Fall Color in Your Garden *"Autumn is a second spring when every leaf is a flower." - Albert Camus*

Fall colors include foliage, stems, fruits and still a few flowers. *There are beautiful perennials and annuals which will continue to give us colorful blooms for many more weeks. Some bulbs like autumn crocus, are fall blooming as well. Fall foliage colors are plants' displays that begin with the ending of summer. In autumn the sun drops lower in the sky every day. Traveling through more atmosphere, red, orange and yellow are more prominent components of the sunlight we see. We're surrounded by tones of yellow, orange, pink, peach, rust and red from the plants as well. Plants like dogwood and river birch produce nearly purple leaves each fall.*

The Biology of Fall Color

Chlorophyll is the green of plants and it is the main pigment responsible for photosynthesis (light energy and CO2 to chemical energy). As days shorten, nights cool and plants dry, photosynthesis decreases and spent chlorophyll is not replaced. As the green of chlorophyll fades, other pigments that were previously masked begin to show. Carotenoides, tannins and anthocyanins are some of the other major pigments found in deciduous leaves.

All leaves contain carotenoids that help transfer light energy to chlorophyll. There is a reason so many of our high-elevation plants have golden fall color. Carotenoids help protect chlorophyl from high-elevation overexposure to light. Beta-Carotene is one of the most common carotenoids present in most leaves. Beta-Carotene absorbs blue and green light and reflects yellow and red light, giving leaves their orange hues.

Carotenoids are more durable than chlorophyll but less efficient at light gathering. They help by protecting the fragile and more efficient chlorophylls. Carotenoids are bound in the chlorophyll containment areas of each leaf cell.

Flavonols, a part of the flavonoid protein family, is always present in leaves. Though present, it's golden colors remain unseen until Chlorophyll production slows.

Anthocyanins are water soluble ("watercolor") pigments dissolved inside leaf cells. Anthocyanins produce red, pink, purple and blue colors. They are the pigments found in purple-leaved trees & shrubs. The early red color of new growth in many high-elevation plants is from anthocyanin it blocks some UV light and the sugars act as anti-freeze. Anthocyanin production increases as chlorophyll production declines.

Anthocyanins make cherries, cranberries, and beets red and make grapes and blueberries blue. The inside of cells become more acidic with age and lower pH makes anthocyanin colors more red. Early season cell contents are more basic and will generate more blue colors from the same anthocyanins. Iron and aluminum in leaf cells also modify colors. Anthocyanins are used as pH indicators because their color changes with pH; they are pink in acidic solutions (pH < 7), purple in neutral solutions (pH ~ 7), greenish-yellow in alkaline solutions (pH > 7).

In cells, anthocyanins are "blue blockers" and filter-out damaging ultra-violet (UV) light.

Anthocyanins are fused into sugar molecules within cells and sugar supplies are required for anthocyanin production and display. As leaf sugars are generated for transport out of the leaf (for storage in roots and stems), low temperatures and a developing abscission layer slow sugar movement and keep more in the aging leaves.

In plants with red fall colors, more sunlight usually produces better colors. Vine maple, big-tooth maple, mountain ash, serviceberry and red-twig dogwood all grow well in moderate shade and still give us intense orange-red through purple fall colors. Orange leaves are a combination or anthocyanins and carotenoides.

When chlorophyll, carotenoides and anthocyanin are gone and the leaf turns brown, tannin is responsible. Tannin gives us the beige, tan and brown of autumn. Tannin is contained in all leaves in varying amounts. Some trees such as Bur Oak and many grasses have high concentrations of tannin and their leaves turn amber in fall.

Causes of colors:

While the genetics of plants determine which colors the plant can display, there are also other factors. Shortening day-length, cold nights and drought are all factors. We have no control over the first two but we can often affect the third. Drier conditions in late summer can reduce the production of chlorophyll and hasten the transition into winter acclimatization. Ideal conditions for the best fall colors start with a couple of September frosts followed by warm sunny autumn days and cool (barely freezing) nights for a long "Indian Summer". Without hard frosts some photosynthesis can continue to produce sugars that are used to make anthocyanins. Weather can also ruin fall colors. Hard frosts can turn leaves brown while cloudy or rainy days inhibit the color because of the lack of light and warmth.

A more acidic soil may make redder leaves and a more alkaline soil makes more purplish leaves in some species. To acidify soil, add cottonseed or neemseed meal or a little iron sulfate. To raise the pH of soil and decrease acidity, add lime or wood ashes.

In order to survive winter temperatures, trees slowly close off the tubes that carry water and nutrients to and from the leaves with an abscission layer of cells that form at the base of the leaf stem, protecting the “limbs and body” of the tree. When the abscission layer is complete, water and nutrients no longer flow and the leaf slowly dies and, weekend at the stem, falls gently away.

What you can do:

Begin cutting back on watering in early September to let plants know it is time to prepare for winter. Plants need to “shutter” up top to avoid winter damage. It is not bad to see your plants occasionally wilt a little but do not let them dry out completely. After fall color begins in earnest, keep-up the watering so the fall root growth can be maximized. (It is best to keep newly planted trees, shrubs and perennials moist in fall to maximize now root production.)

Pruning: If leaves are still green, into mid-September, woody plants should have enough time to seal the cuts before the cold / dry winter. Major pruning is best done late winter to early spring with hedging or heading-back during the growing season. Fall pruning, after dormancy, is not recommended unless a branch is in imminent danger of being ripped off by snow (or if a plant is excessively vigorous). Fall pruning leaves open wounds and removes stored energy.

Fall Color to see:

Pear on High st. corner of Spring. Lilac (actually has purple fall color some years) corner of Church and Donner Pass Rd. - (don’t prune lilac after June), Tansy, Nova-belgii (New York) aster – (add calcium and pinch in June to help stems stand-up). See Juniper, Arctostapylos, Oregon grape, Thimbleberry at Gray’s cabin. The C.B.White House a red oak. The Eaton House has several Bigtooth Maples. The Library has Vine Maple, Spiraea and Crabapple. The Hospital MOB has Golden Currant. the Post Office (1984) has Maples: (Red, Norway, Big-tooth, Amur), Serviceberry, Nine-bark, Red-twig Dogwood, Golden currant, Sumac, Russian olive. Alibi has Hawthorne, and Mt. Ash-tree to shrub. Brickletown has cranberry bushes, oak, Bechtel / Brandywine crabapples, apples and more. The sheriff’s office, Truckee Physical Therapy and, of course, Villager Nursery, have some excellent examples of fall colors.

Plants for Fall Color

Flowering Trees		**Height**	**Desc.**
Malus ioensis cv.	prairie crabapples	15-20’	huge leaves, spectacular red fall colors.
Malus species	apples and crabapples	15-25’	golden-orange fall colors, winter fruit display
Prunus persica	peach	10-15’	no fruit but spring bloom and fall colors
Prunus virginiana cv.	standard-form chokecherry	15-25’	intense red-orange-violet fall colors. Fast growing
Aggressive Deciduous Trees			
Populus tremua ‘erecta’	columnar Swedish aspen	40-60’	red fall color, dense upright habit
Populus tremuloides	quaking aspen	40-80’	golden fall color, white noise (quaking)
Understory Trees, Very Large Shrubs, “Trubs”			
Acer campestre	hedge maple	20-40’	very dense screen with pruning, golden fall color
Acer circinatum	vine maple	15-25’	great bark, rainbow of fall colors, part shade
Acer ginnala var. ginnala	amur maple	8-15’	‘Flame’ is its fall color. tolerates extreme cold
Acer tartaricum	tartarian maple	8-15’	Broader leaf and more varied fall colors than amur.
Acer glabrum	mt. maple	8-20’	open, delicate, pale yellow, cream fall color
Acer grandidentatum	Rocky Mt. bigtooth maple	12-30’	best as multi-trunk, great fall colors -All colors
Amelanchier species	serviceberry	6-15’	species with bright red-orange fall color
Betula occidentalis	western water birch	15-30’	copper bark, yellow-maroon fall color
Cornus sericea	red-twig dogwood	8-15’	fast growing, shade tol., red fall color and stem

Crataegus species	hawthorne	8-10’	some grown as shrubs, like mt. Ash
Malus sargentii (M. sieboldii)	sargent’s crabapple	6-10’	profusion of bright red fruit in late fall - winter
Prunus padus	birdcherry	15-30’	great fall color, massive shrub, very fast growing
Prunus virginiana cv.	chokecherry	15-30’	excellent jam, great fall color, massive shrub
Pyrus species	pear	15-25’	red fall color very late, needs protected location
Sorbus aucuparia (M.S.)	multi-stem european mt. ash	20-30’	multi trunk in part shade, flowers, berries, fall color
Sorbus scopulina	western mt. ash	4-12’	native, more open than European Mt. Ash
Quercus gambellii	gambell oak	10-20’	“Magic Carpet” fall colors from high elevation Rky’s

Large shrub ~ 5-10’

Aronia melanocarpa	black chokeberry	4-6’	deep green leaves, deep red fall color
Physocarpus spp.	ninebark	3-4’	dark purple foliage, burnt-orange fall color
Prunus besseyii	western sand cherry	5-8’	hardy prairie native - bright fall color
Ribes aureum (R. odoratum)	golden currant	4-8’	Yellow blooms, big black fruit, bright red fall color
Rhus aromatica (R. odorata)	skunkbush sumac	4-8’	Rainbow of fall colors. looks like poison oak
Rhus typhina	staghorn sumac	4-6’	Spreading clumps, RED fall color
Rosa glauca	red-leaf rose	5-8’	great purple leaves, bright orange hips
Spiraea douglasii	western spirea	4-6’	unique late flower spikes, orange fall colors
Viburnum trilobum (V. opulus)	cranberry bush	4-8’	big blooms, great fall colors, bright persistent fruit

Small shrub < 5’

Artemisia tridentata	basin sagebrush	2-3’	dry land, silvery native beautiful with fall grasses
Berberis thundbergii	crimson barberry	2-3’	spring prune for summer color, ORANGE in fall
Ericameria nauseosa	rabbitbrush	2-3’	awesome fall yellow bloom, silver foliage
Euonomous alata ‘compacta’	dwf. buring bush	3-4’	fluorescent magenta fall color - “Burning Bush”
Holodiscus discolor	rock spray	3-5’	great native shrub with large white plumes
Berberis aquifolium	Oregon grape	6”-3’	part shade; evergreen, bright red fall splashes
Picea abies ‘nidiformis’	nest Spruce	1-1.5’	finer than mugo pine - keeps the garden “alive”
Pinus mugo ‘compacta’	mugo pine	2-4’	like a really dwarf lodgepole pine
Potentilla fruticosa (Diasphora)	bush cinquefoil	2-4’	blooms all summer and well into the fall, blooming.
Ribes roezlii	gooseberry	1-2’	bright red fall berries and leaves
Rosa rugosa ‘Hansa’	hansa Tomato rose	3-5’	very hardy rose in Truckee. Large red hips in fall
Rosa woodsii	wild rose / wood’s rose	3-6’	bold red hips amid orange fall
Spiraea bumalda ‘Goldflame’	goldflame spiraea	2-3’	golden foliage, pink blooms, red fall color
Spiraea splendens var. splendens	Sierra spirea	1-2’	beautiful next to granite boulders or ponds, native
Spiraea betulifolia ‘Tor’	birchleaf spirea	2-3’	red-orange fall color, white blooms
Spirea nipponica ‘Snowmound‘	snowmound spirea	3-5’	big easy shrub with a profusion of white in spring
Symphoricarpos spp.	snowberry & coralberry	2-5’	rounded blue-grey foliage turns pale-cream in fall
Syringa meyeri	dwarf lilac	4-5’	for a small space, deep purple fall color
Vaccinium angustifolium	lowbush blueberry	2-4’	excellent fruiting low shrub with magenta fall color
Viburnum opulus ‘Alfredo‘	compact cranberry bush	3-4’	dwarf of the big-one - berries and red fall color

Woody Groundcovers

Arctostaphylos uva-ursi	bear-berry manzanita	2-4”	glossy red berries in fall
Cotoneaster dameri ‘eichholz’	bear-berry cotoneaster	4-8”	red berries and spotted intense red fall foliage
Juniperus communis	alpine carpet juniper (native)	4” - 2’	native creeping tough juniper purplish fall color
Berberis repens	creeping barberry (OR grape)	6” - 1’	bright red on some of the leaves in fall
Symphoricarpos mollis	creeping snowberry	4-8”	big white berries in the fall

Perennial Fall Blooms

Achillea filipendulina	golden yarrow
Aconitum carmichaelii	autumn monkshood
Alcea rosea	hollyhock
Anemone japonica	Japanese anemone
Anemone sylvestris	snowdrop anemone
Aster nova-angliae	New England aster
Aster nova-belgii	New York aster
Campanula persicifolia	peachleaf bellflower
Campanula takesimana	Korean bellflower
Choeone	turtlehead
Clematis tangutica	goldenbells clematis
Colchicum	autumn crocus
Crucus staivus	saffron
Digitalis purpurea	foxglove
Echinaceae purpurea	purple coneflower
Fragaria x 'Lipstick'	red flowering strawberry
Geum chiloense	Chilean geum
Helianthus tuberosus	Jerusalem artichoke
Lewisia cotyledon	lewisia
Liatris spicata	gayfeather
Lychnis coronaria	rose campion
Monarda didyma	bee balm
Nepeta siberica	Siberian catmint
Oenothera missouriensis	sundrops oenothera
Phlox paniculata	summer phlox
Phygelius x rectus	cape fuchsia
Physostegia virginiana	obedient plant
Primula x polyantha	english primrose
Rosa sp.	rugosa and miniature roses (still in full bloom)
Rudbeckia fulgida	'Goldsturm' (gold storm) rudbeckia
Rudbeckia hirta	black-eyed Susan
Rudbeckia laciniata	lace-leaved rudbeckia
Rudbeckia nitida	'Herbstsonne' (autumn sun) rudbeckia
Sedum spectabile	autumn joy sedum
Tanacetum vulgare	tansy
Epilobium canun	(Zauschneria californica) California fuchsia

Perennial Fall Foliage Color

Artemisia schmidtiana	silver mound / angel's hair
Bergenia cordifolia	
Dicentra spectabilis	showy bleeding heart
Eryngium gigantea	sea holly
Fragaria spp.	strawberry
Geranium spp.	hardy geranium
Hosta	funkia, plantain lily
Scabiosa fama	scabiosa

And many, many more!!!!

"I trust in nature for the stable laws of beauty and utility. Spring shall plant and autumn garner to the end of time."
- Robert Browning

Villager nursery inc.
Helping Mountain Gardens Thrive Since 1975
10678 Donner Pass Road
Truckee, California
530.587.0771