Argentine Stem Weevil

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The Argentine Stem Weevil (*Listronotus bonariensis*) or ASW is as the name suggests an immigrant from South America. According to the CSIRO, the Argentine stem weevil is now well established in NSW, ACT, VIC, SA, TAS and WA. QLD and the NT are not confirmed. In the larval stages they are a serious pest of cool season turf such as Poa annua and to a lesser extent Agrostis stolonifera. In New Zealand, they are not only a serious problem in cool season turfgrass but a serious pest of pasture grass, where left unchecked they can destroy large areas of otherwise good grazing land for livestock.

Basic identifying features of an adult weevil are as follows;

- Small size, between approximately 3 and 3.5mm in length.
- They, like other beetles have a hard exoskeleton.
- Elytra (Wing covers) are often a dusty brown colour.
- Like all beetles and other insects, the adult has 6 legs.
- A small snout is present at the front of the head capsule.
- They can be very mobile within the grass canopy.

Figure 1. An adult stem weevil in a *Poa* and *Agrostis* spp mixed golf green.

The adult weevil life span has been observed ranging between 62- 179 days. When they first emerge as a young adult, they tend to be a lighter grey brown colour however, as they age, they become darker in colour and sometimes end up as almost black.

Whilst the adult beetles do have wings, it is believed that they usually tend to walk rather than fly. When these insects reach adult hood, their feeding habits seem to be of less significance to the overall health of the turfgrass plant. So whilst the adult beetle will feed on the leaves of the plant, they also tend to spend much of the time searching for a mate.

Figure 2. Argentine stem weevil eggs inside the leaf sheath.

Once a weevil has located a mate, they will breed. After a period of gestation, the female will begin to lay her eggs. Most female stem weevil will lay as many as 36 or 37 eggs over approximately 40 days.

The female will select a suitable grass stem, burrow into the leaf sheath tissue and oviposit up to 3 brown, ovoid shaped eggs less than 1mm in length inside the sheath of the turfgrass plant.

Egg laying starts in July and is thought to finish in March of the following year. The egg is known to hatch within as little as 10 days in very warm weather and as much as 20-30 days in cooler conditions.

Basic identifying features of a weevil larva are as follows;

- Creamy white in colour.
- Length to about 1-1.5mm.
- As with all weevil larvae, there is an absence of legs.
- They are very active when exposed.

When the larvae feed they disrupt the xylem cells of the host plant and as a result, the movement of water and nutrients into the leaves is slowed and or stopped completely. This gives an initial symptom such as yellowing of individual leaves which is then followed by wilting of the plant and necrosis due to drought stress. The macro symptoms can often be mistaken as dry patch.

The development of larvae from hatching to the beginning of pupation usually seems to last between 14 and 66 days depending upon the temperature, hence 14 days in very warm temperatures and possibly up to 66 days in cooler temperatures.

The ASW pupates which is like an apparent dormancy however, whilst the insect stops feeding and therefore damage to the turf may seem to stop, on the inside major changes are taking place in the lead up to the crescendo of metamorphosis.

Basic identifying features of a weevil pupa are as follows;

- Creamy yellow colour.
- About 3mm in length.
- They have a snout, legs and developing wings like the adult form.
- They wriggle very slightly when disturbed but are not mobile, they appear as if in a deep sleep.

When the ASW emerges as an adult, the life cycle is in its final stage. This is when the process starts all over again. It is worth noting that the ASW appears to be able to complete more than 3 generations in a good year under Australian conditions.

A snap shot of the ASW is as follows:

1. Eggs for the first generation are laid by the overwintering adults beginning in July.
2. 1st and 2nd instar larvae feed inside the plant stems.
3. Late 2nd instar and early 3rd instar larvae exit the stem of close mown turfgrass.
4. 3rd and 4th instar larvae feed on roots and other plant material in the thatch layer.
5. ASW larvae do not ingest large quantities of soil as part of their feeding habit.
6. The warmer the temperature, the quicker the life cycle and therefore greater potential for more generations to occur in a season.

Figure 3. 4th instar Argentine Stem Weevil larvae.

Figure 4. Argentine Stem Weevil pupa.

Figure 5. The ASW adult at 10x magnification.

In order to control the Argentine Stem Weevil, Then these 6 points need to be understood. They then need to be considered in conjunction with an understanding of how registered chemical products work when planning a preventative chemical control programme. Registered chemical control options for Argentine Stem Weevil in turfgrass are as follows in the table below;

Chemical control option	Active and trade names	Mode of action	Best target life stage
Organophosphates	**Chlorpyriphos** (Chlorpyriphos 500EC) **Diazinon** (Pennside turf) **Methidathon** (Supracide 400EC)	Cholinesterase inhibitors **1B**	**Adult and later instar larvae**
Synthetic Pyrethroids	**Compel Pro** (Bifenthrin)	Sodium channel modulators **3A**	**Adult**
Phenylpyrazoles	**Fipronil** (Impede)	GABA- Gated chlorine channel antagonists. **2C**	**Larvae**
Anthranilic Diamides	**Acelepryn** (Chlorantraniliprole) Spinner (Cyantraniliprole)	Ryanodine receptor modulators **28**	**Larvae**

Organophosphates (Chlorpyriphos, Diazinon and Methidathon) are contact insecticides. They work best when the target insect is present and contact the chemical at the time of application. These compounds generally have a very short effective life span once applied; this means that they are often only effective for about 7-14 days. They are not systemic and as such will not be taken up by the plant. Because they are not systemic, any insect that is feeding inside the plant is very unlikely to contact and therefore be affected by them.

Synthetic Pyrethroids (Compel Pro) are also contact insecticides. They work best when the adult ASW is present and in contact with the chemical at the time of application. These compounds also generally have a very short effective life span once applied ranging from about 7-14 days. They are not systemic and as such will not be taken up by the plant. They are not effective against ASW larvae.

Phenylpyrazoles (Impede) are moderately systemic insecticides that are able to be absorbed into the plant and be ingested by the young larvae feeding within. They are a larvicide and have no effect on the adult ASW population.

Anthranilic Diamides (Acelepryn and Cyantraniliprole) are systemic insecticides that are able to be absorbed into the plant and be ingested by the young larvae feeding within. They are also a larvicide and have no effect on the adult ASW population.

So in summary of the information thus far we can build a picture as follows;

1. It is better to control the overwintering adults early. This will help to reduce the adult population before they start to lay the eggs for the first generation.
2. Apply a suitable larvicide well before the weevil larvae leave the plant (both Fipronil and Acelepryn require between 7 and 14 days to be moved up into the plant). Ideally, it is good for these chemistries to be in the plant by the time the eggs hatch.

A programmed approach is always a good strategy.

It is always good to be prepared. When planning a preventative control programme, take note of the weather; for example, lower than usual winter rainfall and mild winter temperatures in your local area may contribute to a potentially heavy first generation pest population in the following spring.

A good rule of thumb is to be prepared to apply larvicides in the following months;

1.July **2.September** **3.November** **4.January**

Remember:

- It is good to apply a Synthetic Pyrethroid in early to mid-July in order to reduce the over wintering adult population.
- Follow up with an application of Acelepryn mid to late July.
- Repeat these two steps every 8-10 weeks.

A programmed approach should also consider chemical rotation. So if in July you apply Acelepryn as your larvicide, then when it is time for the next larvicide application, substitute it for Fipronil in mid to late September.

These two larvicides will work exceptionally well when placed alternatively in a programmed approach. In order to successfully control the larvae of the ASW, it is worth bearing in mind that you should be expecting to apply three and sometimes four well timed applications of larvicide in a spring/ summer period.