

APPENDIX C

LENGTHS OF CROP DEVELOPMENT STAGES

Table C-1. Lengths of Crop Development Stages^a in Days for Various Planting Periods and Climatic Regions Based on
FAO-24 (Doorenbos and Pruitt 1977) and FAO-56 (Allen et al. 1998)

Crop	Init. (L_{ini})	Dev. (L_{dev})	Mid (L_{mid})	Late (L_{late})	Total	Plant Date	Region
a. Small Vegetables							
Broccoli	35	45	40	15	135	Sep	Calif. Desert, USA
Cabbage	40	60	50	15	165	Sep	Calif. Desert, USA
Carrots	20	30	50/30	20	100	Oct/Jan	Arid Climate
	30	40	60	20	150	Feb/Mar	Mediterranean
	30	50	90	30	200	Oct	Calif. Desert, USA
Cauliflower	35	50	40	15	140	Sep	Calif. Desert, USA
Celery	25	40	95	20	180	Oct	(Semi) Arid
	25	40	45	15	125	Apr	Mediterranean
	30	55	105	20	210	Jan	(Semi) Arid
Crucifers ^a	20	30	20	10	80	Apr	Mediterranean
	25	35	25	10	95	Feb	Mediterranean
	30	35	90	40	195	Oct/Nov	Mediterranean
Lettuce	20	30	15	10	75	Apr	Mediterranean
	30	40	25	10	105	Nov/Jan	Mediterranean
	25	35	30	10	100	Oct/Nov	Arid Region
	35	50	45	10	140	Feb	Mediterranean
Onion (dry)	15	25	70	40	150	Apr	Mediterranean
	20	35	110	45	210	Oct, Jan	Arid Region; Calif., USA

Onion (green)	25	30	10	5	70	Apr/May Oct	Mediterranean Arid Region Calif., USA
Onion (seed)	20	45	20	10	95	Mar	Calif. Desert, USA
Spinach	30	55	55	40	180	Sep	Mediterranean Arid Region
	20	45	165	45	275	Apr	
	20	20	15/25	5	60/70	Sep/Oct/ Nov	
	20	30	40	10	100	Mar/Apr	
Radish	5	10	15	5	35	Winter	Mediterranean; Europe Arid Region
b. Vegetables—Solanum Family (<i>Solanaceae</i>)							
Eggplant	10	10	15	5	40	Oct	Arid Region
	30	40	40	20	130	May/Jun	Mediterranean
Sweet peppers (bell)	30	45	40	25	140	Apr/Jun	Europe and Mediterranean
	25/30	35	40	20	125	Oct	Mediterranean Arid Region
Tomato	30	40	110	30	210	Jan	Arid Region
	30	40	40	25	135	Apr/May	Calif., USA
	35	40	50	30	155	Jan	Calif. Desert, USA
	25	40	60	30	155	Oct/Nov	Arid Region
	35	45	70	30	180	Apr/May	Mediterranean
	30	40	45	30	145		
c. Vegetables—Cucumber Family (<i>Cucurbitaceae</i>)							
Cantaloupe	30	45	35	10	120	Jan	Calif., USA
	10	60	25	25	120	Aug	Calif., USA

(Continued)

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FAO-24 (Doorenbos and Pruitt 1977) and FAO-56 (Allen et al. 1998) (Continued)

Crop	Init. (L_{ini})	Dev. (L_{dev})	Mid (L_{mid})	Late (L_{late})	Total	Plant Date	Region
Cucumber	20	30	40	15	105	Jun/Aug	Arid Region
	25	35	50	20	130	Nov/Feb	Arid Region
Pumpkin, winter squash	20	30	30	20	100	Mar/Aug	Mediterranean
	25	35	35	25	120	Jun	Europe
Squash, zucchini	25	35	25	15	100	Apr/Dec	Mediterranean; Arid Region
	20	30	25	15	90	May/Jun	Mediterranean; Europe
Sweet melons	25	35	40	20	120	May	Mediterranean
	30	30	50	30	140	Mar	Calif., USA
	15	40	65	15	135	Aug	Calif. Desert, USA
	30	45	65	20	160	Dec/Jan	Arid Region
Watermelons	20	30	30	30	110	Apr	Italy
	10	20	20	30	80	Mar/Aug	Near East (desert)
d. Roots and Tubers							
Beets, table	15	25	20	10	70	Apr/May	Mediterranean
	25	30	25	10	90	Feb/Mar	Mediterranean; Arid
Cassava							
year 1	20	40	90	60	210	Rainy	Tropical Regions
year 2	150	40	110	60	360	season	

Potato	25	30	30/45	30	115/130	Jan/Nov May Apr Apr/May Dec Apr Rainy seas. Mar Jun Sep Apr May Nov Nov	(Semi) Arid Climate Continental Climate Europe Idaho, USA Calif. Desert, USA Mediterranean Tropical Regions Calif., USA Calif., USA Calif. Desert, USA Idaho, USA Mediterranean Mediterranean Arid Regions
Sweet potato	15	30	50	30	125		
Sugar beet	30	45	90	15	180		
	25	30	90	10	155		
	25	65	100	65	255		
	50	40	50	40	180		
	25	35	50	50	160		
	45	75	80	30	230		
	35	60	70	40	205		
e. Legumes (<i>Leguminosae</i>)							
Beans (green)	20	30	30	10	90	Feb/Mar	Calif., Mediterranean
	15	25	25	10	75	Aug/Sep	Calif., Egypt, Lebanon
Beans (dry)	20	30	40	20	110	May/Jun	Continental Climates
	15	25	35	20	95	Jun	Pakistan, Calif.
	25	25	30	20	100	Jun	Idaho, USA
Fava bean	15	25	35	15	90	May	Europe
Broad bean	20	30	35	15	100	Mar/Apr	Mediterranean
Dry bean	90	45	40	60	235	Nov	Europe
Green bean	90	45	40	0	175	Nov	Europe
Green gram, cowpeas	20	30	30	20	110	Mar	Mediterranean

(Continued)

Table C-1. Lengths of Crop Development Stages in Days for Various Planting Periods and Climatic Regions Based on
FAO-24 (Doorenbos and Pruitt 1977) and FAO-56 (Allen et al. 1998) (Continued)

Crop	Init. (L_{ini})	Dev. (L_{dev})	Mid (L_{mid})	Late (L_{late})	Total	Plant Date	Region
Groundnut	25	35	45	25	130	Dry season	West Africa
	35	35	35	35	140	May	High Latitudes
	35	45	35	25	140	May/June	Mediterranean
Lentil	20	30	60	40	150	Apr	Europe
	25	35	70	40	170	Oct/Nov	Arid Region
Peas	15	25	35	15	90	May	Europe
	20	30	35	15	100	Mar/Apr	Mediterranean
	35	25	30	20	110	Apr	Idaho, USA
Soybeans	15	15	40	15	85	Dec	Tropics
	20	30/35	60	25	140	May	Central USA
	20	25	75	30	150	June	Japan
f. Perennial Vegetables (with winter dormancy and initially bare or mulched soil)							
Artichoke	40	40	250	30	360	Apr (1st yr)	California
	20	25	250	30	325	May (2nd yr)	(cut in May)
Asparagus	50	30	100	50	230	Feb	Warm Winter
	90	30	200	45	365	Feb	Mediterranean
g. Fiber Crops							
Cotton	30	50	60	55	195	Mar-May	Egypt; Pakistan; Calif., USA
	45	60	45-75	45	195-225	Mar	Calif. Desert, USA
	30	50	60	55	195	Sep	Yemen
	30	50	55	45	180	Apr	Texas

Flax	25	35	50	40	150	Apr	Europe
	30	40	100	50	220	Oct	Arizona
h. Oil Crops							
Castor beans	25	40	65	50	180	Mar	(Semi) Arid Climates
	20	40	50	25	135	Nov	Indonesia
Safflower	20	35	45	25	125	Apr	California, USA
	25	35	55	30	145	Mar	High Latitudes
	35	55	60	40	190	Oct/Nov	Arid Region
Sesame	20	30	40	20	100	Jun	China
Sunflower	25	35	45	25	130	Apr/May	Mediterranean; Calif., USA
i. Cereals							
Barley/oats/wheat	15	25	50	30	120	Nov	Central India
	20	25	60	30	135	Mar/Apr	35–45° L
	15	30	65	40	150	July	East Africa
	40	30	40	20	130	Apr ^c	
	40	60	60	40	200	Nov	
	20	50	60	30	160	Dec	Calif. Desert, USA
Winter wheat	20 ^b	60 ^b	70	30	180	Dec	California, USA
	30	140	40	30	240	Nov	Mediterranean
	160	75	75	25	335	Oct ^c	Idaho, USA
Grains (small)	20	30	60	40	150	Apr	Mediterranean
	25	35	65	40	165	Oct/Nov	Pakistan; Arid Region

(Continued)

Table C-1. Lengths of Crop Development Stages in Days for Various Planting Periods and Climatic Regions Based on
FAO-24 (Doorenbos and Pruitt 1977) and FAO-56 (Allen et al. 1998) (Continued)

Crop	Init. (L_{ini})	Dev. (L_{dev})	Mid (L_{mid})	Late (L_{late})	Total	Plant Date	Region
Maize (grain)	30	50	60	40	180	Apr	East Africa (alt.)
	25	40	45	30	140	Dec/Jan	Arid Climate
	20	35	40	30	125	Jun	Nigeria (humid)
	20	35	40	30	125	Oct	India (dry, cool)
	30	40	50	30	150	Apr	Spain (spr, sum.); Calif., USA
Maize (sweet)	30	40	50	50	170	Apr ^c	Idaho, USA
	20	20	30	10	80	Mar	Philippines
	20	25	25	10	80	May/Jun	Mediterranean
	20	30	50/30	10	90	Oct/Dec	Arid Climate
	30	30	30	10 ^d	110	Apr	Idaho, USA
Millet	20	40	70	10	140	Jan	Calif. Desert, USA
	15	25	40	25	105	Jun	Pakistan
	20	30	55	35	140	Apr	Central USA
Sorghum	20	35	40	30	130	May/Jun	USA; Pakistan; Mediterranean
Rice	20	35	45	30	140	Mar/Apr	Arid Region
	30	30	60	30	150	Dec/May	Tropics; Mediterranean
	30	30	80	40	180	May	Tropics

j. Forages									
Alfalfa, total season ^e	10	30	var.	var.				Jan	Calif., USA
Alfalfa ^e 1st cutting cycle	10	20	20	10	60			Apr (last -4° deg)	Idaho, USA
	10	30	25	10	75				
Alfalfa ^e , other cutting cycles	5	10	10	5	30			Mar	Calif., USA
	5	20	10	10	45			Jun	Idaho, USA
Bermuda for seed	10	25	35	35	105			Mar	Calif. Desert, USA
Bermuda for hay (several cuttings)	10	15	75	35	135			—	Calif. Desert, USA
Grass pasture ^e	10	20	—	—	—				
Sudan, 1st cutting cycle	25	25	15	10	75			Apr	Calif. Desert, USA
Sudan, other cutting cycles	3	15	12	7	37			Jun	Calif. Desert, USA
Switchgrass ^f	20	45	40	60	165			Apr	Kansas, USA
k. Sugarcane									
Sugarcane, virgin	35	60	190	120	405				Low Latitudes
	50	70	220	140	480				Tropics
	75	105	330	210	720				Hawaii, USA
Sugarcane, ratoon	25	70	135	50	280				Low Latitudes
	30	50	180	60	320				Tropics
	35	105	210	70	420				Hawaii, USA
l. Tropical Fruits and Trees									
Banana, 1st yr	120	90	120	60	390			Mar	Mediterranean
Banana, 2nd yr	120	60	180	5	365			Feb	Mediterranean
Pineapple	60	120	600	10	790				Hawaii, USA

(Continued)

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FAO-24 (Doorenbos and Pruitt 1977) and FAO-56 (Allen et al. 1998) (Continued)

Crop	Init. (L_{ini})	Dev. (L_{dev})	Mid (L_{mid})	Late (L_{late})	Total	Plant Date	Region
m. Grapes and Berries							
Grapes	20	100	90	30	240	Apr	Low Latitudes
	20	100	90	30	240	Mar	Calif., USA
	20	90	50	20	180	May	High Latitudes
	20	90	80	20	210	Apr	Mid Latitudes (wine)
Hops	25	40	80	10	155	Apr	Idaho, USA
n. Fruit Trees							
Citrus	90	30	150	95	365	Jan	Mediterranean
Deciduous orchard, light pruning	10	10	160	30	210	Mar	High Latitudes
	10	10	190	60	270	Mar	Low Latitudes
	10	10	190	30	240	Mar	Calif., USA
Deciduous orchard, heavy pruning	10	80	90	30	210	Mar	High Latitudes
	10	80	120	60	270	Mar	Low Latitudes
	10	60	140	30	240	Mar	Calif., USA
Mango	20	40	50	50	160	July	Brazil
Olives	10	20	150	90	270 [§]	Mar	Mediterranean
Pistachios	10	20	80	40	150	Feb	Mediterranean
Walnuts	10	10	140	30	190	Apr	Utah, USA
o. Wetlands—Temperate Climate							
Wetlands (cattails, bulrushes)	10	30	80	20	140	May	Utah, USA; killing frost
	180	60	90	35	365	Nov	Florida, USA
Wetlands (short veg.)	180	60	90	35	365	Nov	Frost-free climate