SUPPLEMENTARY MATERIAL

Table S1. Effect of short photoperiod (08L:16D) on post-winter development (days ± SE) of *Rhagoletis cerasi* males and females from Dossenheim population (Germany). Pupae were incubated in a climate chamber after keeping in short photoperiod condition at 4 ± 1ºC for a period ranged from 2 to 8.5 months.

Chilling period (months)	Post-winter development (days)			
	Males		Females	
	N	mean ± SE	N	mean ± SE
2	0		0	
2.5	5	42 ± 2.2 (37, 49)	5	35 ± 1.9 (30, 40)
3	7	38 ± 1.6 (33, 45)	15	33 ± 1.1 (24, 39)
3.5	26	32 ± 1.0 (24, 47)	22	29 ± 1.0 (19, 35)
4	28	30 ± 0.8 (23, 43)	44	29 ± 0.7 (20, 42)
4.5	36	27 ± 0.9 (19, 47)	45	25 ± 0.6 (19, 34)
5	50	24 ± 0.7 (18, 34)	33	22 ± 0.6 (18, 30)
5.5	40	22 ± 0.5 (17, 34)	42	21 ± 0.4 (17, 29)
6	34	21 ± 0.3 (18, 27)	55	20 ± 0.3 (16, 26)
6.5	54	21 ± 0.2 (18, 26)	37	20 ± 0.3 (17, 24)
7	40	20 ± 0.2 (17, 23)	48	19 ± 0.2 (15, 23)
7.5	39	20 ± 0.3 (17, 24)	38	19 ± 0.3 (15, 23)
8	37	20 ± 0.3 (17, 24)	42	19 ± 0.3 (15, 23)
8.5	25	20 ± 0.4 (17, 26)	39	19 ± 0.3 (17, 23)

* Number in brackets refer to minimum and maximum time needed for post-winter development.

Table S2. Effect of long photoperiod (16L:08D) on post-winter development (days ± SE) of *Rhagoletis cerasi* males and females from Dossenheim population (Germany). Pupae were incubated in a climate chamber after keeping in long photoperiod condition at 4 ± 1ºC for a period ranged from 2 to 8.5 months.

Chilling period (months)	Post-winter development (days)			
	Males		Females	
	N	mean ± SE	N	mean ± SE
2	0		0	
2.5	7	38 ± 2.1 (27, 43)	8	34 ± 1.1 (31, 39)
3	10	33 ± 1.3 (27, 39)	20	30 ± 0.8 (23, 37)
3.5	20	29 ± 0.8 (21, 35)	29	28 ± 0.9 (19, 38)
4	15	30 ± 1.3 (21, 37)	16	25 ± 0.8 (21, 29)
4.5	39	27 ± 0.8 (19, 40)	30	26 ± 0.7 (19, 33)
5	52	23 ± 0.6 (18, 33)	35	22 ± 0.5 (18, 30)
5.5	38	21 ± 0.4 (17, 28)	39	21 ± 0.5 (17, 29)
6	28	21 ± 0.4 (16, 26)	27	19 ± 0.4 (16, 24)
6.5	25	20 ± 0.4 (17, 24)	30	20 ± 0.4 (17, 24)
7	31	19 ± 0.4 (15, 23)	27	18 ± 0.4 (15, 22)
7.5	48	18 ± 0.3 (15, 21)	32	18 ± 0.3 (15, 21)
8	15	19 ± 0.5 (16, 23)	4	17 ± 0.9 (15, 19)
8.5	14	19 ± 0.7 (15, 23)	13	16 ± 0.8 (12, 21)

* Number in brackets refer to minimum and maximum time needed for post-winter development.

Table S3. Effect of light condition (24L:00D) on post-winter development (days ± SE) of *Rhagoletis cerasi* males and females from Dossenheim population (Germany). Pupae were incubated in a climate chamber after keeping in light condition at 4 ± 1ºC for a period ranged from 2 to 8.5 months.

Chilling period (months)	Post-winter developmental (days)			
	Males		Females	
	N	mean ± SE	N	mean ± SE
2	0		0	
2.5	9	39 ± 0.8 (35, 42)	5	36 ± 2.8 (31, 46)
3	14	34 ± 1.3 (21, 40)	14	33 ± 1.3 (24, 43)
3.5	22	30 ± 0.9 (19, 36)	34	30 ± 0.6 (22, 40)
4	31	29 ± 0.7 (21, 39)	34	28 ± 0.8 (21, 41)
4.5	36	27 ± 0.7 (19, 35)	41	25 ± 0.6 (19, 33)
5	38	23 ± 0.7 (18, 34)	44	22 ± 0.5 (18, 29)
5.5	43	22 ± 0.4 (19, 30)	42	20 ± 0.4 (17, 29)
6	53	20 ± 0.3 (16, 28)	37	19 ± 0.3 (16, 23)
6.5	46	21 ± 0.3 (17, 24)	36	20 ± 0.4 (17, 28)
7	35	19 ± 0.3 (16, 24)	54	18 ± 0.2 (15, 22)
7.5	48	19 ± 0.3 (15, 24)	29	19 ± 0.5 (15, 28)
8	38	19 ± 0.3 (15, 23)	32	17 ± 0.3 (15, 20)
8.5	36	18 ± 0.3 (15, 24)	36	17 ± 0.4 (12, 21)

* Number in brackets refer to minimum and maximum time needed for post-winter development.

Table S4. Effect of dark conditions (00L:24D) on post-winter development (days ± SE) of *Rhagoletis cerasi* males and females from Dossenheim population (Germany). Pupae were incubated in a climate chamber after keeping in dark conditions at 4 ± 1ºC for a period ranged from 2 to 8.5 months.

Chilling period (months)	Post-winter development (days)			
	Males		Females	
	N	mean ± SE	N	mean ± SE
2	0		0	
2.5	6	36 ± 2.3 (29, 42)	9	37 ± 1.4 (29, 45)
3	9	36 ± 0.9 (32, 40)	20	32 ± 1.0 (24, 39)
3.5	20	31 ± 0.9 (26, 40)	21	32 ± 0.9 (25, 40)
4	32	30 ± 0.6 (24, 37)	24	29 ± 0.8 (20, 36)
4.5	41	27 ± 0.6 (19, 35)	34	26 ± 0.7 (19, 33)
5	42	25 ± 0.6 (18, 32)	39	22 ± 0.6 (18, 31)
5.5	33	23 ± 0.8 (18, 38)	52	21 ± 0.4 (17, 31)
6	35	21 ± 0.4 (18, 29)	45	20 ± 0.4 (18, 30)
6.5	46	22 ± 0.3 (18, 28)	38	21 ± 0.3 (17, 24)
7	46	21 ± 0.3 (18, 26)	36	19 ± 0.2 (15, 22)
7.5	47	21 ± 0.2 (18, 24)	34	20 ± 0.2 (18, 23)
8	47	20 ± 0.3 (17, 24)	42	20 ± 0.2 (17, 23)
8.5	48	20 ± 0.2 (18, 25)	25	19 ± 0.3 (17, 22)

* Number in brackets refer to minimum and maximum time needed for post-winter development.

Table S5. Effect of low relative humidity condition (40%RH) on post-winter development (days ± SE) of *Rhagoletis cerasi* males and females from Dossenheim population (Germany). Pupae were incubated in a climate chamber after keeping at 4 ± 1ºC and low humidity for a period ranged from 2 to 8.5 months.

Chilling period (months)	Post-winter development (days)			
	Males		Females	
	N	mean ± SE	N	mean ± SE
2	0		0	
2.5	6	39 ± 1.5 (32, 43)	9	38 ± 2.2 (31, 53)
3	17	34 ± 1.1 (26, 43)	23	32 ± 1.0 (24, 45)
3.5	23	32 ± 0.9 (27, 42)	29	31 ± 0.8 (22, 40)
4	26	30 ± 0.7 (23, 38)	23	29 ± 0.8 (21, 36)
4.5	41	27 ± 0.6 (20, 36)	31	26 ± 0.7 (19, 34)
5	45	25 ± 0.6 (18, 35)	41	24 ± 0.7 (18, 33)
5.5	49	24 ± 0.5 (20, 32)	37	22 ± 0.5 (17, 31)
6	38	22 ± 0.4 (18, 31)	46	21 ± 0.5 (18, 32)
6.5	37	23 ± 0.4 (17, 30)	36	22 ± 0.4 (20, 29)
7	28	21 ± 0.2 (20, 24)	57	20 ± 0.2 (15, 24)
7.5	41	22 ± 0.3 (19, 26)	45	21 ± 0.2 (18, 25)
8	37	22 ± 0.2 (20, 24)	33	20 ± 0.2 (17, 23)
8.5	29	22 ± 0.3 (19, 25)	43	20 ± 0.3 (17, 25)

* Number in brackets refer to minimum and maximum time needed for post-winter development.

Table S6. Effect of medium relative humidity condition (60%RH) on post-winter development (days ± SE) of *Rhagoletis cerasi* males and females from Dossenheim population (Germany). Pupae were incubated in a climate chamber after keeping at 4 ± 1ºC and medium humidity for a period ranged from 2 to 8.5 months.

Chilling period (months)	Post-winter development (days)			
	Males		Females	
	N	mean ± SE	N	mean ± SE
2	0		0	
2.5	4	41 ± 0.9 (38, 42)	8	37 ± 1.6 (31, 43)
3	16	36 ± 1.4 (28, 45)	11	30 ± 1.5 (19, 36)
3.5	25	32 ± 0.8 (24, 39)	23	30 ± 0.8 (22, 39)
4	36	30 ± 0.5 (23, 37)	30	29 ± 0.6 (20, 36)
4.5	32	28 ± 0.6 (21, 34)	45	26 ± 0.6 (19, 33)
5	47	25 ± 0.6 (18, 34)	42	24 ± 0.6 (18, 35)
5.5	41	23 ± 0.6 (19, 36)	44	21 ± 0.4 (17, 29)
6	43	21 ± 0.4 (18, 29)	42	21 ± 0.4 (18, 32)
6.5	53	23 ± 0.3 (19, 28)	37	21 ± 0.3 (17, 25)
7	40	21 ± 0.2 (19, 24)	38	20 ± 0.2 (18, 24)
7.5	42	22 ± 0.2 (18, 24)	33	21 ± 0.3 (18, 24)
8	37	21 ± 0.2 (19, 24)	38	21 ± 0.3 (19, 24)
8.5	27	21 ± 0.3 (19, 25)	48	20 ± 0.2 (18, 24)

* Number in brackets refer to minimum and maximum time needed for post-winter development.

Table S7. Effect of high relative humidity condition (70-80%RH) on post-winter development (days ± SE) of *Rhagoletis cerasi* males and females from Dossenheim population (Germany). Pupae were incubated in a climate chamber after keeping at 4 ± 1ºC and high humidity for a period ranged from 2 to 8.5 months.

Chilling period (months)	Post-winter development (days)			
	Males		Females	
	N	mean ± SE	N	mean ± SE
2	0		0	
2.5	5	39 ± 1.9 (34, 46)	8	35 ± 0.9 (31, 38)
3	11	36 ± 1.0 (32, 41)	15	31 ± 0.7 (24, 34)
3.5	15	32 ± 1.7 (22, 43)	36	30 ± 0.8 (19, 38)
4	33	31 ± 0.9 (21, 41)	34	29 ± 0.9 (20, 48)
4.5	33	26 ± 0.7 (20, 36)	45	26 ± 0.7 (19, 36)
5	41	23 ± 0.4 (18, 29)	45	24 ± 0.5 (18, 30)
5.5	29	24 ± 0.8 (20, 36)	55	21 ± 0.4 (17, 30)
6	43	21 ± 0.4 (18, 29)	44	21 ± 0.4 (18, 30)
6.5	25	22 ± 0.3 (20, 26)	45	21 ± 0.2 (20, 24)
7	48	21 ± 0.2 (18, 24)	44	20 ± 0.2 (16, 25)
7.5	34	21 ± 0.2 (18, 24)	42	21 ± 0.3 (18, 24)
8	34	21 ± 0.3 (19, 24)	45	20 ± 0.2 (19, 23)
8.5	36	21 ± 0.2	43	20 ± 0.2

	(19, 23)	(17, 24)

* Number in brackets refer to minimum and maximum time needed for post-winter development.

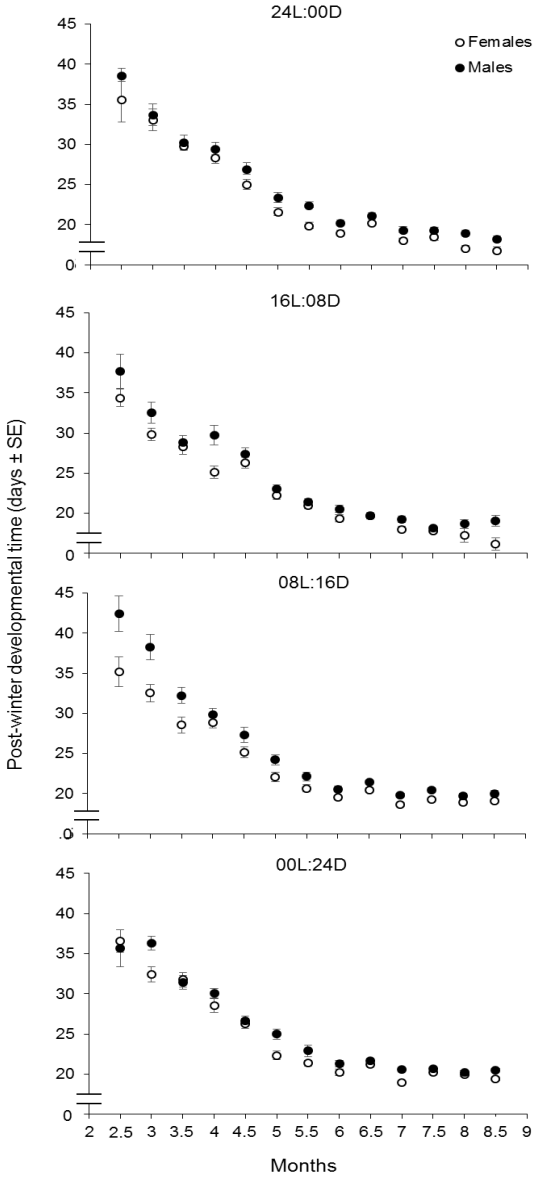

Figure S1. Postwinter developmental period (days) of *Rhagoletis cerasi* pupae from Dossenheim population (Baden-Württemberg State, Germany) after chilling for a period ranged from 2 to 8.5 months. ~~Throughput~~ Throughout

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chilling period, pupae were exposed to continuous light (24L:00D) and dark (00L:24D) conditions as well as to short (08L:16D) and long (16L:08D) photoperiod regimes.

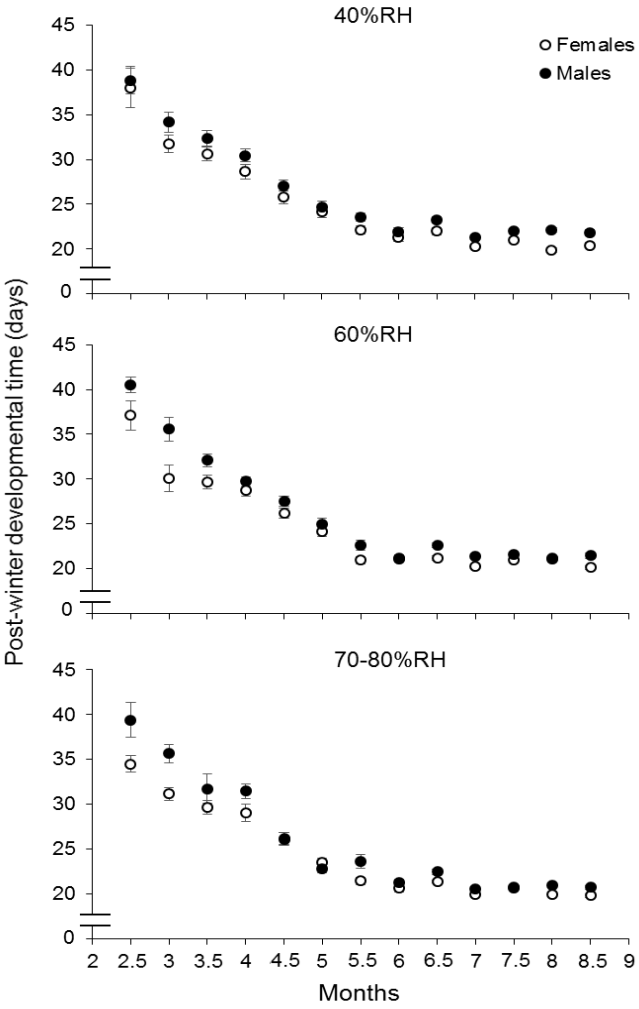

Figure S2. Postwinter developmental period (days) of *Rhagoletis cerasi* pupae from Dossenheim population (Germany) after chilling for a period ranged from 2 to 8.5 months. ~~Throughput~~ Throughout chilling period, pupae were exposed to low (40% RH), medium (60% RH) and high (70-80% RH) relative humidity conditions during chilling period.

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