

Lawn Turf: White Grubs & Leatherjackets – Identification & Management

Revised: May, 2013 – G. Nickerson and C. Maund (NBDAAF)



EC: European Chafer, *Rhizotrogus majalis*

- **Description:** adult (14 mm long), light caramel coloured; C-shaped larva, mature larva 25 mm long (unrolled); raster (pattern of spines) diverges (looks like an open zipper) near posterior end; adults and mature larvae are smaller than adults and mature larvae of most JuB and the JaB.
- **Damage:** **The EC is usually the most damaging of the white grub pests.** Larvae feed on roots of turf and grasses and some crops in the grass family; create dead patches; mature grubs attract birds and skunks.
- **Life Cycle:** One generation per year; adults appear approximately in mid July in NB; mate at dusk in trees; 25-50 eggs/female; eggs laid in bare patches of turf; larvae hatch early Aug; 7-8 weeks to maturity; overwinter as mature (3rd instar) larvae below frost; feed cool temps fall and spring; pupae May-June.
- **Control:** monitor turf sod (golf cup changer, square spade); treatment threshold: 5-20 grubs/0.1m² (10-15 grubs/0.1m² for healthy lawn); pupate when *Vanhoutte spirea* is in full bloom; maintain healthy turf, biological and chemical management options.
- **Other:** origin Europe; New Jersey 1940; New Brunswick 2010.



JuB: June Beetles (June Bugs), *Pyllophaga* spp. (various species)

- **Description:** 7 species (in NB); adults medium to dark brown; Adult: 15 to 40 mm; common species is 30 mm long; C-shaped larva; large common species has mature larva 30 mm long (unrolled); raster (pattern of spines) has almost parallel lines and does not diverge (looks like closed zipper) near posterior end.
- **Damage:** larvae feed on roots of turf and pasture grasses and ornamentals; adults feed on foliage of shrubs/trees.
- **Life Cycle:** three years to develop (common species); adults fly May-June (attracted to lights); eggs laid in grassy areas (June); most damage 2nd season when young larvae feeding; larvae pupate and adults remain in soil until 3rd season;
- **Control:** Monitor for larvae if numerous adults observed flying in June; treatment threshold 3-5 grubs/0.1m²; small larvae easier to control; often does not seriously damage turf significantly in NB.



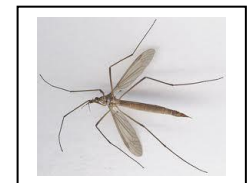
JaB: Japanese Beetle, *Popillia japonica*

- **Description:** bright metallic green thorax, coppery wings and tufts of white hairs along abdomen; adult (8-11 mm long); C-shaped larva, mature larva 25 mm long (unrolled); raster (pattern of spines) at posterior end forms the letter V;
- **Damage:** larvae feed on turf roots; wilting and yellowing plants (Aug/Sept); adult beetles feed on a wide variety of ornamentals & fruit crops;
- **Life Cycle:** one generation per year; adults emerge in July; feed 30-45 days and lay eggs in soil; larvae feed fall and spring; move deep into soil for winter; pupate next season in June.
- **Control:** recommended after peak egg laying / early larval instar in July-Aug (ON); traps for adults; nematodes, chemical options.
- **Other:** imported to North America in 1916; moving steadily east from USA and southern Ontario; now found in all Maritime Provinces.



LJ: European Crane Fly (ECF) - Leatherjacket, *Tipula paludosa*

- **Description:** adults (body 20 mm long) superficially look like very large mosquitoes with narrow wings and long legs, but do not bite; females which are full of eggs are apparently too heavy to fly; female European CF which have laid most eggs are poor at flying and fly close to the ground; larvae look leathery (leatherjackets); mature larva 20 mm long; grey-greenish brown with black specks; pupa brown (20 mm long) with spines.
- **Damage:** mostly turf; larvae feed below surface during day on roots and also feed at night on stems and foliage; larvae attract birds;
- **Life Cycle:** one generation per year; larvae feed all spring; stop feeding (June); pupate (late Aug); adults emerge in 2 weeks (NB: early Sep); mate immediately at dusk; 200-300 eggs/female laid within 24 hrs and require moisture to survive; hatch in 7-15 days; larvae feed all fall.
- **Control:** Monitor early spring or fall for larvae (leatherjackets) or pupae with soapy water drench or spade; treatment threshold 15-25 larvae per 0.1m² depending on turf quality or tolerance; higher threshold in fall; nematodes (*S. feltiae*) in spring; chemical options.



Credits: OMAF Pub. 162 Handbook for Professional Turf Managers; OMAF Turf IPM Manual Pub. 816; LNB Atlantic Sustainable Turf Manual.

Always follow Integrated Pest Management principles; healthy turf and soils will reduce pest infestation and damage.

Table 1: Nematode products for management of European chafer (EC) larvae, June beetles (June bugs) larvae (JuB), Japanese beetle (JaB) larvae and European crane fly larvae (LJ) leatherjackets in New Brunswick (may not be a complete list).

Active Ingredients	Product Names* Formulations**	Group	Rate	Pest Y = on Label N = not on label				General Comments
				EC	JuB	LJ	JaB	
Nematodes <i>H. bacteriophora</i>	Nemasys G (BU)	Bio	25-100 million/ 100m ²	Y	N	N	Y	Use at early 1st-2nd instar; soil 12-30°C for 2 weeks; avoid direct sunlight; water in well; keep soil moist for 2 weeks; do not store for more than 2 weeks;
Nematodes <i>Heterorhabditis bacteriophora</i>	Lawn Guardian (NIC)	Bio	5 million / 100m ²	Y	Y	N	Y	Canadian strains; warm soil 10-30°C; irrigate before and after treatment; avoid direct sun during application; timing spring or fall; late Aug to early Sep to early instars best; keep refrigerated.
Nematodes <i>Steinernema feltiae</i>	Guardian (NIC)	Bio	5 million / 100m ²	N	N	Y	N	Canadian strains; warm soil 10-30°C; irrigate before and after treatment; avoid direct sun during application; timing spring or fall; late Aug to early Sep to early instars best; keep refrigerated.

* Becker-Underwood (BU); Natural Insect Control (NIC)

Note: Information may change without notice. Always check Health Canada links for current label information:

<http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php> (English) or <http://pr-rp.hc-sc.gc.ca/lr-re/index-fra.php> (French)

Provincial pesticide permits: New Brunswick Department of Environment and Local Government; pesticides@gnb.ca Ph: (506) 444-5361

Accreditation and Certification: <http://www.planthealthatlantic.com/>

Table 2: List of **chemical** products for management of European chafer (EC), June beetles (June bugs) larvae (JuB), Japanese beetle (JaB) and European crane fly larvae (LJ) leatherjackets in New Brunswick (may not be a complete list).

Active Ingredients	Product Names*	IRAC Group	Mode of Action	Pest Y = on label N = not on label				General Comments (Follow instructions on label.)
				EC	JuB	LJ	JaB	
Carbaryl	Sevin SL (D); T&O Carbaryl (BCS)	1A	Contact	Y	N	N	Y	For suppression of population. Apply on early instars (youngest grubs) for optimum control.
Chlorantraniliprole	Acelepryn (D)	28	Systemic	Y	N	N	Y	The systemic has to be taken up by plants. Apply in mid-May for control of early instars (youngest grubs) in mid-August (i.e. ninety days after application).
Clothianidin	Arena (V)	4A	Systemic	Y	N	Y	Y	EC and JaB: Preventative – apply early, from when adults appear to peak egg hatch. Curative – high rate after egg hatch or when damage appears. Late season applications (late summer or early fall) may provide suppression only. LJ: Only apply when LJ reach damaging levels. Apply in the spring, when larvae are mature but prior to pupation OR in the fall prior to egg hatch.
Imidacloprid	Merit (BCS); Imidacloprid (Q-Pro),	4	Systemic	Y	N	Y	Y	One application per season. EC and JaB: For optimum control, make application prior to egg hatch of the target pest(s). LJ: Apply when adult European crane flies are flying in early Sep (approximate for NB). For suppression of early LJ stages in fall. Do not apply if the product has already been applied for another pest in the current year.
Thiamethoxam	Veridian (Syn)	4	Systemic	Y	N	N	Y	For optimum control, treat from peak flight to peak egg hatch. Apply one application from peak of adult flight to 3rd instar larvae of the species being targeted. In NB, for EC: peak flight (approximate mid-July); egg hatch (approximately early to mid Aug).

* Product names: Not complete list: Bayer Crop Science (BCS); Dupont (D); Syngenta (Syn); Valent Canada (V); Makhteshim Agan of North America (Q-Pro)

Charts: European chafer (EC) life cycle; NY compared with New Brunswick data 2011 and suggested optimum control period during early larval instar stage.

EC – life cycle (Western New York)

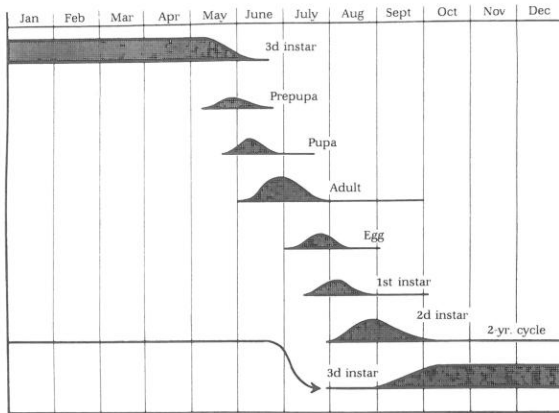


Figure 15-7. Life history of the European chafer in western New York, showing the dominant 1-year and minor 2-year life cycles. (From Tashiro and Gambrell 1963, fig. 3, courtesy of the Entomological Society of America.)

EC – NB data: P, A, Larvae 2nd(75%) 3rd (25%)

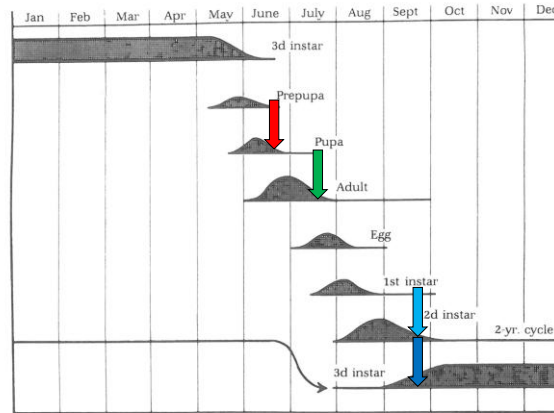


Figure 15-7. Life history of the European chafer in western New York, showing the dominant 1-year and minor 2-year life cycles. (From Tashiro and Gambrell 1963, fig. 3, courtesy of the Entomological Society of America.)

EC – Suggested optimum control period ☆

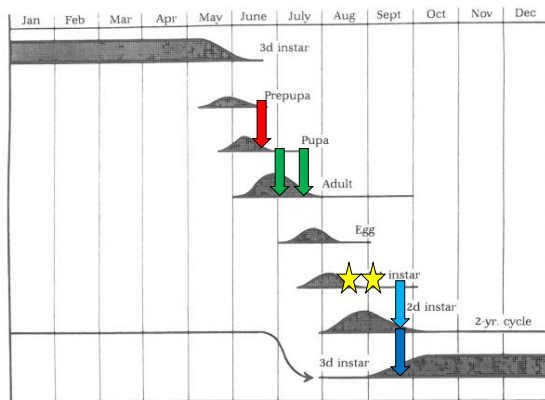


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Phyllophaga (JB)
(top)

(Photos of adults
approximately
2.5 X life size)

European chafer
(bottom)

Raster on grub
stage of
European chafer
(looks like an
open zipper)



Note: Information compiled for LNB IPM Symposium, Feb. 28, 2013 and is for general information only. It may be subject to interpretation or correction based on specific location, site, turf or pest conditions. No specific manufacturer or product endorsement is implied. No liability or warranty is offered.