APPENDIX 2 Crop Sequence Problems and Opportunities

Compiled by Charles L. Mohler

Find the preceding crop in the second column and the following crop in the 5th row. The row goes across pp. 104–108. Using the row number and column number, locate the detailed note in the notes section, p.s 109–123.

	A	B	C	D	E	F	G	H	I
	FAMILY								
	—	Lily	Lily	Lily	Lily	Legume	Legume	Lettuce	Night-shade
	FOLLOWING CROP								
FAMILY	**PRECEDING CROP**	General	Onion	Scallion	Leek	Garlic	Bean, snap	Pea	Lettuce, etc.[1]	Potato
1 —	General		W-							W-
2 Lily	Onion	C	XXXX		D	D				
3 Lily	Scallion	C		XXXX						
4 Lily	Leek	C	D		XXXX	D, S				S
5 Lily	Garlic	C	D		D, S	XXXX				S, S-, N-
6 Legume	Bean, snap						XXXX		D	D
7 Legume	Pea							XXXX	D, C-	
8 Lettuce	Lettuce etc.[1]		W-		W-		D	D	XXXX	D
9 Nightshade	Potato	W-			S	S, C-	D		D	XXXX
10 Nightshade	Tomato						D		D	D, I
11 Nightshade	Eggplant									D, I
12 Nightshade	Pepper									D
13 Carrot	Carrot, parsnip		W		S	S	D		D	D, S
14 Carrot	Celery, herbs etc.[2]									D
15 Carrot	Celeriac									D
16 Mustard	Crucifer greens[3]									
17 Mustard	Broccoli, cauliflower						D		D	D
18 Mustard	Cabbage, b. sprouts[4]						D	D-	D	D
19 Mustard	Kale, collards						D	D-	D	D
20 Mustard	Radish							D-		D
21 Mustard	Turnip, rutabaga, daikon							D-		D
22 Cucurbit	Cucumber	W-					W-		W	
23 Cucurbit	Melons[5]	W-					W-		W	
24 Cucurbit	Pumpkin, winter squash	W-					W-		W	
25 Cucurbit	Summer squash	W-							W	
26 Beet	Spinach, chard		W-		W-				C-	
27 Beet	Beet									D
28 Grass	Sweet corn						D-			C-
29 Rose	Strawberry									D
30 Grass	Field corn						D-			C-
31 Grass	Oat	D-, W	W, I	W, I	W, I		D-		D-	D-, I
32 Grass	Spring barley	D-, W	W, I	W, I	W, I		D-	D-	D-	D-, I
33 Grass	Winter wheat, spelt	D-	W, I	W, I	W, I		D-		D-	D-, I
34 Grass	Rye	D-	W, I	W, I	W, I		D-		D-	D-, I
35 Legume	Soybean						D			D-
36 Legume	Dry bean						D		D	D
37 Legume	Alfalfa hay									D-
38 Grass-legume	Grass & grass-leg. hay		I	I	I					D-
39 Grass	Winter grain, cc[6]	W-, I-, N, S, C, C-	I	I	I		D-	D-	C	D-
40 Grass	Spring grain, cc[7]	D-, I-, N, S, C-	I	I	I		D-			D-
41 Grass	Annual ryegrass	N, S	I	I	I					D-
42 Grass	Sorghum-sudangrass	D-	I	I	I					D-
43 Buckwheat	Buckwheat									D-, S-
44 Legume	White clover	I, N-							I	
45 Legume	Clovers, hardy[8]	I, N-						D	D, I	
46 Legume	Clovers, not hardy[9]	N-							I	
47 Legume	Sweet clover	N-					D			D
48 Legume	Hairy vetch	D, N-, C-						D		
49 Legume	Field pea	N-, C-						D	D	
50 Legume	Bell bean	N-						D	D	
51 Mustard	Rape, canola	D-								D-
52 Mustard	Oilseed radish	D-								D-

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

	J	K	L	M	N	O	P	Q	R	S	T	U	V
	FAMILY												
	Night-shade	Night-shade	Night-shade	Carrot	Carrot	Carrot	Mustard	Mustard	Mustard	Mustard	Mustard	Mustard	Cucurbit
	FOLLOWING CROP												
	Tomato	Eggplant	Pepper	Carrot, parsnip	Celery, herbs etc.[2]	Celeriac	Crucifer greens[3]	Broccoli, cauliflower	Cabbage, b. sprouts[4]	Kale, collards	Radish	Turnip, rutabaga, daikon	Cucumber
1													
2													
3													
4				S								S	
5				S								S	
6								D-	D-	D-	D-	D-	
7							C-				C-		
8	D, C-	C-	C-	W-									C-
9	D, I	D, I		D, S, W-	D, S-	D	S-					S	
10	XXXX	D, I	D					D-	D-	D-	D-	D-	D
11	D, I	XXXX	D										D
12	D	D	XXXX										D
13				XXXX	D	D						S	D
14				D	XXXX	D							
15				D	D	XXXX							
16	D, C-	C-	C-				XXXX	D	D	D	D	D	N-, C-
17							D	XXXX	D	D	D	D	N-
18	D						D	D	XXXX	D	D	D	N-
19							D	D	D	XXXX	D	D	N-
20							D	D	D	D	XXXX	D	N-
21							D	D	D	D	D	XXXX	D, N-
22		D	D	W			W, N-	D-, N-	D-, N-	D-, N-	D-	D-	XXXX
23		D	D	W			W, N-	N-	N-	N-			D
24		D	D	W			W, N-	N-	N-	N-			D
25		D	D	W			W, N-	N-	N-	N-			D
26				W-							C-		
27								D	D	D			
28								D-	D-	D-			
29	D	D											
30								D-	D-	D-			
31				W, I	W			D-	D-	D-			I
32				W, I	W			D-	D-	D-			I
33				W, I	W			D-	D-	D-			I
34				W, I	W			D-	D-	D-			I
35													
36													
37				D									
38				W, I									I
39				C	C		C	D-	D-	D-			
40								D-, W-, S-	D-, W-, S-	D-, W-, S-			
41							D-	D-	D-	D-	D-	D-	
42													
43								D-	D-	D-	D-	D-	
44													
45							C-	C-		C-			
46													
47													
48													N-
49								N-, W-	N-, W-	N-, W-			
50							N-	N-	N-	N-	N-	N-	
51							D	D	D	D	D	D	
52							D	D	D	D	D	D	

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Find the preceding crop in the second column and the following crop in the 5th row. The row goes across pp. 104–108. Using the row number and column number, locate the detailed note in the notes section, p.s 109–123.

			W	X	Y	Z	AA	AB	AC	AD	AE
			FAMILY								
			Cucurbit	Cucurbit	Cucurbit	Beet	Beet	Grass	Rose	Grass	Grass
			FOLLOWING CROP								
	FAMILY	**PRECEDING CROP**	Melons[5]	Pumpkin, w. squash	Summer squash	Spinach, chard	Beet	Sweet corn	Strawberry	Field corn	Oat
1	—	General									
2	Lily	Onion									
3	Lily	Scallion									
4	Lily	Leek									
5	Lily	Garlic									
6	Legume	Bean, snap									
7	Legume	Pea				C-					
8	Lettuce	Lettuce etc.[1]	C-	C-	C-						
9	Nightshade	Potato					D		D		
10	Nightshade	Tomato	D	D	D				D		
11	Nightshade	Eggplant	D	D	D						
12	Nightshade	Pepper	D	D	D						
13	Carrot	Carrot, parsnip									
14	Carrot	Celery, herbs etc.[2]									
15	Carrot	Celeriac									
16	Mustard	Crucifer greens[3]	N-, C-	N-, C-	N-, C-						
17	Mustard	Broccoli, cauliflower	N-	N-	N-, C-				D-		
18	Mustard	Cabbage, b. sprouts[4]	N-	N-	N-		D				
19	Mustard	Kale, collards	N-	N-	N-						
20	Mustard	Radish	N-	N-	N-						
21	Mustard	Turnip, rutabaga, daikon	N-	N-	N-						
22	Cucurbit	Cucumber	D	D	D			I		I	
23	Cucurbit	Melons[5]	XXXX	D	D			I		I	
24	Cucurbit	Pumpkin, winter squash	D	XXXX	D			I		I	
25	Cucurbit	Summer squash	D	D	XXXX			I		I	
26	Beet	Spinach, chard				XXXX					
27	Beet	Beet					XXXX				
28	Grass	Sweet corn		D			D-	XXXX		I	D
29	Rose	Strawberry							XXXX		
30	Grass	Field corn		D			D-	I		XXXX	D
31	Grass	Oat	I				D-, I	I		I	XXXX
32	Grass	Spring barley	I				D-, I	I		I	
33	Grass	Winter wheat, spelt	I				D-, I	I		D, I	I
34	Grass	Rye	I				D-, I	I		I	I
35	Legume	Soybean								D-	
36	Legume	Dry bean									
37	Legume	Alfalfa hay									
38	Grass-legume	Grass & grass-leg. hay	I				I	D-, I, N-	I	D-, I, N-	D, I
39	Grass	Winter grain, cc[6]					D-				
40	Grass	Spring grain, cc[7]					D-				
41	Grass	Annual ryegrass									
42	Grass	Sorghum-sudangrass									
43	Buckwheat	Buckwheat									
44	Legume	White clover									
45	Legume	Clovers, hardy[8]									
46	Legume	Clovers, not hardy[9]									
47	Legume	Sweet clover									
48	Legume	Hairy vetch	D-, N-	N-	N-						
49	Legume	Field pea									
50	Legume	Bell bean									
51	Mustard	Rape, canola									
52	Mustard	Oilseed radish									

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR
	FAMILY												
	Grass	Grass	Grass	Legume	Legume	Legume	Grass-legume	Grass	Grass	Grass	Grass	Buck-wheat	Legume
	FOLLOWING CROP												
	Spring barley	Winter wheat, spelt	Rye	Soybean	Dry bean	Alfalfa	Grass-legume hay	Winter grain, cc[6]	Spring grain, cc[7]	Annual ryegrass	Sorghum-sudangrass	Buck-wheat	White clover
1													
2													
3													
4													
5													
6				D	D								
7													
8													
9													
10													
11													
12													
13									W-, S-				
14													
15													
16													
17													
18													
19													
20													
21													
22					W-								
23					W-								
24					W-								
25													
26													
27													
28		D			D-								
29													
30	D	D, D-			D-								
31		D, D-, I	I		D-								
32	XXXX	D, I	D, I		D-								
33	D	XXXX	D, I		D-								
34			XXXX		D-		D						
35				XXXX	D								
36		D-		D	XXXX								
37					N-, S-	XXXX							
38		D, I	D, I		N-, S-		XXXX	C-					
39	D				D-			XXXX					
40					D-				XXXX				
41										XXXX			
42											XXXX		
43												XXXX	
44													XXXX
45				D	D								
46													
47				D				C-					
48								W					
49													
50													
51													
52				D-									

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Find the preceding crop in the second column and the following crop in the 5th row. The row goes across pp. 104–108. Using the row number and column number, locate the detailed note in the notes section, p.s 109–123.

			AS	AT	AU	AV	AW	AX	AY	AZ
			FAMILY							
			Legume	Legume	Legume	Legume	Legume	Legume	Mustard	Mustard
			FOLLOWING CROP							
	FAMILY	**PRECEDING CROP**	Clovers, hardy[8]	Clovers, not hardy[9]	Sweet clover	Hairy vetch	Field pea	Bell bean	Rape, canola	Oilseed radish
1	—	General								
2	Lily	Onion								
3	Lily	Scallion								
4	Lily	Leek								
5	Lily	Garlic								
6	Legume	Bean, snap					D	D		
7	Legume	Pea	D				D	D		
8	Lettuce	Lettuce etc.[1]	D				D	D		
9	Nightshade	Potato								
10	Nightshade	Tomato								
11	Nightshade	Eggplant								
12	Nightshade	Pepper								
13	Carrot	Carrot, parsnip					W-, N-			
14	Carrot	Celery, herbs etc.[2]								
15	Carrot	Celeriac								
16	Mustard	Crucifer greens[3]							D	D
17	Mustard	Broccoli, cauliflower							D	D
18	Mustard	Cabbage, b. sprouts[4]							D	D
19	Mustard	Kale, collards							D	D
20	Mustard	Radish							D	D
21	Mustard	Turnip, rutabaga, daikon							D	D
22	Cucurbit	Cucumber								
23	Cucurbit	Melons[5]								
24	Cucurbit	Pumpkin, winter squash				C-				
25	Cucurbit	Summer squash								
26	Beet	Spinach, chard								
27	Beet	Beet								
28	Grass	Sweet corn								
29	Rose	Strawberry								
30	Grass	Field corn								
31	Grass	Oat								
32	Grass	Spring barley								
33	Grass	Winter wheat, spelt								
34	Grass	Rye								
35	Legume	Soybean							D	
36	Legume	Dry bean					D	D		
37	Legume	Alfalfa hay					D	D		
38	Grass-legume	Grass & grass-leg. hay				C-				
39	Grass	Winter grain, cc[6]								
40	Grass	Spring grain, cc[7]								
41	Grass	Annual ryegrass								
42	Grass	Sorghum-sudangrass								
43	Buckwheat	Buckwheat								
44	Legume	White clover								
45	Legume	Clovers, hardy[8]	XXXX				D	D		
46	Legume	Clovers, not hardy[9]		XXXX						
47	Legume	Sweet clover	D		XXXX			D		
48	Legume	Hairy vetch				XXXX				
49	Legume	Field pea	D				XXXX	D		
50	Legume	Bell bean	D				D	XXXX		
51	Mustard	Rape, canola							XXXX	D
52	Mustard	Oilseed radish							D	XXXX

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Notes:

A blank cell indicates that the sequence has no known advantages or disadvantages. Follow general rotation guidelines described in this book.

Shading indicates that the crops are in the same family.

XXXX = Crops are the same; do not plant.
D = Disease problems.
D- = Decreases disease problems.
W = Weed problems.
W- = Decreases weed problems.
I = Insect problems.
I- = Decreases insect problems.
N = Crop nutrition problems.
N- = Decreases crop nutrition problems.
S = Soil structural problems.
S- = Decreases soil structural problems.
C = Crop management problems.
C- = Decreases crop management problems.

[1] Includes lettuce, chicory, endive, and escarole.
[2] Includes celery, fennel, parsley, dill, and related herbs.
[3] Includes mustard greens, Asian greens, napa cabbage, arugula, and cress.
[4] Includes cabbage, Brussels sprouts, and kohlrabi.
[5] Includes cantaloupe and watermelon.
[6] Includes winter wheat, spelt, and rye.
[7] Includes barley, oat, and spring wheat.
[8] Includes red clover, alsike clover, and crimson clover in the south.
[9] Includes berseem clover and crimson clover in the north.

Notes on Interactions:

Row	Col.	Notes
1	B	**W-**, weed control in onion, which is a weak competitor, is easier following the good weed suppression that results when a competitive crop like tomato or squash is heavily mulched with hay (80).
1	I	**W-**, due to cultivation, hilling, and digging, potato is useful for cleaning up after a weedy crop (83).
2	A	**C**, many crops do well after alliums, possibly due to mycorrhizal buildup (82, 83).
2	B	**XXXX**
2	D	**D**, white rot, onion smut (danger is primarily to seedlings before transplanting) (36).
2	E	**D**, white rot (36).
3	A	**C**, many crops do well after alliums, possibly due to mycorrhizal buildup (82, 83).
3	C	**XXXX**
4	A	**C**, many crops do well after alliums, possibly due to mycorrhizal buildup (82, 83).
4	B	**D**, onion smut (danger is primarily to seedlings before transplanting), white rot (36).
4	D	**XXXX**
4	E	**D**, white rot (36). **S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
4	I	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
4	M	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
4	U	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
5	A	**C**, many crops do well after Alliums, possibly due to mycorrhizal buildup (82, 83).
5	B	**D**, white rot (36).
5	D	**D**, white rot (36). **S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
5	E	**XXXX**
5	I	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80). **S-**, **N-**, mulched garlic, however, tends to restore soil structure and fertility after the relatively extractive potato crop (80).
5	M	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
5	U	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
6	F	**XXXX**
6	H	**D**, sclerotinia drop (67; see appendix 3, p. 124).
6	I	**D**, sclerotinia stalk rot (67; see appendix 3, p. 124).
6	Q	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
6	R	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
6	S	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
6	T	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
6	U	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
6	AI	**D**, common bacterial blight (*Xanthomonas campestris*; appendix 3, p. 124); soybean cyst nematode (*Heterodera glycines*) increases to high density on bean, though the bean crop is scarcely affected (28, 41).
6	AJ	**D**, common bacterial blight (*Xanthomonas campestris*; appendix 3, p. 124); soybean cyst nematode (*Heterodera glycines*) (28).
6	AW	**D**, field pea and bell bean should not be planted after bean due to *Fusarium*, *Pythium*, and *Sclerotinia* (119).
6	AX	**D**, field pea and bell bean should not be planted after bean due to *Fusarium*, *Pythium*, and *Sclerotinia* (119).
7	G	**XXXX**
7	H	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36). **C-**, there is time for a short-season crop after harvesting pea, and the second crop benefits from N supplied by the pea (81).
7	P	**C-**, there is time for a crop of crucifer greens or spinach after harvesting pea, and the second crop benefits from N supplied by the pea (81).
7	T	**C-**, timing works well to plant lettuce or radish after pea or spinach within a year (82).
7	Z	**C-**, there is time for a crop of crucifer greens or spinach after harvesting pea, and the second crop benefits from N supplied by the pea (81).
7	AS	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
7	AW	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
7	AX	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
8	B	**W-**, a short-season crop like lettuce or spinach allows good weed control and low weed seed production prior to slow-growing, long-season, hard-to-weed crops like onion and carrot (83).
8	D	**W-**, a short-season crop like lettuce or spinach allows good weed control and low weed seed production prior to slow-growing, long-season, hard-to-weed crops like onion and carrot (83).
8	F	**D**, sclerotinia white mold (67; see appendix 3, p. 124).
8	G	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
8	H	**XXXX**
8	I	**D**, sclerotinia stalk rot (67; see appendix 3, p. 124).
8	J	**D**, lettuce, cabbage, and cress can be symptomless carriers of *Colletotrichum coccodes*, which causes tomato anthracnose and black dot. **C-**, short-season salad greens act as a cover crop and are harvested in time to plant tomato, eggplant, or pepper (83).
8	K	**C-**, short-season salad greens act as a cover crop and are harvested in time to plant tomato, eggplant, or pepper (83).
8	L	**C-**, short-season salad greens act as a cover crop and are harvested in time to plant tomato, eggplant, or pepper (83).
8	M	**W-**, a short-season crop like lettuce or spinach allows good weed control and low weed seed production prior to slow-growing, long-season, hard-to-weed crops like onion and carrot (83).
8	V	**C-**, leafy greens can make a crop before cucurbits need to be planted, and residue from the greens act as a green manure (81).
8	W	**C-**, leafy greens can make a crop before cucurbits need to be planted, and residue from the greens act as a green manure (81).
8	X	**C-**, leafy greens can make a crop before cucurbits need to be planted, and residue from the greens act as a green manure (81).
8	Y	**C-**, leafy greens can make a crop before cucurbits need to be planted, and residue from the greens act as a green manure (81).
8	AS	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
8	AW	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
8	AX	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
9	A	**W-**, due to cultivation, hilling, and digging, potatoes are useful for cleaning up weeds prior to other crops (83, 81).
9	D	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, preceding and following root crops with "soil building" crops is often desirable (80).
9	E	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80). **C-**, the timing of potato harvest and garlic planting are well suited for following potato with garlic (83).
9	F	**D**, sclerotinia white mold (67; see appendix 3, p. 124).
9	H	**D**, sclerotinia drop (67; see appendix 3, p. 124).
9	I	**XXXX**
9	J	**D**, early blight, anthracnose, verticillium wilt (67; see appendix 3, p. 124); stem canker (36). **I**, Colorado potato beetle (see table 3.5, p. 40).
9	K	**D**, verticillium wilt (67; see appendix 3, p. 124). **I**, Colorado potato beetle (see table 3.5, p. 40).
9	M	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20). **S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, preceding and following root crops with "soil building" crops is often desirable (80). **W-**, due to cultivation and competitiveness, potato cleans up weeds prior to carrots, which are a poor competitor and hard to weed (83).
9	N	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20). **S-**, potatoes improve soil structure before small direct-seeded crops due to low traffic (83).
9	O	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
9	P	**S-**, potatoes improve soil structure before small direct-seeded crops due to low traffic (83).
9	U	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, preceding and following root crops with "soil building" crops is often desirable (80).
9	AA	**D**, scab of beet is caused by several of the Actinomycete species that cause common scab of potato (36).
9	AC	**D**, verticillium wilt (36); brown and black root rot of strawberries can be caused by the same organism as rhizoctonia canker (black scurf) of potato (36).
10	F	**D**, sclerotinia white mold (67; see appendix 3, p. 124).
10	H	**D**, sclerotinia drop (67; see appendix 3, p. 124).
10	I	**D**, verticillium wilt, sclerotinia stalk rot, early blight (67; see appendix 3, p. 124). **I**, Colorado potato beetle (see table 3.5, p. 40).
10	J	**XXXX**
10	K	**D**, verticillium wilt (67; see appendix 3, p. 124), phytophthora crown, and collar rot (31; see appendix 3). **I**, Colorado potato beetle (see table 3.5, p. 40).
10	L	**D**, phytophthora blight (67; see appendix 3, p. 124).
10	Q	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
10	R	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
10	S	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
10	T	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
10	U	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
10	V	**D**, phytophthora blight (31; see appendix 3, p. 124).
10	W	**D**, phytophthora blight (31; see appendix 3, p. 124).
10	X	**D**, phytophthora blight (67; see appendix 3, p. 124).
10	Y	**D**, phytophthora blight (31; see appendix 3, p. 124).
10	AC	**D**, verticillium wilt (36); brown and black root rot by *Corticium solani* (36).
11	I	**D**, verticillium wilt (67; see appendix 3, p. 124). **I**, Colorado potato beetle (see table 3.5, p. 40).
11	J	**D**, verticillium wilt (67; see appendix 3, p. 124). **I**, Colorado potato beetle (see table 3.5, p. 40).
11	K	**XXXX**
11	L	**D**, phytophthora blight (67; see appendix 3, p. 124).
11	V	**D**, phytophthora blight (see appendix 3, p. 124).
11	W	**D**, phytophthora blight (see appendix 3, p. 124).
11	X	**D**, phytophthora blight (67; see appendix 3, p. 124).
11	Y	**D**, phytophthora blight (see appendix 3, p. 124).
12	I	**D**, verticillium wilt (67; see appendix 3, p. 124).
12	J	**D**, bacterial spot (67; see appendix 3, p. 124).
12	K	**D**, verticillium wilt (67; see appendix 3, p. 124); phytophthora crown and collar rot (see appendix 3).
12	L	**XXXX**
12	V	**D**, phytophthora blight (see appendix 3, p. 124).
12	W	**D**, phytophthora blight (see appendix 3, p. 124).
12	X	**D**, phytophthora blight (67; see appendix 3, p. 124).
12	Y	**D**, phytophthora blight (see appendix 3, p. 124).
13	B	**W**, weed control is difficult in carrots and can lead to heavy weed pressure in onions, which is also a difficult-to-weed crop.
13	D	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
13	E	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
13	F	**D**, sclerotinia white mold (67; see appendix 3, p. 124).
13	H	**D**, sclerotinia drop (67; see appendix 3, p. 124).
13	I	**D**, sclerotinia stalk rot, common scab (67; see appendix 3, p. 124); any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20). **S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, preceding and following root crops with "soil building" crops is often desirable (80).
13	M	**XXXX**
13	N	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
13	O	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
13	U	**S**, root crops tend to reduce soil structure due to the additional soil disturbance during harvest; consequently, growing "soil building" crops before and after a root crop is often desirable (80).
13	V	**D**, Cucumber can be infected with canker from soil containing diseased remains of carrots or turnips (36).
13	AN	**W-**, **S-**, a spring oat cover crop (often with field pea) helps control weeds and restore soil structure after late-harvested root crops like parsnip.
13	AW	**W-**, **N-**, a spring-planted field pea cover crop (often with oat) controls weeds and helps restore N after late-harvested root crops like parsnip.
14	I	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
14	M	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
14	N	**XXXX**
14	O	**D**, celery root rot and celeriac scab are caused by the same organism (*Phoma apiicola*); once a crop has shown infection, neither crop should be grown for 3–4+ years (36); any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
15	I	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
15	M	**D**, any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
15	N	**D**, celery root rot and celeriac scab are caused by the same organism (*Phoma apiicola*); once a crop has shown infection, neither crop should be grown for 3–4+ years (36); any 2-year sequence involving carrot, celery, and potato should be avoided due to root-knot nematode (*Meloidogyne hapla*) (20).
15	O	**XXXX**
16	J	**D**, lettuce, cabbage, and cress can be symptomless carriers of *Colletotrichum coccodes*, which causes tomato anthracnose and black dot (chapter 3, p. 21). **C-**, short-season salad greens act as a cover crop and are harvested in time to plant tomato, eggplant, or pepper (83).
16	K	**C-**, short-season salad greens act as a cover crop and are harvested in time to plant tomato, eggplant, or pepper (83).
16	L	**C-**, short-season salad greens act as a cover crop and are harvested in time to plant tomato, eggplant, or pepper (83).
16	P	**XXXX**
16	Q	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
16	R	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
16	S	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
16	T	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
16	U	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
16	V	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83). **C-**, leafy greens can make a crop before cucurbits need to be planted, and residue from the greens act as a green manure (81).
16	W	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83). **C-**, leafy greens can make a crop before cucurbits need to be planted, and residue from the greens act as a green manure (81).
16	X	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83). **C-**, leafy greens can make a crop before cucurbits need to be planted, and residue from the greens act as a green manure (81).
16	Y	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83). **C-**, leafy greens can make a crop before cucurbits need to be planted, and residue from the greens act as a green manure (81).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
16	AY	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
16	AZ	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
17	F	**D**, sclerotinia white mold (67; see appendix 3, p. 124).
17	H	**D**, sclerotinia drop (67; see appendix 3, p. 124).
17	I	**D**, sclerotinia stalk rot (67; see appendix 3, p. 124).
17	P	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
17	Q	**XXXX**
17	R	**D**, clubroot, fusarium yellows, blackleaf, black rot, white mold (67).
17	S	**D**, clubroot, fusarium yellows, blackleaf, black rot, white mold (67).
17	T	**D**, clubroot (67; see appendix 3, p. 124).
17	U	**D**, clubroot (67; see appendix 3, p. 124).
17	V	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
17	W	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
17	X	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
17	Y	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83). **C-**, two rows of broccoli fit comfortably in the space needed for one row of summer squash.
17	AC	**D-**, broccoli residue reduces the severity of verticillium wilt (*Verticillium dahliae*) in subsequent strawberry (106).
17	AY	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
17	AZ	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
18	F	**D**, sclerotinia white mold (67; see appendix 3, p. 124).
18	G	**D-**, residues of crops in the mustard family suppress aphanomyces root rot of pea (85).
18	H	**D**, sclerotinia drop (67; see appendix 3, p. 124).
18	I	**D**, sclerotinia stalk rot (67; see appendix 3, p. 124); black scurf and stem canker (*Corticum solani*) (36).
18	J	**D**, lettuce, cabbage, and cress can be symptomless carriers of *Colletotrichum coccodes*, which causes tomato anthracnose and black dot (chapter 3, p. 21).
18	P	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola. and many weeds (36).
18	Q	**D**, clubroot, fusarium yellows, blackleaf, black rot, white mold (67).
18	R	**XXXX**
18	S	**D**, clubroot, fusarium yellows, blackleaf, black rot, white mold (67).
18	T	**D**, clubroot (67; see appendix 3, p. 124).
18	U	**D**, clubroot (67; see appendix 3, p. 124).
18	V	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
18	W	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
18	X	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
18	Y	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
18	AA	**D**, beet cyst nematode attacks both cabbage and beet (10).
18	AY	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
18	AZ	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
19	F	**D**, sclerotinia white mold (67; see appendix 3, p. 124).
19	G	**D-**, residues of crops in the mustard family suppress aphanomyces root rot of pea (85).
19	H	**D**, sclerotinia drop (67; see appendix 3, p. 124).
19	I	**D**, sclerotinia stalk rot (67; see appendix 3, p. 124).
19	P	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
19	Q	**D**, clubroot, fusarium yellows, blackleaf, black rot, white mold (67).
19	R	**D**, clubroot, fusarium yellows, blackleaf, black rot, white mold (67).
19	S	**XXXX**
19	T	**D**, clubroot (67; see appendix 3, p. 124).
19	U	**D**, clubroot (67; see appendix 3, p. 124).
19	V	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
19	W	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
19	X	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
19	Y	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
19	AY	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
19	AZ	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
20	G	**D-**, residues of crops in the mustard family suppress aphanomyces root rot of pea (85).
20	I	**D**, common scab (67; see appendix 3, p. 124).
20	P	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
20	Q	**D**, clubroot (67; see appendix 3, p. 124).
20	R	**D**, clubroot (67; see appendix 3, p. 124).
20	S	**D**, clubroot (67; see appendix 3, p. 124).
20	T	**XXXX**
20	U	**D**, clubroot (67; see appendix 3, p. 124).
20	V	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
20	W	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
20	X	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
20	Y	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
20	AY	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
20	AZ	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
21	G	**D-**, residues of crops in the mustard family suppress aphanomyces root rot of pea (85).
21	I	**D**, common scab (67; see appendix 3, p. 124).
21	P	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
21	Q	**D**, clubroot, blackleaf, blackrot (67; see appendix 3, p. 124).
21	R	**D**, clubroot, blackleaf, blackrot (67; see appendix 3, p. 124).
21	S	**D**, clubroot, blackleaf, blackrot (67; see appendix 3, p. 124).
21	T	**D**, clubroot (67; see appendix 3, p. 124).
21	U	**XXXX**
21	V	**D**, Cucumber can be infected with canker from soil containing diseased remains of carrots or turnips (36). **N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
21	W	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
21	X	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).
21	Y	**N-**, brassicas can follow cucurbits within the same year and vice versa without need for additional compost (83).

Row	Col.	Notes
21	AY	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
21	AZ	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
22	A	**W-**, mulched vine crops clean up weeds before hard-to-weed crops (83).
22	F	**W-**, intense cultivation of bean can help clean up weeds following a weedy vine crop (83).
22	H	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83).
22	K	**D**, phytophthora crown and collar rot (see appendix 3, p. 124).
22	L	**D**, phytophthora blight (67; see appendix 3, p. 124).
22	M	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83).
22	P	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83). **N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
22	Q	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21). **N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
22	R	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21). **N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
22	S	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21). **N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
22	T	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
22	U	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
22	V	**XXXX**
22	W	**D**, leaf spots, black rot (gummy stem blight), scab (67; see appendix 3, p. 124); phytophthora blight (see appendix 3).
22	X	**D**, blackrot (gummy stem blight), fusarium crown and fruit rot, phytophthora blight (67; see appendix 3, p. 124).
22	Y	**D**, phytophthora blight (see appendix 3, p. 124).
22	AB	**I**, corn rootworm adults are attracted to cucurbits; they lay their eggs at the base of the plants, and the larvae attack corn roots the following year (see table 3.5, p. 40).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
22	AD	**I**, corn rootworm adults are attracted to cucurbits; they lay their eggs at the base of the plants, and the larvae attack corn roots the following year (see table 3.5, p. 40).
22	AJ	**W-**, intense cultivation of bean can help clean up weeds following a weedy vine crop (83).
23	A	**W-**, mulched vine crops clean up weeds before hard-to-weed crops (83).
23	F	**W-**, intense cultivation of bean can help clean up weeds following a weedy vine crop (83).
23	H	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83).
23	K	**D**, phytophthora crown and collar rot (see appendix 3, p. 124).
23	L	**D**, phytophthora blight (67; see appendix 3, p. 124).
23	M	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83).
23	P	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83). **N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
23	Q	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
23	R	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
23	S	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
23	V	**D**, leaf spots, gummy stem blight, scab (67; see appendix 3, p. 124); phytophthora blight (see appendix 3).
23	W	**XXXX**
23	X	**D**, blackrot (gummy stem blight), fusarium crown and fruit rot, phytophthora blight (67; see appendix 3, p. 124).
23	Y	**D**, phytophthora blight (see appendix 3, p. 124).
23	AB	**I**, corn rootworm adults are attracted to cucurbits; they lay their eggs at the base of the plants, and the larvae attack corn roots the following year (see table 3.5, p. 40).
23	AD	**I**, corn rootworm adults are attracted to cucurbits; they lay their eggs at the base of the plants, and the larvae attack corn roots the following year (see table 3.5, p. 40).
23	AJ	**W-**, intense cultivation of bean can help clean up weeds following a weedy vine crop (83).
24	A	**W-**, mulched vine crops clean up weeds before hard-to-weed crops (83).
24	F	**W-**, intense cultivation of bean can help clean up weeds following a weedy vine crop (83).
24	H	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83).
24	K	**D**, phytophthora crown and collar rot (see appendix 3, p. 124).
24	L	**D**, phytophthora blight (67; see appendix 3, p. 124).
24	M	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83).
24	P	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83). **N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
24	Q	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
24	R	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
24	S	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
24	V	**D**, black rot (gummy stem blight) (67; see appendix 3, p. 124); phytophthora blight (see appendix 3).
24	W	**D**, leaf spots, black rot (gummy stem blight), scab (67; see appendix 3, p. 124); phytophthora blight (see appendix 3).
24	X	**XXXX**
24	Y	**D**, phytophthora blight (see appendix 3, p. 124).
24	AB	**I**, corn rootworm adults are attracted to cucurbits; they lay their eggs at the base of the plants, and the larvae attack corn roots the following year (see table 3.5, p. 40).
24	AD	**I**, corn rootworm adults are attracted to cucurbits; they lay their eggs at the base of the plants, and the larvae attack corn roots the following year (see table 3.5, p. 40).
24	AJ	**W-**, intense cultivation of bean can help clean up weeds following a weedy vine crop (83).
24	AV	**C-**, hairy vetch can be overseeded into winter squash in July to provide a winter cover crop after harvest (83).
25	A	**W-**, mulched vine crops clean up weeds before hard-to-weed crops (83).
25	H	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83).
25	K	**D**, phytophthora crown and collar rot (see appendix 3, p. 124).
25	L	**D**, phytophthora blight (67; see appendix 3, p. 124).
25	M	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83).
25	P	**W**, unmulched vine crops get weedy; therefore, do not follow them with direct-seeded salad greens or carrots (83). **N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
25	Q	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
25	R	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
25	S	**N-**, brassicas can follow vine crops within the same year and vice versa without need for additional compost (83).
25	V	**D**, phytophthora blight (see appendix 3, p. 124).
25	W	**D**, leaf spots, black rot (gummy stem blight), scab (67; see appendix 3, p. 124); phytophthora blight (see appendix 3).
25	X	**D**, blackrot (gummy stem blight), fusarium crown and fruit rot, phytophthora blight (67; see appendix 3, p. 124).
25	Y	**XXXX**
25	AB	**I**, corn rootworm adults are attracted to cucurbits; they lay their eggs at the base of the plants, and the larvae attack corn roots the following year (see table 3.5, p. 40).
25	AD	**I**, corn rootworm adults are attracted to cucurbits; they lay their eggs at the base of the plants, and the larvae attack corn roots the following year (see table 3.5, p. 40).
26	B	**W-**, a short-season crop like lettuce or spinach allows good weed control and low weed seed production prior to slow-growing, long-season, hard-to-weed crops like onion and carrot (83).
26	D	**W-**, a short-season crop like lettuce or spinach allows good weed control and low weed seed production prior to slow-growing, long-season, hard-to-weed crops like onion and carrot (83).
26	H	**C-**, timing works well to plant lettuce or radish after pea or spinach within a year (82).
26	M	**W-**, a short-season crop like lettuce or spinach allows good weed control and low weed seed production prior to slow-growing, long-season, hard-to-weed crops like onion and carrot (83).
26	T	**C-**, timing works well to plant lettuce or radish after pea or spinach within a year (82).
26	Z	**XXXX**
27	I	**D**, scab of beet is caused by several of the Actinomycete species that cause common scab of potato (36).
27	Q	**D**, beet cyst nematode attacks both cabbage and beet (10), and thus presumably also broccoli and cauliflower.
27	R	**D**, beet cyst nematode attacks both cabbage and beet (10).
27	S	**D**, beet cyst nematode attacks both cabbage and beet (10), and thus presumably also kale and collards.
27	AA	**XXXX**
28	F	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
28	I	**C-**, potato works well after corn because it tolerates corn stover (82).
28	Q	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
28	R	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
28	S	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
28	X	**D**, fusarium fruit rot is more common on pumpkin following corn (chapter 3, p. 21).
28	AA	**D-**, use grain crops or sweet corn in rotation with beet to decrease root rots (67).
28	AB	**XXXX**
28	AD	**I**, corn rootworm (see table 3.5, p. 40).
28	AE	**D**, scab (*Gibberella zeae*) on barley and spring wheat tends to be worse following corn even than following another spring grain, unless the corn stalks are removed for silage or by clean tillage (10).
28	AG	**D**, fusarium can be a problem when wheat follows corn (83).
28	AJ	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
29	I	**D**, verticillium wilt (36).
29	J	**D**, verticillium wilt (36).
29	K	**D**, verticillium wilt (67; see appendix 3, p. 124).
29	AC	**XXXX**
30	F	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
30	I	**C-**, potato works well after corn because it tolerates corn stover (82).
30	Q	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
30	R	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
30	S	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
30	X	**D**, fusarium fruit rot is more common on pumpkin following corn (chapter 3, p. 21).
30	AA	**D-**, use grain crops or sweet corn in rotation with beet to decrease root rots (67).
30	AB	**I**, corn rootworm (see table 3.5, p. 40).
30	AD	**XXXX**
30	AE	**D**, scab (*Gibberella zeae*) on barley and spring wheat tends to be worse following corn even than following another spring grain, unless the corn stalks are removed for silage or by clean tillage (10).
30	AF	**D**, barley should not be grown after corn due to possibility of scab (119).
30	AG	**D**, scab (*Fusarium* spp. and *Gibberella* spp.) can be a problem when wheat follows corn (83, 20). **D-**, foot rot is negligible when wheat follows oat, corn, or beans (20); take-all is better suppressed by corn than by other crops like soybean and sunflower (65).
30	AJ	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
31	A	**D-**, small grains decrease nematode populations (chapter 3, p. 21). **W**, broadleaf weeds have time to set seeds in a grain crop before harvest (39, based on experience of Eric and Anne Nordell).
31	B	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
31	C	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
31	D	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
31	F	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
31	H	**D-**, rotation with small grains decreases root-knot nematode (*Meloidogyne hapla*) effects on lettuce (22).
31	I	**D-**, use of 2 years of grass or 1 year of cereal in rotation with potato helps reduce rhizoctonia canker (67). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	M	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	N	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell).
31	Q	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
31	R	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
31	S	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
31	V	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	W	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	AA	**D-**, use grain crops or sweet corn in rotation with beet to decrease root rots (67). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	AB	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	AD	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	AE	**XXXX**
31	AG	**D**, incidence of foot rot of wheat caused by *Fusarium culmorum* (but not by *Helminthosporium sativum*) declines more slowly if oat is part of the rotation (56). **D-**, foot rot is negligible when wheat follows oat, corn, or bean (20). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	AH	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
31	AJ	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
32	A	**D-**, small grains decrease nematode populations (chapter 3, p. 21). **W**, broadleaf weeds have time to set seeds in a grain crop before harvest (39, based on experience of Eric and Anne Nordell).
32	B	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
32	C	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
32	D	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
32	F	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
32	G	**D-**, a preceding oat crop reduces aphanomyces (common) root rot (*Aphanomyces euteiches*) (54).
32	H	**D-**, rotation with small grains decreases root-knot nematode (*Meloidogyne hapla*) effects on lettuce (22).
32	I	**D-**, use of 2 years of grass or 1 year of cereal in rotation with potato helps reduce rhizoctonia canker (67). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
32	M	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult to cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
32	N	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult to cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell).
32	Q	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
32	R	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
32	S	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
32	V	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
32	W	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
32	AA	**D-**, use grain crops or sweet corn in rotation with beet to decrease root rots (67). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
32	AB	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
32	AD	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
32	AF	**XXXX**
32	AG	**D**, barley is a good host for take-all, even though it is less affected by the disease than wheat (52); foot rot is highest when following barley (20). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
32	AH	**D**, barley is a host for ergot (119). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
32	AJ	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
33	A	**D-**, small grains decrease nematode populations (chapter 3, p. 21).
33	B	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
33	C	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
33	D	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
33	F	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
33	H	**D-**, rotation with small grains decreases root-knot nematode (*Meloidogyne hapla*) effects on lettuce (22).
33	I	**D-**, use of 2 years of grass or 1 year of cereal in rotation with potato helps reduce rhizoctonia canker (67). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	M	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	N	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell).
33	Q	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
33	R	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
33	S	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
33	V	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	W	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	AA	**D-**, use grain crops or sweet corn in rotation with beet to decrease root rots (67). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	AB	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	AD	**D**, seedling root rots of corn are more common following wheat than following oat (20). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	AE	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	AF	**D**, To avoid leaf diseases, avoid planting barley after wheat (107); barley should not be planted after wheat due to leaf diseases and root rot (119).
33	AG	**XXXX**
33	AH	**D**, wheat is a host for ergot (119). **I**, wireworms *Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
33	AJ	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
34	A	**D-**, small grains decrease nematode populations (chapter 3, p. 21).
34	B	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
34	C	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
34	D	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, onion thrips may be a problem when grain or any grass precedes onions (83).
34	F	**D-**, use grain crops or sweet corn in rotation with beans to decrease root rots (67).
34	H	**D-**, rotation with small grains decreases root-knot nematode (*Meloidogyne hapla*) effects on lettuce (22).
34	I	**D-**, use of 2 years of grass or 1 year of cereal in rotation with potato helps reduce rhizoctonia canker (67). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
34	M	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
34	N	**W**, broadleaf weeds have time to set seeds in a grain crop before harvest, which is particularly a problem in noncompetitive or difficult-to-cultivate crops like onion and carrot (39, based on experience of Eric and Anne Nordell).
34	Q	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
34	R	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
34	S	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
34	V	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
34	W	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
34	AA	**D-**, use grain crops or sweet corn in rotation with beet to decrease root rots (67). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
34	AB	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
34	AD	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
34	AE	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
34	AH	**XXXX**
34	AJ	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
34	AL	**D**, avoid planting crops that are hosts to ergot, such as forage grasses, before and after rye in the rotation (119).
35	F	**D**, common bacterial blight (*Xanthomonas campestris*; appendix 3, p. 124); soybean cyst nematode (28).
35	I	**D-**, soybean before potato prevents scab (82).
35	AD	**D-**, a previous crop of soybean reduces red root rot of corn (*Phoma terrestris* + *Pythium* spp. and *Fusarium* spp.) (123).
35	AI	**XXXX**
35	AJ	**D**, common bacterial blight (*Xanthomonas campestris*; appendix 3, p. 124); soybean cyst nematode (28).
35	AY	**D**, following soybean with rape or canola fosters buildup of *Sclerotinia* (119).
36	F	**D**, common bacterial blight (appendix 3, p. 124); soybean cyst nematode (28).
36	H	**D**, sclerotinia drop (67; see appendix 3, p. 124).
36	I	**D**, sclerotinia stalk rot (67; see appendix 3, p. 124).
36	AG	**D-**, foot rot is negligible when wheat follows oat, corn, or beans (20).
36	AI	**D**, common bacterial blight (*Xanthomonas campestris*; appendix 3, p. 124); soybean cyst nematode increases to high density on bean, though the bean crop is scarcely affected (28, 41).
36	AJ	**XXXX**
36	AW	**D**, field pea and bell bean should not be planted after bean due to *Fusarium*, *Pythium*, and *Sclerotinia* (119).
36	AX	**D**, field pea and bell bean should not be planted after bean due to *Fusarium*, *Pythium*, and *Sclerotinia* (119).
37	I	**D-**, alfalfa decreases fusarium wilt (20).
37	M	**D**, carrot root dieback can be severe after alfalfa; alfalfa is a host for *Pythium violae*, which causes cavity spot (see chapter 3, p. 21).
37	AJ	**N-**, **S-**, dry beans do well after sod crops due to good tilth and nutrition (83).
37	AK	**XXXX**
37	AW	**D**, field pea and bell bean should not be planted after alfalfa due to *Fusarium* and *Pythium* (119).
37	AX	**D**, field pea and bell bean should not be planted after alfalfa due to *Fusarium* and *Pythium* (119).
38	B	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
38	C	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
38	D	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
38	I	**D-**, green manure of rye or other grass reduces common scab and black scurf (rhizoctonia canker) (36); also, use of 2 years of grass or 1 year of cereal in rotation with potato helps reduce rhizoctonia canker (67).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
38	M	**W**, perennial grasses and weeds from plowed-down sod make weeding carrots difficult (82). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
38	V	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
38	W	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
38	AA	**I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
38	AB	**D-**, **N-**, corn does well after sod; it is a heavy feeder and can use the high N available, and diseases are not a problem (82). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) and white grubs (*Phyllophaga* spp.) (see table 3.5, p. 40).
38	AC	**I**, white grubs (*Phyllophaga* spp.) (see table 3.5, p. 40).
38	AD	**D-**, **N-**, corn does well after sod; it is a heavy feeder and can use the high N available, and diseases are not a problem (82). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) and white grubs (*Phyllophaga* spp.) (see table 3.5, p. 40).
38	AE	**D**, "If scald is a problem, barley should not be grown after bromegrass" (119). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) (see table 3.5, p. 40).
38	AG	**D**, smooth brome should not be used in rotation with wheat if take-all is a problem (52). **I**, wireworms (*Melanotus communis* and *Limonius* spp.) and white grubs (*Phyllophaga* spp.) (see table 3.5, p. 40).
38	AH	**D**, avoid planting crops that are hosts to ergot, such as forage grasses, before and after rye in the rotation (119). **I**, wireworms` (*Melanotus communis* and *Limonius* spp.) and white grubs (*Phyllophaga* spp.) (see table 3.5, p. 40).
38	AJ	**N-**, **S-**, dry beans do well after sod crops due to good tilth and nutrition (83).
38	AL	**XXXX**
38	AM	**C-**, rye and hairy vetch establish well in plowed sod and make a good transition from grass sod to vegetables (81).
38	AV	**C-**, rye and hairy vetch establish well in plowed sod and make a good transition from grass sod to vegetables (81).
39	A	**W-**, **C**, decomposing rye releases allelopathic toxins that suppress weeds but may also harm crops. Problems can be avoided by incorporating residue 3 weeks before planting (95). **I-**, "High-biomass cover crops such as barley or rye increased population of centipedes, predator mites and other important predators" (107). **N**, incorporation of large amounts of grain straw can tie up nitrogen in microbial tissues, thereby making it unavailable to succeeding crops. **S**, the lag between incorporation and planting, however, leaves the soil open to erosion. **C-**, for maximum dry matter accumulation, use before late spring or early summer crops (81).
39	B	**I**, onion thrips may be a problem when grain precedes onions (82, 83).
39	C	**I**, onion thrips may be a problem when grain precedes onions (82, 83).
39	D	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
39	F	**D-**, use grain crops or sweet corn in rotation with beans to decrease root rots (67).
39	G	**D-**, rye suppresses thielaviopsis (black) root rot (*Thielaviopsis basicola*) (54).
39	H	**C**, avoid direct seeding of small-seeded crops after a rye cover crop due to interference from the straw (82).
39	I	**D-**, green manure of rye or other grass reduces common scab and black scurf (rhizoctonia canker) (20, 36).
39	M	**C**, avoid direct seeding small-seeded crops after a rye cover crop due to interference from the straw (82).
39	N	**C**, avoid direct seeding small-seeded crops after a rye cover crop due to interference from the straw (82).
39	P	**C**, avoid direct seeding small-seeded crops after a rye cover crop due to interference from the straw (82).
39	Q	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
39	R	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
39	S	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67).
39	AA	**D-**, use grain crops or sweet corn in rotation with beet to decrease root rots (67).
39	AF	**D**, to avoid leaf diseases, avoid planting barley after wheat (107).
39	AJ	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
39	AM	**XXXX**
40	A	**D-**, unlike most crops, an oat cover crop decreases density of lesion nematodes (*Pratylenchus* spp.) (41). **I-**, "High-biomass cover crops such as barley or rye increased population of centipedes, predator mites, and other important predators" (107). **N**, incorporating annual ryegrass can tie up N in microbial tissues, thereby making it unavailable to succeeding crops. Problems can be avoided by incorporating residue a few weeks before planting (107). **S**, the lag between incorporation and planting, however, leaves the soil open to erosion. **C-**, "Winter killed cover crops like field pea and oats made the most sense before early planted vegetables, allowing us to work the ground early in the spring" (39, quoting Eric and Anne Nordell).
40	B	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
40	C	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
40	D	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
40	F	**D-**, use grain crops or sweet corn in rotation with bean to decrease root rots (67).
40	I	**D-**, use of 2 years of grass or 1 year of cereal in rotation with potato helps reduce rhizoctonia canker (67).
40	Q	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67). **W-**, **S-**, oat cover crop (often with field pea) controls weeds and improves soil structure before summer-transplanted brassicas (83).
40	R	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67). **W-**, **S-**, oat cover crop (often with field pea) controls weeds and improves soil structure before summer-transplanted brassicas (83).
40	S	**D-**, use grain crops or sweet corn in rotation with cabbage and related species to decrease white mold (67). **W-**, **S-**, oat cover crop (often with field pea) controls weeds and improves soil structure before summer-transplanted brassicas (83).
40	AA	**D-**, use grain crops or sweet corn in rotation with beet to decrease root rots (67).
40	AJ	**D-**, use grain crops or sweet corn in rotation with beans to decrease root rots (67).
40	AN	**XXXX**
41	A	**N**, incorporating annual ryegrass can tie up N in microbial tissues, thereby making it unavailable to succeeding crops. Problems can be avoided by incorporating residue a few weeks before planting (107). **S**, the lag between incorporation and planting, however, leaves the soil open to erosion.
41	B	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
41	C	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
41	D	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
41	I	**D-**, use of 2 years of grass or 1 year of cereal in rotation with potato helps reduce rhizoctonia canker (67).
41	P	**D-**, ryegrass reduces clubroot infection rates more than other rotation species (20).
41	Q	**D-**, ryegrass reduces clubroot infection rates more than other rotation species (20).
41	R	**D-**, ryegrass reduces clubroot infection rates more than other rotation species (20).
41	S	**D-**, ryegrass reduces clubroot infection rates more than other rotation species (20).
41	T	**D-**, ryegrass reduces clubroot infection rates more than other rotation species (20).
41	U	**D-**, ryegrass reduces clubroot infection rates more than other rotation species (20).
41	AO	**XXXX**
42	A	**D-**, sorghum-sudangrass cover crop reduces southern root-knot nematode (*Meloidogyne incognita*) populations in subsequent vegetable crops (30).
42	B	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
42	C	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
42	D	**I**, onion thrips may be a problem when grain or any grass precedes onions (83).
42	I	**D-**, use of 2 years of grass or 1 year of cereal in rotation with potato helps reduce rhizoctonia canker (67).
42	AP	**XXXX**
43	I	**D-**, severity of verticillium wilt was lower following buckwheat green manure than following canola or a fallow period (see chapter 3, p. 21). **S-**, buckwheat leaves the soil in a good state of tilth for potato (83).
43	Q	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
43	R	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
43	S	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
43	T	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
43	U	**D-**, clubroot declines more quickly when tomato, cucumber, snap bean, or buckwheat is grown (see chapter 3, p. 21).
43	AQ	**XXXX**
44	A	**I**, "Grubs, wireworms, maggots, and slugs were also a nuisance after even one year of clover sod" (39, quoting Eric and Anne Nordell). **N-**, nitrogen-fixing cover crop (107).
44	H	**I**, clovers before lettuce increases tarnished plant bug attack (82).
44	AR	**XXXX**
45	A	**I**, "Grubs, wireworms, maggots, and slugs were also a nuisance after even one year of clover sod" (39, quoting Eric and Anne Nordell). **N-**, nitrogen-fixing cover crop (107).
45	G	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
45	H	**D**, clover rot fungus (*Sclerotinia trifoliorum*) occasionally attacks lettuce (36). **I**, clover before lettuce increases tarnished plant bug attack (82).

APPENDIX 2 Crop Sequence Problems and Opportunities (*continued*)

Row	Col.	Notes
45	P	**C-**, fall-sown red clover provides a drought-tolerant cover crop the next summer prior to fall-sown brassicas (83).
45	Q	**C-**, fall-sown red clover provides a drought-tolerant cover crop the next summer prior to fall-sown brassicas (83).
45	S	**C-**, fall-sown red clover provides a drought-tolerant cover crop the next summer prior to fall-sown brassicas (83).
45	AI	**D**, "Never plant dry beans or soybeans after clover unless the cover has been thoroughly incorporated by plowing" (107).
45	AJ	**D**, "Never plant dry beans or soybeans after clover unless the cover has been thoroughly incorporated by plowing" (107).
45	AS	**XXXX**
45	AW	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
45	AX	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
46	A	**N-**, nitrogen-fixing cover crop (107).
46	H	**I**, clover before lettuce increases tarnished plant bug attack (82).
46	AT	**XXXX**
47	A	**N-**, nitrogen-fixing cover crop (107).
47	F	**D**, white sweet clover is an important host in which yellow bean mosaic virus 2 overwinters. It can infect also broad bean (and presumably bell bean), soybean, and alsike and other clovers (36).
47	I	**D**, sweet clover green manure is more conducive to scab development than alfalfa or rye (20).
47	AI	**D**, white sweet clover is an important host in which yellow bean mosaic virus 2 overwinters. It can infect also broad bean (and presumably bell bean), soybean, and alsike and other clovers (36).
47	AM	**C-**, a winter grain can be overseeded into a previously established hairy vetch cover crop to create a mixed grass–legume winter cover (83).
47	AS	**D**, white sweet clover is an important host in which yellow bean mosaic virus 2 overwinters. It can infect also broad bean (and presumably bell bean), soybean, and alsike and other clovers (36).
47	AU	**XXXX**
47	AX	**D**, white sweet clover is an important host in which yellow bean mosaic virus 2 overwinters. It can infect also broad bean (and presumably bell bean), soybean, and alsike and other clovers (36).

Row	Col.	Notes
48	A	**D**, hairy vetch is a good host for northern root-knot nematode (*Meloidogyne hapla*) (113). **N-**, nitrogen-fixing cover crop (107). **C-**, use of hairy vetch (often with rye) before late-planted crops allows maximum accumulation of dry matter and nitrogen (81).
48	G	**D**, avoid hairy vetch in rotation with pea due to black stem fungus (*Ascochyta pinodella*) (20).
48	V	**N-**, cucurbits have a high nitrogen need that vetch can supply (83).
48	W	**D-**, hairy vetch residue incorporated into the soil reduces fusarium wilt in watermelon. **N-**, cucurbits have a high nitrogen need that vetch can supply (83).
48	X	**N-**, cucurbits have a high nitrogen need that vetch can supply (83).
48	Y	**N-**, cucurbits have a high nitrogen need that vetch can supply (83).
48	AM	**W**, hairy vetch can be a severe weed in all winter grains, decreasing both yield and quality. Dormant seeds in the cover-crop sowing may persist in the soil for several years and infest subsequent winter grain crops even if the cover crop is not allowed to seed (59).
48	AV	**XXXX**
49	A	**N-**, nitrogen-fixing cover crop (107). **C-**, "Winter killed cover crops like field pea and oats made the most sense before early planted vegetables, allowing us to work the ground early in the spring" (39, quoting Eric and Anne Nordell).
49	G	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
49	H	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
49	Q	**N-**, **W-**, a field pea cover crop (often with oat) controls weeds and provides nitrogen for summer-transplanted brassicas (83).
49	R	**N-**, **W-**, a field pea cover crop (often with oat) controls weeds and provides nitrogen for summer-transplanted brassicas (83).
49	S	**N-**, **W-**, a field pea cover crop (often with oat) controls weeds and provides nitrogen for summer-transplanted brassicas (83).
49	AS	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
49	AW	**XXXX**

Row	Col.	Notes
49	AX	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
50	A	**N-**, nitrogen-fixing cover crop.
50	G	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
50	H	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
50	P	**N-**, brassicas do well after incorporating bell bean due to abundant N supply (83).
50	Q	**N-**, brassicas do well after incorporating bell bean due to abundant N supply (83).
50	R	**N-**, brassicas do well after incorporating bell beans due to abundant N supply (83).
50	S	**N-**, brassicas do well after incorporating bell bean due to abundant N supply (83).
50	T	**N-**, brassicas do well after incorporating bell bean due to abundant N supply (83).
50	U	**N-**, brassicas do well after incorporating bell bean due to abundant N supply (83).
50	AS	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
50	AW	**D**, sclerotinia disease of broad bean (presumably including bell bean) and red clover rot are closely related (varieties of *S. trifoliorum*); each can attack a variety of crops, including pea, lettuce, and possibly other plants (36).
50	AX	**XXXX**
51	A	**D-**, incorporated mustard family cover crops suppress a variety of soilborne diseases (see chapter 3, p. 21).
51	I	**D-**, plowed-down brassica cover crops act as a fumigant against potato diseases (83).
51	P	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
51	Q	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
51	R	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
51	S	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
51	T	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
51	U	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
51	AY	**XXXX**
51	AZ	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
52	A	**D-**, incorporated mustard family cover crops suppress a variety of soilborne diseases (see chapter 3, p. 21).
52	I	**D-**, plowed-down brassica cover crops act as a fumigant against potato diseases (83).
52	P	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
52	Q	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
52	R	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
52	S	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
52	T	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
52	U	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
52	AI	**D-**, oilseed radish can decrease nematode populations in soybean (119).
52	AY	**D**, clubroot attacks many crops in the mustard family, including cabbage and its relatives, mustard, radish, Chinese cabbage, turnip, canola, and many weeds (36).
52	AZ	**XXXX**