia phyllitidis	sporophytes	Oyama and others 1996b
		prothallia	
	Arabidopsis thaliana	shoots	Talon and others 1990b
		seeds	Derkx and others 1994
	Begonia x cheimantha	leaves	Oden and Heide 1988
	Brassica napus	immature siliques	Zanewich and Rood 1993
	Camellia sinensis	leaves	Oyama and others 1999
		xylem sap	
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Citrus reticulata	developing fruit	Talon and others 1992
	Citrus sinensis	immature fruit	Poling 1991
	Citrus unshiu	young fruit	Goto and others 1989
		developing fruit	Talon and others 1992
	Corylus avellana	seeds	Williams and others 1974
	Cyathea australis	sporophytes	Yamane and others 1985
	Dendranthema grandiflorum	stem tips	Nishijima and others 1997
	Dicksonia antarctica	sporophytes	Yamane and others 1988a
	Dioscorea opposita	dormant bulbils	Tanno and others 1992
	Eriobotrya japonica	immature seeds	Koshioka and others 1988
		immature seeds	Yuda and others 1992
	Eucalyptus globulus	cambial region	Ridoutt and others 1995
	Hordeum vulgare	developing grain	Boother and others 1991
	Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
	Lilium elegans	bulbs	Takayama and others 1993
	Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
	Lolium temulentum	leaves	Gocal and others 1999
	Lycopersicon esculentum	pollinated fruit	Koshioka and others 1994
		unpollinated ovaries	Fos and others 2000
	Lygodium circinnatum (as Me ester)	prothallia	Yamauchi and others 1996
	Lygodium japonicum (as Me ester)	prothallia	Yamane and others 1979
	Malus domestica	immature seeds	Lin and others 1991
			Hedden and others 1993
		developing seeds	Oyama and others 1996a
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Orobanche minor	arial parts	Suzuki and others 1994
	Oryza saliva	ears	Kobayashi and others 1984
	Picea abies	shoots	Oden and others 1987
			Moritz 1995
	Picea sitchensis	shoots	Moritz and others 1989
	Pinus sylvestris	stems	Wang and others 1996
	Pisum sativum	immature seeds	Frydman and others 1974
	Pithecellobium microcarpum	immature seeds	Koshioka and others 1986
	Pseudotsuga menziesii	shoots	Doumas and others 1992
	Prunus persica	immature seeds	Nakayama and others 2001
	Raphanus sativus	mature seed	Nakayama and others 1990
		leaves, stems	Nakayama and others 1995
	Rumex acetosa	shoots	Rijinders and others 1997
	Rumex palustris	shoots	Rijinders and others 1997
	Spinacia oleracea	shoots	Talon and others 1991
	Thlaspi arvense	shoots	Metzger and Mardaus 1986

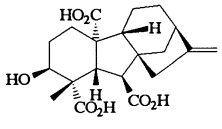
Trifolium repens	arial parts	Suzuki and others 1994
Triticum aestivum	expanding internodes	Webb and others 1998
Vigna unguiculata / sinensis	hypocotyls	Okamoto and others 1995
Vitis vinifera x Vitis rupestris	somatic embryos	Takeno and others 1983
Zea mays	shoots	Fujioka and others 1988b
	pollen	Yamaguchi and others 1990
	immature seeds	Murofushi and others 1991

GA_{12}



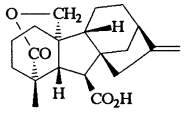
Allium cepa	leaf sheaths	Nojiri and others 1993
Arabidopsis thaliana	shoots	Talon and others 1990b
Camellia sinensis	xylem sap	Oyama and others 1999
Cucurbita maxima	endosperm	Blechschmidt and others 1984
Dioscorea opposita	dormant bulbils	Tanno and others 1992
Fragaria x ananassa Duch.	immature fruit - day neutral	Blake and others 2000b
Hordeum vulgare	developing grain	Gaskin and others 1984
Lilium elegans	bulbs	Takayama and others 1993
Lilium longiflorum	pollen	Abe and others 1991
Malus domestica	immature seeds	Hedden and others 1993
	developing seeds	Oyama and others 1996a
Ornithogalum thyroides	inflorescences	Koshioka and others 1999
Orobanche minor	arial parts	Suzuki and others 1994
Picea abies	shoots	Moritz 1995
Pinus sylvestris	stems	Wang and others 1996
Raphanus sativus	stems	Nakayama and others 1995
Sechium edule	testa	Albone and others 1984
Silene armeria	shoots	Talon and Zeevaart 1990
Spinacia oleracea	shoots	Talon and others 1991
Thlaspi arvense	shoots	Metzger and Mardaus 1986
Zea mays	shoots	Fujioka and others 1988a,b

GA_{13}



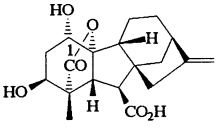
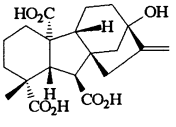
Arabidopsis thaliana	shoots	Talon and others 1990b
Cucurbita maxima	endosperm, embryo	Blechschmidt and others 1984
Marah macrocarpus	embryo	MacMillan and Gaskin 1996
Pisum sativum	pollinated ovaries	Santes and others 1995
Sechium edule	endosperm and testa	Albone and others 1984

GA_{15}



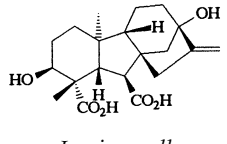
Allium cepa	leaf sheaths	Nojiri and others 1993
Alstroemeria hybrida	leaves	Kappers and others 1997
Anemia phyllitidis	sporophytes	Oyama and others 1996b

Table 1. *Continued*

GA_n	Plant species	Tissue	References
	Arabidopsis thaliana	shoots	Talon and others 1990b
	Aralia cordata	basal buds	Nishijima and others 1993
	Brassica napus	shoots	Hedden and others 1989
	Camellia sinensis	xylem sap	Oyama and others 1999
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Cyathea australis	sporophytes	Yamane and others 1985
	Dicksonia antarctica	sporophytes	Yamane and others 1988a
	Eriobotrya japonica	immature seeds	Koshioka and others 1988 Yuda and others 1992
	Lilium elegans	bulbs	Takayama and others 1993
	Lycopersicon esculentum	seeds	Bohner and others 1988
		pollinated fruit	Koshioka and others 1994
	Malus domestica	immature seeds	Lin and others 1991 Hedden and others 1993
		xylem exudate	Motosugi and others 1996
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Picea abies	shoots	Moritz 1995
	Prunus spachiana	shoots	Kobayashi and others 1996
	Raphanus sativus	leaves, stem	Nakayama and others 1995
	Sechium edule	testa	Albone and others 1984
	Solanum tuberosum	immature berries	Jones and others 1988
	Spinacia oleracea	shoots	Talon and others 1991
	Thlaspi arvense	shoots	Metzger and Mardaus 1986
	Triticum aestivum	developing grain	Gaskin and others 1980
	Zea mays	shoots	Fujioka and others 1988b
GA_{16}			
	Mis-identified for GA_{54} in immature ears of *Secale cereale*		Dathe and others 1978, 1989
GA_{17}			
	Abelmoschus esculentus	immature seed	Koshioka and others 1996
	Agrostemma githago	shoots and leaves	Jones and Zeevaart 1980
	Arabidopsis thaliana	shoots	Talon and others 1990b
	Brassica napus	shoots	Hedden and others 1989
		immature siliques	Zanewich and Rood 1993
	Calonyction aculeatum	immature seeds	Murofushi and others 1973
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Citrus reticulata	developing fruit	Talon and others 1992
	Citrus sinensis	immature fruit	Poling 1991
		shoots	Poling and Maier 1988
	Citrus unshiu	developing fruit	Talon and others 1992
	Cucurbita maxima	embryo	Lange and others 1993b
	Fragaria x ananassa Duch.	leaves - short day	Taylor and others 1994
		leaves - day neutral	Taylor and others 2000a
		immature fruit - day neutral	Blake and others 2000b

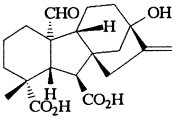
Hordeum vulgare	developing and germinating grain	Gaskin and others 1984 Boother and others 1991
Ipomoea reptans	immature seeds	Matsuo and others 1984
Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
Lactuca sativa	seeds	Toyomasu and others 1993
Leucaena leucocephala	immature seed	Arigayo and others 1983
Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
Lupinus albus	seeds	Gaskin and others 1992
Lycopersicon esculentum	seeds, pericarp	Bohner and others 1988
	pollinated and parthenocarpic fruit	Koshioka and others 1994
Malus domestica	immature seeds	Lin and others 1991 Hedden and others 1993
	developing seeds	Oyama and others 1996a
	xylem exudate	Motosugi and others 1996
Oryza sativa	spikelets	Kobayashi and others 1988
Pennesitum glaucum	shoots	Devi and others 1994
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Phaseolus coccineus	immature seeds	Durley and others 1971
	embryo and testa	Albone and others 1984
Phaseolus vulgaris	immature seeds	Yamane and others 1977
Pisum sativum	immature seeds	Frydman and others 1974 Gaskin and others 1985
	dark-grown shoots	Gaskin and others 1985
	pods, ovules	Garcia-Martinez and others 1991
	pollinated ovaries	Santes and others 1995
Pithecellobum microcarpum	immature seeds	Koshioka and others 1986
Prunus cerasus	immature seeds	Nakayama and others 1996
Prunus persica	immature seeds	Nakayama and others 2001
Pyrus communis	seeds	Martin and others 1977
Quamoclit pennata	immature seeds	Matsuo and others 1984
Raphanus sativus	leaves, stems	Nakayama and others 1995
	mature seeds	Nakayama and others 1990
Sechium edule	endosperm, embryo	Albone and others 1984
Silene armeria	shoots	Talon and Zeevaart 1990
Spinacia oleracea	shoots	Metzger and Zeevaart 1980a
Triticum aestivum	developing grain	Gaskin and others 1980
	mature grain	Lenton and others 1994
	expanding internode young ears	Webb and others 1998
Vicia faba	immature seeds	Sponsel and others 1979
Vitis vinifera	seeds, seedless and seeded berries	Perez and others 2000
Zea mays	young tassels	Heupel and others 1985
	shoots	Fujioka and others 1988a,b
	immature seeds	Murofushi and others 1991
	callus ex embryo	Talo and others 1995

GA_{18}



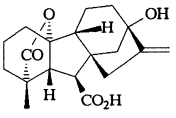
Lupinus albus	seeds	Gaskin and others 1992
Lupinus luteus	immature seeds	Koshimizu and others 1968
Malus domestica	xylem exudate	Motosugi and others 1996
Wisteria floribunda	immature seeds	Koshimizu and others 1972

Table 1. *Continued*

GA_n	Plant species	Tissue	References
GA_{19}			
	Agrostemma githago	shoots and leaves	Jones and Zeevaart 1980
	Alstroemeria hybrida	leaves	Kappers and others 1997
	Anemia phyllitidis	sporophytes	Oyama and others 1996b
	Arabidopsis thaliana	shoots	Talon and others 1990b
	Aralia cordata	basal buds	Nishijima and others 1993
	Begonia x cheimantha	leaves	Oden and Heide 1988
	Betula pendula	vegetative buds	Zanewich and Rood 1994
	Brassica napus	stems	Rood and others 1987
		shoots	Hedden and others 1989
		immature siliques	Zanewich and Rood 1993
	Calonyction aculeatum	immature seeds	Murofushi and others 1973
	Camellia sinensis	endosperm	Koshioka and others 1993
	Campanula isophylla	leaves and stems	Jensen and others 1996
	Carthamus tinctorius	stems	Potter and others 1993
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Citrus reticulata	developing fruit	Talon and others 1992
	Citrus sinensis	shoots	Poling and Maier 1988
			Talon and others 1990a
		immature fruit	Poling 1991 seeds
		seeds	Turnbull 1989
	Citrus unshiu	young fruit	Goto and others 1989
		developing fruit	Talon and others 1992
	Dendranthema grandiflorum	stem tips	Nishijima and others 1997
	Dioscorea opposita	dormant bulbils	Tanno and others 1992
	Eriobotrya japonica	immature seeds	Koshioka and others 1988
	Eucalyptus globulus	cambial region	Hasan and others 1994
			Ridoutt and others 1995
	Eucalyptus nitens	apical buds	Hasan and others 1994
	Eustoma grandiflorum	shoots + floral buds	Hisamatsu and others 1998b
	Fragaria x ananassa Duch.	leaves – short day	Taylor and others 1994
		leaves – day neutral	Taylor and others 2000a
		immature fruit – day neutral	Blake and others 2000b
	Gentiana triflora	stems and leaves	Koshioka and others 1998
	Helianthus annum	immature seeds	Hutchison and others 1988
	Hordeum vulgare	germinating grain	Gaskin and others 1984
		leaf sheaths	Croker and others 1990
	Humulus lupulus	shoots	Watanabe and others 1978
	Ipomoea batatas	immature and mature seeds	Matsuo and others 1984
	Ipomoea pes-caprae	seeds	Matsuo and others 1984
	Ipomoea reptans	seeds	Matsuo and others 1984
	Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
	Lactuca sativa	shoots	Waycott and others 1991
		seedlings	Toyomasu and others 1992
		mature seeds	Toyomasu and others 1993
	Lathyrus odoratus	shoots	Ross and others 1992
	Leucaena leucocephala	immature seed	Arigayo and others 1983
	Lilium elegans	bulbs	Takayama and others 1993
	Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
	Lolium temulentum	leaves	Gocal and others 1999

Lupinus luteus	immature fruits	Fukui and others 1972
Lycopersicon esculentum	seeds, pericarp	Bohner and others 1988
	pollinated and parthenocarpic fruit	Koshioka and others 1994
	leaves + shoot tips	Grunzweig and others 1997
	unpollinated ovaries	Fos and others 2000
Malus domestica	leaves and buds	Koshioka and others 1985
	immature seeds	Lin and others 1991
		Hedden and others 1993
	developing seeds	Oyama and others 1996a
	xylem exudate	Motosugi and others 1996
Mangifera indica	leaves	Davenport and others 2001
Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
Ornithogalum thyroides	inflorescences	Koshioka and others 1999
Orobanche minor	arial parts	Suzuki and others 1994
Oryza sativa	roots, shoots, ears	Kurogochi and others 1979
	immature seeds, ears	Kobayashi and others 1984
	spikelets	Kobayashi and others 1988
Pennesitum glaucum	shoots	Devi and others 1994
Phaseolus coccineus	immature seeds	Durley and others 1971
	embryo and testa	Albone and others 1984
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Phaseolus lunatus	stems, root nodules	Dobert and others 1992a
Phyllostachys bambusoides	shoots	Yanagisawa and others 1992
Phyllostachys edulis	shoots	Murofushi and others 1966
Pisum sativum	immature seeds	Gaskin and others 1985
	pods, ovules	Garcia-Martinez and others 1991
	pollinated ovaries	Santes and others 1995
	shoots	Davies and others 1982
Polianthes tuberosa	corms	Chang and others 2001
Populus tremuloides	vegetative buds	Zanewich and Rood 1994
Prunus avium	fruitlets	Blake and Browning 1994
	germinating seeds, apices ex 10-wk old and ex mature plants	Blake and others 2000a
Prunus cerasus	immature seeds	Nakayama and others 1996
Prunus persica	immature seeds	Nakayama and others 2001
Prunus spachiana	shoots	Kobayashi and others 1996
Raphanus sativus	leaves, stem	Nakayama and others 1995
	mature seed	Nakayama and others 1990
Rumex acetosa	shoots	Rijinders and others 1997
Rumex palustris	shoots	Rijinders and others 1997
Saccharum spp	leaves, shoot apical meristem	Kuhnle and others 1983
Salix pentandra	shoots, catkins	Davies and others 1985
	roots	Olsen and others 1994
Sasa kurilensis	shoots	Yanagisawa and others 1992
Secale cereale	immature ears	Dathe and others 1989
Sechium edule	testa	Albone and others 1984
Silene armeria	shoots	Talon and Zeevaart 1990
Spinacia oleracea	shoots	Metzger and Zeevaart 1980a
		Talon and others 1991
	roots	Metzger and Zeevaart 1980b
Thlaspi arvense	shoots	Metzger and Mardaus 1986
Trifolium repens	arial parts	Suzuki and others 1994
Triticum aestivum	developing grain	Gaskin and others 1980
	shoots	Appleford and Lenton 1991
	mature grain	Lenton and others 1994
	expanding internode young ears	Webb and others 1998

Table 1. *Continued*

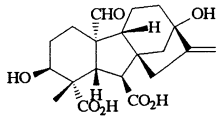
GA_n	Plant species	Tissue	References
	Vicia faba	immature seeds	Sponsel and others 1979
	Vigna unguiculata / sinensis	stems, root nodules	Dobert and others 1992b
	Vitis vinifera	seeds, seedless and seeded berries	Perez and others 2000
	Zea mays	young tassels	Heupel and others 1985
		shoots	Fujioka and others 1988a,b
		immature seeds	Murofushi and others 1991
		callus ex embryo	Talo and others 1995
GA_{20}			
	Abelmoschus esculentus	immature seed	Koshioka and others 1996
	Agrostemma githago	shoots and leaves	Jones and Zeevaart 1980
	Allium cepa	leaf sheaths	Nojiri and others 1993
	Alnus tenuifolia	vegetative buds	Zanewich and Rood 1994
	Alstroemeria hybrida	leaves	Kappers and others 1997
	Anemia phyllitidis	sporophytes	Oyama and others 1996b
	Arabidopsis thaliana	shoots	Talon and others 1990b
	Aralia cordata	basal buds	Nishijima and others 1993
	Begonia x cheimantha	leaves	Oden and Heide 1988
	Betula pendula	vegetative buds	Zanewich and Rood 1994
	Brassica napus	stems	Rood and others 1987
		shoots	Hedden and others 1989
		immature siliques	Zanewich and Rood 1993
	Bryophyllum daigremontianum	shoot tips and upper leaves	Gaskin and others 1973
	Camellia sinensis	endosperm	Koshioka and others 1993
		leaves, xylem sap	Oyama and others 1999
	Carthamus tinctorius	stems	Potter and others 1993
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Citrus reticulata	developing fruit	Talon and others 1992
	Citrus sinensis	shoots	Poling and Maier 1988
		reproductve buds, ovaries, shoots, developing fruit	Talon and others 1990a
		immature fruit	Poling 1991
		seeds, leaves	Turnbull 1989
	Citrus unshiu	young fruit	Goto and others 1989
	Cucumis melo	mature seeds	Edelstein and others 1995
		developing fruit	Talon and others 1992
	Dalbergia dolichopetela	germinating seed	Moritz and Montiero 1994
	Dendranthema grandiflorum	stem tips	Nishijima and others 1997
	Dioscorea opposita	dormant bulbils	Tanno and others 1992
	Eriobotrya japonica	immature seeds	Koshioka and others 1988
	Eucalyptus globulus	cambial region	Hasan and others 1994
			Ridoutt and others 1995
	Eustoma grandiflorum	shoots + floral buds	Hisamatsu and others 1998b
	Fragaria x ananassa Duch.	leaves - short day	Taylor and others 1994
		leaves - day neutral	Taylor and others 2000a
		immature fruit - day neutral	Blake and others 2000b
	Gentiana triflora	stems and leaves	Koshioka and others 1998
	Helianthus annuus	seeds	Hutchison and others 1988
	Hordeum vulgare	germinating grain	Gaskin and others 1984

		Boother and others 1991
	leaf sheaths	Croker and others 1990
	seedlings	Boother and others 1991
Ipomoea batatas	immature and mature seeds	Matsuo and others 1984
Ipomoea reptans	seeds	Matsuo and others 1984
Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
Lactuca sativa	shoots	Waycott and others 1991
	seedlings	Toyomasu and others 1992
	mature seeds	Toyomasu and others 1993
Lathyrus odoratus	shoots	Ross and others 1990
Leucaena leucocephala	immature seed	Arigayo and others 1983
Lilium elegans	bulbs	Takayama and others 1993
Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
Lolium temulentum	leaves	Gocal and others 1999
Lycopersicon esculentum	seeds, pericarp	Bohner and others 1988
	pollinated and parthenocarpic fruit	Koshioka and others 1994
	leaves + shoot tips	Grunzweig and others 1997
	unpollinated ovaries	Fos and others 2000
Lygodium circinnatum (as Me ester)	prothallia	Yamauchi and others 1996
Malus domestica	leaves and buds	Koshioka and others 1985
	immature seeds	Lin and others 1991
		Hedden and others 1993
	developing seeds	Oyama and others 1996a
Mangifera indica	leaves	Davenport and others 2001
Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
Ornithogalum thyroides	inflorescences	Koshioka and others 1999
Orobanche minor	arial parts	Suzuki and others 1994
Oryza saliva	immature seeds, ears	Kobayashi and others 1984
	spikelets	Kobayashi and others 1988
Pennesitum glaucum	shoots	Devi and others 1994
Pharbitis nil	immature seeds	Murofushi and others 1968
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Phaseolus coccineus	immature seeds	Durley and others 1971
	light-grown seedlings	Bowen and others 1973
	embryo and testa	Albone and others 1984
Phaseolus lunatus	stems, root nodules	Dobert and others 1992a
Phaseolus vulgaris	immature seeds	Yamane and others 1977
Phyllostachys bambusoides	shoots	Yanagisawa and others 1992
Phyllostachys edulis	shoots	Yanagisawa and others 1992
Picea abies	shoots	Moritz 1995
Pinus sylvestris	stems	Wang and others 1996
Pisum sativum	immature seeds	Eeuwens and others 1973
		Frydman and MacMillan 1973
	cotyledons, embryonic axes and testa	Sponsel 1983
	shoot apices	Ingram and others 1983
	dark-grown seedlings	Gaskin and others 1985
	pods, seeds	Garcia-Martinez and others 1987a
	parthenocarpic ovaries	
	pollinated ovaries	Garcia-Martinez and others 1987a
		Santes and others 1995
	pods, ovules	Garcia-Martinez and others 1991
Pithecellobum microcarpum	immature seeds	Koshioka and others 1986

Table 1. *Continued*

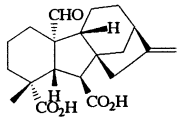
GA_n	Plant species	Tissue	References
	Polianthes tuberosa	corms	Chang and others 2001
	Populus tremuloides	vegetative buds	Zanewich and Rood 1994
	Prunus avium	fruitlets	Blake and Browning 1994
		germinating seeds, apices ex 10-wk-old and mature plants	Blake and others 2000a
	Prunus cerasus	immature seeds	Nakayama and others 1996
	Prunus spachiana	shoots	Kobayashi and others 1996
	Raphanus sativus	leaves, stems	Nakayama and others 1995
		mature seeds	Nakayama and others 1990
	Rumex acetosa	shoots	Rijinders and others 1997
	Rumex palustris	shoots	Rijinders and others 1997
	Saccharum spp	leaves, shoot apical meristem	Kuhnle and others 1983
	Salix pentandra	shoots	Davies and others 1985
	Sasa kurilensis	shoots	Yanagisawa and others 1992
	Secale cereale	immature ears	Dathe and others 1989
	Silene armeria	shoots	Talon and Zeevaart 1990
	Solanum tuberosum	immature berries	Jones and others 1988
	Spinacia oleracea	shoots	Metzger and Zeevaart 1980a Talon and others 1991
	Stevia rebaudiana	stems + leaves	Alves and Ruddat 1979
	Thlaspi arvense	shoots	Metzger and Mardaus 1986
	Trifolium repens	arial parts	Suzuki and others 1994
	Triticum aestivum	developing grain	Gaskin and others 1980
		shoots	Appleford and Lenton 1991
		mature grain	Lenton and others 1994
		expanding internodes and young ears	Webb and others 1998
	Vicia faba	immature seeds	Sponsel and others 1979
	Vigna unguiculata / sinensis	leaves, petioles and epicotyls	Garcia-Martinez and others 1987b
		stems, root nodules	Dobert and others 1992b
		hypocotyls	Okamoto and others 1995
	Zea mays	young tassels	Heupel and others 1985
		shoots	Fujioka and others 1988a,b
		pollen	Yamaguchi and others 1990
		immature seeds	Murofushi and others 1991
		callus ex embryo	Talo and others 1995
GA_{21}			
	Canavalia gladiata	immature seeds	Murofushi and others 1969a,b
GA_{22}			
	Canavalia gladiata	immature seeds	Murofushi and others 1969a,b

GA_{23}



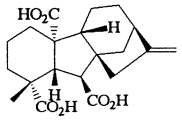
Ipomoea batatas	immature and mature seeds	Matsuo and others 1984
Leucaena leucocephala	immature seed	Arigayo and others 1983
Lupinus albus	seeds	Gaskin and others 1992
Lupinus luteus	immature fruits	Fukui and others 1972
Malus domestica	xylem exudate	Motosugi and others 1996
Wisteria floribunda	immature seeds	Koshimizu and others 1972

GA_{24}



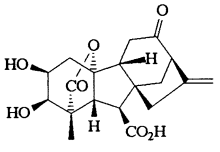
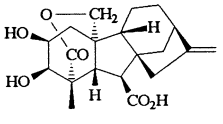
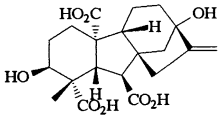
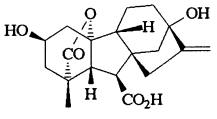
Allium cepa	leaf sheaths	Nojiri and others 1993
Alstroemeria hybrida	leaves	Kappers and others 1997
Anemia phyllitidis	sporophytes and prothallia	Oyama and others 1996b
Arabidopsis thaliana	shoots	Talon and others 1990b
Brassica napus	shoots	Hedden and others 1989
	immature siliques	Zanewich and Rood 1993
Citrus reticulata	developing fruit	Talon and others 1992
Citrus unshiu	young fruit	Goto and others 1989
	developing fruit	Talon and others 1992
Cyathea australis	sporophytes	Yamane and others 1985
Dioscorea opposita	dormant bulbils	Tanno and others 1992
Eriobotrya japonica	immature seeds	Yuda and others 1992
Lilium elegans	bulbs	Takayama and others 1993
Lilium longiflorum	pollen	Abe and others 1991
Lycopersicon esculentum	seeds	Bohner and others 1988
	pollinated fruit	Koshioka and others 1994
Malus domestica	immature seeds	Lin and others 1991
Marah macrocarpus	endosperm	Beeley and others 1975
Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
Ornithogalum thyroides	inflorescences	Koshioka and others 1999
Orobanche minor	arial parts	Suzuki and others 1994
Oryza sativa	ears	Kobayashi and others 1984
Raphanus sativus	leaves, stems	Nakayama and others 1995
	mature seeds	Nakayama and others 1990
Secale cereale	immature ears	Dathe and others 1989
Thlaspi arvense	shoots	Metzger and Mardaus 1986
Triticum aestivum	developing grain	Gaskin and others 1980
Zea mays	shoots	Fujioka and others 1988b

GA_{25}



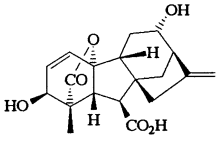
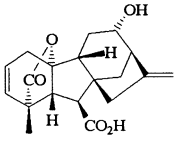
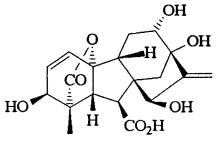
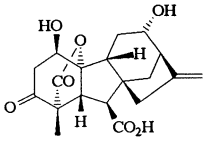
Anemia phyllitidis	prothallia	Oyama and others 1996b
Arabidopsis thaliana	shoots	Talon and others 1990b
Cibotium glaucum	sporophytes	Yamane and others 1988a
Citrus unshiu	young fruit	Goto and others 1989

Table 1. *Continued*

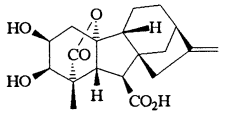
GA_n	Plant species	Tissue	References
	Cucurbita maxima	embryo	Blechschmidt and others 1984
		endosperm	Lange and others 1993a
	Dicksonia antarctica	sporophytes	Yamane and others 1988a
	Hordeum vulgare	developing grain	Gaskin and others 1984
	Lycopersicon esculentum	seeds	Bohner and others 1988
		pollinated fruit	Koshioka and others 1994
	Malus domestica	immature seeds	Hedden and others 1993
		developing seeds	Oyama and others 1996a
	Marah macrocarpus	endosperm	Beeley and others 1975
		embryos	MacMillan and Gaskin 1996
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Prunus cerasus	immature seeds	Nakayama and others 1996
	Pyrus communis	seeds	Martin and others 1977
	Raphanus sativus	leaves, stems	Nakayama and others 1995
		mature seeds	Nakayama and others 1990
	Sechium edule	endosperm, embryo, testa	Albone and others 1984
	Thlaspi arvense	shoots	Metzger and Mardaus 1986
GA_{26}			
	Pharbitis nil	immature seeds	Yokota and others 1971
	Pharbitis purpurea	immature seeds	Fujisawa and others 1985
GA_{27}			
	Arabidopsis thaliana	shoots	Talon and others 1990b
	Calonyction aculeatum	immature seeds	Murofushi and others 1973
	Pharbitis nil	immature seeds	Yokota and others 1971
	Pharbitis purpurea	immature seeds	Fujisawa and others 1985
	Sechium edule	testa	Albone and others 1984
GA_{28}			
	Cucurbita maxima	endosperm	Lange and others 1993a
		embryo	Lange and others 1993b
	Dalbergia dolichopetela	germinating seed	Moritz and Montiero 1994
	Lupinus luteus	immature fruits	Fukui and others 1971
GA_{29}			
	Abelmoschus esculentus	immature seed	Koshioka and others 1996
	Alstroemeria hybrida	leaves	Kappers and others 1997

Arabidopsis thaliana	shoots	Talon and others 1990b
Betula pendula	vegetative buds	Zanewich and Rood 1994
Brassica napus	shoots	Hedden and others 1989
	immature siliques	Zanewich and Rood 1993
Calonyction aculeatum	immature seed	Murofushi and others 1973
Carthamus tinctorius	stems	Potter and others 1993
Citrus reticulata	developing fruit	Talon and others 1992
Citrus sinensis	shoots	Poling and Maier 1988
	buds, shoots, fruit	Talon and others 1990a
	immature fruit	Poling 1991
	seeds, leaves	Turnbull 1989
Citrus unshiu	developing fruit	Talon and others 1992
Eriobotrya japonica	immature seeds	Koshioka and others 1988
Eucalyptus globulus	cambial tissue	Hasan and others 1994
		Ridoutt and others 1995
Fragaria x ananassa Duch.	leaves – short day	Taylor and others 1994
	leaves – day neutral	Taylor and others 2000a
	immature fruit - day neutral	Blake and others 2000b
Hordeum vulgare	leaf sheaths	Croker and others 1990
	seedlings	Boother and others 1991
Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
Lactuca sativa	shoots	Waycott and others 1991
Lathyrus odoratus	shoots	Ross and others 1990
Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
Lolium temulentum	leaves	Gocal and others 1999
Lycopersicon esculentum	seeds, pericarp	Bohner and others 1988
	pollinated and parthenocarpic fruit	Koshioka and others 1994
	leaves + shoot tips	Grunzweig and others 1997
	unpollinated ovaries	Fos and others 2000
Mangifera indica	leaves	Davenport and others 2001
Oryza sativa	immature seeds, ears	Kobayashi and others 1984
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Phaseolus coccineus	testa	Albone and others 1984
Phaseolus lunatus	root nodules	Dobert and others 1992a
Phaseolus vulgaris	immature seeds	Yamane and others 1977
Picea abies	shoots	Moritz 1995
Pisum sativum	immature seeds	Frydman and MacMillan 1973
	cotyledons, embryonic axis and testa	Sponsel 1983
	shoot apices	Ingram and others 1983
	dark-grown seedlings	Gaskin and others 1985
	pods, seeds	Garcia-Martinez and others 1987a
	pollinated and	Garcia-Martinez and others 1987a
	parthenocarpic ovaries	Santes and others 1995
	pods, ovules	Garcia-Martinez and others 1991
Prunus armeniaca	immature seeds	Bottini and others 1985
Prunus avium	fruitlets	Blake and Browning 1994
	apices ex 10-wk-old and ex mature seedlings	Blake and others 2000a
Prunus domestica	pericarp	Reed and Martin 1976
Prunus spachiana	shoots	Kobayashi and others 1996
Raphanus sativus	leaves, stem	Nakayama and others 1995
Saccharum spp	leaves, shoot, apical meristem	Kuhnle and others 1983
Salix pentandra	shoots	Davies and others 1985
	roots	Olsen and others 1994

Table 1. *Continued*

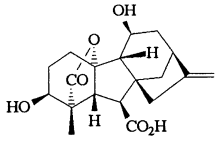
GA_n	Plant species	Tissue	References
	Sechium edule	embryo and testa	Albone and others 1984
	Silene armeria	shoots	Talon and Zeevaart 1990
	Spinacia oleracea	shoots	Metzger and Zeevaart 1980a Talon and others 1991
		roots	Metzger and Zeevaart 1980b
	Thlaspi arvense	shoots	Metzger and Mardaus 1986
	Triticum aestivum	shoots	Appleford and Lenton 1991
		mature grain	Lenton and others 1994
		expanding internodes and young ears	Webb and others 1998
	Vicia faba	immature seeds	Sponsel and others 1979
	Vigna unguiculata / sinensis	stems, root nodules	Dobert and others 1992b
	Zea mays	young tassels	Heupel and others 1985
		shoots	Fujioka and others 1988a,b
		immature seeds	Murofushi and others 1991
		callus ex embryo	Talo and others 1995
GA_{30}			
	Calonyction aculeatum	immature seeds	Murofushi and others 1973
	Prunus cerasus	immature seeds	Nakayama and others 1996
	Prunus persica	immature seeds	Nakayama and others 2001
GA_{31}			
	Calonyction aculeatum	immature seeds	Murofushi and others 1973
GA_{32}			
	Prunus armeniaca	immature seeds	Coombe 1971 Yamaguchi and others 1975a,b Bottini and others 1985
	Prunus avium	fruitlets	Blake and Browning 1994
		mature and germinating seeds, apices ex 10-wk-old seedlings	Blake and others 2000a
	Prunus cerasus	immature seeds	Nakayama and others 1996
	Prunus persica	seeds	Yamaguchi and others 1975a,b
GA_{33}			
	Calonyction aculeatum	immature seeds	Murofushi and others 1973

GA_{34}



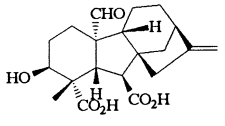
Abelmoschus esculentus	immature seed	Koshioka and others 1996
Allium cepa	leaf sheaths	Nojiri and others 1993
Arabidopsis thaliana	shoots	Talon and others 1990b
Alstroemeria hybrida	leaves	Kappers and others 1997
Brassica napus	shoots	Hedden and others 1989
	immature siliques	Zanewich and Rood 1993
Calonyction aculeatum	immature seeds	Murofushi and others 1973
Cucumis melo	mature seeds	Edelstein and others 1995
Hordeum vulgare	developing grain	Gaskin and others 1984
		Boother and others 1991
	germinating grain	Gaskin and others 1984
Leucaena leucocephala	immature seed	Arigayo and others 1983
Lilium elegans	bulbs	Takayama and others 1993
Lycopersicon esculentum	leaves + shoot tips	Grunzweig and others 1997
	unpollinated ovaries	Fos and others 2000
Malus domestica	immature seeds	Lin and others 1991
		Hedden and others 1993
	developing seeds	Oyama and others 1996a
Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
Oryza sativa	immature seeds, ears	Kobayashi and others 1984
	spikelets	Kobayashi and others 1988
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Picea abies	shoots	Moritz 1995
Raphanus sativus	leaves, stem	Nakayama and others 1995
Spinacia oleracea	shoots	Talon and others 1991
Triticum aestivum	shoots	Appleford and Lenton 1991
	expanding internode	Webb and others 1998
Zea mays	immature seeds	Murofushi and others 1991
	shoots	Fujioka and others 1988b

GA_{35}



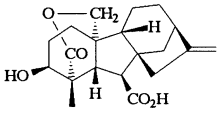
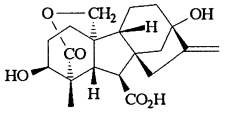
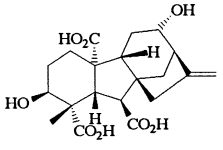
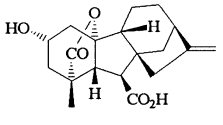
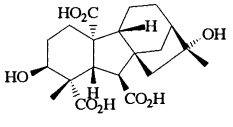
Cyathea australis	sporophytes	Yamane and others 1985
Cytisus scoparius	immature seeds	Yamane and others 1971,1974
Eriobotrya japonica	immature seeds	Koshioka and others 1988
	immature seeds	Yuda and others 1992
Malus domestica	immature seeds	Lin and others 1991
		Hedden and others 1993
	developing seeds	Oyama and others 1996a

GA_{36}

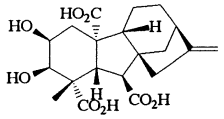


Arabidopsis thaliana	shoots	Talon and others 1990b
Cucurbita maxima	endosperm	Lange and others 1993a
Dioscorea opposita	dormant bulbils	Tanno and others 1992
Psilotum nudum	fronds	Takahashi and others 1984
Saccharum spp	apical meristem	Koshioka and others 1984

Table 1. *Continued*

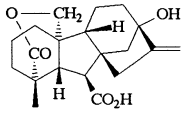
GA_n	Plant species	Tissue	References
GA_{37}			
	Arabidopsis thaliana	shoots	Talon and others 1990b
	Aralia cordata	basal buds	Nishijima and others 1993
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Cucurbita maxima	embryos	Lange and others 1993b
	Dicksonia antarctica	sporophytes	Yamane and others 1988a
	Marah macrocarpus	endosperm	MacMillan and Gaskin 1996
	Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
	Phaseolus vulgaris	immature seeds	Hiraga and others 1974b Yamane and others 1977
GA_{38}			
	Camellia sinensis	endosperm	Koshioka and others 1993
	Cucurbita maxima	embyos	Lange and others 1993b
	Orobanche minor	arial parts	Suzuki and others 1994
	Phaseolus coccineus	embryo, testa	Albone and others 1984
	Phaseolus vulgaris	immature seeds	Hiraga and others 1974b Yamane and others 1977
	Sechium edule	endosperm, embryos	Albone and others 1984
GA_{39}			
	Cucurbita maxima	embryos and mature seeds	Blechschmidt and others 1984
	Cucurbita pepo	seeds	Fukui and others 1977
GA_{40}			
	Cibotium glaucum	sporophytes	Yamane and others 1988a
	Raphanus sativus	mature seeds	Nakayama and others 1998
GA_{41}			
	Arabidopsis thaliana, gai mutant	shoots	Talon and others 1990c

GA_{43}



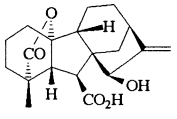
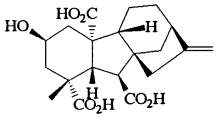
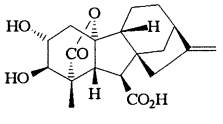
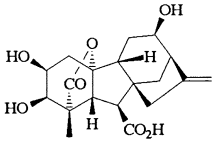
Cucurbita maxima	endosperm	Graebe and others 1974
	embryos, endosperm	Blechschmidt and others 1984
Lupinus albus	seeds	Gaskin and others 1992
Marah macrocarpus	endosperm	Beeley and others 1975
	embryos	MacMillan and Gaskin 1996
Pisum sativum	pollinated ovaries	Santes and others 1995

GA_{44}



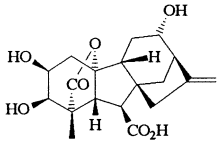
Abelmoschus esculentus	immature seed	Koshioka and others 1996
Agrostemma githago	shoots and leaves	Jones and Zeevaart 1980
Allium cepa	leaf sheaths	Nojiri and others 1993
Alstroemeria hybrida	leaves	Kappers and others 1997
Arabidopsis thaliana	shoots	Talon and others 1990b
Aralia cordata	basal buds	Nishijima and others 1993
Brassica napus	shoots	Hedden and others 1989
Camellia sinensis	endosperm	Koshioka and others 1993
	xylem sap	Oyama and others 1999
Campanula isophylla	leaves and stems	Jensen and others 1996
Citrus reticulata	developing fruit	Talon and others 1992
Citrus sinensis	shoots	Poling and Maier 1988
Citrus unshiu	young fruit	Goto and others 1989
	developing fruit	Talon and others 1992
Dendranthema grandiflorum	stem tips	Nishijima and others 1997
Eriobotrya japonica	immature seeds	Koshioka and others 1988
Eucalyptus globulus	cambial tissue	Ridoutt and others 1995
Eustoma grandiflorum	shoots + floral buds	Hisamatsu and others 1998b
Fragaria x ananassa Duch.	leaves - short day	Taylor and others 1994
	immature fruit - day neutral	Blake and others 2000b
Gentiana triflora	stems and leaves	Koshioka and others 1998
Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
Lilium elegans	bulbs	Takayama and others 1993
Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
Lolium temulentum	leaves	Gocal and others 1999
Lycopersicon esculentum	seeds	Bohner and others 1988
	pollinated and parthenocarpic fruit	Koshioka and others 1994
	leaves, shoot tips	Grunzweig and others 1997
	unpollinated ovaries	Fos and others 2000
Malus domestica	immature seeds	Lin and others 1991
		Hedden and others 1993
	xylem exudate	Motosugi and others 1996
Orobanche minor	arial parts	Suzuki and others 1994
Oryza sativa	immature seeds, ears	Kobayashi and others 1984
Pharbitis purpurea	immature seeds	Fujisawa and others 1985
Phaseolus coccineus	embryo and testa	Albone and others 1984
	suspensor	Picciarelli and Alpi 1986
Phaseolus lunatus	stems, root nodules	Dobert and others 1992a
Phaseolus vulgaris	immature seeds	Yamane and others 1977
Pisum sativum	immature seeds	Frydman and others 1974
		Gaskin and others 1985
Prunus cerasus	immature seeds	Nakayama and others 1996

Table 1. *Continued*

GA_n	Plant species	Tissue	References
	Prunus persica	immature seeds	Nakayama and others 2001
	Prunus spachiana	shoots	Kobayashi and others 1996
	Raphanus sativus	leaves, stems	Nakayama and others 1995
	Sechium edule	endosperm, embryo, testa	Albone and others 1984
	Silene armeria	shoots	Talon and Zeevaart 1990
	Spinacia oleracea	shoots	Metzger and Zeevaart 1980a Talon and others 1991
		roots	Metzger and Zeevaart 1980b
	Thlaspi arvense	shoots	Metzger and Mardaus 1986
	Trifolium repens	arial parts	Suzuki and others 1994
	Triticum aestivum	developing grain	Gaskin and others 1980
		shoots	Appleford and Lenton 1991
		expanding internode young ear	Webb and others 1998
	Vicia faba	immature seeds	Sponsel and others 1979
	Vigna unguiculata / sinensis	stems, root nodules	Dobert and others 1992b
	Zea mays	young tassels	Heupel and others 1985
		shoots	Fujioka and others 1988a,b
		immature seeds	Murofushi and others 1991
GA_{45}			
	Anemia mexicana	gametophytes	Nester-Hudson and others 1998
	Helianthus annuus	almost mature seeds	Hutchison and others 1988
	Malus domestica	immature seeds	Hedden and others 1993
		developing seeds	Oyama and others 1996a
	Pyrus communis	seeds	Bearder and others 1975 Martin and others 1977 Dolan and MacMillan 1985
GA_{46}			
	Marah macrocarpus	endosperm	Beeley and MacMillan 1976
		endosperm, embryo	MacMillan and Gaskin 1996
GA_{47}			
	Orobanche minor	arial parts	Suzuki and others 1994
GA_{48}			
	Cucurbita maxima	endosperm	Lange and others 1993a
		embryo	Lange and others 1993b

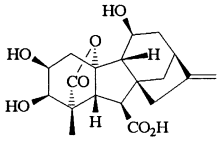
Cucurbita pepo	seeds	Fukui and others 1977
Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b
Hordeum vulgare	developing grain	Gaskin and others 1984 Boother and others 1991
	germinating grain	Gaskin and others 1984

GA_{49}



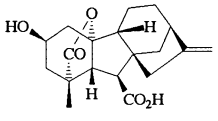
Cucurbita maxima	endosperm, embryos	Blechschmidt and others 1984
Cucurbita pepo	seeds	Fukui and others 1977
Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b

GA_{50}



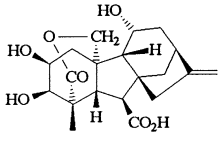
Eriobotrya japonica	immature seeds	Koshioka and others 1988 Yuda and others 1992
Lagenaria leucantha	seeds	Fukui and others 1978

GA_{51}



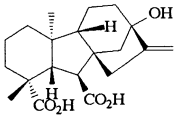
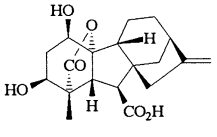
Allium cepa	leaves	Nojiri et. 1993
Arabidopsis thaliana	shoots	Talon and others 1990b
Brassica napus	shoots	Hedden and others 1989
	immature siliques	Zanewich and Rood 1993
Camellia sinensis	xylem sap	Oyama and others 1999
Lilium elegans	bulbs	Takayama and others 1993
Lycopersicon esculentum	leaves + shoot tips	Grunzweig and others 1997
Malus domestica	immature seeds	Lin and others 1991
Ornithogalum thyroides	inflorescences	Koshioka and others 1999
Oryza sativa	ears	Kobayashi and others 1984
Picea abies	shoots	Moritz 1995
Pisum sativum	seeds	Sponsel and MacMillan 1977
Raphanus sativus	leaves, stem	Nakayama and others 1995
Spinacia oleracea	shoots	Talon and others 1991
Thlaspi arvense	shoots	Metzger and Mardaus 1986
Vigna unguiculata / sinensis	hypocotyls	Okamoto and others 1995

GA_{52}



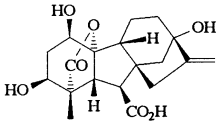
Lagenaria leucantha	seeds	Fukui and others 1978

Table 1. *Continued*

GA_n	Plant species	Tissue	References
GA_{53}			
	Agrostemma githago	shoots and leaves	Jones and Zeevaart 1980
	Arabidopsis thaliana	shoots	Talon and others 1990b
	Aralia cordata	basal buds	Nishijima and others 1993
	Brassica napus	immature siliques	Zanewich and Rood 1993
	Camellia sinensis	xylem sap	Oyama and others 1999
	Campanula isophylla	leaves and stems	Jensen and others 1996
	Citrus reticulata	developing fruit	Talon and others 1992
	Citrus unshiu	young fruit	Goto and others 1989
		developing fruit	Talon and others 1992
	Dendranthema grandiflorum	stem tips	Nishijima and others 1997
	Dioscorea opposita	dormant bulbils	Tanno and others 1992
	Eustoma grandiflorum	shoots + floral buds	Hisamatsu and others 1998b
	Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b
	Gentiana triflora	stems and leaves	Koshioka and others 1998
	Juglans regia	pollinated and unpollinated ovaries	Tadeo and others 1994
	Lactuca sativa	shoots	Waycott and others 1991
	Leucaena leucocephala	immature seed	Arigayo and others 1983
	Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
	Lolium temulentum	leaves	Gocal and others 1999
	Lycopersicon esculentum	leaves + shoot tips	Grunzweig and others 1997
		unpollinated ovaries	Fos and others 2000
	Malus domestica	immature seeds	Lin and others 1991
			Hedden and others 1993
		developing seeds	Oyama and others 1996a
		xylem exudate	Motosugi and others 1996
	Mathiola incana	shoots + flower buds	Hisamatsu and others 1998a
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Oryza sativa	immature seeds	Kobayashi and others 1984
	Pennisitum glaucum	shoots	Devi and others 1994
	Pharbitis purpurea	immature seeds	Fujisawa and others 1985
	Polianthes tuberosa	corms	Chang and others 2001
	Rumex acetosa	shoots	Rijinders and others 1997
	Rumex palustris	shoots	Rijinders and others 1997
	Sechium edule	testa	Albone and others 1984
	Silene armeria	shoots	Talon and Zeevaart 1990
	Spinacia oleracea	shoots	Talon and others 1991
	Thlaspi arvense	shoots	Metzger and Mardaus 1986
	Triticum aestivum	shoots	Appleford and Lenton 1991
		expanding internode, young ears	Webb and others 1998
	Vicia faba	immature seeds	Sponsel and others 1979
	Zea mays	young tassels	Heupel and others 1985
		shoots	Fujioka and others 1988a,b
		immature seeds	Murofushi and others 1991
		callus ex embryo	Talo and others 1995
GA_{54}			
	Malus domestica	immature seeds	Lin and others 1991

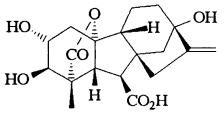
		Hedden and others 1993
	developing seeds	Oyama and others 1996a
Secale cereale	immature ears	Dathe and others 1989
Triticum aestivum	developing grain	Gaskin and others 1980

GA_{55}



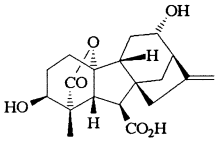
Carica papaya	fruits	Dathe and others 1991
Secale cereale	immature ears	Dathe and others 1989
Triticum aestivum	developing grain	Gaskin and others 1980

GA_{56}



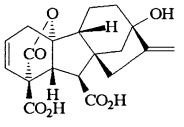
Salix pentandra	roots	Olsen and others 1994

GA_{58}



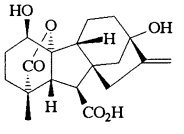
Cibotium glaucum	sporophytes	Yamane and others 1988a
Cucurbita maxima	endosperm	Beale and others 1984
Cyathea australis	sporophytes	Yamane and others 1985
Orobanche minor	arial parts	Suzuki and others 1994

GA_{59}



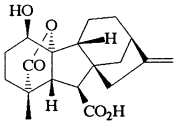
Canavalia gladiata	immature seeds	Yokota and Takahashi 1981

GA_{60}



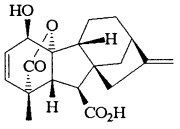
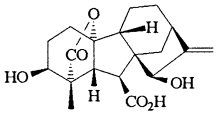
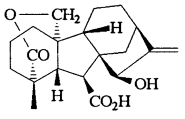
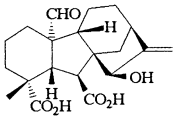
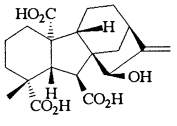
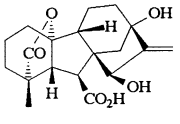
Pisum sativum	pollinated ovaries	Santes and others 1995
Secale cereale	immature ears	Dathe and others 1989
Spinacia oleracea	shoots	Zeevaart and others 1993
Triticum aestivum	developing grain	Kirkwood and MacMillan 1982

GA_{61}

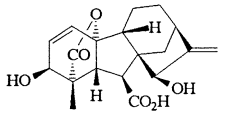


Anemia mexicana	gametophytes	Nester-Hudson and others 1998
Eriobotrya japonica	immature seeds	Koshioka and others 1988
Malus domestica	immature seeds	Kirkwood and MacMillan 1982 Lin and others 1991

Table 1. *Continued*

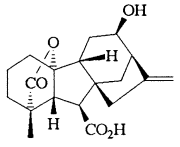
GA_n	Plant species	Tissue	References
			Hedden and others 1993
		developing seeds	Oyama and others 1996a
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Pyrus malus	immature seeds	Kirkwood and MacMillan 1982
	Triticum aestivum	developing grain	Kirkwood and MacMillan 1982
GA_{62}			
	Malus domestica	immature seeds	Lin and others 1991
			Hedden and others 1993
		developing seeds	Oyama and others 1996a
	Marah macrocarpus	endosperm	MacMillan and Gaskin 1996
	Pyrus malus	immature seeds	Kirkwood and MacMillan 1982
	Triticum aestivum	developing grain	Kirkwood and MacMillan 1982
GA_{63}			
	Malus domestica	immature seeds	Lin and others 1991
			Hedden and others 1993
		developing seeds	Oyama and others 1996a
	Prunus persica	immature seeds	Nakayama and others 2001
	Pyrus communis	seeds	Dolan and others 1985
GA_{64}			
	Helianthus annuus	almost mature seeds	Hutchison and others 1988
GA_{65}			
	Helianthus annuus	seeds	Hutchison and others 1988
GA_{66}			
	Helianthus annuus	seeds	Hutchison and others 1988
GA_{67}			
	Helianthus annuus	seeds	Dolan and MacMillan 1985
			Hutchison and others 1988

GA_{68}



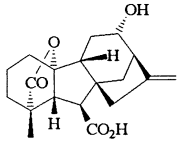
Malus domestica	immature seeds	Lin and others 1991 Hedden and others 1993
Prunus persica	immature seeds	Nakayama and others 2001
Pyrus communis	seeds	Dolan and MacMillan 1985

GA_{69}



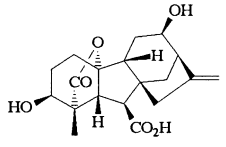
Cibotium glaucum	sporophytes	Yamane and others 1988a
Cyathea australis	sporophytes	Yamane and others 1985
Hordeum vulgare	developing grain	Gaskin and others 1984

GA_{70}



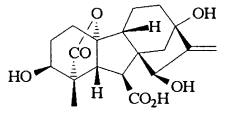
Abelmoschus esculentus	immature seed	Koshioka and others 1996
Cibotiun glaucum	sporophytes	Yamane and others 1988a
Cyathea australis	sporophytes	Yamane and others 1985
Lygodium circinnatum (as Me ester)	prothallia	Yamauchi and others 1996
Malus domestica	developing seeds	Oyama and others 1996a

GA_{71}



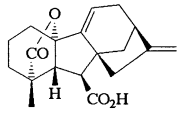
Arabidopsis thaliana, gai mutant	shoots	Talon and others 1990c
Cibotium glaucum	sporophytes	Yamane and others 1988a
Cyathea australis	sporophytes	Yamane and others 1985

GA_{72}



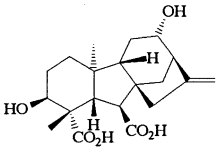
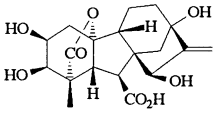
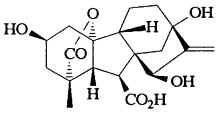
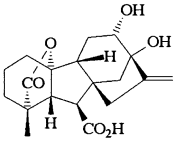
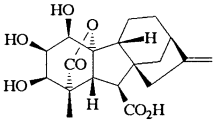
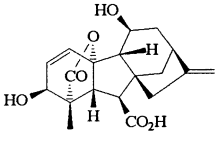
Helianthus annuus	seeds	Hutchison and others 1988

GA_{73}

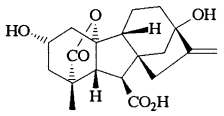


Lygodium circinnatum (as Me ester)	prothallia	Yamauchi and others 1996
Lygodium flexuosum (as Me ester)	prothallia	Yamauchi and others 1996

Table 1. *Continued*

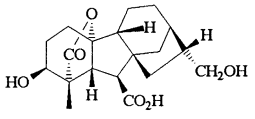
GA_n	Plant species	Tissue	References
	Lygodium japonicum (as Me ester)	prothallia	Yamane and others 1988b
	Malus domestica	developing seeds	Oyama and others 1996a
GA_{74}			
	Cucurbita maxima	endosperm, embryos	Blechschmidt and others 1984 Murofushi and others 1988
GA_{75}			
	Helianthus annuus	mature seeds	Castellaro and others 1990
GA_{76}			
	Helianthus annuus	mature seeds	Castellaro and others 1990
GA_{77}			
	Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b
	Lactuca sativum	mature seeds	Toyomasu and others 1993
	Raphanus sativus	mature seed	Nakayama and others 1990
GA_{79}			
	Triticum aestivum	mature grain	Penny and others 1993 Lenton and others 1994
GA_{80}			
	Eriobotrya japonica	immature seeds	Yuda and others 1992
	Malus domestica	immature seeds	Hedden and others 1993

GA_{81}



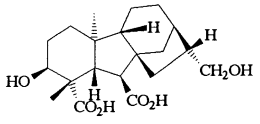
Citrus sinensis	seeds	Turnbull 1989
Eucalyptus globulus	cambial region	Ridoutt and others 1995
Lathyrus odoratus	shoots	Ross and others 1990
Lycopersicon esculentum	unpollinated ovaries	Fos and others 2000
Pisum sativum	dark grown shoots	Gaskin and others 1985
	pods	Garcia-Martinez and others 1991
	pollinated ovaries	Santes and others 1995
Spinacia oleracea	shoots	Zeevaart and others 1993

GA_{82}



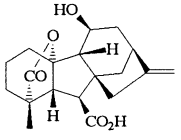
Lupinus albus	seeds	Gaskin and others 1992

GA_{83}



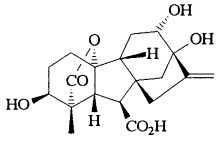
Lupinus albus	seeds	Gaskin and others 1992

GA_{84}



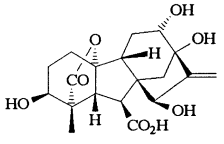
Eriobotrya japonica	immature seeds	Yuda and others 1992
Malus domestica	immature seeds	Hedden and others 1993

GA_{85}



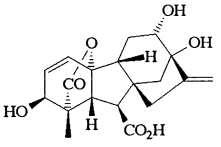
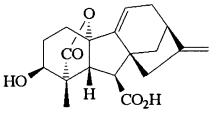
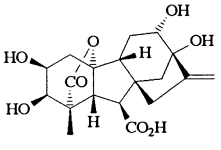
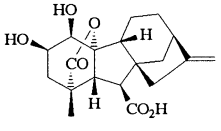
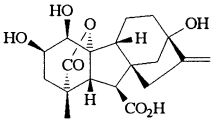
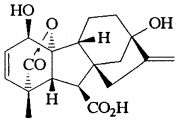
Brassica campestris	cotyledons	Sheng and others 1992a
		Bhaskar and others 1991
Cucurbita maxima	embryos	Lange and others 1993b
Prunus avium	fruitlets	Blake and Browning 1994
	mature seeds, germinating seeds, apices ex 10-wk-old seedlings	Blake and others 2000a

GA_{86}

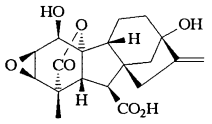


Prunus avium	fruitlets	Blake and Browning 1994
	mature and germinating seeds, apices ex 10-wk-old seedlings	Blake and others 2000a

Table 1. *Continued*

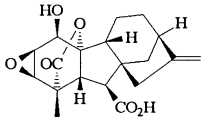
GA_n	Plant species	Tissue	References
	Prunus cerasus	immature seeds	Nakayama and others 1996
	Prunus persica	immature seeds	Bhaskar and others 1991
GA_{87}			
	Prunus avium	fruitlets	Blake and others 1993
		mature and germinating seeds, apices ex 10-wk-olds seedlings	Blake and others 2000a
	Prunus cerasus	immature seeds	Nakayama and others 1996
	Prunus persica	immature seeds	Nakayama and others 2001
GA_{88}			
	Lygodium circinnatum (as Me ester)	prothallia	Yamauchi and others 1996
	Malus domestica	immature seeds	Hedden and others 1993
GA_{89}			
	Brassica campestris	cotyledons	Sheng and others 1992b
GA_{90}			
	Triticum aestivum	mature grain	Penny and others 1993
GA_{91}			
	Pisum sativum	pollinated ovaries	Santes and others 1995
	Triticum aestivum	developing grain	Penny and others 1994
GA_{92}			
	Triticum aestivum	developing grain	Penny and others 1994

GA_{93}



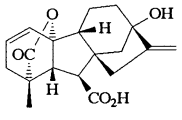
Triticum aestivum	mature grain	Findlow and others 1997

GA_{94}



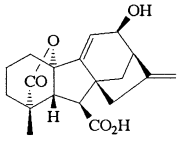
Triticum aestivum	mature grain	Findlow and others 1997

GA_{95}



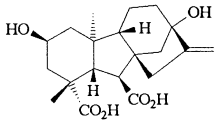
Prunus cerasus	immature seeds	Nakayama and others 1996
Prunus persica	immature seeds	Nakayama and others 2001

GA_{96}



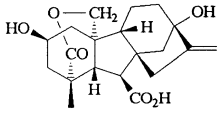
Lygodium circinnatum (as Me ester)	prothallia	Yamauchi and others 1996

GA_{97}



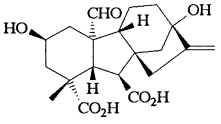
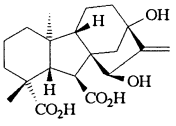
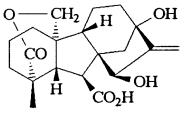
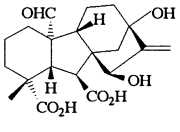
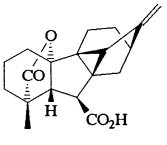
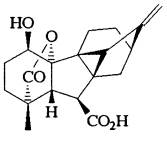
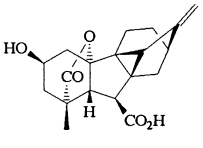
Campanula isophylla	leaves and stems	Jensen and others 1996
Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b
Hordeum vulgare	floral apices, leaf sheaths	Mander and others 1996
Lolium perenne	leaf tissue	Morvan-Bertrand and others 2001
Lycopersicon esculentum	cultured roots, fruit	Mander and others 1996
Pisum sativum	pods	Mander and others 1996
Primus persica	immature seeds	Nakayama and others 2001
Spinacia oleracea	shoots	Mander and others 1996
Triticum aestivum	young ears	Webb and others 1998

GA_{98}

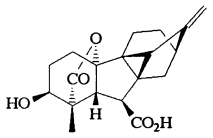


Pisum sativum	immature seeds	Frydman and others 1974a see Mander and others 1996
Spinacia oleracea	shoots	Mander and others 1996
Triticum aestivum	young ear	Webb and others 1998
Vicia faba	immature seeds	Sponsel and others 1979
Zea mays	pollen	Mander and others 1996

Table 1. *Continued*

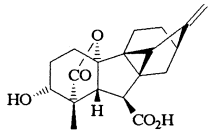
GA_n	Plant species	Tissue	References
GA_{99}			
	Spinacia oleracea	shoots	Mander and others 1996
GA_{100}			
	Helianthus annuus	seeds	Owen and others 1996 Hutchison and others 1988
GA_{101}			
	Helianthus annuus	seeds	Owen and others 1996 Hutchison and others 1988
GA_{102}			
	Helianthus annuus	seeds	Owen and others 1996 Hutchison and others 1988
GA_{103}			
	Malus domestica	seeds	Oyama and others 1996a
GA_{104}			
	Anemia mexicana	gametophytes	Furber and Mander 1988 Furber and others 1989
	Malus domestica	immature seeds	Oyama and others 1996a
GA_{105}			
	Malus domestica	immature seeds	Oyama and others 1996a

GA_{106}



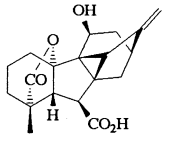
Malus domestica	immature seeds	Oyama and others 1996a

GA_{107}



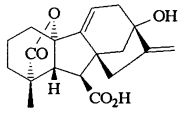
Anemia phyllitidis	prothallia	Yamauchi and others 1991
Malus domestica	immature seeds	Oyama and others 1996a

GA_{108}



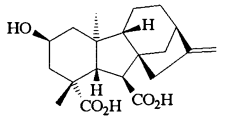
Malus domestica	immature seeds	Oyama and others 1996a

GA_{109}



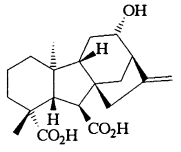
Lygodium circinnatum (as Me ester)	gametophytes	Wynne and others 1998b

GA_{110}



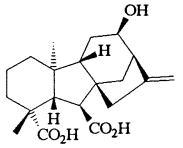
Elaeis guineesis	inflorescences	Owen and others 1998
Spinacia oleacea	leaves	Owen and others 1998

GA_{111}



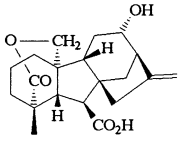
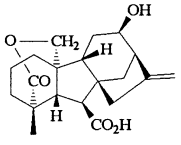
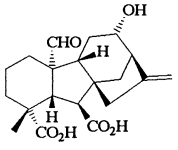
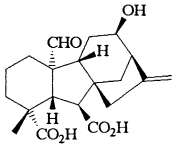
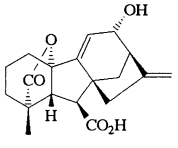
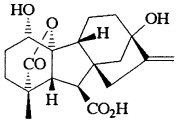
Cucurbita maxima	endosperm, embryo	Blechschmidt and others 1984 Murofushi and others 1988
Cybotium glaucum	croziers	Yamane and others 1988a
Dicksonia antarctica	croziers	Yamane and others 1988a
Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b
Raphanus sativus	shoots	Nakayama and others 1998

GA_{112}

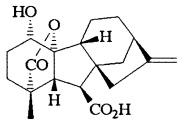


Dicksonia antarctica	croziers	Yamane and others 1988a

Table 1. *Continued*

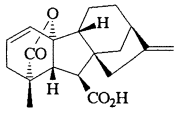
GA_n	Plant species	Tissue	References
	Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b
	Matthiola incana	shoots + flower buds	Hisamatsu and others 1998a
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Raphanus sativus	shoots	Nakayama and others 1998
GA_{113}			
	Raphanus sativus	shoots	Nakayama and others 1998
GA_{114}			
	Raphanus sativus	shoots	Nakayama and others 1998
GA_{115}			
	Ornithogalum thyroides	inflorescences	Koshioka and others 1999
	Raphanus sativus	shoots	Nakayama and others 1998
GA_{116}			
	Raphanus sativus	mature seed, shoots	Nakayama and others 1998
GA_{117}			
	Lygodium circinnatum (as Me ester)	gametophytes	Wynne and others 1998a
GA_{118}			
	Prunus persica	immature seeds	Nakayama and others 2001

GA_{119}



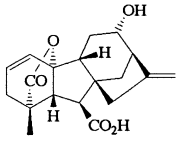
Prunus persica	immature seeds	Nakayama and others 2001

GA_{120}



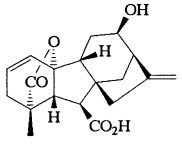
Ornithogalum thyroides	inflorescences	Koshioka and others 1999
Prunus persica	immature seeds	Nakayama and others 2001

GA_{121}



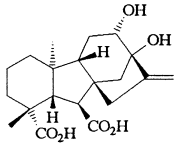
Prunus persica	immature seeds	Nakayama and others 2001

GA_{122}



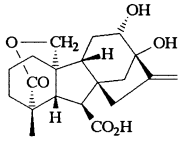
Prunus persica	immature seeds	Nakayama and others 2001

GA_{123}



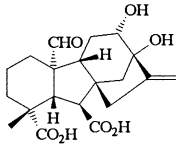
Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b

GA_{124}



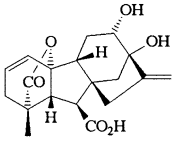
Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b

GA_{125}



Fragaria x ananassa Duch.	immature fruit – day neutral	Blake and others 2000b

Table 1. *Continued*

GA_n	Plant species	Tissue	References
GA_{126}			
	Prunus persica	immature seeds	Nakayama and others 2001

a Mistakenly identified as **GA_{38}** *in immature seeds of Pisum sativum (Frydman and others 1974) then withdrawn (Sponsel and others 1979).*

Table 2. Alphabetical Listing of Vascular Plants and the Gibberellins Identified in Their Various Tissues

Plant	Tissue	Gibberellin	Reference
Abelmoschus esculentus	immature seed	GA_1 GA_3 GA_4 GA_8 GA_{17} GA_{20} GA_{29} GA_{34} GA_{44} GA_{70}	Koshioka and others 1996
Abies alba	needles	GA_9	Christmann and Doumas 1998
Agrostemma githago	shoots and leaves	GA_1 GA_{17} GA_{19} GA_{20} GA_{44} GA_{53}	Jones and Zeevaart 1980
Allium cepa	leaf sheaths	GA_1 GA_4 GA_8 GA_9 GA_{12} GA_{15} GA_{20} GA_{24} GA_{34} GA_{44} GA_{51}	Nojiri and others 1993
Alnus tenuifolia	vegetative buds	GA_1 GA_8 GA_{20}	Zanewich and Rood 1994
Alstroemeria hybrida	leaves	GA_1 GA_4 GA_8 GA_9 GA_{15} GA_{19} GA_{20} GA_{24} GA_{29} GA_{34} GA_{44}	Kappers and others 1997
Althaea rosea	shoot apices	GA_1 GA_3 GA_9	Harada and Nitsch 1967
Anemia mexicana	gametophytes	GA_{104}	Furber and Mander 1988 Furber and others 1989
	gametophytes	GA_{45} GA_{61}	Nester-Hudson and others 1998
Anemia phyllitidis	prothallia	GA_9 GA_{24} GA_{25} GA_{107}	Oyama and others 1996b Yamauchi and others 1991
	sporophytes	GA_4 GA_9 GA_{15} GA_{19} GA_{20} GA_{24}	Oyama and others 1996b
Arabidopsis thaliana	seeds	GA_1 GA_3 GA_4 GA_9	Derkx and others 1994
	shoots	GA_1 GA_4 GA_8 GA_9 GA_{12} GA_{13} GA_{15} GA_{17} GA_{19} GA_{20} GA_{24} GA_{25} GA_{27} GA_{29} GA_{34} GA_{36} GA_{37} GA_{44} GA_{51} GA_{53}	Talon and others 1990b
	shoots (*gai* mutant)	GA_{41} GA_{71}	Talon and others 1990c
Aralia cordata	basal buds	GA_1 GA_4 GA_{15} GA_{19} GA_{20} GA_{37} GA_{44} GA_{53}	Nishijima and others 1993
Avena sativa	inflorescences	GA_3	Kaufman and others 1976
Begonia x cheimantha	leaves	GA_1 GA_4 GA_9 GA_{19} GA_{20}	Oden and Heide 1988
Betula pendula	vegetative buds	GA_1 GA_8 GA_{19} GA_{20} GA_{29}	Zanewich and Rood 1994
Brassica campestris	seedlings	GA_{85}	Bhaskar and others 1991

			Sheng and others 1992a
	cotyledons	GA_{89}	Sheng and others 1992b
Brassica napus	shoots	GA_1 GA_8 GA_{15} GA_{17} GA_{19} GA_{20} GA_{24} GA_{29} GA_{44} GA_{51}	Hedden and others 1989
	stems	GA_1 GA_3 GA_{19} GA_{20}	Rood and others 1987
	immature siliques	GA_1 GA_3 GA_4 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{24} GA_{29} GA_{34} GA_{51} GA_{53}	Zanewich and Rood 1993
Bryophyllum daigremontianum	shoot tips and upper leaves	GA_{20}	Gaskin and others 1973
Calonyction aculeatum	immature seeds	GA_8 GA_{17} GA_{19} GA_{27} GA_{29} GA_{30} GA_{31} GA_{33} GA_{34}	Murofushi and others 1973
Calysigia soldanella	seeds	GA_3 GA_4 GA_7	Matsuo and others 1984
Camellia sinensis	leaves	GA_9 GA_{20}	Oyama and others 1999
	leaves, fruitlets	GA_8	Turnbull 1989
	endosperm	GA_1 GA_3 GA_8 GA_{19} GA_{20} GA_{38} GA_{44}	Koshioka and others 1993
	xylem sap	GA_9 GA_{12} GA_{15} GA_{20} GA_{44} GA_{51} GA_{53}	Oyama and others 1999
Campanula isophylla	leaves and stems	GA_1 GA_{19} GA_{44} GA_{53} GA_{97}	Jensen and others 1996
Canavalia gladiata	immature seeds	GA_{21} GA_{22}	Murofushi and others 1969a,b
		GA_{59}	Yokota and Takahashi 1981
Carica papaya	fruits	GA_1 GA_3 GA_{55}	Dathe and others 1991
Carthamus tinctorius	stems	GA_1 GA_3 GA_{19} GA_{20} GA_{29}	Potter and others 1993
Cibotium glaucum	sporophytes	GA_1 GA_4 GA_9 GA_{15} GA_{17} GA_{19} GA_{20} GA_{25} GA_{37} GA_{40} GA_{58} GA_{69} GA_{70} GA_{71} GA_{111}	Yamane and others 1988a
Citrus reticulata	developing fruit	GA_1 GA_4 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{24} GA_{29} GA_{44} GA_{53}	Talon and others 1992
Citrus sinensis	shoots	GA_1 GA_8 GA_{17} GA_{19} GA_{20} GA_{29} GA_{44}	Poling and Maier 1988
		GA_1 GA_{19} GA_{20} GA_{29}	Talon and others 1990a
	leaves	GA_8 GA_{20} GA_{29}	Turnbull 1989
	seeds	GA_1 GA_{19} GA_{20} GA_{29} GA_{81}	Turnbull 1989
	fruitlets	GA_3 GA_8	Turnbull 1989
	immature fruit	GA_1 GA_4 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{29}	Poling 1991
	reproductve buds	GA_1 GA_{29}	Talon and others 1990a
	developing fruit	GA_{20}	Talon and others 1990a
Citrus unshiu	water sprouts	GA_1	Kawarada and Sumiki 1959
	young fruit	GA_1 GA_4 GA_9 GA_{19} GA_{20} GA_{24} GA_{25} GA_{44} GA_{53}	Goto and others 1989
	developing fruit	GA_1 GA_4 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{24} GA_{29} GA_{44} GA_{53}	Talon and others 1992
Corylus avellana	seeds	GA_1 GA_9	Williams and others 1974
Cucumis melo	mature seeds	GA_1 GA_3	Hemphill and others 1972
		GA_1 GA_3 GA_4 GA_8 GA_{20} GA_{34}	Edelstein and others 1995
Cucumis sativus	mature seeds	GA_1 GA_3 GA_4	Hemphill and others 1972
Cucurbita maxima		GA_{43}	Graebe and others 1974
		GA_4 GA_{12} GA_{13} GA_{43} GA_{49} GA_{58} GA_{74} GA_{111}	Blechschmidt and others 1984

Table 2. *Continued*

Plant	Tissue	Gibberellin	Reference
		GA_{58}	Beale and others 1984
	endosperm	GA_{74}	Murofushi and others 1988
		GA_1 GA_8 GA_{25} GA_{28} GA_{36} GA_{48}	Lange and others 1993a
	embryo	GA_{13} GA_{25} GA_{39} GA_{43} GA_{49} GA_{74} GA_{111}	Blechschmidt and others 1984
		GA_1 GA_4 GA_{17} GA_{28} GA_{37} GA_{38} GA_{48} GA_{85}	Lange and others 1993b
		GA_{74}	Murofushi and others 1988
	mature seed	GA_{39}	Blechschmidt and others 1984
Cucurbita pepo	seeds	GA_{39} GA_{48} GA_{49}	Fukui and others 1977
Cyathea australis	sporophytes	GA_1 GA_4 GA_9 GA_{15} GA_{24} GA_{35} GA_{58} GA_{69} GA_{70} GA_{71}	Yamane and others 1985
Cytisus scoparius	immature seeds	GA_{35}	Yamane and others 1971,1974
Dalbergia dolichopetela	germinating seed	GA_1 GA_3 GA_4 GA_5 GA_8 GA_{20} GA_{28}	Moritz and Montiero 1994
Daucus carota	somatic cell embryo cultures	GA_1 GA_4 GA_7	Noma and others 1979
Dendranthema grandiflorum	stem tips	GA_1 GA_9 GA_{19} GA_{20} GA_{44} GA_{53}	Nishijima and others 1997
Dicksonia antarctica	sporophytes	GA_4 GA_9 GA_{15} GA_{25} GA_{37} GA_{111} GA_{112}	Yamane and others 1988a
Dioscorea opposita	dormant bulbils	GA_4 GA_9 GA_{12} GA_{19} GA_{20} GA_{24} GA_{36} GA_{53}	Tanno and others 1992
Elaeis guineesis	inflorescences	GA_{110}	Owen and others 1998
Eriobotrya japonica	immature seed	GA_9 GA_{15} GA_{19} GA_{20} GA_{29} GA_{35} GA_{44} GA_{50} GA_{61}	Koshioka and others 1988
	immature seed	GA_9 GA_{15} GA_{24} GA_{35} GA_{50} GA_{80} GA_{84}	Yuda and others 1992
Eucalyptus globulus	cambial region	GA_1 GA_4 GA_8 GA_9 GA_{19} GA_{20} GA_{29} GA_{44} GA_{81}	Ridoutt and others 1995
Eucalyptus nitens	apical buds	GA_{19}	Hasan and others 1994
Eustoma grandiflorum	shoots + floral buds	GA_1 GA_{19} GA_{20} GA_{44} GA_{53}	Hisamatsu and others 1998b
Fragaria x ananassa Duch. (short day)	mature leaves (LD)	GA_1 GA_8 GA_{17} GA_{19} GA_{20} GA_{29} GA_{44}	Taylor and others 1994
	mature leaves (SD)	GA_1 GA_5 GA_8 GA_{19} GA_{20} GA_{29}	Taylor and others 1994
	leaf exudates	GA_1 GA_3	Taylor and others 2000b
Fragaria x ananassa Duch. (day neutral)	leaves	GA_1 GA_3 GA_8 GA_{17} GA_{19} GA_{20} GA_{29}	Taylor and others 2000a
	immature fruits	GA_1 GA_3 GA_5 GA_8 GA_{12} GA_{17} GA_{19} GA_{20} GA_{29} GA_{44} GA_{48} GA_{49} GA_{53} GA_{77} GA_{97} GA_{111} GA_{112} GA_{123} GA_{124} GA_{125}	Blake and others 2000b
Gentiana triflora	stems and leaves	GA_1 GA_{19} GA_{20} GA_{44} GA_{53}	Koshioka and others 1998
Helianthus annuus	seeds	GA_{67}	Dolan and MacMillan 1985
		GA_1 GA_4 GA_{19} GA_{20} GA_{45} GA_{64} GA_{65} GA_{66} GA_{67} GA_{72}	Hutchison and others 1988
	mature seeds	GA_{75} GA_{76}	Castellaro and others 1990
	seeds	GA_{100} GA_{101} GA_{102}	Owen and others 1996
Hordeum vulgare	germinating grain	GA_1 GA_3	Yamada 1982
		GA_1 GA_3 GA_{17} GA_{19} GA_{20} GA_{34} GA_{48}	Gaskin and others 1984
	developing grain	GA_1 GA_4 GA_8 GA_{12} GA_{17} GA_{25} GA_{34} GA_{48} GA_{69}	Gaskin and others 1984
		GA_1 GA_3 GA_8 GA_9 GA_{17} GA_{20} GA_{34} GA_{48}	Boother and others 1991

	leaf sheaths	GA_1 GA_3 GA_8 GA_{19} GA_{20} GA_{29} GA_{97}	Croker and others 1990 Mander and others 1996
	seedlings	GA_1 GA_3 GA_8 GA_{20} GA_{29}	Boother and others 1991
	floral apices	GA_{97}	Mander and others 1996
Humulus lupulus	shoots	GA_{19}	Watanabe and others 1978
Ipomoea batatas	immature seeds	GA_1 GA_3 GA_5 GA_{19} GA_{20} GA_{23}	Matsuo and others 1984
	mature seeds	GA_5 GA_{19} GA_{20} GA_{23}	
Ipomoea pes-caprae	immature seeds	GA_{19}	Matsuo and others 1984
Ipomoea reptans	immature seeds	GA_1 GA_3 GA_5 GA_{17} GA_{19} GA_{20}	Matsuo and others 1984
Juglans regia	unpollinated and pollinated ovaries	GA_1 GA_4 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{29} GA_{44} GA_{53}	Tadeo and others 1994
Lactuca sativa	shoots	GA_1 GA_3 GA_5 GA_8 GA_{19} GA_{20} GA_{29} GA_{53}	Waycott and others 1991
	seedlings	GA_1 GA_{19} GA_{20}	Toyomasu and others 1992
	mature seeds	GA_1 GA_{17} GA_{19} GA_{20} GA_{77}	Toyomasu and others 1993
Lagenaria leucantha	seeds	GA_{50} GA_{52}	Fukui and others 1978
Lathyrus odoratus	shoots	GA_1 GA_8 GA_{20} GA_{29} GA_{81}	Ross and others 1990
		GA_{19}	Ross and others 1992
Leucaena leucocephala	immature seed	GA_1 GA_8 GA_{17} GA_{19} GA_{20} GA_{23} GA_{34} GA_{53}	Arigayo and others 1983
Lilium elegans	bulbs	GA_1 GA_4 GA_9 GA_{12} GA_{15} GA_{19} GA_{20} GA_{24} GA_{34} GA_{44} GA_{51}	Takayama and others 1993
Lilium longiflorum	pollen	GA_{12} GA_{24}	Abe and others 1991
Lolium perenne	leaf tissue	GA_1 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{29} GA_{44} GA_{53} GA_{97}	Morvan-Bertrand and others 2000
Lolium temulentum	leaves	GA_1 GA_3 GA_8 GA_9 GA_{19} GA_{20} GA_{29} GA_{44} GA_{53}	Gocal and others 1999
Lupinus albus	seeds	GA_1 GA_3 GA_4 GA_{17} GA_{18} GA_{23} GA_{43} GA_{82} GA_{83}	Gaskin and others 1992
Lupinus luteus	immature seeds	GA_{18}	Koshimizu and others 1968
	immature fruits	GA_{19} GA_{23} GA_{28}	Fukui and others 1971,1972
Lycopersicon esculentum	leaves + shoot tips	GA_1 GA_3 GA_4 GA_8 GA_{19} GA_{20} GA_{29} GA_{34} GA_{44} GA_{51} GA_{53}	Grunzweig and others 1997
	seeds	GA_1 GA_8 GA_{15} GA_{17} GA_{19} GA_{20} GA_{24} GA_{25} GA_{29} GA_{44}	Bohner and others 1988
	pericarp	GA_1 GA_8 GA_{17} GA_{19} GA_{20} GA_{29}	Bohner and others 1988
	cultured roots	GA_1 GA_3	Butcher and others 1988
		GA_{97}	Mander and others 1996
	pollinated fruit	GA_1 GA_8 GA_9 GA_{15} GA_{17} GA_{19} GA_{20} GA_{24} GA_{25} GA_{29} GA_{44}	Koshioka and others 1994
	parthenocarpic fruit	GA_1 GA_8 GA_{17} GA_{19} GA_{20} GA_{29} GA_{44}	Koshioka and others 1994
	fruit	GA_{97}	Mander and others 1996
	unpollinated ovaries	GA_1 GA_3 GA_8 GA_9 GA_{19} GA_{20} GA_{29} GA_{34} GA_{44} GA_{53} GA_{81}	Fos and others 2000
Lygodium circinnatum	prothallia	GA_9 GA_{20} GA_{70} GA_{73} GA_{88} GA_{96} (all as Me esters)	Yamauchi and others 1996
	gametophytes	GA_{109}	Wynne and others 1998b
	gametophytes	GA_{117} (as Me ester)	Wynne and others 1998a
Lygodium flexuosum	prothallia	GA_{73} (as Me ester)	Yamauchi and others 1996

Table 2. *Continued*

Plant	Tissue	Gibberellin	Reference
Lygodium japonicum	prothallia	GA_9 (as Me ester)	Yamane and others 1979
		GA_{73} (as Me ester)	Yamane and others 1988b
Malus domestica	immature seeds	GA_{68}	Dolan and MacMillan 1985
		GA_1 GA_3 GA_4 GA_7 GA_8 GA_9 GA_{15} GA_{17} GA_{19} GA_{20} GA_{24} GA_{34} GA_{35} GA_{44} GA_{53} GA_{54} GA_{61} GA_{62} GA_{63} GA_{68}	Lin and others 1991
		GA_1 GA_3 GA_4 GA_7 GA_9 GA_{12} GA_{15} GA_{17} GA_{19} GA_{20} GA_{25} GA_{34} GA_{35} GA_{44} GA_{45} GA_{53} GA_{54} GA_{61} GA_{62} GA_{63} GA_{68} GA_{80} GA_{84} GA_{88}	Hedden and others 1993
	developing seeds	GA_4 GA_7 GA_9 GA_{12} GA_{17} GA_{19} GA_{20} GA_{25} GA_{34} GA_{35} GA_{45} GA_{53} GA_{54} GA_{61} GA_{62} GA_{63} GA_{70} GA_{73} GA_{80} GA_{84} GA_{88} GA_{103} GA_{104} GA_{105} GA_{106} GA_{107} GA_{108}	Oyama and others 1996a
	leaves and buds	GA_{19} GA_{20}	Koshioka and others 1985
	xylem exudate	GA_{15} GA_{17} GA_{18} GA_{19} GA_{23} GA_{44} GA_{53}	Motosugi and others 1996
Mangifera indica	leaves	GA_1 GA_3 GA_{19} GA_{20} GA_{29}	Davenport and others 2001
Marah macrocarpus	embryos	GA_{46}	Beeley and MacMillan 1976
		GA_1 GA_3 GA_4 GA_7 GA_{13} GA_{25} GA_{43} GA_{46}	MacMillan and Gaskin 1996
	endosperm	GA_4 GA_7 GA_{24} GA_{25} GA_{43}	Beeley and others 1975
		GA_3 GA_4 GA_7 GA_{25} GA_{37} GA_{43} GA_{46} GA_{62}	MacMillan and Gaskin 1996
Mathiola incana	shoots + flower buds	GA_1 GA_4 GA_8 GA_{19} GA_{20} GA_{24} GA_{34} GA_{37} GA_{53} GA_{112}	Hisamatsu and others 1998a
Ornithogalum thyroides	inflorescences	GA_4 GA_7 GA_9 GA_{12} GA_{15} GA_{19} GA_{20} GA_{24} GA_{25} GA_{51} GA_{53} GA_{61} GA_{112} GA_{115} GA_{120}	Koshioka and others 1999
Orobanche minor	arial parts	GA_1 GA_4 GA_9 GA_{12} GA_{19} GA_{20} GA_{24} GA_{38} GA_{44} GA_{47} GA_{58}	Suzuki and others 1994
Oryza sativa	immature seeds	GA_{19} GA_{20} GA_{29} GA_{34} GA_{44} GA_{53}	Kobayashi and others 1984
	spikelets	GA_4 GA_{17} GA_{19} GA_{20} GA_{34}	Kobayashi and others 1988
	shoots	GA_{19}	Kurogoshi and others 1979
	ears	GA_1	Suzuki and others 1981
		GA_{19}	Kurogoshi and others 1979
		GA_1 GA_4 GA_9 GA_{19} GA_{20} GA_{24} GA_{29} GA_{34} GA_{44} GA_{51}	Kobayashi and others 1984
	roots	GA_{19}	Kurogoshi and others 1979
Pennesitum glaucum	shoots	GA_1 GA_3 GA_8 GA_{17} GA_{19} GA_{20} GA_{53}	Devi and others 1984
Pharbitis nil	immature seeds	GA_{20}	Murofushi and others 1968
		GA_8 GA_{26} GA_{27}	Yokota and others 1971
Pharbitis purpurea	immature seeds	GA_3 GA_5 GA_8 GA_{17} GA_{19} GA_{20} GA_{26} GA_{27} GA_{29} GA_{34} GA_{44} GA_{53}	Fujisawa and others 1985

Pharbitis tricolor	immature seeds	GA_1 GA_3	Matsuo and others 1984
Phaseolus coccineus	immature seeds	GA_1 GA_5	MacMillan and others 1958, 1960
		GA_6 GA_8	MacMillan and others 1962
		GA_1 GA_3 GA_5 GA_6 GA_8 GA_{17} GA_{19} GA_{20}	Durley and others 1971
	embryo and testa	GA_1 GA_5 GA_6 GA_{17} GA_{19} GA_{20} GA_{38} GA_{44}	Albone and others 1984
	cotyledonary embryos	GA_1 GA_4 GA_5 GA_6	Picciarelli and Alpi 1985
	testa	GA_8 GA_{29}	Albone and others 1984
	suspensors	GA_1 GA_4 GA_5 GA_6 GA_8 GA_{44}	Picciarelli and Alpi 1986
	dark-grown seedlings	GA_4	Crozier and others 1971
	light-grown seedlings	GA_1 GA_4 GA_5 GA_{20}	Bowen and others 1973
Phaseolus lunatus	stems	GA_1 GA_3 GA_{19} GA_{20} GA_{44}	Dobert and others 1992a
	root nodules	GA_1 GA_3 GA_{19} GA_{20} GA_{29} GA_{44}	Dobert and others 1992a
Phaseolus vulgaris	immature seeds	GA_1 GA_5	West and Phinney 1959 West 1961
		GA_6 GA_8	Durley and others 1971
		GA_1 GA_4 GA_8 GA_{37} GA_{38}	Hiraga and others 1974b
	seeds (8–10 mm)	GA_1 GA_5 GA_6 GA_8 GA_{17} GA_{20} GA_{29} GA_{38}	Yamane and others 1977
	seeds (ca 15 mm)	GA_1 GA_4 GA_5 GA_6 GA_8 GA_{20} GA_{29} GA_{37} GA_{38} GA_{44}	Yamane and others 1977
	mature seeds	GA_1 GA_8	Hiraga and others 1974a,b
Phyllostachys bambusoides	shoots	GA_1 GA_{19} GA_{20}	Yanagisawa and others 1992
Phyllostachys edulis	shoots	GA_{19}	Murofushi and others 1966
		GA_1 GA_{20}	Yanagisawa and others 1992
Picea abies	shoots	GA_1 GA_3 GA_4 GA_7 GA_9 GA_{12} GA_{15} GA_{20} GA_{29} GA_{34} GA_{51}	Oden and others 1987 Moritz 1995
Picea sitchensis	shoots	GA_1 GA_3 GA_4 GA_9	Moritz and others 1989
Pimpinella anisum	somatic cell embryo cultures	GA_1 GA_4 GA_7	Noma and others 1979
Pinus attenuata	pollen	GA_3 GA_4 GA_7	Kamienska and others 1976
Pinus sylvestris	stems	GA_1 GA_3 GA_4 GA_9 GA_{12} GA_{20}	Wang and others 1996
	needles	GA_1 GA_3 GA_4	Wang and others 1996
Pisum sativum	shoots	GA_{19} GA_{20} GA_{29}	Davies and others 1982
	dark-grown shoots	GA_1 GA_8 GA_{17} GA_{20} GA_{29} GA_{81}	Gaskin and others 1985
	internodes	GA_4	Poole and others 1995
	shoot apices	GA_1 GA_{20} GA_{29}	Ingram and others 1983
	parthenocarpic and pollinated ovaries	GA_1 GA_8 GA_{20} GA_{29}	Garcia-Martinez and others 1987a
	pollinated ovaries	GA_1 GA_3 GA_8 GA_{13} GA_{17} GA_{19} GA_{20} GA_{29} GA_{43} GA_{60} GA_{81} GA_{91}	Santes and others 1995
		GA_1 GA_8 GA_{20} GA_{29}	Garcia-Martinez and others 1987a
	ovules	GA_1 GA_3 GA_8 GA_{19} GA_{20} GA_{29}	Garcia-Martinez and others 1991
	fertilized ovules	GA_4 GA_7	Rodrigo and others 1997
	cotyledons	GA_{20} GA_{29}	Sponsel 1983
	embryonic axes	GA_{20} GA_{29}	Sponsel 1983
	testa	GA_{20} GA_{29}	Sponsel 1983
	seeds	GA_{20} GA_{29}	Frydman and MacMillan 1973
		GA_9	Frydman and others 1974
		GA_{17} GA_{19} GA_{44}	Gaskin and others 1985
		GA_{20}	Eeuwens and others 1973

Table 2. *Continued*

Plant	Tissue	Gibberellin	Reference
		GA_{51}	Sponsel and MacMillan 1977
		GA_1 GA_8 GA_{20} GA_{29}	Garcia-Martinez and others 1987a
	embryos	GA_{98}	Mander and others 1996
	pods	GA_1 GA_8 GA_{20} GA_{29}	Garcia-Martinez and others 1987a
		GA_3 GA_{17} GA_{19} GA_{81}	Garcia-Martinez and others 1991
		GA_{97}	Mander and others 1996
Pithecellobium microcarpum	immature seeds	GA_1 GA_9 GA_{17} GA_{19} GA_{20}	Koshioka and others 1986
Polianthes tuberosa	corms	GA_1 GA_{19} GA_{20} GA_{53}	Chang and others 2001
Populus tremuloides	vegetative buds	GA_1 GA_8 GA_{19} GA_{20}	Zanewich and Rood 1994
Prunus armeniaca	immature seeds	GA_{32}	Coombe 1971
			Yamaguchi and others 1975a,b
		GA_1 GA_5 GA_{29} GA_{32}	Bottini and others 1985
Prunus avium	fruitlets	GA_{87}	Blake and others 1993
		GA_1 GA_3 GA_5 GA_{19} GA_{20} GA_{29} GA_{32} GA_{85} GA_{86}	Blake and Browning 1994
	mature seeds	GA_{32} GA_{85} GA_{86} GA_{87}	Blake and others 2000a
	germinating seeds	GA_1 GA_3 GA_5 GA_{19} GA_{20} GA_{32} GA_{85} GA_{86} GA_{87}	Blake and others 2000a
	shoot apices ex 10 wk-old seedlings	GA_1 GA_3 GA_5 GA_8 GA_{19} GA_{20} GA_{29} GA_{32} GA_{85} GA_{86} GA_{87}	Blake and others 2000a
	shoot apices ex mature plants	GA_1 GA_3 GA_5 GA_8 GA_{19} GA_{20} GA_{29}	Blake and others 2000a
Prunus cerasus	seeds	GA_3 GA_{17} GA_{19} GA_{20} GA_{25} GA_{30} GA_{32} GA_{44} GA_{86} GA_{87} GA_{95}	Nakayama and others 1996
	pericarp	GA_{29}	Reed and Martin 1976
Prunus domestica			
Prunus persica	seeds	GA_5 GA_{32}	Yamaguchi and others 1975a,b
		GA_{86}	Bhaskar and others 1991
		GA_3 GA_9 GA_{17} GA_{19} GA_{30} GA_{44} GA_{63} GA_{68} GA_{87} GA_{95} GA_{97} GA_{118} GA_{119} GA_{120} GA_{121} GA_{122} GA_{126}	Nakayama 2001
Prunus spachiana	shoots	GA_1 GA_{15} GA_{19} GA_{20} GA_{29} GA_{44}	Kobayashi and others 1996
Pseudotsuga menziesii	shoots	GA_1 GA_3 GA_4 GA_7 GA_9	Doumas and others 1992
Psilotum nudum	fronds	GA_{36}	Takahashi and others 1984
Pyrus communis	seeds	GA_{45}	Bearder and others 1975
		GA_{17} GA_{25} GA_{45}	Martin and others 1977
		GA_{45} GA_{63} GA_{68}	Dolan and others 1985
Pyrus malus	seeds	GA_{61} GA_{62}	Kirkwood and MacMillan 1982
Quamoclit pennata	seeds	GA_3 GA_5 GA_{17}	Matsuo and others 1984
Raphanus sativus	mature seeds	GA_1 GA_5 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{24} GA_{25} GA_{40} GA_{77} GA_{116}	Nakayama and others 1990, 1998
	leaves and/or stems	GA_1 GA_4 GA_9 GA_{12} GA_{15} GA_{17} GA_{19} GA_{20} GA_{24} GA_{25} GA_{29} GA_{34} GA_{44} GA_{51}	Nakayama and others 1995
	shoots	GA_{111} GA_{112} GA_{113} GA_{114} GA_{115} GA_{116}	Nakayama and others 1998
Rhizophora mucranata	leaves	GA_3 GA_5 GA_9	Ganguly and Sircar 1974
Rumex acetosa	shoots	GA_1 GA_4 GA_9 GA_{19} GA_{20} GA_{53}	Rijinders and others 1997
Rumex palustris	shoots	GA_1 GA_4 GA_9 GA_{19} GA_{20} GA_{53}	Rijinders and others 1997

Saccharum spp	leaves and shoots	GA_1 GA_3 GA_{19}	Kuhnle and others 1983
	apical meristems	GA_{20} GA_{29}	
	apices	GA_4 GA_{36}	Koshioka and others 1984
Salix pentandra	shoots	GA_1 GA_{19} GA_{20} GA_{29}	Davies and others 1985
	catkins	GA_1 GA_{19}	Davies and others 1985
	roots	GA_1 GA_8 GA_{19} GA_{29} GA_{56}	Olsen and others 1994
Sasa kurilensis	shoots	GA_1 GA_{19} GA_{20}	Yanagisawa and others 1992
Secale cereale	plants *(sic)*	GA_1 GA_3	Eckert and others 1978
	immature ears	GA_{19} GA_{20} GA_{24} GA_{54} GA_{55} GA_{60}	Dathe and others 1989
Sechium edule	embryo	GA_1 GA_3 GA_4 GA_7 GA_8 GA_{17} GA_{25} GA_{29} GA_{38} GA_{44}	Albone and others 1984
	endosperm	GA_1 GA_3 GA_4 GA_7 GA_{13} GA_{17} GA_{25} GA_{38} GA_{44}	Albone and others 1984
	testa	GA_1 GA_3 GA_7 GA_8 GA_{12} GA_{13} GA_{15} GA_{19} GA_{25} GA_{27} GA_{29} GA_{44} GA_{53}	Albone and others 1984
Silene armeria	shoots	GA_1 GA_8 GA_{12} GA_{17} GA_{19} GA_{20} GA_{29} GA_{44} GA_{53}	Talon and Zeevaart 1990
Solanum tuberosum	immature berries	GA_{15} GA_{20}	Jones and others 1988
Sonneratia apelata	leaves	GA_1 GA_3	Ganguly and Sircar 1974
Spinacia oleracea	shoots	GA_{17} GA_{19} GA_{20} GA_{29} GA_{44} GA_{53}	Metzger and Zeevaart 1980a
		GA_1 GA_4 GA_5 GA_7 GA_8 GA_9 GA_{12} GA_{15} GA_{17} GA_{19} GA_{20} GA_{29} GA_{34} GA_{44} $GA_{51}GA_{53}$	Talon and others 1991
		GA_{60} GA_{81}	Zeevaart and others 1993
		GA_{97} GA_{98} GA_{99}	Mander and others 1996
	leaves	GA_{110}	Owen and others 1998
	roots	GA_{19} GA_{29} GA_{44}	Metzger and Zeevaart 1980b
Stevia rebaudiana	stems and leaves	GA_{20}	Alves and Ruddat 1979
Thlaspi arvense	shoots	GA_1 GA_8 GA_9 GA_{12} GA_{15} GA_{19} GA_{20} GA_{24} GA_{25} GA_{29} GA_{44} GA_{51} GA_{53}	Metzger and Mardaus 1986
Trifolium repens	arial parts	GA_1 GA_4 GA_9 GA_{19} GA_{20} GA_{44}	Suzuki and others 1994
Triticum aestivum	shoots	GA_1 GA_3 GA_4 GA_8 GA_{19} GA_{20} GA_{29} GA_{34} GA_{44} GA_{53}	Appleford and Lenton 1991
	leaves, roots	GA_1 GA_3	Eckert and others 1978
	leaves, stems	GA_1 GA_3 GA_4 GA_7	Jensen and Junttila 1987
	expanding internode	GA_1 GA_3 GA_4 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{29} GA_{34} GA_{44} GA_{53}	Webb and others 1998
	young ears	GA_1 GA_3 GA_8 GA_{17} GA_{19} GA_{20} GA_{29} GA_{44} GA_{53} GA_{97} GA_{98}	Webb and others 1998
	developing grain	GA_{15} GA_{17} GA_{19} GA_{20} GA_{24} GA_{44} GA_{54} GA_{55}	Gaskin and others 1980
		GA_{60} GA_{61} GA_{62}	Kirkwood and MacMillan 1982
		GA_{91} GA_{92}	Penny and others 1994
	mature grain	GA_8 GA_{17} GA_{19} GA_{20} GA_{29} GA_{79}	Lenton and others 1994
		GA_{79} GA_{90}	Penny and others 1993
		GA_{93} GA_{94}	Findlow and others 1997
Vicia faba	immature seeds	GA_{17} GA_{19} GA_{20} GA_{29} GA_{44} GA_{53} GA_{98}	Sponsel and others 1979
Vigna unguiculata/sinensis	shoots	GA_1 GA_{20}	Garcia-Martinez and others 1987b

Table 2. *Continued*

Plant	Tissue	Gibberellin	Reference
	stems	GA_1 GA_3 GA_8 GA_{19} GA_{20} GA_{29} GA_{44}	Dobert and others 1992b
	root nodules	GA_1 GA_{19} GA_{20} GA_{29} GA_{44}	Dobert and others 1992b
	hypocotyls	GA_1 GA_4 GA_9 GA_{20} GA_{51}	Okatomoto and others 1995
	leaf, petiole, epicotyl	GA_3 GA_{20}	Garcia-Martinez and others 1987b
Vitis vinifera	seedless berries	GA_{17} GA_{19}	Perez and others 2000
	seeds, seeded berries	GA_1 GA_3 GA_{17} GA_{19}	Perez and others 2000
Vitis vinifera x V. rupestris	somatic embryos	GA_4 GA_9	Takeno and others 1983
Wisteria floribunda	immature seeds	GA_{18} GA_{23}	Koshimizu and others 1972
Zea mays	shoots	GA_1 GA_3 GA_4 GA_5 GA_7 GA_8 GA_9 GA_{12} GA_{15} GA_{17} GA_{19} GA_{20} GA_{24} GA_{29} GA_{34} GA_{44} GA_{53}	Fujioka and others 1988a,b
	young tassels	GA_1 GA_8 GA_{17} GA_{19} GA_{20} GA_{29} GA_{44} GA_{53}	Heupel and others 1985
	pollen	GA_1 GA_9 GA_{20}	Yamaguchi and others 1990
		GA_{98}	Mander and others 1996
	silk	GA_3	Murofushi and others 1991
	immature seeds	GA_1 GA_8 GA_9 GA_{17} GA_{19} GA_{20} GA_{29} GA_{34} GA_{44} GA_{53}	Murofushi and others 1991
	callus ex embryo	GA_1 GA_{17} GA_{19} GA_{20} GA_{29} GA_{53}	Talo and others 1995

Table 3. Occurrence of Individual Gibberellins in Fungi

Fungus	GA	Reference
Gibberella fujikuroi	GA_1	Takahashi and others 1955 Stodola and others 1955,1957 Grove and others 1958
	GA_2	Takahashi and others 1955 Grove 1961
	GA_3	Cross 1954 Stodola and others 1955 Takahashi and others 1955
	GA_4	Takahashi and others 1957
	GA_7 GA_9	Cross and others 1962
	GA_{10}	Hanson 1966
	GA_{11}	Brown and others 1967
	GA_{12}	Cross and Norton 1965
	GA_{13}	Galt 1965
	GA_{14}	Cross 1966
	GA_{15}	Hanson 1967
	GA_{16}	Galt 1968
	GA_{20}	McInnes and others 1977
	GA_{24} GA_{25}	Harrison and MacMillan 1971
	GA_{36} GA_{37}	Bearder and MacMillan 1973
	GA_{40}	Yamaguchi and others 1975
	GA_{41} GA_{42}	Bearder and MacMillan 1973
	GA_{47}	MacMillan and Wels 1974 Beeley and MacMillan 1976
	GA_{54} GA_{55} GA_{56} GA_{57}	Murofushi and others 1979
	GA_{78}	Willis 1990

Table 3. *Continued*

Phaeospheria sp. L489	GA_4 GA_9	Sassa and others 1989, 1994
	GA_{24}	Sassa and others 1994
	GA_{82}	Seto and others 1995
Sphaceloma bidentis	GA_4 GA_9 GA_{13} G_{A14} GA_{15} GA_{24}	Rademacher 1992
Sphaceloma manihiticola	GA_4	Rademacher and Graebe 1979 Zeigler and others 1980
	GA_9 GA_{13} GA_{14} G_{A15} GA_{24} GA_{25} GA_{36} GA_{37}	Rademacher 1992
Sphaceloma menthea	GA_4 GA_9 GA_{13} GA_{14} GA_{15} GA_{24}	Rademacher 1992
Sphaceloma perseae	GA_4 GA_{13} GA_{14} GA_{24}	Rademacher 1992
Sphaceloma rhois	GA_4 GA_9 GA_{13} GA_{14} GA_{15} GA_{24}	Rademacher 1992

Table 4. Occurrence of Individual Gibberellins in Bacteria

Bacterium	GA	Reference
Acetobacter diazotropicus	GA_1 GA_3	Bastian and others 1998
Azospirillum lipoferum	GA_1 GA_3	Bottini and others 1989
Azospirillum brasilense	GA_1 GA_3	Janzen and others 1992
Bacillus licheniformis	GA_1 GA_3 GA_4 GA_{20}	Gutierri-Manero and others 2001
Bacillus pumilus	GA_1 GA_3 GA_4 GA_{20}	Gutierri-Manero and others 2001
Herbospirillum seropedicae	GA_3	Bastian and others 1998
Rhizobium phaseoli	GA_1 GA_4	Atzhorn and others 1988

MS data. This method raises the question of the minimal data required for acceptable identification. The data in primary journals upon which identification is based vary considerably. Authors and referees are therefore strongly urged to apply, and publish, one of the following sets of criteria: (1) isolation of the pure product and comparison of its chemical and physical properties with those of an authentic specimen; (2) full-scan GC-MS, comparing Kovats retention indices (KRI) and *m/z* (and relative intensities) of at least six significant ions with those of standards; (3) GC-selected ion monitoring (SIM) comparing retention times and *m/z* (and relative intensities) of at least six significant ions with those of standards.

In the present case the following criteria for the identification of the GAs have been applied:

1. Only publications in refereed journals are cited
2. Identification from normal (tall) phenotypes is given preference
3. Preliminary communications are not cited where a full paper has been published
4. GAs identified after hydrolysis of plant extracts are not included
5. Some papers, even though they are contained in refereed journals, have not been cited on the grounds that they are judged to contain insufficient data upon which to justify claimed identification.

The data in Tables 1–4 show the widespread natural occurrence of GAs (128 plants, 7 fungi, and 7 bacteria). Table 1 shows that GA_1 is the most widespread (86 plants) and that its precursors in the early 13-hydroxylation pathway occur with increasing frequency from GA_{53} (35 plants) to GA_{44} (44 plants) to GA_{19} (75 plants) to GA_{20} (80 plants). A similar increasing sequence of occurrence of the members of the non-early 13-hydroxylation to GA_4 and GA_9 is evident, namely, GA_{12} (20 plants) to GA_{15} (24 plants) to GA_{24} (24 plants) to GA_9 (49 plants) and GA_4 (54 plants). Gibberellin A_3, the major GA of *Gibberella fujikuroi*, has now been shown to occur in 45 plants.

Note added in proof

In Table 1, please note that the numeral 1 in the GA_{16} structure has no meaning. Please ignore it.

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