

Crop	Growth Stage ¹		Plant Part ²		Leaves: # to collect
	When to collect samples	Code	Plant part to collect (Indicator plant part)	Code	
African violet	Mature plants of flowering size	B, M	Most recent mature leaf	M	25
Alfalfa	Prior to or early bloom	E, B	Most recent mature trifoliolate leaves from the top 1/3 (6") of plants	T	30
Almond	mid shoot on current seasons extension growth on young trees	M	Normal size leaves on non-fruiting spurs	M	30-40
Apple	5 to 10 weeks after full bloom	M	Most recent mature leaf from mid shoot, leaves near base of current year's growth, or leaves from spurs; 4-8 leaves per plant	M	50
	(mid-June to mid-July)		from 20-30 plants		
Asparagus	Mid-summer	E	Top 4-6" of most recent mature fronds	M	20-30
	Late-summer	M	Top 18" of most recent mature fronds	M	
Avocado	Recent summer flush	M	Recently expanded, mature and healthy leaves. Non-fruiting terminals	M	4-8 leaves each, from 20 random trees
Azalea	Prior to flowering	E	Most recent mature leaf	M	75-100
Bahiagrass	see Grass (Forage & Pasture)				
Banana	Actively growing suckers. Should be able to reach leaf from the ground	E	3rd fully expanded leaf. 20cm wide strips from each side of the mid-rib to the leaf margins (in the centre section)	E	select from 5 trees
Barley	see Small Grain				
Bean	Seedlings (less than 12")	S	All the above-ground portion	W	20-30
	Prior to, or during initial bloom	E, B	Most recent mature leaf	M	
Beet	Early to mid-growth	E, B	Most recent mature leaf	M	20-30
Begonia (<i>Rieger elatior</i>)	Prior to heavy flower formation	E, B	Most recent mature leaf (1 st leaf from top that is 2" wide or greater)	M	20
Bentgrass	see Grass (Turf)				
Bermuda, coastal (hybrid)	see Grass (Forage & Pasture)				
Bermudagrass (turf)	see Grass (Turf)				
Blackberry	Postharvest	M	Most recent mature leaf on primocane (nonfruiting laterals)	M	20 - 40
Blueberry	Early or during bloom	E, B	Most recent mature leaf from mid-portion of current season's growth	M	50 - 60
Bluegrass	see Grass (Forage & Pasture)				
Bluestem, big	see Grass (Forage & Pasture)				
Boxwood	Summer	M	2-3" currings from terminal growth	M	20 cuttings
Broccoli	Early or prior to head formation	E, B	Most recent mature leaf	M	25-30
Bromegrass	see Grass (Forage & Pasture)				
Cabbage	Early to mid-growth	E	First mature leaf from centre of whorl; should be oldest undamaged leaf	M	25-30
Cabbage, chinese	8 leaf stage	E	Oldest undamaged leaf	M	25-30
Camellia	Summer	M	Most recent mature leaf	M	25-30
Caneberries	see Blackberry or Raspberry				
Canola	Prior to bloom	E	Most recent mature leaf	M	
Cantaloupe	see Melons				
Capsicum	Flowering - early fruiting	E	Young, mature leaf with petiole	M	30
Carnation	Unpinched plants	E	4 th or 5 th leaf pair from base of plant	M	20-30
	Pinched plants	B, F, M	5 th or 6 th leaf pair from top of primary laterals	M	
Carrot	Early growth (60 days after seeding)	E	Most recent mature leaf	M	20-30
Cauliflower	Early or prior to head formation	E	Most recent mature leaf	M	25-30
Centipede	see Grass (Turf)				
Celery	Plant half grown	E	Youngest mature leaf blade	M	30
Cherry	5 to 10 weeks after full bloom	M	Leaves near base of current year's growth or from spurs; 4-8 leaves per plant from 20-30 plants	M	50-100
Chia	New flush	M	most recent mature leaf	M	50-60
Chillies	Flowering - early fruiting	E	Young, mature leaf with petiole	M	30
Chinese cabbage (heading types)	8-leaf stage	E	Oldest undamaged leaf	M	25-30
Chrysanthemum	Prior to or at flowering	E, B, F	Most recent mature leaf from top of plant or upper leaves on flowering stem	M	20-30
Citrus	SA & VIC (3-6months old); NSW & QLD (5-7 months old)	E	Healthy and mature leaves from the middle of non-fruiting terminals from the previous spring flush	M	40 - 60
Clover	Prior to bloom	E	Top 4-6 inches of the plant	T	40-50
Collards	Early	E	Oldest undamaged leaf	M	25-30
Conifers	Summer	E	Terminal shoot from upper 1/3 of tree; do not sample from leader or top whorl	M	20-40
	Seedlings (less than 4")	S	Entire top of plant cut 1" above soil	W	15-20 plants

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Corn, field	Early (4–12")	E	Entire top of plant cut 1" above soil	W	10–15
	Prior to tasselling (>12")	E	First fully developed leaf below the whorl; This leaf should be totally unrolled and have developed a sheath (collar) on the stalk.	M	
	Tasselling & shooting to silking	B, F	Leaf opposite and below the uppermost developing ear (earleaf)	E	
	Maturity	M	Leaf opposite and below the uppermost developing ear	M	
	Sampling after silking is not recommended	—	—	—	
Corn stalk (end of season)	1–3 weeks after black layer has formed on 80% of the kernels of most ears	M	8" segment collected at 6–14" above the soil line	H	15
Corn, sweet	Prior to tasselling	E	First fully developed leaf below the whorl; This leaf should be totally unrolled and have developed a sheath (collar) on the stalk.	M	15–20
	At tasselling	E		E	
Cotton	Seedling: Four weeks following emergence of 2–3 true leaves	S Weeks 1,2,3,4	Most recent mature leaf and petioles. Separate petioles in the field.	M	25–30
	Early: Four weeks following seedling (S) stage, includes pinhead square formation	E Weeks 1, 2, 3, 4			
	Bloom: Begins when plants have at least 5 open blooms per 25 row feet	B Weeks 1, 2, 3, 4			
	Fruit: Begins 5th week after beginning of bloom	F Weeks 1, 2, 3, 4			
	Mature	M			
Cucumber	Early to early bloom	E, B	Most recent mature leaf (generally 4 th to 5 th leaf from a growing point)	M	15–20
Cucumber, greenhouse	Early to early bloom	E, B	Most recent mature leaf (generally 4 th to 5 th leaf from a growing point)	M	8–10
Date Palm	Early in the potted form	E	most recent mature leaf	M	1 whole leaf
Fescue	see Grass (Turf or Forage & Pasture)				
Fir	During dormancy (~Sept–Dec)	M	Two or three shoots from the upper 1/3 or 1/2 of 8–12 trees. DO NOT sample from leader or top whorl.	M	15–30 shoots
Daisy, gerber	All growth stages	E,B,F,M	Most recent mature leaf	M	25–50
Gammagrass	see Grass (Forage & Pasture)				
Gardenia	Summer	B	Most recent mature leaf	M	25
Garlic	Early growth prior to root/bulb enlargement	E	Center mature leaves	M	20–30
Geranium	All growth stages	E,B,F,M	Most recent mature leaf	M	25–50
Ginger	2-3 months	E	3rd fully expanded leaf from the top of the plant (ignore rolled leaves at the top)	M	40 - 50
Grape, muscadine (<i>Vitis rotundifolia</i>)	Mid to late summer but prior to final swelling of fruit (end of bloom through Aug); Best Time – June to early July	B, F	Most recent mature leaf opposite fruit clusters from well-exposed shoots (generally the 1st or 2nd fruit cluster from the base of the shoot)	M	60–80
Grape, vinifera (<i>Vitis aestivalis, labrusca & vinifera</i>)	Full bloom through veraison (ripening of fruit)	B, F	PETIOLES ONLY from Most recent mature leaf opposite fruit clusters from well-exposed shoots (generally the 1st or 2nd fruit cluster from the base of the shoot)	P	80–100
Grass (Forage & Pasture)	Tillering (Less than 6" tall)	S	Entire top of plant cut 1/2" above soil	T	2 handfuls
	Greater than 6" tall and prior to seed head formation (after tillering to before boot stage)	E	Top 6 inches of plant or the upper half of the plant (top 4 leaves)	T	20 tops
	After seed head formation (recommended only when troubleshooting)	F	Most recent mature leaf (leaf below seed head)	M	20–30 leaves
Grass (Turf)	During normal growing season; at least two days regrowth	M	Two handfuls of freshly mowed grass (with trash removed)	T	2 handfuls
Holly	Summer	M	Most recent mature leaf	M	30–50

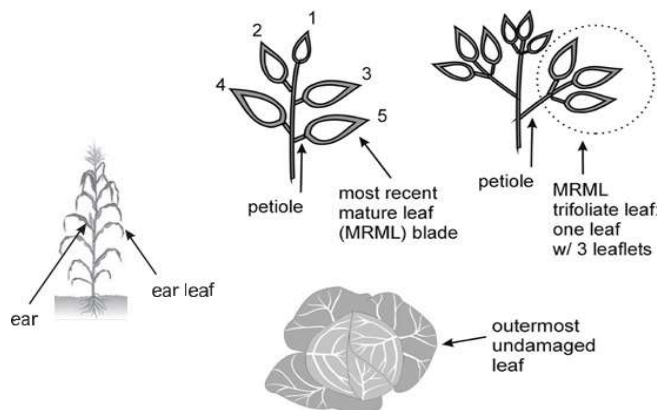
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Hydrangea	Early summer	M	Most recent mature leaf	M	30-50
Impatiens	All growth stages	E,B,F,M	Most recent mature leaf	M	25-50
Kale	Early or during bloom	E, B	Most recent mature leaf	M	25-30
Lettuce	Anytime during growing season	E	Outermost undamaged leaf	M	10-20
Lettuce (leaf), greenhouse	Anytime during growing season	E	Outermost undamaged leaf	M	10-20
Leucaena	Juvenile	E	Leaves + Petiole	M	40-50
Lima bean	<i>see Bean</i>				
Lychee	1-2 weeks after flower panicle emergence	E	First healthy leaf bunch from under the panicle	M	4 pairs of leaves from 20 different trees
Macadamia	6-7 month old leaves from the 2nd whorl of previous summer flush dominant terminals (no growth evident)	M	Leaf and petiole	M	2-3 leaves from 30 random trees
Maize	30 - 40 days after emergence	M	youngest, mature leaf	M	20-25
Mango	Nth QLD during peak flowering period; SE QLD just prior to flowering	M	youngest, mature leaf	M	20-30
Marigold	All growth stages	E,B,F,M	Most recent mature leaf	M	25-50
Melons (watermelon, muskmelon)	Prior to or during bloom; prior to fruit set	E, B	Most recent mature leaves (generally the 5th leaf from the growing tip)	M	12-30
Millet	<i>see Grass (Forage & Pasture)</i>				
Milo	<i>see Sorghum</i>				
Mung bean	<i>see Bean</i>				
Muskmelon	<i>see Melons</i>				
Mustard greens	Early or during bloom	E, B	Most recent mature leaf	M	25-30
Oats	<i>see Small Grain</i>				
Onion	Early growth prior to root/bulb enlargement	E	Center mature leaves	M	20-30
Orchardgrass	<i>see Grass (Forage & Pasture)</i>				
Ornamental shrubs & trees (not conifers)	During active growth	M	Most recent mature leaf on current year's growth	M	30-100
Pansy	All growth stages	E,B,F,M	Most recent mature leaf	M	25-50
Passionfruit	Well developed, prior to active vegetative growth and fertiliser application	M	youngest fully expanded, recently matured leaf. Behind a recent flush of growth	M	30-40
Pasture	Grazing height, vegetative growth stage	M	Vegetative growth	M	500g
Paw Paw	Most recent mature leaf	M	whole leaf	M	1 whole leaf
Peach	Mid-season; 12 to 14 weeks after bloom	F, M	Leaves near base of current year's growth; 4-8 leaves per plant / 20-30 plants	M	50-100
Peanut	Prior to, or at bloom.	E or B	Most recent mature tetrafoliate leaves (about 3rd to 5th leaf from growing point)	M	25-30
Pear	5 to 10 weeks after full bloom	M	Leaves near base of current year's growth or leaves from spurs; 4-8 leaves per plant from 20-30 plants	M	50-100
Peas (English, southern)	Prior to or during initial flowering	E,B	Most recent mature leaf (about the 3 rd set of leaf from the growing point).	M	30-60
Pecan	6-8 weeks after bloom; 8-12 weeks after catkin fall (July 7 to August 7)	M	Middle pairs of leaflets from a compound leaf on a terminal shoot	M	30-45
Pepper (bell, hot, banana)	Prior to bloom	E	Most recent mature leaf	M	20-30
Petunia	All growth stages	E,B,F,M	Most recent mature leaf	M	25-50
Pine	Summer	M	Needles from upper 1/3 crown; select dominant trees with good form and crown; primary lateral branches from first flush of past season's growth; strip needles (include sheaths and fascicles)	M	200 needles
Pineapple	During vegetative growth	M	Most recent mature leaf, generally fourth leaf from the apex (D leaf)	M	10-15
Poinsettia	Prior to or at bloom	E, B	Most recent mature leaf	M	15-20
Potato, Irish	Prior to or during early bloom	E, B	Most recent mature leaf (3 rd to 6 th leaf from the growing tip)	M	20-30
	Early flowering to half-grown tubers	M	Most recent mature leaf (3 rd to 6 th leaf from the growing tip)	M	
Raspberry	Postharvest (10 to 14 days after final harvest)	M	Youngest mature leaves on primocane (nonfruiting laterals)	M	20-40
Rhododendron	Summer	M	Most recent mature leaf	M	20-30
Rose	During flower production	F	Upper leaves on the flowering stem or 5-leaflet leaf below bud	M	20-30
Rye	<i>see Small Grain</i>				
Ryegrass	<i>see Grass (Forage & Pasture)</i>				
	Seedling stage to early jointing; GS 3-6 (Feekes) or GS 26-31 (Zadoks)	S	Entire top of plant cut 1/2" above soil	W	2 handfuls
	Early jointing to just prior to heading (ie just prior to boot); GS 7-9 (Feekes) or GS 32-39	E	The 2-4 uppermost leaves (Top 4-6")	T	25-40

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Small Grain	(Zadoks)				
	Just prior to heading (boot stage); GS 10–11 (Feekes) GS 45–100 (Zadoks)[sampling after heading is not recommended]	B	Flag leaf	M	30–40
Snap Bean	see Bean				
Sorghum (Milo, Grain sorghum)	Early or Bloom	E, B	If E, first leaf out of the whorl; if B, second leaf from the top	M	20
Sorghum-Sudan	Early or Bloom	E, B	Top 4" to 6" of plant	T	15–20 plants
Soybean	Seedlings (less than 12")	S	Entire top of plant cut 1" above soil	W	20–30
	Prior to, or during initial bloom; before pod set [sampling after pods begin to set is not recommended]	E, B, F	Most recent mature leaf	M	
Spinach	Mid-growth	M	Most recent mature leaf	M	20
Spinach, greenhouse	All growth stages	M	Most recent mature leaf	M	20
Spruce	Mid-season to late summer	M	2–3" terminal cuttings	M	25 cuttings
Squash	Summer	B, F, M	Most recent mature leaf (about 5th leaf from the growing point)	M	15–20
Strawberry, field	Early	E Weeks 1-8	Most recent mature leaf and petioles. Separate petiole in the field	M	20–25
	Bloom/Fruit: Initiated when there are 5–10 blooms on >75% of the plants or 2–3 blooms on most plants; Harvest usually begins at B/F week 5 or 6	B/F Weeks 1-12	Most recent mature leaf and petioles. Separate petiole in the field	M	20–25
	Mature	M Weeks 1-4	Most recent mature leaf and petioles. Separate petiole in the field	M	20–25
Strawberry, high tunnel	All growth stages	E,B,F,M	Most recent mature leaf and petioles. Separate petiole in the field	M	20–25
Strawberry, greenhouse	All growth stages	E,B,F,M	Most recent mature leaf and petioles. Separate petiole in the field	M	20–25
Sugarcane	Active growing season	E, M	Top visible dewlap (TVD) leaf - 20 cm cross section of leaf (minus midrib) measured from true centre of leaf towards base	M	20-30
Sweetpotato	Midgrowth; prior to root enlargement	E	Most recent mature leaf (generally the 4 th to 5 th leaf)	M	20–30
Tobacco, burley	Seedling	S	Entire top of plant cut 1" above soil	W	8–12
	Prior to bloom	E		M	
	During bloom	B, F	Most recent mature leaf (about 4 th leaf from growing point)	M	
	Maturity	M		M	
Tobacco, flue-cured	Seedling (greenhouse transplants)	S	Entire top of plant cut 1" above soil	M	8–12
	Before bloom	E		M	
	During early bloom	B	Most recent mature leaf (about 4th leaf from growing point)	M	
	During late bloom	F		M	
	Mature	M		M	
	Harvest leaf	M	Upper leaves (tips) (Position U) (~21st to 30th nodes from the bottom)	H	
	Harvest leaf	M	Middle leaves (smoking) (Position M) (~11 th to 20 th nodes from the bottom)	H	
	Harvest leaf	M	Lower leaves (lugs & cutters) (Position L) (~1 st to 10th node from the bottom)	H	
Tomato, field	Early growth (5-leaf stage through first flower)	S, E	Most recent mature leaf (4rd to 5th compound leaf back from the growing point)	M	
	Early flower through first fruit set (golf-ball-sized fruit)	B		M	
	First fruit set through harvest	F, M		M	

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Tomato, greenhouse	Early growth through first fruit set	S, E, B	Most recent mature leaf (4 th to 5 th compound leaf back from the growing point)	M	8-10
	First fruit set through harvest	F, M			
Triticale	see Small grains				
Turnip greens	Early or during bloom	E, B	Most recent mature leaf	M	25-30
Walnut	6 to 8 weeks after bloom	M	Middle pairs of leaflets from a compound leaf on a mature shoot	M	30-35
Watermelon	see Melons				
Wheat	see Small grains				
Zucchini	see Squash				

¹ Growth-stage codes: S = seedling, E=Early, B = Bloom (prior to first fruit), F = Fruiting, M = Mature

² Plant-part codes: W = Whole plant, T = Top, E = Ear leaf, M = Most recent mature leaf (MRML), O = Outermost undamaged leaf, P = Petiole, H = Harvest leaf



Indicator plant part		Example crops
Code	Description	
M	Most recent mature leaf (MRML)	Most plants, including cotton & strawberry
W	Whole plant (cut ½-1" above soil surface)	Seedling or young plants
T	Top 3-6 inches or top 2-4 leaves	Turf; forage grass and small grains prior to reproductive
E	Ear leaf (opposite and below ear)	Corn (from tasseling through silking)
P	Petiole only	Vinifera grape
O	Outermost undamaged leaf	Lettuce and other leaf vegetables
H	Harvest leaf	Tobacco

Information Sourced from: NCSA & CS Plant Tissue Analysis Guide - Updated May 2014, Plant/ Waste/ Solution/ Media Analysis Section Agronomic Division, N.C. Dept. of Agriculture & Consumer Services