



# Ponaplants - Technical Knowledge Base

Version 3.0 | 4 June 2026

## 1. What Is Ponaplants?

Ponaplants is a natural biological product that uses nanotechnology to interact with plants at the cellular level. It is marketed and sold as a biostimulant and soil amendment that strengthens plants to help their ability to fend off insects and microbes.

It is not a pesticide, fungicide, insecticide, or herbicide in the conventional sense. It is a biological intervention that eliminates harmful organisms while simultaneously building the plant's long-term immunity. With regular use, plants progressively develop self-defending capability. It also significantly increases the rate at which plant roots absorb nutrients from the soil.

### 1.1 Core Technology

- Particle size: 7 angstroms - small enough to pass through plant cell walls
- Hydrophilic: travels with water movement upward through the plant
- Penetration: reaches taproot and entire stem structure - areas no surface spray can reach
- Mechanism: eliminates pathogens from the root cause (literally the root), not just the surface expression
- Antifungal residual: stays active in treated soil for 28 days after application
- Enhanced translocation: dramatically increases the rate at which roots absorb and translocate nutrients and minerals through the plant

### 1.2 What It Does - Full Coverage

Ponaplants addresses all major categories of plant stress simultaneously:

Category	Specific Threats Covered
Fungal	Fusarium wilt, mildew (powdery and downy), fungal cankers, rust, general soil fungi
Bacterial	Bacterial cankers, bacterial wilt, greening disease (HLB - Citrus Greening)
Insects (external)	Aphids, thrips, spider mites, army worms, weevils, gnats - repelled/expelled on contact
Insects (internal)	Stem borers, coffee borers - eliminated via nano-penetration through stem walls
Soil pests	Nematodes, chafer grubs, leather jackets, white grubs, weevils, Fusarium wilt spores (2-3 applications)
Tropical fungal	Cocoa, Papaya, and Mango fungal disease - validated in tropical conditions

NOT covered	Weeds (use conventional herbicide separately, with 60-day wait before Ponaplants). NEVER use on mushrooms.
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### 1.3 Positive Outcomes Beyond Pest Control

- Accelerated germination - seeds treated with Ponaplants sprout faster
- Accelerated maturity - crops reach harvest stage significantly earlier (e.g., 90-day cucumber matures in 60 days)
- Yield increase - 2x to 5x depending on crop and conditions (see Crop Reference)
- Root development - 300% increase in root biomass when seeds are treated and plantlets sprayed
- Fruit quality - increased Brix (natural sugar) content; higher Brix also builds Systemic Acquired Resistance (SAR)
- Mineral density - enhanced translocation delivers significantly higher levels of calcium, magnesium, zinc, and copper from soil into the plant
- Protein content - 30% increase in crude protein in fodder crops (alfalfa, napier, pak chong)
- Zero residue - no detectable chemical residue in lab tests - qualifies for organic/natural labeling
- Water efficiency - deeper roots and better nutrient uptake reduce long-term irrigation requirements

## 2. Critical Rules - Read Before Using

**⚠ RULE 1: Wait 60 days after ANY chemical use (herbicide, insecticide, fungicide, fertilizer) before applying Ponaplants. Ponaplants dramatically increases plant absorption - any chemical residue will be drawn in at lethal concentration and kill the plant.**

**⚠ RULE 2: NEVER apply Ponaplants to mushrooms or in soil where mushrooms are growing. Mushrooms are fungi. Ponaplants' antifungal properties will destroy them. Residual soil effect lasts 28 days.**

**⚠ RULE 3: Use ONLY organic fertilizer alongside Ponaplants. Inorganic (synthetic) fertilizers release in a fast burst - Ponaplants' enhanced translocation will cause the plant to absorb toxic levels of minerals and nutrients. See Section 3 for the full explanation.**

**⚠ RULE 4: STOP treatment when healing begins. Over-treating prevents the plant from building its own immunity. The goal is a self-defending plant, not a dependent one.**

**⚠ RULE 5: NEVER spray directly on bees. Bees are essential pollinators. Apply early morning or late evening when bee activity is lowest.**

**⚠ RULE 6: NEVER spray directly on blooms. Direct application to flowers will cause them to fall off, resulting in yield loss. Spray leaves, stems, and trunk only.**

**⚠ RULE 7: When transitioning from chemical farming, STOP all herbicide, insecticide, and fungicide use and wait a minimum of 60 days before applying Ponaplants. If on a 90-day crop: wait 60 days then apply - you will still get the benefits in the final 30 days. Alternatively, treat seeds before planting to bypass the 60-day soil wait entirely.**

*i If using inorganic fertilizer and unwilling to switch, use Ponaplants for seed treatment only (before planting) - this gives meaningful immunity without the soil absorption risk.*

### 3. Understanding Fertilizers with Ponaplants

This section explains why organic fertilizer is a non-negotiable requirement when using Ponaplants. Understanding the science will help distributors and field teams explain the rule clearly to growers.

Core principle: Ponaplants significantly increases the rate at which plant roots absorb and translocate nutrients and minerals throughout the plant. This enhanced translocation is central to Ponaplants' yield and growth benefits - but it means the type of fertilizer used is critically important.

#### 3.1 Why Inorganic Fertilizer Cannot Be Used

Inorganic fertilizers deliver a fast burst of nutrients. Nitrate forms are quickly absorbed by plant roots - they are designed for immediate correction of deficiencies. When Ponaplants is active, enhanced translocation means the plant's uptake rate is already dramatically accelerated. Adding a fast-burst inorganic fertilizer creates a toxic overload. The plant absorbs far more than it can process, causing damage or death.

**⚠ Inorganic fertilizer + Ponaplants = toxic overload. Do not use synthetic or inorganic fertilizer alongside Ponaplants at any time.**

#### 3.2 Why Organic Fertilizer Works

Organic fertilizers release nutrients slowly and steadily. Only 3-5% or less is immediately available to the plant. The remainder is released gradually over weeks and months, dependent on soil microbes and conditions.

- Blood meal: slow release over 2-6 weeks
- Compost and manures: even slower - influenced by temperature, moisture, and microbial activity

*i Why this pairing works: Ponaplants' enhanced translocation accelerates uptake; organic fertilizer releases slowly. The combination gives the plant a steady, optimised flow of minerals and nutrients - not a toxic surge. Result: faster growth, deeper roots, and better yields, safely.*

Always apply organic fertilizer and water to the base of the plant when using Ponaplants, so nutrients are carried into the root zone alongside the Ponaplants solution.

## 4. Dilution Rates

Dilution is expressed as water:product. A 50:1 ratio means 50 parts water to 1 part Ponaplants concentrate.

Scenario	Ratio	Notes
Standard foliar spray (most crops)	50:1	General maintenance, prevention, and mild infestations
Strawberries	100:1	Thin epidermis = very high absorption. Apply max once per year.
Seed treatment (general)	50:1	Soak hard seeds 30-60 sec; mist/dip soft seeds briefly then dry
Severe / mature infestations	20:1 to 30:1	Established aphids, army worms, mature fungal infections
Root zone pour	Same as foliar spray	Pour at base of plant - water in with organic fertilizer for deep fungal infections (e.g., Fusarium)
Ornamentals and flowering plants	50:1 (reduce if sensitivity appears)	Test small area first. NEVER spray blooms. Weekly during treatment; monthly for maintenance.
Drone - prevention	50:1	Early-stage insect prevention over cooperative farm areas
Drone - active infestation	20:1 to 30:1	Active aphid or army worm infestations over large areas

## 5. Application Protocols

### 5.1 Timing and Conditions

Apply early morning or late evening. Avoid spraying during high heat - it reduces effectiveness and can stress treated plants. Sunny days are preferred because higher Brix from increased photosynthesis improves results.

**⚠ Never spray when bees are actively foraging. Never spray directly onto blooms - flowers will fall off.**

### 5.2 Pre-Watering

Lightly spray the plant with clean water before applying Ponaplants. Wait a few minutes, then apply. This opens the plant's absorption pathways and improves penetration and results.

### 5.3 New Crop / Clean Field (Best Practice)

This protocol maximises yield gains and builds immunity from the ground up.

- Treat seeds before planting (50:1 soak or mist depending on seed type - see Section 5.6).
- Plant with organic fertilizer only.
- When seedlings emerge, spray with leftover solution from soaking (at same 50:1 dilution).
- Optional: spray once more just before flowering for insect prevention - spray leaves and stems only, avoid blooms.

- After each harvest, apply one treatment to maintain immunity and improve next season's yield.

*i Seed treatment alone (without subsequent sprays) still provides meaningful immunity for the duration of the plant's growing cycle. Treating young saplings and seedlings acts like an immunity shot - earlier maturity, better yields, longer productive life.*

#### 5.4 Existing Crop with Active Infestation

- Identify the cluster area / epicenter of the infestation.
- Increase concentration to 20:1 or 30:1 for severe cases.
- Apply 2-4 times, spaced 3-4 days apart.
- For taproot-attacking fungi (e.g., Fusarium): also pour a small amount at the root base after each spray, watered in with organic fertilizer.
- When infestation visibly reduces - STOP. Let the plant build its own immunity.
- Resume regular maintenance dosing after harvest.

#### 5.5 Transitioning from Chemical Farming

- Stop all herbicide, insecticide, and fungicide use.
- Wait a minimum of 60 days.
- If on a 90-day crop: wait 60 days, then apply - you will still get the benefits in the final 30 days.
- Alternatively: treat seeds before planting (this bypasses the 60-day soil issue as the seed itself carries immunity).

*i Cooperative farming clusters: coordinate with neighbouring farmers to spray simultaneously. Cross-contamination from adjacent untreated plots is one of the most common causes of persistent infestation.*

#### 5.6 Seed Treatment - Soft vs. Hard Seeds

Seed Type	Examples	Method	Notes
Soft seeds	Berries, cotton	Brief dip (1-2 sec) or fine mist. Do NOT soak.	Dry before planting - required for automated planters.
Hard seeds	Avocado, macadamia	Soak 30 seconds to 1 minute, then remove.	Remove promptly - do not over-soak.
Maize / grains	Corn, sorghum	Soak in 50:1 solution; use leftover to spray seedlings.	Highly cost-effective - use leftover across the field.

#### 5.7 Ornamentals and Flowering Plants

- Spray leaves and stems only - NEVER spray directly onto blooms (flowers will fall off).
- Dilution: 50:1 standard; reduce to half strength if leaf stress appears within 24 hours.
- Test-spray a small area and check 24 hours later before treating the whole plant.
- Active treatment: spray once per week for up to three weeks.
- Once thriving: wait two weeks, then move to bi-monthly or monthly maintenance.
- For severe damage: apply root zone solution in addition to foliar spray.

## 5.8 Application Methods

- Hand pump (knapsack sprayer): Best for individual trees and severe localised infestations requiring full coverage of trunk, branches, and root base.
- Drone spray: Best for large cooperative farms, prevention programmes, and early-stage aphid/insect control. Highly efficient for simultaneous cluster treatment.
- Root zone pour: Used in addition to foliar spray for deep fungal infections attacking the taproot. Pour solution at the base of the plant and water in with organic fertilizer.

## 6. Best Practices

The following practices are recommended for all Ponaplants users to maximise results and prevent disease spread.

### 6.1 Do Not Use Infected Leaves as Mulch

When treating a diseased plant or tree - particularly banana trees - do not remove infected leaves and use them as mulch around the base of the plant or neighbouring plants.

Infected plant material carries the pathogen. Using it as mulch will reintroduce the disease directly into the soil, potentially reinfesting the treated tree and spreading infection to surrounding plants. This applies to any fungal, bacterial, or pest-related disease.

- Remove infected leaves and dispose of them away from the growing area entirely.
- Do not compost infected material unless the compost reaches temperatures sufficient to kill pathogens.
- After removing infected material, treat the plant with Ponaplants as normal.

*i This is especially critical for Fusarium wilt in banana plantations. Fusarium can survive in soil for 100+ years - introducing infected mulch can contaminate otherwise clean ground permanently.*

## 7. Crop-by-Crop Reference

This table summarises documented results and recommended protocols by crop. All data from field trials conducted by Marcos and partner research institutions.

Crop	Dilution	Frequency	Yield Gain	Key Notes
Strawberries	100:1	Once per year (max)	2x-3x size, sugar, yield	Thin epidermis = extreme absorption. Never exceed once per year. China holds approx. 40% of world hectares.
Blueberries	50:1	1x/year + after each harvest	3x-4x normal yield	1 treated hectare produces equivalent of 3-4 normal hectares.
Blackberries	50:1	1x/year + after each harvest	3x-4x normal yield	Same profile as blueberries.
Peanuts /	50:1	Seed treatment +	2x-3x; larger nuts;	Pairs excellently with

Groundnuts		spray at seedling emergence	higher protein	nitrogen-fixing rhizobia bacteria. Triple yield documented in Uganda.
Maize / Corn	50:1 seed soak	Seed soak + optional pre-flower spray	3.5 tons/acre (approx. 18 tons/ha)	Use leftover soak solution for field spray. Not economical at full spray for low-value row crops.
Banana (Fusarium wilt)	50:1	2-3 applications, 3-4 days apart + root pour	Eradication of wilt; immune for 1+ year	Pour at root base in addition to spray. Fusarium stays in soil 100+ years. Do not use infected leaves as mulch - see Section 6.
Coffee	50:1	2x/season + harvest treatment	Eliminates stem borers, coffee borers, rust	Nano-penetration reaches boring insects inside stem - unique capability no other product offers.
Grapes	50:1	1-2x/season	No insect pests; higher Brix; no chemical residue	Replaces the plastic-bag pesticide soak method. Zero residue for consumer safety.
Chilies / Peppers	50:1	Standard protocol	2-2.5x yield	Standard foliar application. Good results documented.
Fodder grass (alfalfa, lucerne, napier, pak chong)	50:1	Standard protocol	Double biomass + 30% crude protein increase	Excellent for cattle operations. More and better feed from same land.
Citrus / Oranges	50:1	1-2x/season	Increased Brix + enhanced mineral translocation (Ca, Mg, Zn, Cu)	Better nutritional value. Also effective against HLB (Citrus Greening).
Cocoa	50:1	Standard protocol	Fungal disease control; healthier yields	Validated for fungal disease management in tropical conditions.
Papaya	50:1	Standard protocol	Fungal disease control; growth enhancement	Validated for fungal disease in tropical fruits. Standard foliar application.
Mango	50:1 (20:1 for severe aphid)	Standard protocol	Disease-free fruit; aphid elimination within 10 days	Treat branches AND root zone for aphids. Do not only spray canopy.
Cucumbers	50:1	Standard protocol	Faster maturity; yield increase	90-day crop matures in 60 days. Cross-lessons apply directly to berry crops.
Avocado (seed)	50:1 soak	Seed treatment only	Improved germination	Soak hard seed 30-60 sec before planting in nursery.
Cotton	50:1 dip (no soak)	Seed treatment + standard protocol	Improved germination; pest	Soft seed - dip briefly, dry thoroughly before

			resistance	automated planter.
Tea	50:1	Standard protocol	Expected similar to high-value leaf crops - not yet documented	Identified as opportunity. Update as trial results come in.
Hemp / CBD	50:1	Standard protocol + seed treatment	2x-3x biomass; higher cannabinoid concentration in bud	Active 40-acre trial in Riverside, CA. Use with certified organic fertilizer. Scientific control group monitoring underway.
Turf grass (golf courses, municipal, sports fields)	50:1	Recovery: weekly up to 6 weeks. Maintenance: every 3-4 weeks	Recovery of insect-damaged turf; extended cold-weather performance	Extra applications extend healthy turf down to 27F / -3C. Organic fertilizer required. 60-day wait if prior pesticides applied.
Row crops (soybeans, wheat)	50:1 seed	Seed treatment only	Modest improvement	Not cost-effective at full spray rates. Seed treatment only is viable.
MUSHROOMS	N/A	NEVER	N/A - will be destroyed	Product has strong antifungal properties. Mushrooms are fungi. DO NOT USE. No exceptions.

## 8. Companion Planting and Field Strategies

### 8.1 Tobacco as Insect Decoy

When using inorganic fertilizer is unavoidable and the 60-day transition period is impractical, plant 3-4 tobacco plants per plot. Insects are strongly attracted to nicotine and will concentrate on the tobacco rather than the main crop, giving the farmer time to manage the transition.

### 8.2 Cooperative Cluster Spraying

In fragmented farmland where plots are adjacent (common in China, Ethiopia, Uganda), cross-contamination from untreated neighbouring plots is a persistent problem. Organise all farmers in a cluster to spray simultaneously. Drone application is particularly effective for this.

### 8.3 Soil Remediation Protocol

When acquiring or rehabilitating land with chronic disease (e.g., Striga infestation, Fusarium-contaminated soil), use Ponaplants to clean the soil by planting a disease-attracting trap crop, treating with Ponaplants, then following with the high-value crop. This converts otherwise unusable land into productive ground.

## 9. Disease-Specific Case Studies

### 9.1 Fusarium Wilt (Banana and Soil)

Fusarium wilt is one of the world's most devastating plant diseases. It destroyed Taiwan's banana industry in the 1960s. There is no conventional chemical cure. Fusarium lives in soil for 100+ years and spreads for hundreds of miles.

- Fusarium attacks at the taproot - no surface spray can reach it
- Ponaplants' 7-angstrom nanotechnology penetrates through the plant into the taproot and into the soil
- Documented result: a young banana plantlet treated with Ponaplants in the middle of a Fusarium-infested field, surrounded by dying mature plants, remained healthy and producing one year later
- Protocol: 2-3 applications at 50:1 dilution, 3-4 days apart, with root-base pour watered in with organic fertilizer after each spray
- Important: do not use infected leaves as mulch. Dispose of all diseased material away from the growing area. See Section 6.

### 9.2 HLB - Huanglongbing (Citrus Greening Disease)

HLB is a bacterial disease spread by the Asian citrus psyllid. It causes yellowing, misshapen bitter fruit, and eventual tree death. There is no conventional cure. As of June 2026, HLB is confirmed in Sacramento, California, and spreading throughout the state.

- Ponaplants' 7-angstrom systemic penetration reaches the bacterium throughout the entire vascular system
- No other natural product achieves this level of systemic reach
- Protocol: 50:1 foliar spray, 2-3 applications 3-4 days apart, plus root zone pour watered in with organic fertilizer
- Documented result: Ponaplants eliminates HLB quickly and effectively (confirmed June 2026). Active trials planned in Sacramento.

### 9.3 Stem Borers and Coffee Borers

These pests are considered nearly impossible to treat because they drill into the plant stem and are unreachable by surface sprays. Ponaplants' nano-size allows it to penetrate the stem wall and create an environment inside the stem that the borer cannot tolerate. The pest relocates rather than dying in place - which is why you do not see dead insects after treatment.

### 9.4 Thrip Infestation on Banana

Thrip is an opportunistic pest that appears after primary pests (weevils, nematodes) have weakened the plant. It covers the banana in black scale and bursts the skin. Standard 50:1 foliar spray eliminates thrips. The plant's skin becomes smooth and develops a visible sheen after treatment. Thrip is a secondary pest - eliminate the root cause (nematodes/weevils) and thrip disappears automatically.

## 9.5 Aphid Infestation (Mature)

Protocol for very mature aphid infestation (large, established colonies): escalate to 20:1 dilution. Treat branches, vines, AND root zone - root zone treatment is critical for tree crops. Repeat 3 days later. Complete resolution documented within 10 days on a heavily infested mango tree.

## 9.6 Severe Mildew

Fast-spreading fungal infection with a cluster source area. Increase concentration to 20:1 or 30:1. Apply 2-4 treatments, 3-4 days apart. Stop immediately when healing begins - do not continue. Identify and focus treatment on the cluster source, which is where the infection feeds from. Consistent resolution documented when the protocol is followed correctly.

## 10. UK / EU Regulatory Note

All ingredients are listed on the ECHA website (echa.europa.eu) and approved for use in plant treatment formulations, subject to EU and UK labelling regulations. The product is non-hazardous by OSHA classification and degrades 84.6% by Total Organic Carbon (TOC) reduction within 28 days, meeting EPA criteria for Ready Biodegradability.

Ponaplants is classified as a physical control method rather than a chemical or biological control in certain jurisdictions, which places it outside the jurisdiction of Plant Protection Product regulations. Always confirm local regulatory requirements before distribution.

## 11. Storage

- Store in cool, dry conditions in securely sealed containers
- Keep away from extreme heat, direct sunlight, and open flame
- Store away from foodstuffs
- Do not store near oxidisers, strong acids, or strong bases

*i Safety profile: Non-hazardous (OSHA). Non-flammable. Non-corrosive. No flash point. Biodegradable - degrades 84.6% within 28 days. Safety Data Sheet available on request.*

- End of Knowledge Base | Version 3.0 | 4 June 2026 | Update as new trials are documented -

info@ponaplants.com