PEDAVER
THE TRANSFORMATIVE PRODUCER

Knowledge Paper
199

PQNK - Natural Ecosystem Science for Production Agriculture

Abundance of nutritious food
PQNK®
The science of natural farming

SOIL | PLANTS | PEOPLE | A HEALTHY PLANET

When a Tree Bleeds Gum

The Plant Is Signalling a Problem, Not Asking for a Chemical

Understanding Gummosis Through the PQNK Living-Soil System

Gum is not the enemy. It is evidence that the plant is responding to injury or stress. Treating the gum without correcting the environment that allowed the injury is treating the message instead of the cause.

Gummosis is a visible symptom. The agricultural question is what caused the tissue injury and what conditions allowed it to develop.

> *The visible disease is often the last event in a much longer chain. PQNK moves upstream - from symptom, to tissue, to roots, to water and air, to soil structure, and finally to the production system.*
>
> *— PQNK*

1. A Farmer Asked a Simple Question

A farmer showed gum emerging from the stem of a citrus plant and asked: What is this gum? Why does the plant produce it? What is the remedy?

Conventional plant protection often moves from symptom to disease name and then to a treatment. PQNK begins one step earlier: why has the plant reached a condition in which tissue is being injured and gum is being produced?

Key Messages

- **Gummosis is a symptom, not one disease.**
- **The gum is part of the plant's response to tissue injury.**
- **Moisture, drainage and trunk wetting strongly influence Phytophthora risk.**
- **Roots require both water and oxygen.**
- **PQNK restores the production environment instead of treating only the visible symptom.**
- **An established destructive lesion still requires diagnosis and, when necessary, direct intervention.**

2. What Is Plant Gum?

The sticky material emerging from damaged bark is commonly described as gum or sap-like exudate. The condition is called gummosis.

Gummosis is not, by itself, the name of one particular disease. In citrus, Phytophthora infection is an important cause, but other diseases and physical injuries can also produce gum. UC IPM specifically notes that gumming alone is not definitive for diagnosis.

When bark and associated tissues are injured, gum-like material may accumulate and emerge through cracks or lesions. What the farmer sees on the outside is therefore a visible response to tissue damage. The underlying cause must still be identified.

Gummosis is a symptom. The cause must still be identified.

3. Why Does the Plant Produce It?

Plants cannot walk away from infection or injury. They respond where they stand. Their defence includes local chemical changes, structural barriers and compartmentalisation of damaged tissue.

In Phytophthora gummosis, infected citrus bark can develop cracks from which dark exudate emerges. The affected bark may later dry, crack and slough. Other gummosis-causing disorders can produce somewhat different patterns.

The gum should therefore be read as a biological signal: something has disturbed the normal integrity of this tissue. The correct agricultural question is not merely, 'How do we stop the gum?' It is, 'Why was the tissue damaged in the first place?'

4. Gummosis Is Not Always Phytophthora

Phytophthora gummosis is an important and common cause of profuse dark exudate on the lower trunk of citrus, but it is not the only cause. UC IPM lists Botryosphaeriaceae-associated gummosis and other trunk disorders among the possible lookalikes.

Diagnosis therefore matters. The location of the lesion, the condition of the bark and cambium, crown and root condition, irrigation pattern, trunk wetting, physical injury and other symptoms should be examined before naming the cause.

This distinction protects PQNK from a common error in both conventional and alternative agriculture: treating every similar-looking symptom as though it had one universal cause.

5. Phytophthora Shows Why Water and Aeration Matter

One of the most important causes of citrus gummosis is Phytophthora. These organisms are oomycetes, commonly called water moulds. Under moist conditions they produce motile zoospores. Splashing water can carry infective propagules to susceptible trunk tissue.

UC IPM reports that Phytophthora gummosis develops rapidly under moist, cool conditions and that management focuses on preventing conditions favourable for infection and disease development. It also states that correcting soil or water problems is essential for recovery.

Current Florida citrus guidance likewise warns that overwatering, especially of young trees, promotes buildup of Phytophthora populations and increases the risk of foot rot. Prolonged wetting of the trunk should be avoided.

The presence of water is necessary for life. The wrong water-air relationship can also create conditions favourable for disease.

6. The PQNK Question: What Happened to the Soil Environment?

PQNK does not regard soil simply as material that holds the tree upright. Healthy soil is a living, porous environment containing mineral particles, organic matter, roots, microorganisms, fungal networks, water and air.

Roots require both water and oxygen. When soil remains excessively saturated, air-filled pore space declines and root function can deteriorate. Phytophthora root rot also damages feeder roots, reducing the tree's ability to acquire water and nutrients.

PQNK therefore does not seek maximum water. It seeks the correct soil moisture condition: enough water to sustain biological and plant processes while preserving the aeration required by roots and aerobic soil life. This is the purpose of Soil Moisture Management.

7. Disease Is Not Explained by the Pathogen Alone

Finding a pathogen does not completely explain why disease developed severely in one tree and not another. Disease expression reflects interaction among the host, the causal organism and the environment.

UC IPM notes that Phytophthora species are widespread in citrus orchards, while disease development is strongly influenced by favourable environmental conditions. This leads to an important PQNK distinction: the presence of a potentially harmful organism is not identical to the development of disease.

The production system influences whether roots remain vigorous, whether the crown stays excessively wet, whether bark is repeatedly splashed, whether oxygen stress develops and whether biological relationships remain functional.

SOIL | PLANTS | PEOPLE | A HEALTHY PLANET

8. The Conventional Response Often Starts Too Late

When gum appears, conventional management may recommend cultural measures and, where Phytophthora is confirmed and disease pressure justifies it, fungicidal treatment. Such intervention can be important for saving an already affected tree.

But even conventional plant pathology guidance places strong emphasis on the environment. UC IPM states that correcting soil or water problems is essential for recovery and recommends good drainage, avoiding overirrigation, keeping the graft union above soil and mulch, and preventing prolonged trunk wetting.

This is significant. The disagreement is not whether soil and water conditions matter. They clearly do. The deeper difference is that PQNK makes restoration of the production environment the foundation of plant health rather than allowing a degraded production environment to continue while repeatedly managing its biological consequences.

9. PQNK Is the Long-Term Remedy

The PQNK remedy is not a chemical for gum. It is restoration of the soil-root-water-biological system.

No inundation protects the root zone from unnecessary saturation and prolonged oxygen shortage. No repeated soil disturbance allows soil architecture and biological networks to rebuild. Permanent organic cover moderates the soil environment, protects structure and feeds biology, while orchard mulch must not be piled against the trunk or crown. Biodiversity strengthens the biological complexity of the production environment.

Soil Moisture Management then maintains moist, aerated soil rather than cycling the root zone through flooding, oxygen deprivation and severe drying.

Under a mature PQNK system, many of the soil, water and root stresses that predispose plants to disease are removed or greatly reduced. The objective is not to suppress a symptom more efficiently. It is to restore the conditions in which the plant and its biological partners can function normally.

PQNK does not treat gum. PQNK restores the production environment that should keep the tree healthy.

10. Why We Should Not Write 'Gummosis Can Never Occur Under PQNK'

PQNK should be stated strongly without making an unnecessary biological absolute. A tree in a mature PQNK system can still suffer mechanical injury, graft damage, insect wounds, extreme weather injury, introduction of an aggressive pathogen or another specific disorder.

The scientifically stronger position is this: a mature PQNK system removes or greatly reduces many of the soil, water and root stresses that predispose plants to disease and therefore addresses the environment in which problems such as gummosis frequently develop.

This distinction strengthens rather than weakens the PQNK argument because it separates ecosystem prevention from the impossible promise that no living organism can ever be injured.

11. What About a Tree That Is Already Bleeding Gum?

There are two different questions. The first is how to establish a production system in which disease pressure is naturally minimised. The second is what to do with a tree that already has an active destructive lesion.

They should not be confused.

For the existing tree, first inspect the exact point from which the gum is emerging. Determine whether the lesion is low on the trunk or higher on branches. Examine whether the bark is cracked, dark, sunken, wet, dead or sloughing. Inspect the crown and root zone. Check whether irrigation water contacts the trunk, whether soil remains saturated, whether mulch or soil covers the crown, and whether mechanical or insect injury is present.

If active Phytophthora gummosis or another destructive disease is confirmed and the lesion is already serious, saving the tree may require direct intervention in addition to correcting the production environment. PQNK transition should not be interpreted as a reason to ignore an established infection.

Transition medicine and ecosystem health are not the same thing.

12. A Practical PQNK Diagnostic Sequence

Step 1 - Observe the symptom. Do not scrape, spray or label it before examining the lesion.

Step 2 - Locate the origin. Is the gum emerging from the lower trunk, crown, graft area, branch, pruning wound or insect-damaged tissue?

Step 3 - Examine the tissue. Look at bark integrity, cambium colour, cracking, softness, dead tissue and the direction in which the lesion is spreading.

Step 4 - Examine water. Is irrigation wetting the trunk? Is water ponding? Is the root zone remaining saturated? Is drainage restricted?

Step 5 - Examine soil structure and roots. Is there compaction, hardpan, poor aeration or feeder-root decline?

Step 6 - Examine the biological and physical environment. Look for wounds, insects, sun injury, mulch against the trunk, buried graft union and other disease symptoms.

Step 7 - Correct the production environment. Restore drainage, aeration, appropriate soil moisture, undisturbed soil, organic cover and biodiversity according to PQNK principles.

Step 8 - Treat an established lesion only when diagnosis and severity justify direct intervention. The objective is to save the tree during transition, not to make repeated rescue treatment the production system.

13. The Gum Is the Messenger

This farmer's question illustrates one of the largest differences between ACI and PQNK.

ACI commonly begins with the visible problem: gum -> identify pathogen -> prescribe treatment.

PQNK moves backwards through the causal chain: gum -> tissue injury -> plant stress or pathogen opportunity -> root and crown environment -> soil moisture and aeration -> soil structure -> production system.

The further upstream we move, the closer we come to the agricultural cause that can be changed permanently.

This does not deny pathology. It places pathology within ecology.

Treating the message is not the same as correcting the cause.

14. From Plant Protection to Plant Health

Plant protection is usually organised around threats: fungi, insects, bacteria, viruses, nematodes and weeds. Each threat is assigned a control measure.

PQNK begins with a different objective: create and maintain the natural production environment in which plants, roots and soil biology can function as an integrated system.

This changes the role of intervention. A pesticide or fungicide may occasionally be used during transition when a damaging problem crosses a practical threshold or an established lesion threatens the plant. But such intervention is not the foundation of the production system.

The destination is a field or orchard in which soil structure, aeration, moisture management, organic cover and biodiversity continuously support plant health. The farmer then manages the ecosystem rather than repeatedly purchasing rescue treatments for symptoms created or amplified by the production environment.

Conclusion

A citrus tree producing gum is communicating that tissue has been injured. The gum should therefore not be treated as the enemy.

The immediate cause may be Phytophthora, another pathogen, physical injury or another stress. Diagnosis remains important. But the deeper agricultural lesson concerns the environment in which the plant is living.

Poor drainage, prolonged saturation, repeated trunk wetting, root injury and disrupted soil function create a very different plant-health environment from the porous, biologically active, moisture-managed soil that PQNK seeks to restore.

The objective of PQNK is therefore larger than controlling gummosis. It is to restore the production system so that the conditions favouring repeated disease are no longer routinely created.

PQNK does not ask what chemical will stop the tree from showing the symptom. It asks what must be restored so that the tree no longer needs to produce the symptom in the first place.

SOIL | PLANTS | PEOPLE | A HEALTHY PLANET

Key Propositions

- Gummosis is a symptom, not a single disease.
- Phytophthora is an important cause of citrus gummosis, but gumming alone is not sufficient for diagnosis.
- Moisture, drainage, crown wetting and soil-water conditions strongly influence Phytophthora disease development.
- Roots require both water and oxygen; Soil Moisture Management is therefore central to PQNK plant health.
- The presence of a pathogen is not identical to disease development; host condition and environment matter.
- PQNK restores the soil-root-water-biological system instead of making repeated symptom suppression the production system.
- A mature PQNK environment can greatly reduce important predisposing stresses, but it should not be claimed that no tree can ever suffer gummosis or injury.
- An established destructive lesion still requires diagnosis and may require direct intervention while the production environment is being corrected.

- The long-term transition is from plant protection by purchased rescue inputs to plant health through restored ecosystem function.

Scientific Basis and Selected References

UC Statewide Integrated Pest Management Program. Phytophthora Gummosis - Citrus Pest Management Guidelines. Documents early symptoms, widespread presence of Phytophthora in citrus orchards, rapid development under moist conditions, and the importance of correcting soil and water problems.

UC Statewide Integrated Pest Management Program. Phytophthora Gummosis of Citrus - Home and Landscape. Notes that gumming alone is not definitive for diagnosis; recommends good drainage, avoiding overirrigation and prolonged soggy soil, keeping the graft union above soil and mulch, and avoiding direct trunk wetting.

UC Statewide Integrated Pest Management Program. Phytophthora Root Rot - Citrus. Describes feeder-root destruction, impaired water and nutrient uptake, motile zoospores under moist conditions, and management through drainage and avoidance of overirrigation.

University of Florida IFAS Extension. Florida Citrus Production Guide - Phytophthora Foot Rot and Root Rot. Reports that overwatering can promote Phytophthora populations and increase foot-rot risk, and recommends adequate drainage and avoidance of prolonged trunk wetting.

UC Statewide Integrated Pest Management Program. Diseases and Disorders of Citrus Limbs, Trunks, and Roots. Shows that multiple citrus disorders can cause bark cracking, oozing or gummosis and that diagnosis requires examination of associated symptoms and tissue.

Author's PQNK Interpretation

The scientific sources above establish the pathology and environmental relationships. The broader interpretation - that agriculture should move upstream from symptom control toward restoration of the living soil-root-water system - is the PQNK framework developed by Pedaver.