





# Technical Bulletin for: **Agriotes Wireworm (gallicus)**

*Agriotes gallicus* (Lacordaire) • Coleoptera, Elateridae • AGRGAL



<b>DISTRIBUTION</b>	Central, Western and Southern Europe
<b>HOSTS</b>	Many types of seedlings, potato tubers and sweet potatoes are also potential hosts.
<b>DESCRIPTION</b>	
<b>Adult</b>	About 6-7 mm (males) or 7-9 mm (females) long, brownish to black in color, with a slight greenish tint.
<b>Larvae</b>	Cylindrical, smooth, waxy with few hairs. Larvae are straw yellow in color.
<b>Eggs</b>	
<b>LIFE HISTORY</b>	

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl hexanoate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding is another effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (caspicus)**

*Agriotes caspicus* (Heyden) • Coleoptera, Elateridae • AGRCAS



<b>DISTRIBUTION</b>	Afghanistan, Iran, Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Turkmenistan, and Uzbekistan, Russia
<b>HOSTS</b>	Many types of seedlings, potato tubers and sweet potatoes are also potential hosts.
<b>DESCRIPTION</b>	
<b>Adult</b>	About 9 mm long, brownish to black in color.
<b>Larvae</b>	Cylindrical, smooth, waxy with few hairs. Larvae are straw yellow in color.
<b>Eggs</b>	
<b>LIFE HISTORY</b>	

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl hexanoate, Geraniol and Myrcene in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	 
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding is another effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (lineatus)**

*Agriotes lineatus* (Linnaeus) • Coleoptera, Elateridae • AGRLIN



<b>DISTRIBUTION</b>	Europe, North America, Iran, Israel, and Turkey
<b>HOSTS</b>	Many species, including winter cereals, beet, carrot, onion, alfalfa, clover, tomato, and fruit saplings. Potato tubers and sweet potatoes are also potential hosts.
<b>DESCRIPTION</b>	
<b>Adult</b>	About 7-10 mm long, dark-brownish in color, with rounded, reddish-brown elytra and a near-black head.
<b>Larvae</b>	Initially whitish, turning light brown with maturity, and able to grow up to 15 mm.
<b>Eggs</b>	
<b>LIFE HISTORY</b>	This species prefers humid soil conditions along with relatively high temperatures. The adults appear in early spring, fly at night when temperatures are above 20°C and are attracted to light. They place their eggs (100-300/female) in vegetation-covered humid soil. The emerging larvae, which are sensitive to dryness, initially feed on humus and then on under- and above-ground plant material. They may go through several (up to 12) instars. At maturity they pupate in the soil, to appear in the spring, sometimes dispersing by flying. Total development requires several years.

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl butyrate and Geranyl octanoate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants just before spring. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding and crop rotation are other effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (litigiosus)**

*Agriotes litigiosus* (Rossi) • Coleoptera, Elateridae • AGRLIT



<b>DISTRIBUTION</b>	Iran, Austria, Bulgaria, France, Greece, Italy, Macedonia, Slovenia, Spain and Switzerland.
<b>HOSTS</b>	Many species, including maize, cereals, sunflower, sugar beet, potato, and tomato
<b>DESCRIPTION</b>	
<b>Adult</b>	About 7-11 mm long. Species can come in either dark beige or reddish brown in color, depending on geographical location.
<b>Larvae</b>	
<b>Eggs</b>	
<b>LIFE HISTORY</b>	Eggs are laid in the soil, where larvae feed on the roots of the host plant.

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl isovalerate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding is another effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (obscurus)**

*Agriotes obscurus* (Linnaeus) • Coleoptera, Elateridae • AGROBS



<b>DISTRIBUTION</b>	Widely distributed across Europe, Northern Caucasus, Kazakhstan, and Mongolia. Introduced to North America
<b>HOSTS</b>	Many species, including maize, cereals, sunflower, sugar beet, potato, and tomato
<b>DESCRIPTION</b>	
<b>Adult</b>	About 7-10 mm long, dark brown with convex elytra covered in yellow-gray hairs.
<b>Larvae</b>	Dark metallic yellow, can grow up to 25 mm long
<b>Eggs</b>	White, nearly globular, up to 0.5 mm in diameter.
<b>LIFE HISTORY</b>	Adults are on the wing from April to June or May to August, depending on geography. Females lay eggs in groups of 3-18, totally 75-230, on leaves or in the soil to a depth of 5 cm. Larvae develop for 3-5 years, feeding on the roots of the host plant. Pupation begins generally around July-August, with young Adults emerging around the same time, overwintering in the soil up to 25 cm below the surface.

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl hexanoate and Geranyl octanoate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding is another effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (ponticus)**

*Agriotes ponticus* (Stepanov) • Coleoptera, Elateridae • AGRPON



<b>DISTRIBUTION</b>	Southern Europe, including Italy, France, Spain, Bulgaria, Austria, Corsica, Czech Republic, Greece, Hungary, and Crete.
<b>HOSTS</b>	Many species, including Potato and Sweet Potato species.
<b>DESCRIPTION</b>	
<b>Adult</b>	
<b>Larvae</b>	
<b>Eggs</b>	
<b>LIFE HISTORY</b>	

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl butyrate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding, as well as crop rotation, are other effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (proximus)**

*Agriotes proximus* (Schwarz) • Coleoptera, Elateridae • AGRPRO



<b>DISTRIBUTION</b>	Widely distributed, including Austria, Bulgaria, Greece, Hungary, Italy, Moldova, Near East, North Africa, Slovakia, and South Russia.
<b>HOSTS</b>	Many species, including Maize, cereal grains, sunflower, sugar beet, potato, and tomato
<b>DESCRIPTION</b>	
<b>Adult</b>	7-11 mm long, very similar to <i>A. lineatus</i> morphologically.
<b>Larvae</b>	
<b>Eggs</b>	
<b>LIFE HISTORY</b>	

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl butyrate and Geranyl octanoate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding, as well as crop rotation, are other effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (rufipalpis)**

*Agriotes rufipalpis* (Brullé) • Coleoptera, Elateridae • AGRRUF



<b>DISTRIBUTION</b>	Widely distributed, including Bulgaria, Croatia, Greece, Hungary, Slovakia, and the former Yugoslavia.
<b>HOSTS</b>	Many species, including Maize, cereal grains, sunflower, sugar beet, potato, and tomato
<b>DESCRIPTION</b>	
<b>Adult</b>	7-11 mm long, body and elytra are greenish-brown to shiny black. Looks very similar, albeit smaller, to <i>A. sordidus</i>
<b>Larvae</b>	
<b>Eggs</b>	
<b>LIFE HISTORY</b>	

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl hexanoate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding, as well as crop rotation, are other effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (sordidus)**

*Agriotes sordidus* (Brullé) • Coleoptera, Elateridae • AGRSOR



<b>DISTRIBUTION</b>	Widely distributed, including Britain, France, Spain, Sicily
<b>HOSTS</b>	Many species, including Maize, cereal grains, sunflower, sugar beet, potato, and tomato
<b>DESCRIPTION</b>	
<b>Adult</b>	9-12 mm long, body and elytra are shiny black
<b>Larvae</b>	
<b>Eggs</b>	
<b>LIFE HISTORY</b>	Adults are on the wing around the end of April. Larvae feed on the roots and seeds of this host plant within the soil.

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl hexanoate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants, changing out after 3-4 weeks as necessary. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding, as well as crop rotation, are other effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (sputator)**

*Agriotes sputator* (Linnaeus) • Coleoptera, Elateridae • AGRSPU



<b>DISTRIBUTION</b>	Widely distributed, including Central Europe, Asia Minor, Northern Mongolia and Northern Africa
<b>HOSTS</b>	Many species, including Maize, cereal grains, sunflower, sugar beet, potato, and tomato
<b>DESCRIPTION</b>	
<b>Adult</b>	Measures between 6 and 9 mm long, bluntly pointed head and pronotum, of which the latter is brownish-ginger in color. The abdomen is brownish-black, with the elytra tinted reddish-brown with yellow tinge.
<b>Larvae</b>	Yellow, slender, stiff and leathery, growing to ~20 mm in length.
<b>Eggs</b>	
<b>LIFE HISTORY</b>	The adults are active for one or two months from late spring onwards. About one hundred eggs are laid in batches, 2 to 5 cm (0.8 to 2.0 in) beneath the soil and hatch after about two weeks. The larvae develop in the soil for two to four years. They feed on seeds and seedlings and the new tillers of cereal crops, and gnaw their way into roots, finding their food by smell. When fully-grown, the larvae pupate in late summer in the soil. The adults emerge two to three weeks later. The insects overwinter as adults and as larvae, the whole life cycle taking up to five years to complete.

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	Geranyl butyrate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants, changing out after 3-4 weeks as necessary. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding, as well as crop rotation, are other effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (ustulatus)**

*Agriotes ustulatus* (Schaller) • Coleoptera, Elateridae • AGRUST



<b>DISTRIBUTION</b>	Widely distributed, including Central Europe, Asia Minor, Northern Mongolia and Northern Africa
<b>HOSTS</b>	Many species, including Maize, cereal grains, sunflower, sugar beet, potato, and tomato
<b>DESCRIPTION</b>	
<b>Adult</b>	Measures between 7 to 11 mm long, brownish or reddish-brown abdomen and elytra with a black head and prothorax.
<b>Larvae</b>	Can go through up to 13 instars under lab conditions. Initially 1 mm in length.
<b>Eggs</b>	
<b>LIFE HISTORY</b>	Eggs are laid in moist soil and can be laid singly or in clusters, where clusters can be made up by 2 to 39 eggs, between May and June. Larvae hatch within 3-4 weeks and begin feeding on the roots of the host plants. Larvae reach maturity in the summer months and pupate within the soil. Fully-developed adults occur in two weeks, who overwinter and take wing in late March and early April.

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	E,E-famesyl acetate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants, changing out after 3-4 weeks as necessary. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding, as well as crop rotation, are other effective preventative measure.	

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# Technical Bulletin for: **Agriotes Wireworm (ustulatus)**

*Agriotes ustulatus* (Schaller) • Coleoptera, Elateridae • AGRUST



<b>DISTRIBUTION</b>	Widely distributed, including Central Europe, Asia Minor, Northern Mongolia and Northern Africa
<b>HOSTS</b>	Many species, including Maize, cereal grains, sunflower, sugar beet, potato, and tomato
<b>DESCRIPTION</b>	
<b>Adult</b>	Measures between 7 to 11 mm long, brownish or reddish-brown abdomen and elytra with a black head and prothorax.
<b>Larvae</b>	Can go through up to 13 instars under lab conditions. Initially 1 mm in length.
<b>Eggs</b>	
<b>LIFE HISTORY</b>	Eggs are laid in moist soil and can be laid singly or in clusters, where clusters can be made up by 2 to 39 eggs, between May and June. Larvae hatch within 3-4 weeks and begin feeding on the roots of the host plants. Larvae reach maturity in the summer months and pupate within the soil. Fully-developed adults occur in two weeks, who overwinter and take wing in late March and early April.

## MONITORING INFORMATION

<b>ACTIVE INGREDIENTS, LURE, FIELD LIFE</b>	E,E-famesyl acetate in a plastic vial. Lure longevity: 30 Days	
<b>TRAP TO USE</b>	Yellow Card, Double-sided or back-folding	
<b>MONITORING STRATEGY</b>	Hang trap near potential host plants, changing out after 3-4 weeks as necessary. Check with Cooperative Extension or Master Gardener for local information and recommendations.	
<b>CULTURAL &amp; PHYSICAL CONTROL</b>	Check soil near roots for wireworm presence or roots themselves for damage. Flooding fields for a few days prior to seeding, as well as crop rotation, are other effective preventative measure.	

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