

Sweet Potato Weevil Management



Sweet Potato Weevil



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Sweet potato weevil (*Cylas formicarius*) is often considered to be the **most serious pest of sweet potato**.

Weevil infestation ranges from 20 to 50% on many farms and **can even reach to 80%** depending on the season and variety.

Higher infestation occurs during dry seasons

Sweet Potato Weevil Adult



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The adult weevil looks like an ant and is about 6.5 mm long



Sweet Potato Weevil

Adult damage



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The adult weevils feed on the leaves, vines and storage roots, but do little damage.



Sweet Potato Weevil Larva



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Larvae - the most destructive stage.

It is a small, whitish worm about 5-7 mm in length with a brown head



Sweet Potato Weevil

Larva damage



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The larvae do galleries in the tubers of the sweet potatoes, which strongly depreciates the commercial quality of the production.

Damaged tubers are thus much more sensitive to secondary invading fungi and bacteria causing rots before and after harvest.



Sweet Potato Weevil

Larva damage



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The larvae also do tunnels within a sweet potato stem and damage the base of the vine.



Sweet Potato Weevil Damage



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The impact on yield depends to a great extent on the soil and weather.

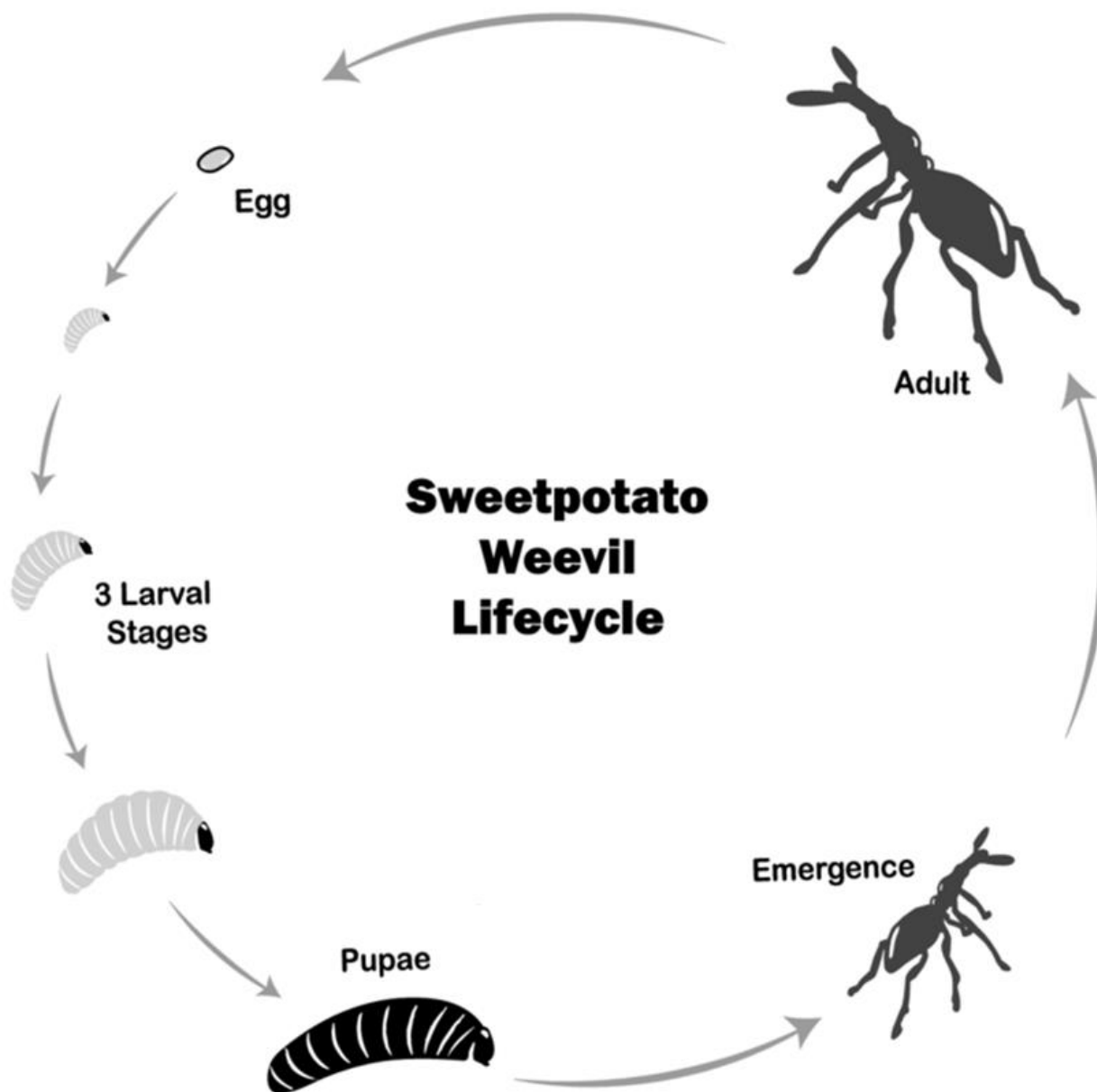
Light sandy soils and low rainfall increase the chances of heavy infestations.

There is also evidence that red-fleshed low dry matter varieties are more susceptible to infestation.

Sweet Potato Weevil Life cycle



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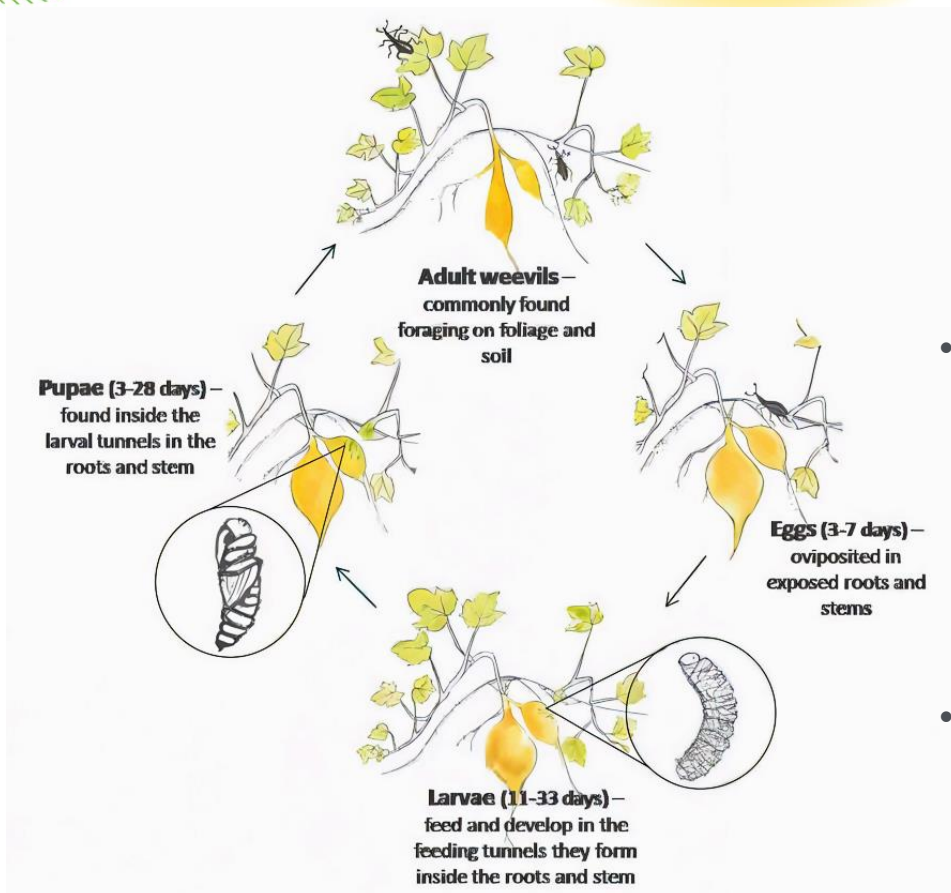


Sweet Potato Weevil

Life cycle



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- The adult female lays eggs on the stems, in vines or in storage roots, preferring the latter. Because the female cannot dig, she finds storage roots in which to lay her eggs by entering through soil cracks.
- Upon hatching, the larvae enter the base of stems or tubers and tunnel as they feed. The entire larval phase as well as pupation takes place in the plant.
- At optimal temperatures of 27-30°C, Sweet Potato Weevil completes development (from egg to adult) in about 33 days.
- Adult longevity is about 75-105 days and females lay between 100 and 250 eggs in this period.

Sweet potato area harvested, yield, production in Zimbabwe (Faostat)



Year	Area harvested,ha	Yield,kg/ha	Production, ton
2023	32 283	7 684	248 073

The average yield in Zimbabwe is 7.6 ton/ha
There is a big room to grow!

Country	Yield,kg/ha
Senegal	45 524
Egypt	34 073
Niger	31 678
Ethiopia	28 832
Botswana	26 645
Malawi	24 488
Morocco	22 454

Sweet Potato Weevil

Economic losses



Reports of losses ranging from five to 80% in areas where the weevil occurs.

Sweet Potato Weevil Damage
Field trial (2014 and 2015) at three locations.
International Potato Center Tamale, Ghana

Cultivar	Total yield (ton/ha)	Marketable yield (ton/ha)	Non-Marketable yield (ton/ha)	Loss in %
Apomuden	15,14	10,03	5,11	33,8
Kuffuor	8,79	6,31	2,48	28,2
Local	9,24	6,81	2,43	26,3
Nanugungungu	16,79	12,5	4,29	25,6

The average loss because of sweetpotato weevils is around 30%

What does that translate to in monetary terms?



What does that mean in money?



ALISHA - an orange flesh sweet potato variety
90-110 days maturity

Vines cost (30-40 ths. vines)	900-1200
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Fertilizer cost	3000-3500
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Potential Yield	15-20 tons/ha
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Price/kg	0.5-0.6 USD/kg
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Herbicide	79 USD Tornado 3L (36 USD) Simba 1,3 l/ha (24 USD) Quickstep 0,5 l/ha (19 USD)
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Insecticide foliar spray	6 USD Borey 150 ml/ha (6 USD)
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Potential revenue	7500 - 12000 USD
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Potential profit	3200 - 7500 USD/ha
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What does that mean in money?



The average loss because of sweet potato weevils is around 30%
15 ton yield – 30% loss= 10.5 ton (4.5 ton/ha of losses)
4.5 ton = **2250 USD/ha of losses**

What does that mean in money?



ALISHA - an orange flesh sweet potato variety
90-110 days maturity

Vines cost/ha	1200
Fertilizer cost/ha	3000-3500
Yield	10 tons
Price/kg	0.5-0.6 USD/kg
Herbicide	79 USD Tornado 3L (36 USD) Simba 1,3 l/ha (24 USD) Quickstep 0,5 l/ha (19 USD)
Insecticide foliar spray	6 USD Borey 150 ml/ha (6 USD)
Potential revenue (15 ton/ha)	7500 - 12000 USD
Real revenue (10 ton/ha)	5000-6000 USD
Potential profit (15 ton/ha)	3200 - 7200 USD/ha
Real profit (10 ton/ha)	715 USD – 1700 USD
Loss	4300 USD

Sweet Potato Weevil Control



When the sweet potato weevil populations are high, no single control method provides adequate protection. A combination of techniques, referred to as "Integrated Pest Management" (IPM), is recommended to manage and control the pest. **Effective control measures include:**

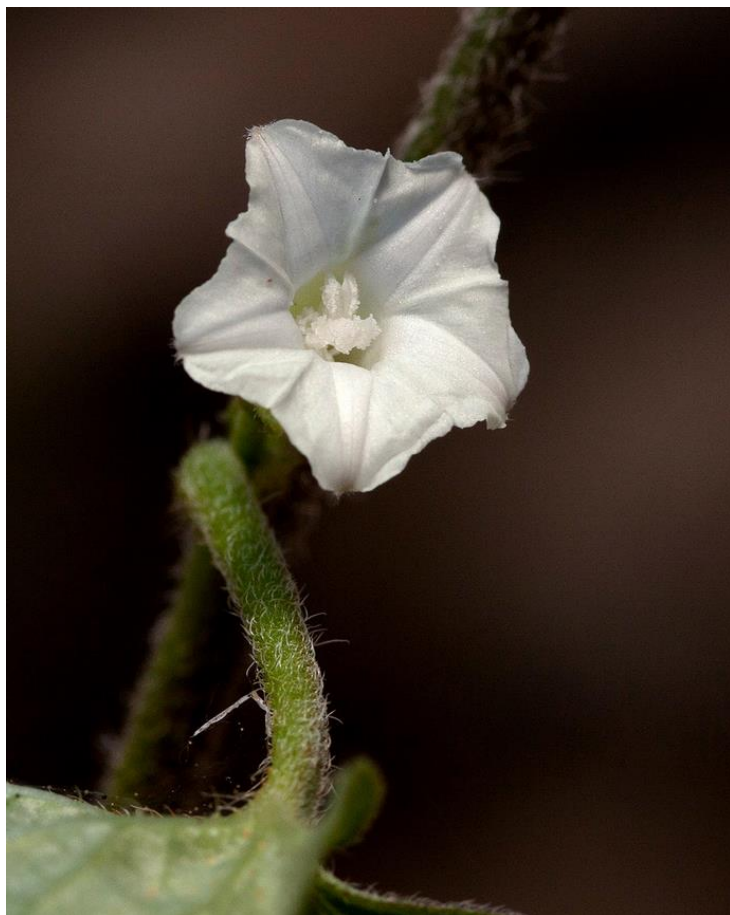
- Choose short-season varieties, i.e., those that produce a crop early.
- Sanitation of the field, removing previous crop debris. Infested sweet potato debris left in the field will infest the new plants/crop
- Use of uninfested vine tips as planting material. Select and use healthy planting material from fields that do not have weevil infestation
- Crop rotation. Do not plant sweet potato in the same field year after year. Plant another crop, for example pumpkins or peppers which will not be attacked by the sweet potato weevil.
- Timely planting and prompt harvesting to avoid a dry period.
- Applying sufficient irrigation to prevent or reduce soil cracking. Cracks in the dry soil allow for easy access of sweet potato weevil to the tubers. Mould or hill the soil around the base of plants to fill soil cracks so the weevil cannot reach to penetrate the tubers
- Harvest sweet potatoes as soon as they are ready. The longer the crop is left in the ground, the greater will be the infestation
- Keep sweet potato fields clean. **Remove all weeds, especially host crops**

Sweet Potato Weevil

Host plant



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The sweet potato (*Ipomoea batatas*) is a dicotyledonous plant that belongs to the bindweed or morning glory family, Convolvulaceae.

Sweet Potato Weevil attack other plants in the sweet potato family, including morning glory (*Ipomoea*)

Morning glory control In Sweet potato

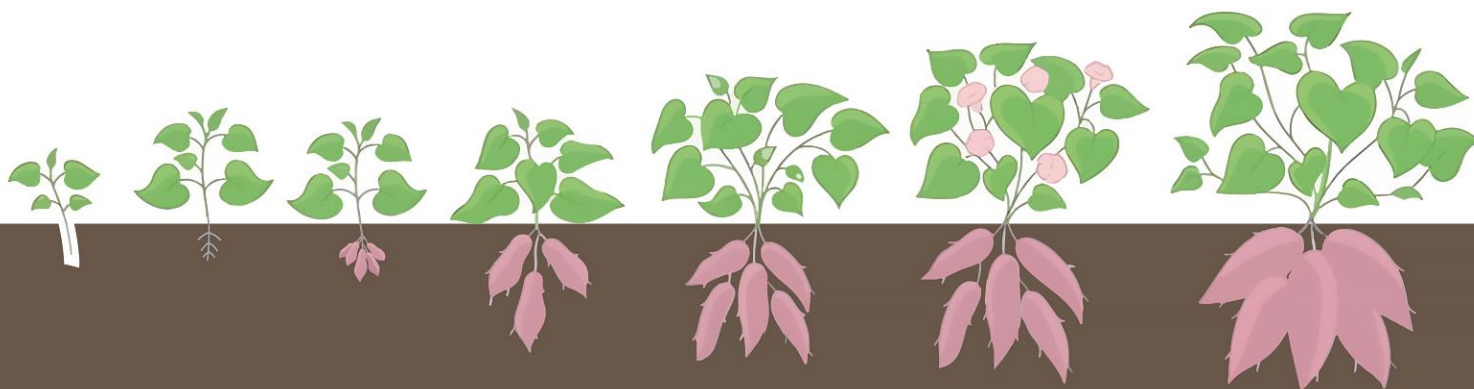


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Managing morning glory (Ipomoea) in sweet potato is difficult because they belong to one family. Herbicide that will effectively control morning glory will damage sweet potato.

An option is to use **Tornado 540®** (3 l/ha) before planting of sweet potato.

Tornado 540®



Blow every weed away



Tornado 540®

HERBICIDE

Glyphosate acid, 540 g/l
(present as potassium salt)

Tornado 540® is a unique formulation of glyphosate, formulated as a potassium salt which is one of the most soluble form among competitors, that gives a rapid transport throughout the plant and down to the roots, where weed-killing power is needed most.

Tornado 540® is non-selective and kills all plants that are emerged.

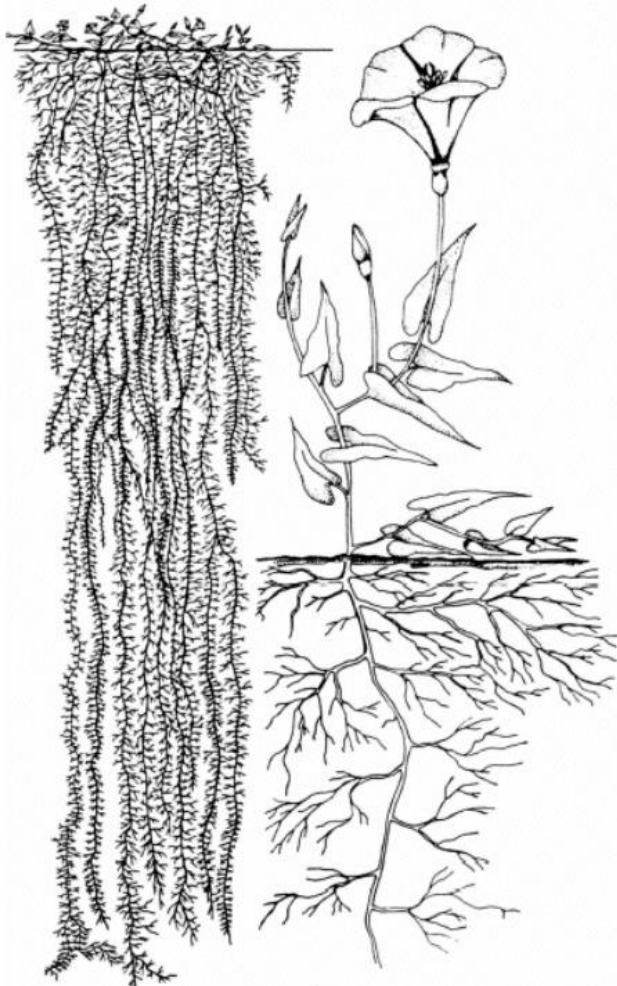
Thus it should be applied before planting to not kill sweet potato!



Glyphosate efficacy against bindweed
(Blackberry plant was not touched by the herbicide)

Sweet Potato Weevil

Host plant



Morning Glory plants have **deep and extensive root systems that can penetrate the soil up to 4.5 meters.**

Hand-weeding is not an option. Roots or rhizome fragments left behind may resprout. Repeated hand pulling works eventually, but is highly labor intensive.

There are number of products for Morning Glory control in other crops.

Thus, don't forget about crop rotation!



Sweet Potato Weevil Management with Insecticides



Sweet potato weevils are difficult to control using chemical pesticides as the egg, larval and pupal stages of their lifecycle are protected within the stems and roots, and not easily reached by insecticides.

However, there are several options that proved to be effective in a number of countries.

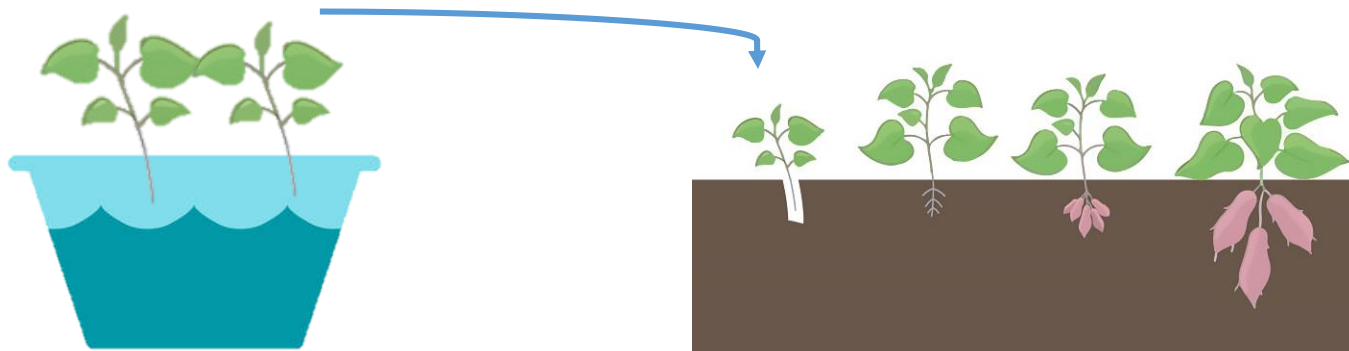
Sweet Potato Weevil Management with Insecticides



Option 1

Planting materials (vines) are dipped into Tanrek 500 insecticide prior to planting, which delay pest infestation for several months.

Mix Tanrek 500 (0,4 ml/1L water). Soak vines for 15 minutes, drain and then plant.



Sweet Potato Weevil Management with Insecticides



Integrated management of sweet potato weevil
Tirhut College of Agriculture, Bihar, India

Table 3. Efficacy of pest management module against sweet potato weevil (2021-22)

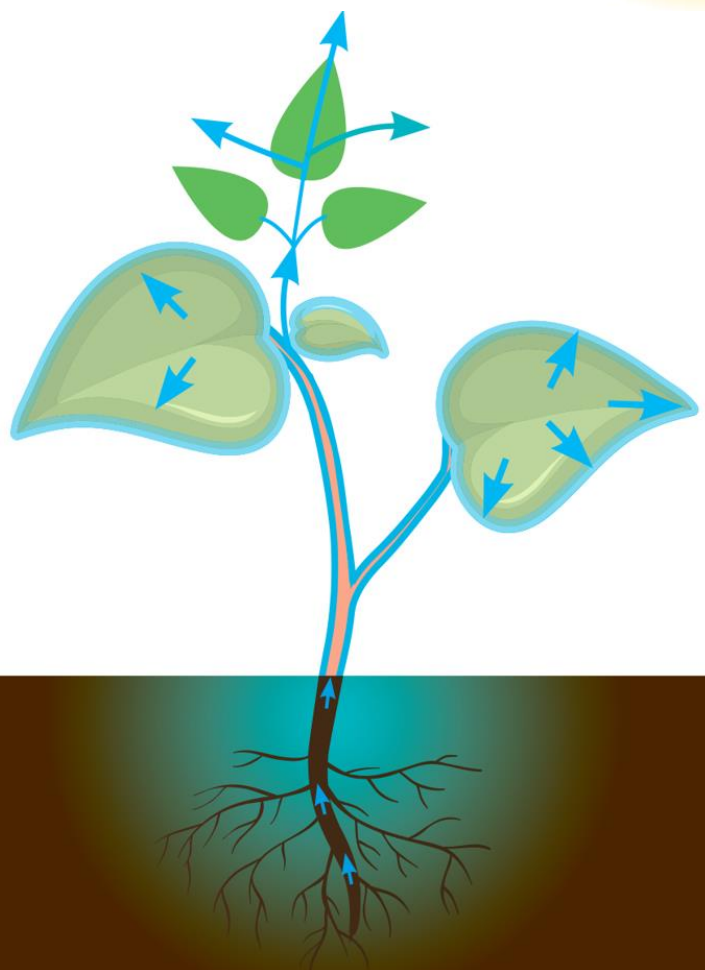
Treatment	Per cent vine infestation				Mean vine infestation	Tuber yield (t/ha)	Tuber infestation	
	30 DAP	45 DAP	60 DAP	75 DAP			Infested tuber yield (t/ha)	Tuber infestation(%)
T ₁	13.33	23.33	29.33	37.33	25.83	12.84	7.96	62.16
T ₂	8.67	19.33	25.33	36.67	22.50	16.57	4.89	29.51
T ₃	6.00	6.00	15.33	20.67	12.00	19.85	4.08	20.59
T ₄	6.67	4.67	10.67	12.67	8.67	20.43	1.02	5.01

- **T₁** Untreated control
- **T₂** Vine treatment with Imidacloprid + timely harvest
- **T₃** Vine treatment with Imidacloprid + foliar insecticide at 30 and 60 DAP + timely harvest
- **T₄** Vine treatment with Imidacloprid + earthing up + foliar insecticide at 30 and 60 DAP + timely harvest

Sweet Potato Weevil Management with Insecticides



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Tanrek 500® exhibits strong upwards systemicity.

It will be taken up by the stem and travel within the plant with the sap flow. (upwards).

Tanrek 500® does not move downwards, so it will not protect the root system that will appear later.

Thus, we believe, that the soil drench application is more promising.

Tanrek 500® is held within the soil particles, resists leaching and provides protection from further pest attacks, protecting the roots, root zone around the plant and the plant itself.

Sweet Potato Weevil Management with Insecticides



Option 2

Apply Tanrek 500® as a soil drench at root zone immediately after planting.

Dosage: 0,035 ml /plant

Apply as a soil drench 1 day after transplanting.

Mix 7 ml Tanrek 500® with 20 l water and apply 100 ml of this mixture to the soil around the base of the stem of each plant.

Repeat when needed (usually 28 days after) at the base of the plant



Sweet Potato Weevil Management with Insecticides



Option 3

Soak the vines into the Tanrek 500 solution

Mix Tanrek 500 (0,4 ml/1L water). Soak vines for 15 minutes, drain and then plant

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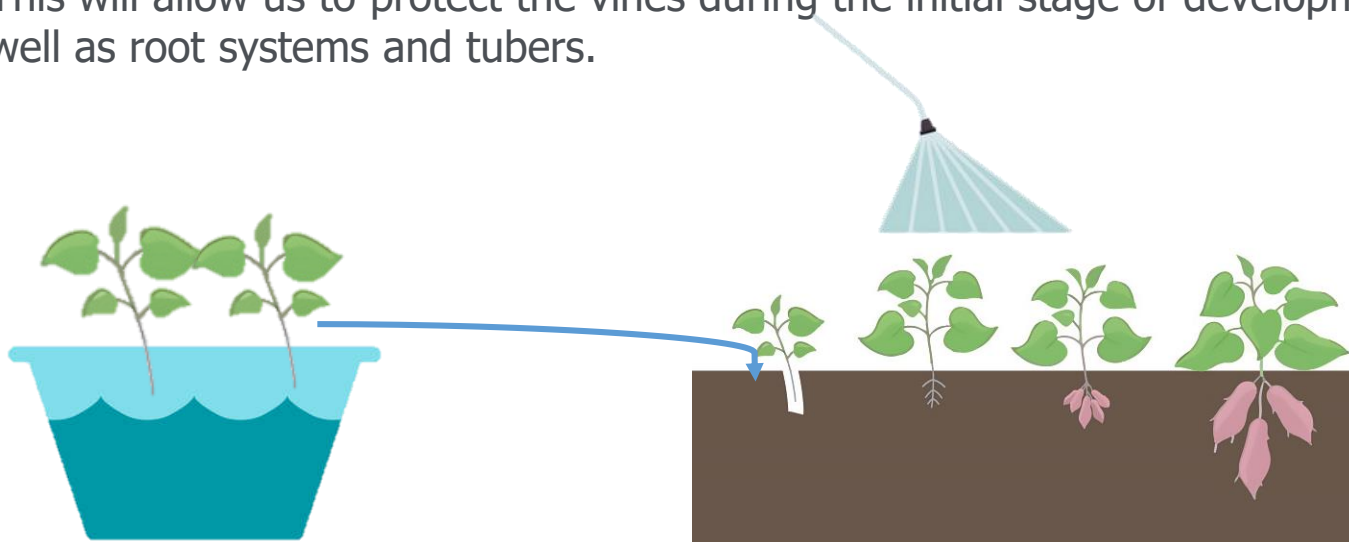
Apply Tanrek 500 as a soil drench, after the root system is starting to develop well.

Dosage: 0,035 ml /plant

Apply as a soil drench 1 day after transplanting.

Mix 7 ml Tanrek 500 with 20 l water and apply 100 ml of this mixture to the soil around the base of the stem of each plant.

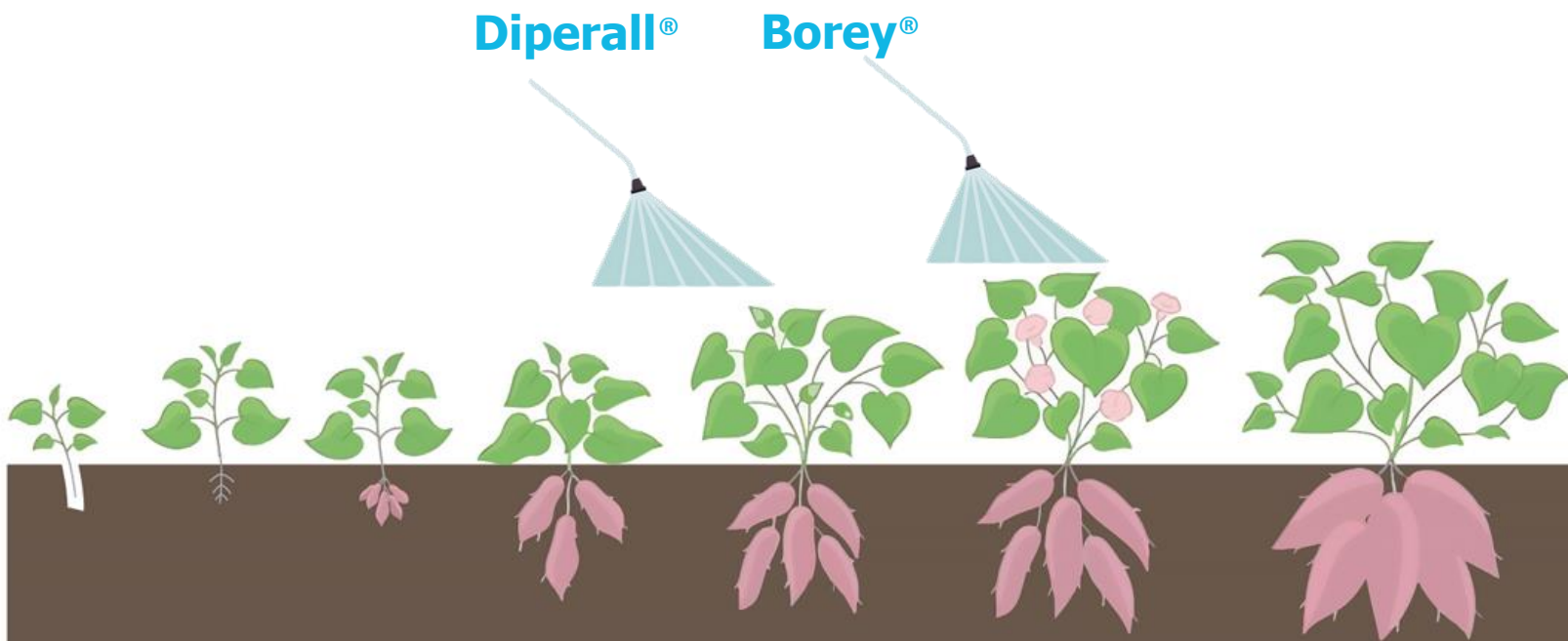
This will allow us to protect the vines during the initial stage of development as well as root systems and tubers.



Sweet Potato Weevil Management with Insecticides



- Inspect the crop regularly, at least once a week: check the base of the vines, looking for damage and holes
- Ideally, use the male pheromone to monitor weevil populations (if available).
- Spray with Dipefall if damage occurs at the crown area of the vines (i.e., the part just above ground level).
- **Dosage: 150 ml/ha (10 ml / 16L knapsack)**



How costs turn into profits?



Potential revenue (15 ton/ha)	7500 - 12000 USD
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Real revenue (10 ton/ha)	5000-6000 USD
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Potential profit (15 ton/ha)	3200 - 7200 USD/ha
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Real profit (10 ton/ha)	715 USD – 1700 USD
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Loss	4300 USD
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Sweet Potato Weevil Management Programme

Tanrek 500	Diperall
12 USD / 250ml	12 USD / 250ml
0,035 ml /plant (40 000 vines/ha) = 1,4 L/ha	Dosage: 150 ml/ha
67 USD/ha	12 USD/ha
Total: 80 USD/ha	

Spending 80 USD to save 4300 USD
x53 Return on investment

We grow well. Together

