

For NRCS practices that allow or require tree planting, the addition of adapted tropical and sub-tropical fruit trees can improve biodiversity, enhance carbon sequestration, benefit wildlife, and be of secondary benefit to producers when removal of product (e.g., nuts, fruit, etc.) is allowed. This fact sheet provides NRCS planners information about adapted tropical and sub-tropical fruit trees recommended for Florida. General requirements or considerations when adding tropical or sub-tropical fruit trees to address a conservation practice purpose(s) are:

- Spacing requirements of a given practice should always be followed regardless of commercial spacing recommendations for the species in this list.
- If managed to be <15 ft tall, most species listed should not be planted in a silvopasture system, particularly if palatable or potentially toxic.
- Most species should be protected from grazing, particularly those that are palatable or potentially toxic, when used in a hedgerow at least until lower limbs above browse height of livestock.
- See Florida NRCS Riparian Forest Buffer (CPS 391) or Tree/Shrub Planting (CPS 612) guidance for appropriate non-fruiting species and suggested planting densities.
- For long term (>20 yr) carbon sequestration goals, consider planting at the widest spacing recommended or allowed by practice and let the trees get as large as possible.
- For short term (<10 yr) carbon sequestration goals, consider use the spacing recommended for orchard planting or minimum allowed by practice and, if suitable, using prunings as livestock feed or mulch.
- Follow appropriate weed control and manage associated forages during tree establishment; some Florida forage species, particularly stargrass (*Cynodon* spp.), can overgrow/smother young trees.

Common Name	Scientific Name	NRCS Practice	USDA Plant Hardiness Zones (see map p. 6)	Invasive	Min. Temp.	Soil	Drought/ Flood Tolerance	Growth Rate/Time to First Harvest	Pruning	Pollination	Irrigation	Forage Quality /Antiquity (CP=Crude Protein, TDN= Total Digestible Nutrients, CT= Condensed Tannin)	Protection from Livestock	Commercial Planting
Atemoya	<i>Annona squamosa</i> x <i>A. cherimola</i> and <i>A. cherimola</i> x <i>A. squamosa</i> hybrids	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381) use with caution	9b to 12	No	Young trees killed at 28 to 29 F (-2.0 C); mature trees damaged or killed at or below 24 F (-4.4 C)	Well drained soil types including sands and lime-stone based soils; pH 6.0-6.7	Drought - Slight to Moderate; Flood - Not Tolerant to Tolerant depending on rootstock	Fast/2-4 yr grafted trees; 3-5 yr from seed	Pruning required to maintain trees at recommended 6 to 12 ft (1.8 to 3.6 m) in height; unpruned trees can reach 25 to 30 ft (7 to 9 m)	Compatibility varies with cultivar; pollinated by beetles; hand pollinating can improve fruit set	During periods of drought stress and during flowering and fruit set; do not over water	Antiquity: Toxic alkaloids in seed; some level alkaloids in leaves, bark, and young fruit; use with caution in silvopasture	Continuous if maintained <15 ft (3.6 m); if allowed to grow >15 ft (3.6 m), until lower limbs above browse height	Pruned trees 16-20 ft (5-6 m); unpruned trees 25-30 ft (6.7- 7.6 m) apart, benefits from wind protection

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Avocado	West Indian Race - <i>Persea americana</i> var. <i>americana</i> ; Mexican Race - <i>P. americana</i> var. <i>drymifolia</i> ; Guatemalan Race - <i>P. nubigena</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381) use with caution	9b to 11 (Mexican Race); 10 to 11 (West Indian and Guatemalan Races)	No	Mexican - young trees killed at 24 to 26 F (-4 to -3 C), mature trees damaged or killed at 18 to 26 F (-8 to -3 C); other races young trees killed 28-30 F (-2 to -1 C), mature trees 25 to 30 F (-4 to -1 C)	Well drained; clay, sand, or loam; pH 5.5-7.0	Drought - Moderate	Moderate to moderately fast/ 2-3 yr budded or grafted; 8-10 yr from seed	Pruning requirements depend on cultivar; recommended height 10-15 ft (1.8 to 3.6 m); unpruned trees of some cultivars can reach 30-40 ft (9.1- 19.8 m)	In Florida, self and cross-compatible; for cross pollination plant both A and B flowering types	During establishment (<3 yr) and trees >3 yr only during prolonged dry periods	Antiquality: Toxicity reported in livestock from excessive ingestion of fruit (unripe), leaves, and seed; quantity to be excessive is unknown; use with caution in silvopasture	Continuous if maintained <15 ft (3.6 m); if allowed to grow >15 ft (3.6 m), until lower limbs above browse height	Pruned trees 18-20 ft (5.4- 6 m) centers; 87 -100 trees/acre (217-247 trees/ha); unpruned trees 23-30 ft (7-9.1 m) or more apart
Breadfruit, Pana	<i>Artocarpus altilis</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381)	11 to 12	No	Killed <40 F (4.4 C)	Well drained sandy loam or clay loam soils, pH 6.1-7.4	Drought - Moderate; Flood - Not tolerant saturated soils	Moderate to Moderately slow; vegetative or grafted trees- 2-4 yr; trees from seed 5-10 yr	Top at 10 ft (3 m) to encourage lateral branches; annually as needed to 16-25 ft (4-8 m); unpruned to 40-50 ft (12-15 m)	Cross pollinated, but pollination is not required for fruit to form	During establishment (<1 yr)	Used as browse species and cut and carry; Antiquality: none reported	Continuous if maintained <15 ft (3.6 m); if allowed to grow >15 ft (3.6 m), until lower limbs above browse height	Pruned trees rows 26 ft (8 m) apart, 26-33 ft 8-10 m) within row; unpruned 25 ft (7.6 m) apart
Carambola	<i>Averrhoa carambola</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381)	9b to 11	No	Killed 20 to 24 F (-6.6 to -4.4 C); 30 to 32 F (1.1. to 0 C) may kill young leaves, young trees, and twigs.	Adapted to well drained soils; pH 4.5-7.0	Drought - Moderate/ Flood - Moderate	Rapid/ approx. 2 yr	Pruning required for early tree development and to maintain trees at 6 to 12 ft (1.8 to 3.6 m) height; unpruned trees 20-30 ft (6-9 m)	Requirement for cross pollination cultivar dependent.	During establishment (<3 yr old); older trees regularly from flowering through harvest.	Readily browsed; Quality: 11-13% CP; 70-80% TDN; 3-4% CT; Antiquality: None reported	Continuous if maintained <12 ft (1.8 m); if allowed to grow >12 ft (1.8 m), until lower limbs above browse height.	Pruned/ unpruned trees, rows 20 - 25 ft (6 - 7.6 m) apart; 15-20 ft (4.5 - 6 m) within row; needs wind protection

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Jaboticaba	<i>Myrciaria cauliflora</i> (= <i>Plinia cauliflora</i>)	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391)	9b to 11	No	Tolerates 26 to 29 F (-3.3 to -1.7 C) for a few hours in Florida	Best on deep, rich, well-drained soil; have grown and borne well on sand oolitic limestone, pH 5.5-6.5	Drought - Not tolerant	Slow/ 5-7 yr from vegetative, 8-10 yr seed	Pruning required for early tree development and to maintain trees at 8 to 10 ft (2.4 to 3 m) height; unpruned trees 15-30 ft (3.6-9 m)	Requires cross pollination; plant in groups.	During establishment and during dry season to regulate flowering period and maximize fruit production	Unknown, related species not readily grazed.	Continuous after planting due to slow growth.	Pruned trees rows 20 ft (6 m) apart; 12-20 (4.5-6 m) within row; unpruned trees 30 ft (9 m) apart each way
Jackfruit	<i>Artocarpus heterophyllus</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381)	10 to 12	No	Leaves damaged at 32 F (0 C), branches at 30 F (-1 C); branches and trees may be killed at 28 F (-2 C)	Well drained sand, sandy loams, rocky; pH 5.0-7.5	Drought - Moderate/ Flood - Not Tolerant of flooding or saturated soils	Moderate to moderately fast/ grafted trees 2-3 yr; 3-10 yr from seed	Generally none first year, pruned to first lateral 2nd year; prune back to 8-14 ft and remove lower branches; unpruned trees (30-40 ft (9-12 m)	Fruit set and quality better when cross pollinated	During establishment (<3 yr) and trees >3 yr only during prolonged dry periods	Readily browsed; Quality: 13-18% CP, 51-59% TDN, 3-4% CT; fruit readily eaten; Antiquality: none reported.	Continuous if maintained <15 ft (3.6 m); if allowed to grow >15 ft (3.6 m), until lower limbs above browse height.	Pruned trees 20-25 ft (6.1-7.6 m); unpruned trees 25-30 ft (7.6-9.1 m)
Loquat	<i>Eriobotrya japonica</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381) use with caution	8a to 11	Spreads by seed; IFAS use with caution in South and Central Florida, not invasive in North Florida	Tolerates down to 8 to 10 F (-13 to -12 C); flowers and/or fruit damaged <27 F (-2.8 C); tree growth negatively affected >95 F (35 C)	Clay; sand; loam; alkaline; acidic; well-drained; pH 5.0-8.0	Drought - Moderate/ Flood - Not tolerant	Moderate/1-2 yr from vegetative; 6-8 yr from seed	Pruning required for early tree development and to maintain trees at 6 to 12 ft (1.8 to 3.6 m) in height; unpruned trees 20-30 ft (6-9 m).	Self-compatible, but presence of other cultivars improve fruit set and size	During establishment (<3 yr) and trees >3 yr during fruit development or prolonged dry periods	Livestock readily consume leaves; Antiquality: unripe fruit considered toxic; seed have HCN; use with caution in silvopasture	Continuous if maintained <12 ft (1.8 m); if allowed to grow >12 ft (1.8 m), until lower limbs above browse height.	Pruned trees 12 ft (3.6 m) in rows with rows 20 ft (6 m) apart; 20 ft (6 m) apart in squares; unpruned trees 25-30 ft (7.6-9 m) apart each way

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Lychee	<i>Litchi chinensis</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381)	10 to 11	No	Young trees killed 28 to 32 F (-2 to 0°C); older trees killed 24 to 25 F (-3 to -4 C)	Well drained clay, loam, sand; pH 5.5-7.0	Drought: Moderate/ Flood: Occasional	Moderately slow; grafted 3-5 yr, trees from seeds >10 yr	Not necessary on young trees, prune older trees to 10-15 ft (3-4.5 m); unpruned trees 20-40 ft (6-9M)	Self pollinates; cross pollination from different cultivars will increase yield	During establishment (<1 yr); may improve yield for established trees.	Quality: Annual tree prunings found to have 8-10% CP, 50-52% TDN, 3.9% CT; silvopasture limited in pruned groves due to small tree size; Antiquity: none reported	Continuous if maintained <15 ft (3.6 m); if allowed to grow >15 ft (3.6 m), until lower limbs above browse height	Pruned trees 24 X 24 ft (8 X8 m), 50 - 100 trees/acre (120-240 trees/ha); unpruned trees 35 ft; trees benefit from wind protection
Mamey	<i>Pouteria sapota</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381) use with caution	10b to 11a	No	Young specimens are highly cold-sensitive; mature trees can withstand 28 F (-2.2 C)	Well drained soils, from heavy clays to the limestone and sandy, pH 6-8.4	Drought - Intolerant; Flood - Intolerant saturated/ flooded	Moderately slow; grafted 3-5 yr, trees from seeds >7	Establishment pruning; pruned 12-15 ft (3.7-4.6 m) annually; unpruned 40 feet (12.2 m) in Florida and may exceed 60 feet (18.3 m)	Self pollinates; cross pollination can improve yield	During establishment (<1 yr), mature trees 1-2 in/week during prolonged drought	Antiquity: Leaves and seed (HCN ?) reported to be toxic	Continuous if maintained <15 ft (3.6 m); if allowed to grow >15 ft (3.6 m), until lower limbs above browse height	Pruned trees 25-30 ft (7.6-9.1 m) between row, 15-20 ft (4.6-6.1 m) within between trees; 75-145/ acre (180-350/ha); unpruned trees 20-30 ft (6.1-9.1 m) or more apart
Mammy Apple, Mammea Apricot	<i>Mammea americana</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381) use with caution	10b to 12	No	Trees of all ages will be damaged or killed by temperature s below 30F (-1.1 C) for only a few hours	Well drained fertile soil with high organic matter; tolerates heavy, poor, acid or alkaline soils; pH 4-8.5	Drought - Moderate Flood - Intolerant saturated	Slow to Moderately slow/ 4 -5 year grafted 8 - 13 yr from seed	Prune limbs to establish good structure; 60-70 ft (18-21 m) mature height	Trees can have only male, only female, or herma-phroditic flowers; self-pollinated, but proximity of male trees will improve yield	During establishment (<3 yr) and trees >3 yr only during prolonged dry periods	Antiquity: Fruit can cause digestive upset in some humans; extracts of fruit, seed, leaves, and bark insecticidal; seed reported to be toxic; use with caution in silvopasture	Continuous protection until established or if livestock browsing is a concern	32 ft (10 m) centers for fruit; closer spacing is desirable for wood production

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Mango	<i>Mangifera indica</i>	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381)	10b to 12	No	Young trees killed at 29 F to 30 F (-1.7 C to -1.1 C); mature trees damaged or killed at 25 F (-3.9 C); flowers and small fruits damaged or killed <40 F (4.4 C) for a few hours.	Well drained; clay, sand, or loam; pH 5.5-7.5	Drought - Moderate	Moderately slow/ grafted trees 3-5 yr; 6-10 yr from seed	Pruning required for early tree development to increase lateral branches; after several years, prune back to 12-15 ft (3.6-4.6 m); unpruned trees 30-100 ft (9.5-30.5 m)	Primarily cross pollinated; limited self pollinated	During establishment (<3 yr) and trees >3 yr only during prolonged dry periods	Readily browsed; Quality: 8-17% CP, 64-66% TDN, 1-3% CT; Antiquity: leaves eaten in excess can be toxic (CT?).	Continuous if maintained <15 ft (3.6 m); if allowed to grow >15 ft (3.6 m), until lower limbs above browse height.	Pruned trees 12-15 ft (3.7-4.6 m); unpruned trees 25-30 ft (7.6-9.1 m) apart
White Sapote, Casimiroa	<i>Casimiroa edulis</i> and <i>C. tetrameria</i> and hybrids.	Hedgerow Planting (CPS 422); Riparian Forest Buffer (CPS 391); Silvopasture (CPS 381)	9b to 11	No	Young trees killed <24 F (-4 C); mature trees damaged or killed <26 F (-3 C)	Well-drained soils from sands, to clays, to limestone based; pH 5.6-7.0	Drought - Moderate	Moderately slow/3-4 yr grafted trees; 7-8 yr from seed	Pruning required for early tree development and to maintain trees at 10 to 15 ft (1.8 to 3.6 m) in height; unpruned trees 60 ft (18 m)	Cultivars with only functional female flowers require cross pollination	During establishment (<3 yr) and trees >3 yr only during prolonged dry periods	Readily browsed; Quality: 15% CP, 70% TDN, and 7.8% CT; Antiquity: CT may limit intake, seed reported to be toxic	Continuous if maintained <15 ft (3.6 m); if allowed to grow >15 ft (3.6 m), until lower limbs above browse height.	Pruned trees 20 X 20 ft (6 X 6 m); unpruned trees 25 ft (7.6 m) apart each way

Reference Links:

Atemoya

<https://www.growables.org/information/TropicalFruit/Atemoyacherimoya.htm>

<https://edis.ifas.ufl.edu/publication/MG332>

<https://www.cabidigitallibrary.org/doi/10.1079/cabicompendium.5806>

<https://www.cabidigitallibrary.org/doi/10.1079/cabicompendium.5820>

Avocado

<https://www.growables.org/information/TropicalFruit/AvocadoPerseaAmericana.htm>

<https://edis.ifas.ufl.edu/publication/MG213>

Breadfruit, Pana

<https://www.growables.org/information/TropicalFruit/breadfruit.htm>

<https://www.cabidigitallibrary.org/doi/10.1079/cabicompendium.1822>

Carambola

<https://www.growables.org/information/TropicalFruit/carambola.htm>

<https://edis.ifas.ufl.edu/publication/FE1079>

<https://www.cabidigitallibrary.org/doi/full/10.1079/cabicompendium.8082>

Jaboticaba

<https://www.growables.org/information/TropicalFruit/jaboticaba.htm>

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Jackfruit

<https://www.growables.org/information/TropicalFruit/jackfruit.htm>

<https://edis.ifas.ufl.edu/publication/MG050>

<https://www.cabidigitallibrary.org/doi/10.1079/cabicompendium.20559>

Loquat

<https://www.growables.org/information/TropicalFruit/loquat.htm>

<https://edis.ifas.ufl.edu/publication/MG050>

<https://www.cabidigitallibrary.org/doi/10.1079/cabicompendium.20559>

Lychee

<https://edis.ifas.ufl.edu/publication/MG051>

<https://www.growables.org/information/TropicalFruit/lychee.htm>

Mamey

<https://www.growables.org/information/TropicalFruit/MameySapote.htm>

<https://edis.ifas.ufl.edu/publication/MG331>

Mammy Apple, Mammea Apricot

<https://www.growables.org/information/TropicalFruit/tropicalapricot.htm>

<https://www.cabidigitallibrary.org/doi/10.1079/cabicompendium.32390>

Mango

<https://www.growables.org/information/TropicalFruit/mango.htm>

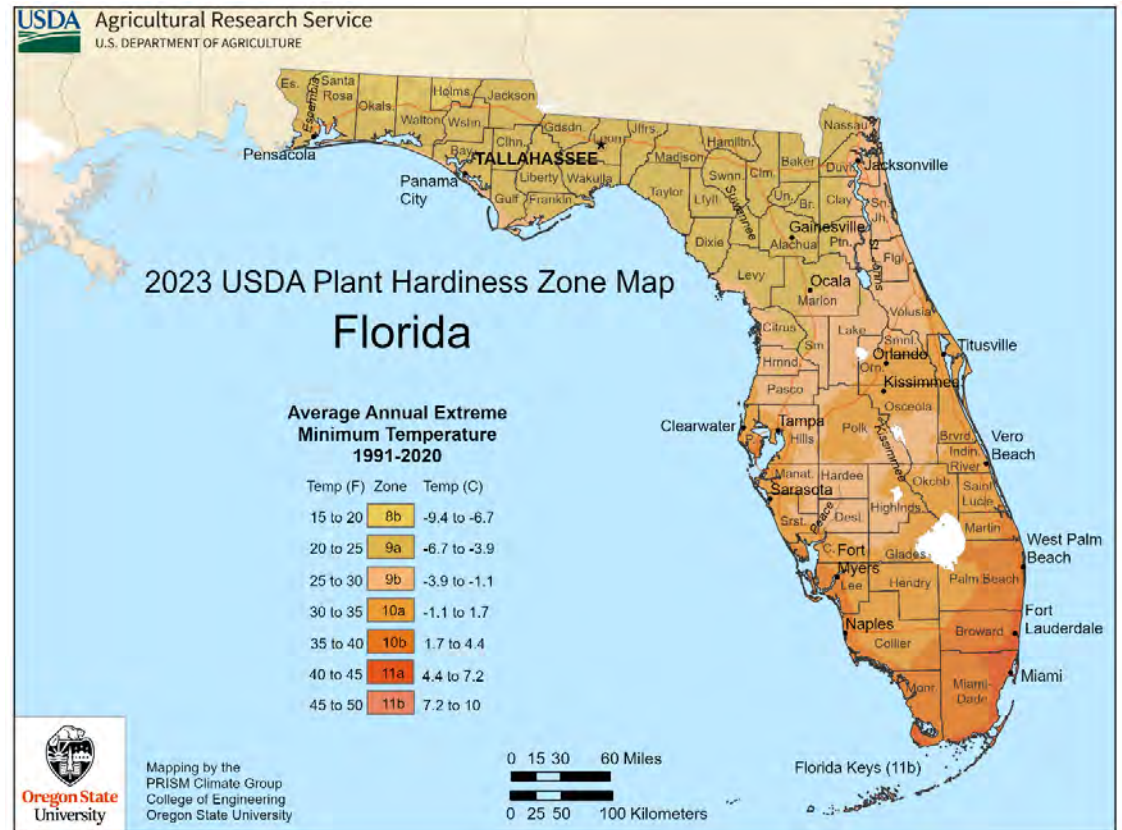
<https://edis.ifas.ufl.edu/publication/MG216>

<https://www.cabidigitallibrary.org/doi/full/10.1079/cabicompendium.34505>

White Sapote, Casimiroa

<https://www.growables.org/information/TropicalFruit/SapoteWhite.htm>

<https://edis.ifas.ufl.edu/publication/HS304>



2023 USDA Plant Hardiness Zone Map for Florida

Brooksville PMC Information is available online at:
<https://www.plant-materials.nrcs.usda.gov/flpmc> or scan

