

Chapter 37.

Spinach Production in Florida

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BOTANY

Nomenclature

Family - Chenopodiaceae

Spinach - *Spinacia oleracea*

Origin

Spinach is believed to be native to the Middle East in the general area of Iran (Fig. 37-1).

Related Species

Beet and Swiss chard are the only other vegetables of significance in the Chenopodiaceae family. The most important economic plant in this family is the sugar beet.

VARIETIES

Spinach varieties grown in Florida include:

Smooth leaf

A&C #30 (H)¹

Semi-savoy leaf

Chinook II (H)

Gladiator (H)

Skookum (H)

Savoy leaf

Ambassador (H)

Hybrid 612 (H)

¹H = hybrid.

SEEDING AND PLANTING

Planting dates and seeding information are given in Table 1.

FERTILIZER AND LIME

For mineral soils, broadcast all P₂O₅, micronutrients, and 25 to 50% of N and K₂O. Topdress remaining N and K₂O about 2 to 3 weeks after seeding (see Table 2).

For organic soils, broadcast all fertilizer before seeding. Up to 30 lbs/A of N might be needed in cool, winter weather or after leaching rain.

PLANT TISSUE ANALYSIS

Plant tissue analysis information for spinach is given in Table 3. The analysis was done 30 days after seeding, using the most recently matured leaf.

IRRIGATION

Initial water requirements of spinach (see Chapter 8, *Principles and Practices for Irrigation Management of Vegetables*, Table 4 to 6) will be low (20% to 40% of ETo, see Chapter 8, *Principles and Practices for Irrigation Management of Vegetables*, Table 3) until rapid leaf growth occurs. Water requirements rapidly increase to 95% of ETo and remain at or only slightly below that level through harvest.

WEED MANAGEMENT

Herbicides labeled for weed control in spinach are listed in Table 4.

Table 1. Seeding and planting information for spinach.

Planting dates	
North Florida	Sept - Mar
Central Florida	Sept - Mar
South Florida	Oct - Feb
Seeding information	
Distance between rows (in)	12 - 36
Distance between plants (in)	2 - 6
Seeding depth (in)	0.5
Seed per acre (lb)	10 - 15
Days to maturity from seed	45 - 60
Plant population ¹ (acre)	261,136
¹ Population based on closest between and within row spacing.	

Table 2. Soil test and fertilizer recommendations for mineral soils for spinach.¹

Target pH	N lb/A	P ₂ O ₅					K ₂ O				
		VL	L	M	H	VH	VL	L	M	H	VH
(lb/A/crop season)											
6.5	90	120	100	80	0	0	120	100	80	0	0

¹ See Chapter 2 section on supplemental fertilizer application and best management practices, pg 11.

¹ Seeds and transplants may benefit from applications of a starter solution at a rate no greater than 10 to 15 lbs/acre for N and P₂O₅, and applied through the plant hole or near the seeds.

Table 3. Plant tissue analysis for spinach 30 days after seeding. Dry wt. basis.

Status	N	P	K	Ca	Mg	S	Fe	Mn	Zn	B	Cu	Mo
	Percent						Parts per million					
Deficient	<3.0	0.3	3.0	0.6	1.0	0.3	50	50	50	20	5	0.1
Adequate range	3.0-4.5	0.3-0.5	3.0-4.0	0.6-1.0	1.0-1.6	0.3-0.6	50-150	50-100	50-80	20-40	5-10	0.1-1.0
High	>4.5	0.5	4.0	1.0	1.6	0.6	150	100	80	40	10	1.0

Table 4. Chemical weed controls: spinach.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
Carfentrazone (Aim)	Spinach	Preplant Directed-hooded Row-middles	0.031	0.031
Remarks: Aim may be applied as a preplant burndown treatment and/or as a post-directed hooded application to row middles for the burn-down of emerged broadleaf weeds. May be tank mixed with other registered herbicides. May be applied at up to 2 oz (0.031 lb ai). Use a quality spray adjuvant such as crop oil concentrate (coc) or non-ionic surfactant at recommended rates.				
Glyphosate (Roundup, Touchdown Durango, Glyphomax)	Spinach	Prior to crop emergence or pretransplanting	0.5 - 1.0	0.5 - 1.0
Remarks: Apply as directed for "Cropping Systems" under conditions described on label. Does not provide residual weed control.				
Pelargonic Acid (Scythe)	Spinach	Preplant Directed-Shielded	3-10% v/v	3-10% v/v
Remarks: Product is a contact non-selective, foliar applied herbicide. There is no residual activity. May be tank mixed with soil residual compounds. Consult the label for rates and other information.				
Sethoxydim (Poast)	Spinach	Postemergence	0.188 - 0.28	0.188 - 0.28
Remarks: Controls actively growing grass weeds. A total of 3 pts. product per acre may be applied in one season. Do not apply within 30 days of harvest for head lettuce and 15 days of harvest for leaf lettuce and spinach. Apply in 5 to 20 gals. of water adding 2 pts. of crop oil concentrate per acre. Unsatisfactory results may occur if applied to grasses under stress. Use 0.188 lb. ai. (1 pt.) to seedling grasses and up to 0.28 lb. ai. (1.5 pts.) to perennial grasses emerging from rhizomes, etc. Consult label for grass species and growth stage for best control.				

Table 5. Disease management for spinach.

Chemical (a.i.)	Fungicide Group	Maximum Rate/Acre/		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Ridomil Gold 4 EC (Mefenoxam)	4	2 pt/trtd acre			Pythium seedling blight	Apply at seeding in a 7-12" band on soil over seed furrow
Actigard (Acibenzolar-s-methyl)	21	0.75 oz	2.25 oz	7	Downy mildew	Apply preventatively. Do not make more than 3 consecutive applications.
Aliette 80 WDG (Fosetyl-Al)	33	5 lb	35 lb	3	Downy mildew	Limit is 7 appl/crop. Do not tank mix with copper fungicides
Amistar (Azoxystrobin)	11	5 oz	20 oz	0	Various, see label	Limit is 4 appl/crop & alternate chemistry
Cabrio 20 EG (Pyraclostrobin)	11	16 oz	64 oz	0	Various, see label	Limit is 4 appl/crop & alternate chemistry
Armicarb 100, Kaligreen, Milstop, (Potassium bicarbonate)		See labels	See labels	See labels	Powdery mildew	Do not mix with highly acidic pesticides. Use within 12 hrs of mixing
Various copper compounds (see individual labels), including Badge SC, Basic Copper 53, Blueshield, COCS WDG, Champ DP, Champion WP, Copper Count N, Cuprofix Ultra, Kentan, Kocide, Nordox, Nu Cop	M1	See labels	See labels	1	Downy mildew White rust Anthracnose Cercospora leaf spot	Flecking on leaves may occur. Do not tank-mix with phosphonic fungicides
Various Potassium phosphite compounds (see individual labels), including Fosphite, Fungi-phite, Prophyt, Phostral,		See labels	See labels	0	Downy mildew Pythium	
Various sulfur compounds (see individual labels), including Dusting Sulfur-IAP, Micro Sulf, Micronized Gold, Microthiol disperss	M2	See labels	See labels		Powdery mildew	Do not apply during periods of warm weather
Oxidate (Hydrogen dioxide)		2 gal				
Quadris 2.08 FL (Azoxystrobin)	11	15.4 fl oz	2.88 qt	0	Downy mildew, Stemphyllium leaf spot Various, see label	For restrictions and use patterns, see celery for foliar diseases and onions for soilborne diseases
Rhapsody (Bacillus subtilis strain QST 713)		6 qt		0	Downy mildew Powdery mildew	
Cabrio 20 EG (Pyraclostrobin)		16 oz	64 oz	0	Various, see label	Limit is 4 appl/crop & alternate chemistry