College of Agriculture, Food and Environment
Cooperative Extension Service

Plant Pathology Fact Sheet **PPFS-FR-S-30**

Cultural Calendar for Commercial Strawberry Production

Nicole Gauthier, Plant Pathology Extension Specialist; Kimberly Leonberger, Plant Pathology Extension Associate; Ric Bessin, Entomology Extension Specialist; Matt Springer, Wildlife Extension Specialist; Daniel Becker, Horticulture Extension Associate; and John Strang & Shawn Wright, Horticulture Extension Specialists

Integrated pest management (IPM) includes the combination of biological, cultural, physical, and chemical tools in efforts to manage diseases and pests while minimizing risks associated with pesticides. Cultural practices are an integral part of an IPM program and should be incorporated into all commercial systems whether large or small, conventional or organic. This publication provides recommended practices at approximate growth stages and/or production periods. However, these timelines are approximate and may require adjustment for particular conditions. Growers who encounter situations that may not align with suggestions here should contact their county Extension office for assistance. Extension offices can also provide updated pest management recommendations. This cultural guide serves as a supplement to published spray guides and scouting guides.

BLOOM

PETAL FALL

PRE-HARVEST

HARVEST

Matted Row Strawberry Production

	GROWTH STAGE	Planting	Pre-bloom	During bloom	Post-bloom	Harvest	End of season
Diseases	**Crown Rot** (Anthracnose)	Plant only healthy, disease-free plants.		Remove and dispose of diseased plants.	Remove and dispose of diseased plants.		Rotate out of strawberries for at least 1 year.
	Fruit Rots (Anthracnose, Botrytis, Leather Rot)		Uncover plants and place straw mulch around and between plants.	Place straw mulch around plants; Remove weeds to improve air flow.	Place straw mulch around plants; Remove and dispose of diseased berries and leaves; Remove weeds to improve air flow.	Place straw mulch around plants; Remove and dispose of diseased, damaged, and fallen fruit.	Mow old foliage (do not damage crowns); Rake, remove, and dispose of or till leaf and berry debris.
	Leaf Spots (Blight, Spot, Scorch)	Select resistant cultivars.	Uncover plants and place straw mulch around and between plants.	Place straw mulch around plants; Remove weeds to improve air flow.	Place straw mulch around plants; Remove and dispose of diseased leaves; Remove weeds to improve air flow.		Mow old foliage (do not damage crowns); Rake, remove, and dispose of or till leaf and berry debris.
	Red Stele	Plant in well-drained beds; Avoid replanting if red stele was a problem in the past; Select resistant cultivars.			Avoid over-irrigating.	Avoid over-irrigating.	Rotate out of strawberries for 10 or more years.
Insects	**Protect Pollinators**		Regularly remove or mow weeds in and around fields to reduce flowers that attract pollinators.	Regularly remove or mow weeds in and around fields to reduce flowers that attract pollinators.	Regularly remove or mow weeds in and around fields to reduce flowers that attract pollinators.		
	Sap Beetle					Remove and dispose of damaged fruit; Pick berries frequently and store immediately.	
	Slugs				Provide good soil drainage and air circulation; Remove weeds to eliminate habitat.	Remove and dispose of damaged fruit; Provide good soil drainage and air circulation.	Renovate planting by thinning and removing old plants; Keep field areas closely mowed; Delay fall mulching as long as practical.

	GROWTH STAGE	Planting	Pre-bloom	During bloom	Post-bloom	Harvest	End of season
Insects	**Spotted Wing Drosophila**[1]	Plant early maturing cultivars.			Remove weeds to eliminate habitat.	Remove and dispose of damaged fruit; Pick berries frequently and store immediately at a temperature below 40°F.	Increase plant spacing to improve air circulation.
	Tarnished Plant Bug	Plant cultivars that flower and harvest earlier in the growing season or have a concentrated period of flowering and fruit set.	Control weeds to reduce overwintering sites; Remove early season flowers.	If the problem occurred in previous years, limit mowing between rows and surrounding areas to reduce insect movement onto strawberries.	Remove weeds to eliminate habitat.		
Weeds	**Broad Leaf & Grass Weeds**	Plant and till in the cover crop before planting strawberries; Control weeds in and around plantings; Mulch in late autumn.	Control weeds in and around plantings.	Remove weeds; Mulch as needed; Control weeds in and around plantings.	Remove weeds; Control weeds in and around plantings.	Remove weeds; Control weeds in and around plantings.	Control weeds in and around plantings.
Wildlife	**Deer, Rabbits & Voles**		Check and repair wildlife exclosures.		Mow to reduce rodent habitat.		Install raptor perches; Protect predators like coyotes; Check and repair wildlife exclosures; Scout for voles and treat as needed; Encourage hunting for deer and rabbits to reduce population densities.

[1] June bearing strawberry ripen earlier than spotted wing Drosophila emergence, thus this pest may not be of concern on these varieities. However, everbearing strawberry ripen multiple times a year, including late in the season, which may result in damage from this pest.

	GROWTH STAGE	Planting	Pre-bloom	During bloom	Post-bloom	Harvest	End of season
Abiotic	**Plant Health**	Mulch with straw when the temperature is expected to drop below 20°F.	Remove mulch; Monitor weather and protect plantings during cold weather.	Use frost-freeze protection strategies to limit crown damage and bloom losses.			Renovate planting by thinning and removing older plants; Fertilize at renovation and again in late August; Collect leaf tissue between mid-July and mid-August for nutrient analysis; Irrigate as needed to prevent drought stress; In late autumn, apply straw mulch for winter protection.

Plasticulture Strawberry Production

	GROWTH STAGE	Planting	Pre-bloom	During bloom	Post-bloom	Harvest	End of season
Diseases	**Crown Rot** (Anthracnose, Botrytis)	Plant only healthy, disease-free plants	Remove and dispose of diseased plants.	Remove and dispose of diseased plants.	Remove and dispose of diseased plants.	Remove and dispose of diseased plants.	Rotate out of strawberries and other susceptible crops for at least 1 year.
	Fruit Rots (Anthracnose, Botrytis)		Remove and dispose of dead plant debris from beds during dormancy (before new leaves emerge).	Remove weeds around crowns to improve air flow.	Remove and dispose of diseased berries and leaves; Remove weeds around crowns to improve air flow.	Remove and dispose of diseased berries and damaged fruit.	Rotate out of strawberries and other susceptible crops for at least 1 year (anthracnose fruit rot).
	Leaf spots (Blight, Spot, Scorch)		Remove and dispose of dead plant debris from beds during dormancy (before new leaves emerge).	Remove weeds around crowns to improve air flow.	Remove and dispose of diseased berries and leaves; Remove weeds around crowns to improve air flow.	Remove and dispose of plants as soon as possible after harvest.	

	GROWTH STAGE	Planting	Pre-bloom	During bloom	Post-bloom	Harvest	End of season
Insects	**Protect Pollinators**		Regularly remove or mow weeds in and around fields to reduce flowers that attract pollinators.	Regularly remove or mow weeds in and around fields to reduce flowers that attract pollinators.	Regularly remove or mow weeds in and around fields to reduce flowers that attract pollinators.		
	Sap Beetle				Remove weeds around crowns to eliminate habitat.	Remove and dispose of damaged fruit; Pick berries frequently.	
	Slugs	When laying plastic, ensure tight soil-to-plastic contact on firm beds to eliminate air pockets that can serve as habitat.			Provide good soil drainage and air circulation.	Remove and dispose of damaged fruit; Provide good soil drainage and air circulation.	
	Spotted Wing Drosophila		Avoid excessive nitrogen fertilizer to prevent development of dense canopy growth.		Remove weeds around crowns to improve light penetration and air flow.	Remove and dispose of damaged fruit; Pick berries frequently and store immediately at a temperature below 40°F.	
Weeds	**Broad Leaf & Grass Weeds**	Plant cover crops (annual rye) after bed-shaping, preferably before transplanting; Mow between rows, or apply straw between rows of plastic.	Mow as needed between rows at the highest setting or roller-crimp the cover crop when it begins to grow above the height of beds.	Mow as needed.	Mow as needed.	Mow as needed.	Plant cover crops after harvest; Remove plastic and drip tube; Till plantings.

	GROWTH STAGE	Planting	Pre-bloom	During bloom	Post-bloom	Harvest	End of season
Wildlife	**Deer, Rabbits, & Voles**	Install raptor perches; Protect predators like coyotes; Erect, check, and repair wildlife exclosures; Scout for voles and treat as needed.	Check and repair wildlife exclosures		Mow to reduce rodent habitat.		Install raptor perches; Protect predators like coyotes; Erect, check, and repair wildlife exclosures; Scout for voles and treat as needed; Encourage hunting for deer and rabbits to reduce population densities.
Abiotic	**Plant Health**	Form high beds to improve soil drainage and air circulation; Space plants to avoid canopy crowding; Plant during the first or second week of September; Cover plants with floating row covers in early to mid-November.	Remove floating row covers to moderate early growth; Begin weekly fertigation 1 to 2 weeks after new leaves emerge from crowns; Avoid excessive nitrogen fertilizer.	Collect leaf tissue for weekly nutrient analysis starting at first bloom; Begin fertigation with nitrogen; Remove floating row covers and re-cover for freeze events to protect blooms.	Cover and uncover plants with floating row covers as needed for freeze protection.		Remove and destroy plants and all unharvested fruit immediately after final harvest to prevent pest and pathogen build-up and carryover to rotational crops; Rotate out of strawberry for at least 1 year.

May 2020

Editor: Cheryl Kaiser, Plant Pathology Extension Support
Photos: Kim Hummer, USDA (bloom); John Strang, UK (petal fall, post-bloom); and Stephen Ausmus, USDA-ARS (harvest)