

PRODUCT KNOWLEDGE · PHOSPHORUS

V-Germinator Pro

P_2O_5 27% · N 4.5 · K_2O 2 · Mg 0.5 · S 2 · Fe 0.5

Liquid phosphorus in a plant-based carrier, for the two moments a granule cannot reach: the germinating seed, and the mid-life window when the basal phosphate has already been fixed.

PS 5469-2020

Licence CM/L-4300/2026

2 L · 4 L · 8 L

Plant-based carrier



THE PROBLEM

Pakistan imports phosphate. Then the soil takes most of it back.

What happens to conventional phosphate on calcareous ground.

Applied  100% applied

Fixed by the soil  ~80% fixed

Left for the crop  ~20% left

80–95%

of Pakistani soils are phosphorus-deficient
and roughly 80% of what is applied is fixed, because
soil pH sits far above the 6.0–7.0 window where
phosphorus stays available

A granule has to survive months in that soil before the root
arrives. A liquid delivered at the moment of demand does not.

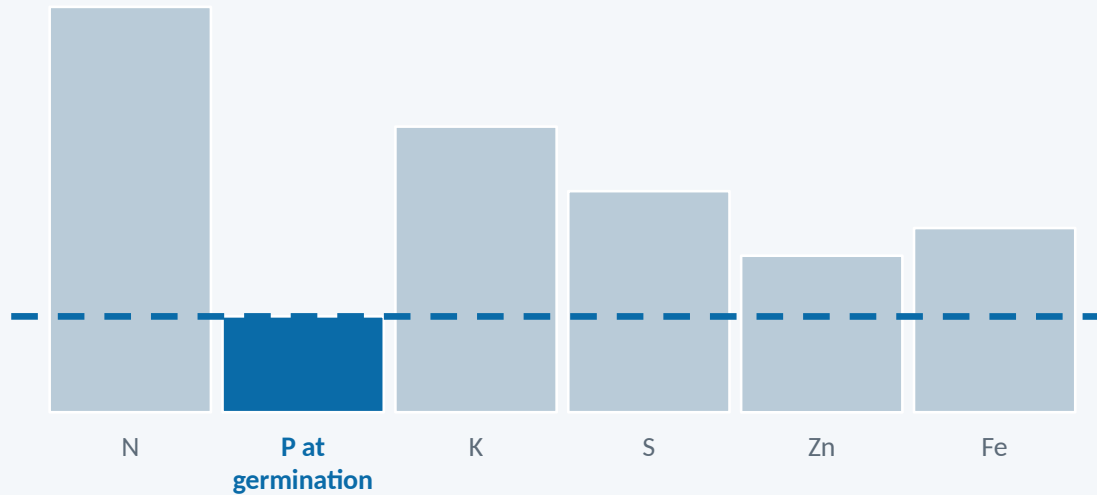
Figures as cited in VAN's 2026 product literature; see the sources slide.



Phosphorus is not lost from the field. It is converted into a form the root cannot take, and it accumulates there season after season.

At germination, every other nutrient waits on phosphorus.

Carl Sprengel set the law out in 1840; Justus von Liebig made it famous. Early in the season the limiting stave is almost always phosphorus, because it is the nutrient the seedling needs and the one the soil is least willing to release.



— the water line — what the crop actually yields

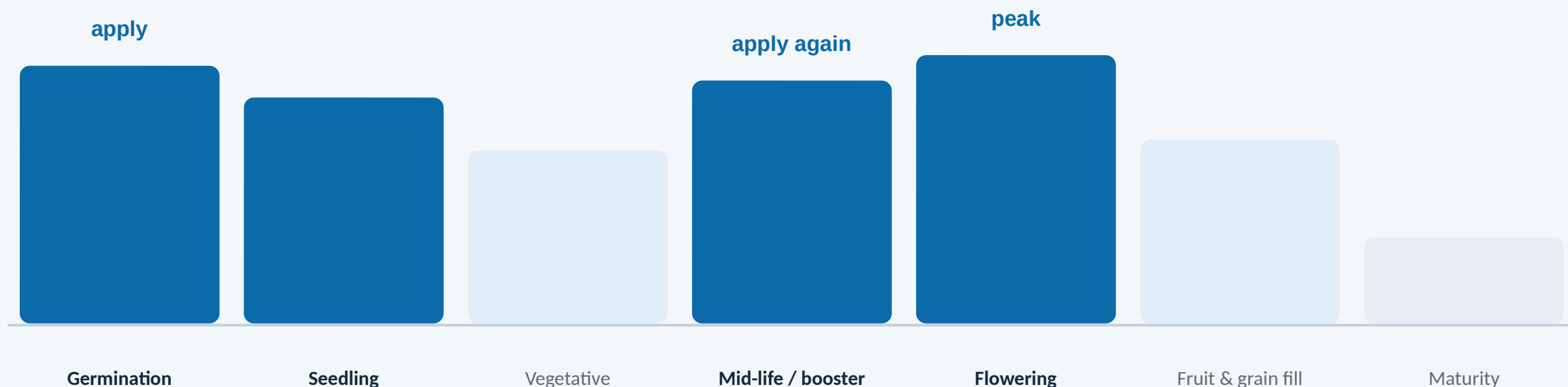
Energy first

Phosphorus is the plant's energy currency. A seedling short of it cannot pay for the uptake of anything else — so a phosphorus shortage at germination quietly shortens every other stave in the barrel for the rest of the season.

The staves show the shape of the problem, not measured soil values. A soil test is what tells you your own — VAN Lab publishes its prices.

Two peaks, and a granule only ever covers the first.

Relative phosphorus demand across the season. V-Germinator Pro is built for both — at germination, and again as a phosphate booster in mid-life.



VAN's guidance is to apply it about 40 days after the first phosphate application, or at the mid-life stage — as a booster on top of the basal granule rather than instead of it.

The band shows the shape of demand, not measured uptake for a named crop.

What is actually in the bottle.

Three pack sizes, one analysis.



V-Germinator Pro — 2 L, 4 L and 8 L

PHOSPHORUS

P_2O_5 27% w/v (270 g/L) — the declared headline nutrient

ALONGSIDE IT

N 4.5% · K_2O 2% · Mg 0.5% · S 2% · Fe 0.5%

PHYSICAL

Black liquid, 100% water soluble, pH 2 – 4

CARRIER

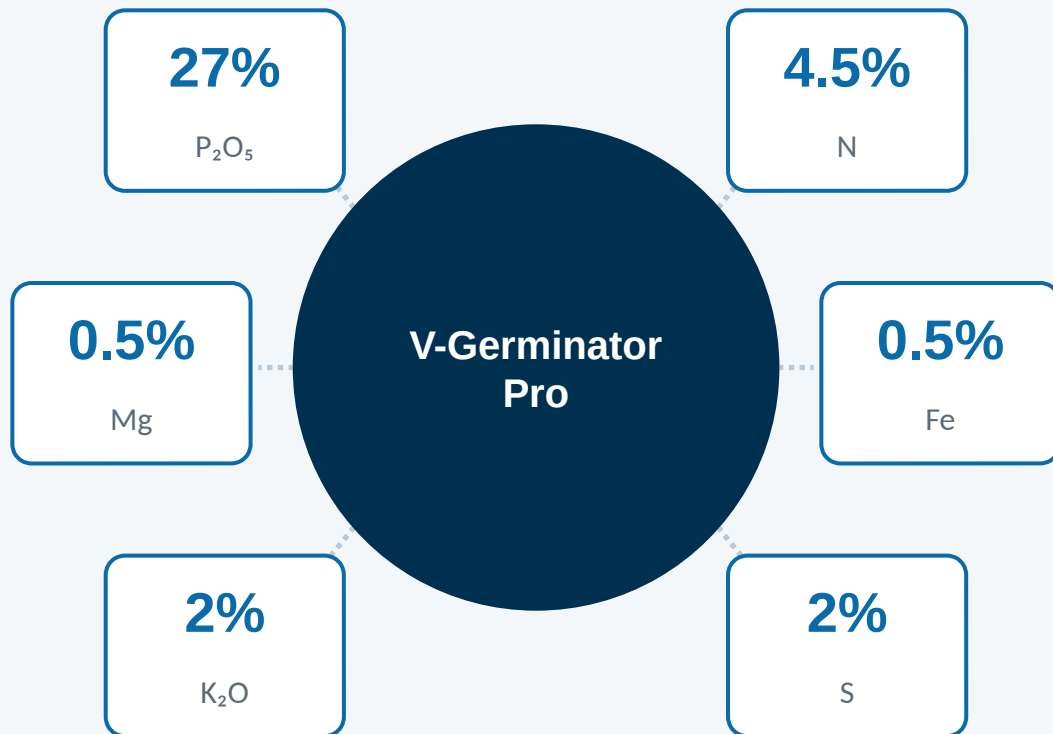
Plant-based, sucrose-rich organic solvent — proprietary

STANDARD & LICENCE

PS 5469-2020 · PSQCA marks licence CM/L-4300/2026

Six nutrients, declared.

As registered under PS 5469-2020 and as published on van.com.pk.



REACTION

pH 2 – 4

acidic — which is what keeps the phosphate in solution

SOLUBILITY

100% soluble

black liquid; fertigation or foliar

CARRIER

Plant-based

a sucrose-rich organic solvent, not a mineral acid

The carrier is doing as much work as the phosphorus.

What is engineered in beyond the six declared nutrients.

1 A plant-based carrier

The phosphorus is carried in a sucrose-rich organic solvent rather than a mineral acid solution. The sugars are bio-available: soil microbes use them, and microbial activity is what mineralises organic phosphorus back into an available form.

2 Acidic delivery

At pH 2 to 4 the phosphate stays in solution all the way to the root, instead of meeting free calcium in alkaline irrigation water and precipitating before it arrives.

3 Liquid, so it is placed

A liquid goes where the water goes. That means it reaches the root at the moment of demand rather than waiting in the soil for the root to find it.

4 Iron carried with it

Iron is included because phosphate suppresses iron uptake and calcareous soil suppresses it again. Sending phosphorus without iron creates the deficiency the next product has to correct.

Magnesium, sulfur and iron are all label-declared on this product, so the figures appear on the analysis slide.

One incompatibility matters more than all the others.

Established interactions between soil nutrients — after Mulder. These describe how nutrients behave with one another, not how V-Germinator Pro performs.



Works with

Balanced phosphorus improves magnesium uptake, and balanced magnesium improves both nitrogen and phosphorus uptake in return

The sucrose fraction feeds soil microbes, raising the phosphatase activity that mineralises stable organic phosphorus

Sulfur acidifying its surroundings has the same effect on phosphorus availability from a different direction

Iron delivered with the phosphate offsets the suppression the phosphate itself causes



Competes with

 **ZINC.** Do not tank-mix this product with zinc. Phosphate and zinc precipitate as zinc phosphate — you lose both, and you may block the line

Excess phosphorus reduces zinc, iron and copper uptake generally, which is why the two are applied separately rather than together

Excess calcium suppresses phosphorus, magnesium, iron and zinc together — the standing condition of a calcareous soil

Excess iron in turn reduces phosphorus availability, so the iron here is a trace and not a headline

 Compatible with all fertilizers and agrochemicals EXCEPT zinc. That is not a formulation weakness; it is basic chemistry, and it applies to every soluble phosphate on the market. Apply zinc on a separate pass.

What phosphorus is actually doing in there.

Six functions, none of which the plant can perform without it.

1 Energy currency

Captures and converts solar energy into chemical energy — ATP is a phosphate molecule

2 Pays for uptake

Gives the crop the energy it needs to extract every other nutrient from the soil

3 Cell division

Present in every living cell; central to division and to new tissue

4 Root architecture

Drives early root development, which then governs water and nutrient access all season

5 Genetic material

The backbone of DNA and RNA is a sugar-phosphate chain

6 Seed and grain

Concentrates in seed and grain — a phosphorus-short crop sets and fills poorly

What a phosphorus-short crop looks like.

General agronomy, not a VAN measurement. It advances in three stages, and by stage three the season is decided.

1 Stage 1 — mild

Leaves begin to purple from the edges inward

2 Stage 2 — prolonged

Left untreated, the leaf goes purple across its surface

3 Stage 3 — severe

The leaf turns completely purple; growth has already been lost

4 Oldest leaves first

Phosphorus is mobile: the plant strips it from old tissue to feed new growth

5 Thin roots

A shallow root system, which then limits every other nutrient and all the water

6 Late everything

Delayed flowering and maturity — which in Pakistan can push harvest into the wrong weather

Fertigation or foliar — the same product, two jobs.

VAN publishes a separate 4R schedule for each. They are not alternatives; they answer different questions.

Fertigation

Delivered with the irrigation, to the root zone, across the whole acre.

- The route for germination and early root establishment
- Reaches the root at the moment of demand rather than waiting in the soil
- One week after planting, before and after flowering, two to three times

Foliar

Sprayed onto the leaf, bypassing the soil entirely.

- The route when the soil is the problem — high pH, high free calcium, or dry
- Fastest correction of a visible deficiency
- Same stages, lower volume, and no fixation between the tank and the plant

On the worst calcareous ground the foliar route is not a convenience, it is the only route that reliably arrives.

WHERE IT IS USED

Built for horticulture and high-value crops.

VAN publishes stages and doses by crop group for both the fertigation and the foliar schedule.

Fruiting vegetables

Leafy vegetables

Onion

Garlic

Potato

Maize

Orchards

Soft fruits

Oilseed crops

Ornamentals

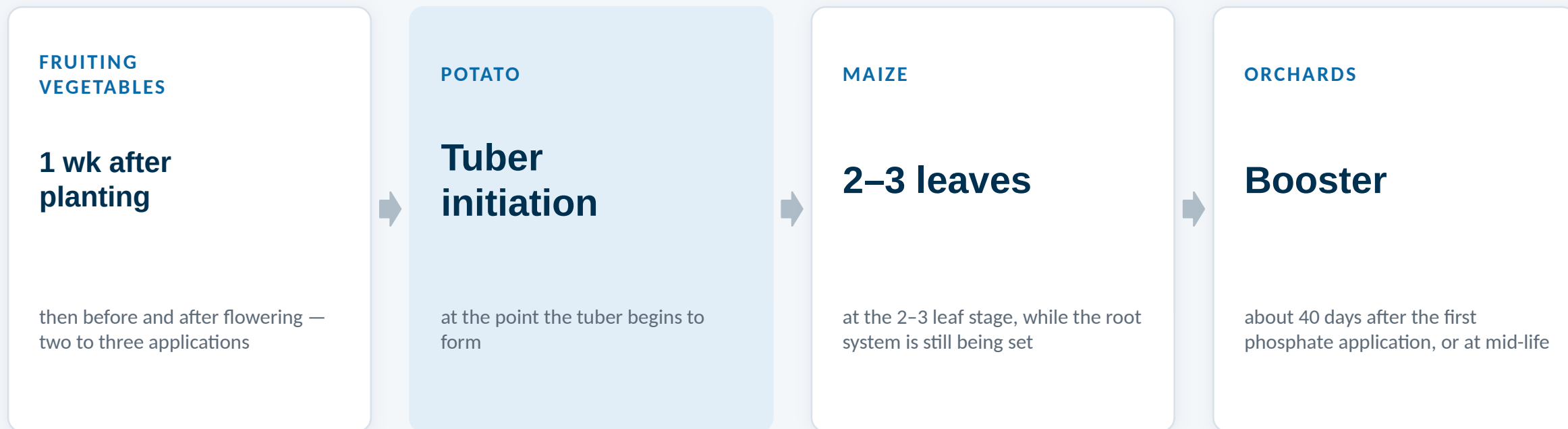
Ten crop groups with published stages, on van.com.pk and in the 4R schedule.



V-Germinator Pro is a phosphate booster as well as a germination product: VAN's guidance is to apply it around 40 days after the first phosphate application, or at the mid-life stage.

Right source, right rate, right time, right place.

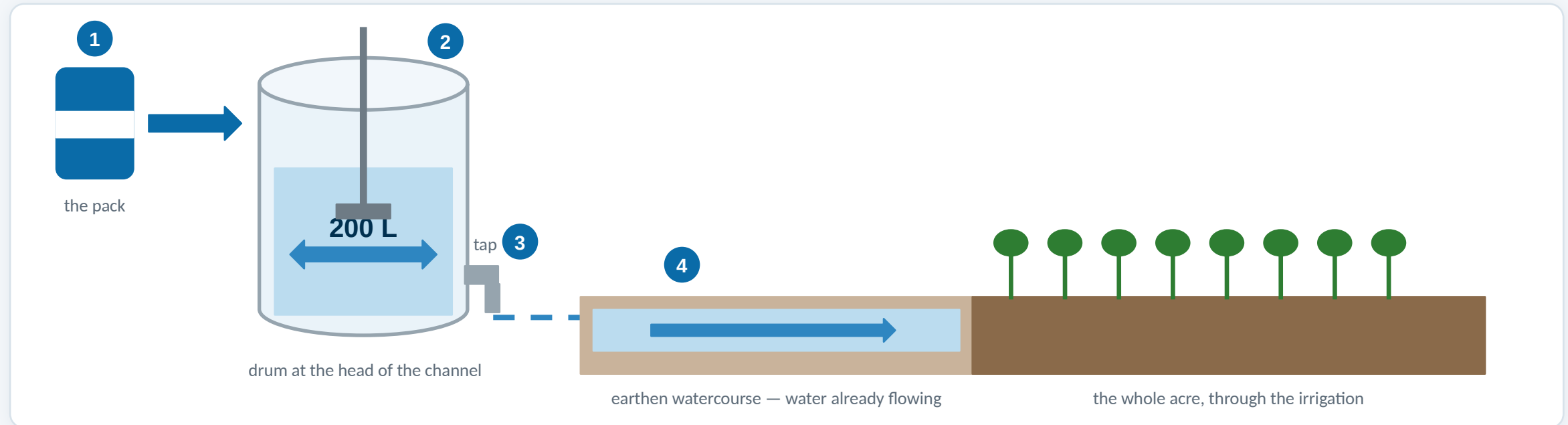
The published stages, by crop group.



Leafy vegetables, onion, garlic, oilseeds and ornamentals all have published stages on both the fertigation and foliar schedules.

It goes in at the drum, not at the bag.

A starter has one window, and it is short.



1 Measure it

Per the published crop plan. Weigh it. A guessed dose is the commonest error in the field.

2 Dissolve and agitate

Into a 200 L drum of water at the head of the watercourse. Stir until it is fully in solution — undissolved product settles and blocks the tap.

3 Meter it in

Open the tap so the drum empties across the whole irrigation, not in one slug. The water should already be flowing.

4 At the right stage

At establishment — a week after planting, at tuber initiation, at 2–3 leaves. Into the wetted root zone, across the whole acre.

Doses are per acre, from VAN agronomy. The drum is drawn at 200 L because that is what is standing at the head of most Punjabi watercourses — scale the water, not the product.

Four things that decide whether it works.

1



Never mix with zinc

Phosphate and zinc precipitate as zinc phosphate. You lose both nutrients and you may block the emitter. Apply zinc separately.

2

It is a booster, not a replacement

This tops up a basal phosphate at the moment of demand. It is not a substitute for putting phosphorus in the ground at sowing.

3

Timing beats rate

The two demand peaks are narrow. A modest dose inside the window beats a large one outside it.

4

Do not neutralise the acid

pH 2–4 is doing work. Tank-mixing it towards neutral will drop the phosphate out of solution before it reaches the plant.

What is behind the bottle.

1

PS 5469-2020

Registered against the Pakistan Standard for liquid nutrient supplements.

2

Licence CM/L-4300/2026

PSQCA marks licence, current, printed on the pack.

3

Tested before it ships

Every batch is tested in VAN's own PNAC-accredited laboratory, ISO/IEC 17025:2017, LAB-336.

4

Certificate on request

Send the batch number off the pack and VAN will send the certificate of analysis for that batch. Free, no sample, no form.

Four reasons, and none of them is a yield claim.

- 1 Delivered, not stored**

A liquid applied at the moment of demand does not have to survive months in a soil that is trying to fix it.
- 2 Six nutrients declared**

Phosphorus with nitrogen, potash, magnesium, sulfur and iron — all on the label, not implied.
- 3 A carrier that feeds the soil**

The sucrose-rich plant-based carrier supports the microbial activity that releases the phosphorus the soil already holds.
- 4 Two routes**

Fertigation where the soil will cooperate, foliar where it will not.

SOURCES

Where every figure in this deck came from.

Analysis, standard, licence

van.com.pk guaranteed-analysis table — P_2O_5 27%, N 4.5%, K_2O 2%, Mg 0.5%, S 2%, Fe 0.5%, PS 5469-2020, CM/L-4300/2026

Physical properties

VAN V-Germinator Pro technical deck — black liquid, pH 2–4, 100% soluble, sucrose-rich organic solvent

⚠ Zinc incompatibility

Same deck: "compatible with all fertilizers and agrochemicals except Zn". Consistent with basic phosphate chemistry

P deficiency and fixation

Ahmad, M. et al. (2022). Sustainability 14(13), 7669

P uptake by growth stage

As compiled in the same VAN deck, references 4–8

Booster timing

VAN guidance, 23 July 2026 — apply ~40 days after the first phosphate application, or at mid-life

Nutrient interactions

After Mulder's chart — established relationships

Law of the minimum

Carl Sprengel (1840), popularised by Justus von Liebig

605 Al-Hafeez Heights, Gulberg, Lahore 54660 · van.com.pk · WhatsApp +92 300 5003041



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For information only. VAN may change a product's composition at any stage for agronomic, efficiency or upgrade reasons.