

PRODUCT KNOWLEDGE · SECONDARY NUTRITION

Cala-Mag V

Ca 6% · Mg 4% · N 10%

Calcium, magnesium and boron in one compatible liquid — the three nutrients a calcareous soil holds in abundance and still will not hand to the crop.

PS 5469-2020

Licence CM/L-4299/2026

1 L

Foliar & fertigation



It started as a misdiagnosis on a tomato farm in Sindh.

Cala-Mag V is one of the few VAN products with a documented origin, and it is worth telling because it explains the formulation.

1

The symptom

Fruit on a tomato farm in Sindh showed white patches. The grower and those around him took it for a viral disease and treated it as one.

2

The diagnosis

VAN's team identified it as calcium deficiency — not a pathogen. The soil was not short of calcium; the plant could not get at it.

3

The response

A liquid blend of calcium and magnesium with boron, formulated so the three could be delivered together without competing with one another.

4

Why it matters

Calcium deficiency is rarely reported in Pakistan, because it is rarely looked for. It shows up as quality loss in horticulture, and quality loss is usually blamed on something else.

THE PARADOX

The soil is full of calcium. The plant still cannot get any.

A calcareous soil is defined by its calcium carbonate. That is not the same as calcium the root can take up.

Calcium in the soil



abundant, as carbonate

Free in solution



the fraction a root can take

1 in 3

of the world's soils are calcareous

holding excess calcium carbonate — and plants still crave the free calcium ion in soil solution, which is the only form they can absorb

Calcium deficiency is rare in the reports and common in the field. It does not usually reduce tonnage; it reduces grade, firmness and shelf life, which is where the money is.

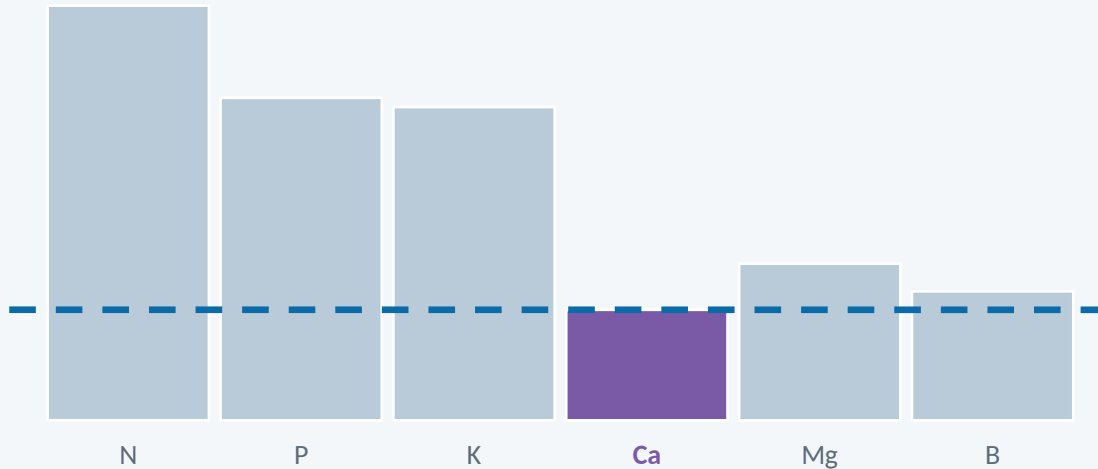
Illustrative proportions, not a measurement — the point is the gap between the two.



Calcium is also almost immobile inside the plant. What the fruit did not receive while it was forming, it will never receive.

Yield can be fine and the crop can still be failing.

Carl Sprengel set the law out in 1840; Justus von Liebig made it famous. Applied to horticulture, the limiting factor often caps quality rather than tonnage.



— the water line — what the crop actually yields

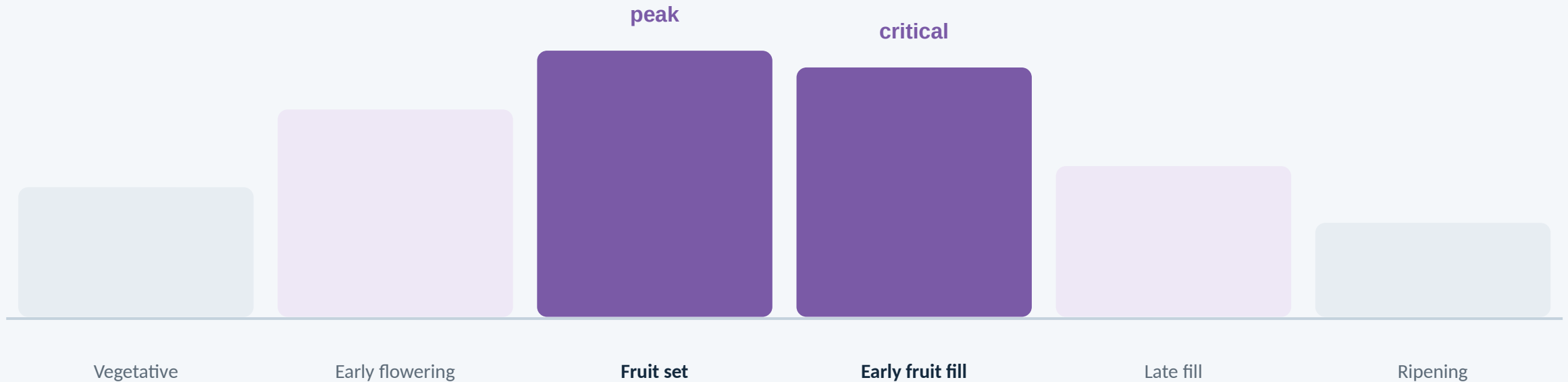
Grade, not tonnage

A tomato crop can hit its weight and still be downgraded for blossom end rot. The shortest stave was calcium, and no amount of nitrogen was ever going to lengthen it. Cala-Mag V is built to raise the three short staves on the right together.

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

Calcium is needed while the fruit is being built, not after.

Relative calcium demand across a fruiting crop. Calcium moves in the transpiration stream and does not redistribute, so the window is narrow and it does not reopen.

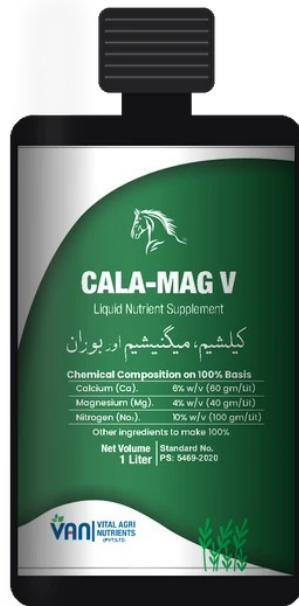


VAN's published programme applies Cala-Mag V from initial flowering through fruit development — inside the window, repeatedly, rather than once when the damage is already visible.

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

What is actually in the bottle.

One litre, four nutrients, fully soluble.



Cala-Mag V — 1 L

ANALYSIS

Ca 6% · Mg 4% · N 10%

PHYSICAL

Transparent liquid, 100% soluble

REACTION

pH 2 – 4 — acidic, which is what keeps calcium in solution

STANDARD & LICENCE

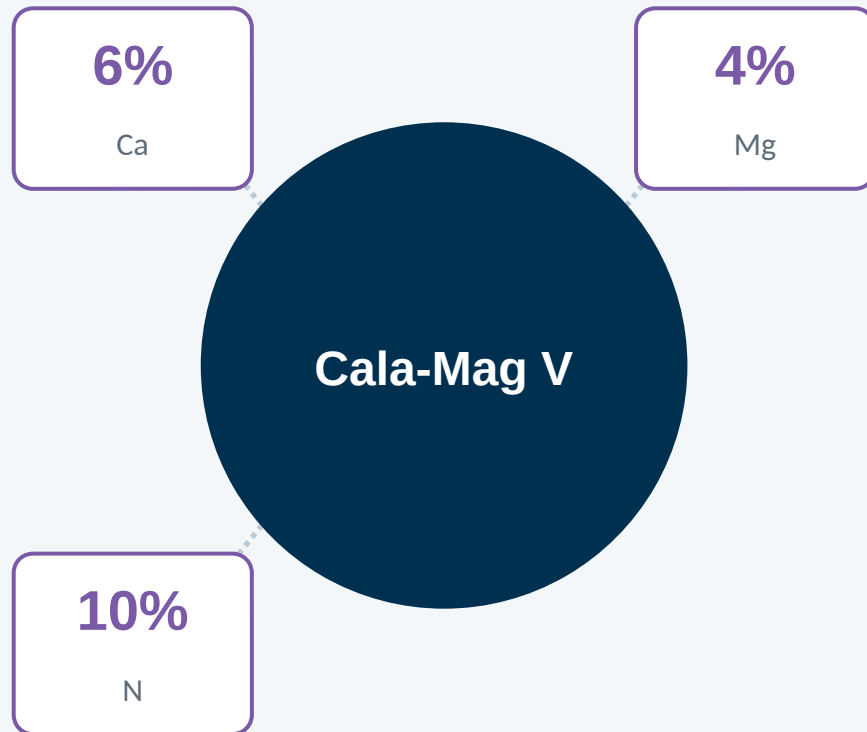
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BORON

Named on the label, with no figure declared. VAN names boron and does not publish a percentage the label does not carry.

What the label declares.

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



REACTION

pH 2 – 4

acidic — calcium precipitates as it approaches neutral

SOLUBILITY

100% soluble

transparent liquid; foliar or fertigation

CARRIER

Amino acids

part of the formulation, aiding uptake and mobility

The hard part is getting calcium and magnesium into the same bottle.

What is engineered in, beyond the four declared nutrients.

1 They antagonise each other

Calcium and magnesium compete for the same uptake sites. Applied carelessly together, each suppresses the other and the crop gains little. The ratio in this product is set so that neither blocks the other.

2 Boron travels with calcium

Boron is directly involved in cell-wall structure and in the movement of calcium into new tissue. Calcium delivered without boron does less work than calcium delivered with it.

3 An acidic carrier

At pH 2 to 4 the calcium stays in solution. Take the same calcium towards neutral and it precipitates — which is exactly what the soil already does to it.

4 Amino acids

Amino acids are part of the formulation, supporting uptake and movement of the cations through the leaf surface rather than leaving them sitting on it.

The amino acid fraction is part of the formulation. It is named here without a figure because it is not label-declared.

This product exists because of an antagonism.

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



Works with

Calcium and boron work together in cell-wall construction — boron helps calcium reach and fix into new tissue

Balanced magnesium improves both nitrogen and phosphorus uptake

Magnesium sits at the centre of the chlorophyll molecule; calcium builds the wall the chlorophyll sits behind

An acidic carrier keeps both cations in solution — the same principle that makes an acidic phosphate work on calcareous ground



Competes with

Calcium and magnesium suppress each other: excess Ca reduces Mg uptake, and excess Mg reduces Ca uptake. Balance is the whole formulation problem

Excess potassium suppresses both calcium and magnesium — a heavy potash programme creates the deficiency this product corrects

Excess calcium also suppresses zinc, iron, manganese, boron, phosphorus and potassium — the standing condition of a calcareous soil

Excess boron reduces nitrogen, potassium and calcium uptake, which is why the boron figure has to be modest and exact

Read the two columns together: potash suppresses calcium and magnesium, calcium suppresses almost everything, and boron in excess suppresses calcium back. Balance is not a slogan here — it is the specification.

What calcium and magnesium are doing in there.

Two nutrients, two different jobs, both structural.

1 Ca — cell walls

Calcium builds and stiffens the cell wall. Firmness, shelf life and resistance to handling damage all start here

2 Ca — cell division

Essential to cell division and to the formation of new tissue at every growing point

3 Ca — signalling

Acts as the plant's internal messenger for stress response

4 Mg — chlorophyll

The magnesium ion sits at the centre of every chlorophyll molecule. No magnesium, no photosynthesis

5 Mg — respiration

Vital to plant respiration and to the enzymes that run it

6 Mg — nutrient use

Improves the efficiency with which the plant uses both nutrients and water

What the two deficiencies look like.

General agronomy, not a VAN measurement. The two are easy to tell apart once you know which end of the plant to look at.

1 Ca — youngest tissue

Calcium is immobile in the plant, so deficiency appears in the newest growth and in the fruit, never in old leaves

2 Ca — blossom end rot

The classic tomato symptom: a sunken, dark patch at the flower end of the fruit. Often mistaken for disease

3 Ca — tip burn

Death of growing points and leaf margins in leafy crops; bitter pit in apples

4 Mg — oldest leaves

Magnesium is mobile, so the plant strips it out of old leaves — the opposite end of the plant from calcium

5 Mg — interveinal

Yellowing between the veins while the veins stay green, working in from the leaf margin

6 Mg — stunting

Overall stunted growth as respiration and photosynthesis both fall away

What the wider research reports for calcium in horticulture.

These are findings from published work on calcium application in fruiting crops, compiled in VAN's 2026 technical deck. They are not VAN trial results and they are not claims for this product.

1 / 3

of the world's soils are calcareous —
excess carbonate, scarce free ion

Foliar

is the route that works when the
soil route does not

Fruit set

is the stage the literature identifies
as decisive

Grade

is what improves — firmness and
shelf life, more than tonnage



VAN publishes no yield percentage for Cala-Mag V. Where the underlying studies report yield differences against an untreated control, those belong to the studies and are cited in the sources.

WHERE IT IS USED

In 6 of VAN's published crop programmes — all of them high-value.

Cala-Mag V is not a broadacre product. It goes where quality, firmness and shelf life decide the price.

Tomato

Chili

Potato

Strawberry

Guava

Mango

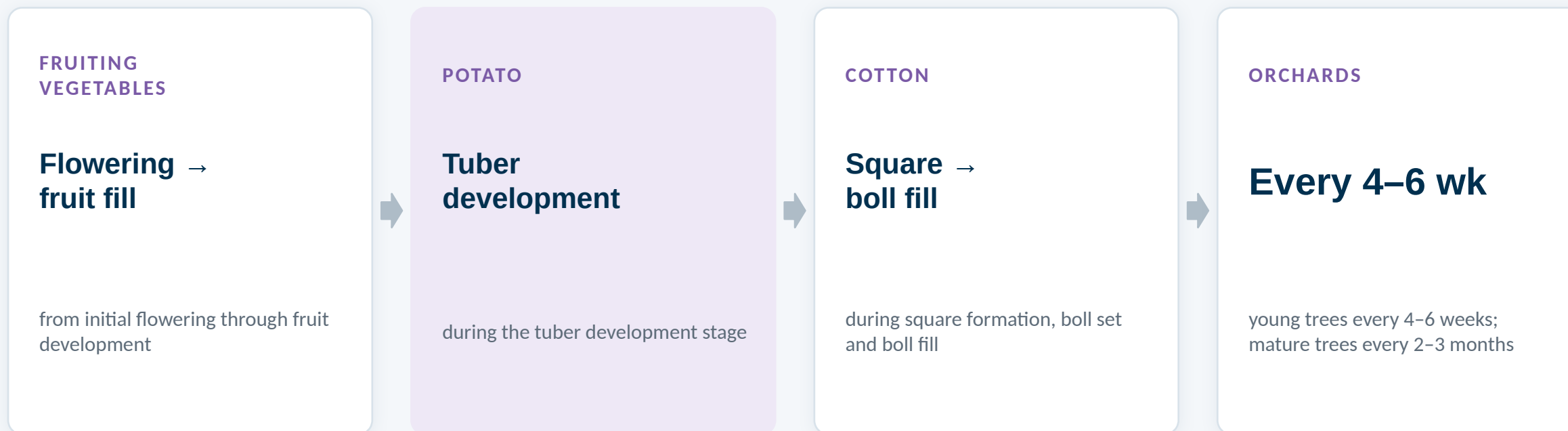
6 crop programmes, published in full and free at van.com.pk/crops/.

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Cotton also responds during square formation, boll set and boll fill, and orchards on a repeating schedule — see the 4R slide.

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

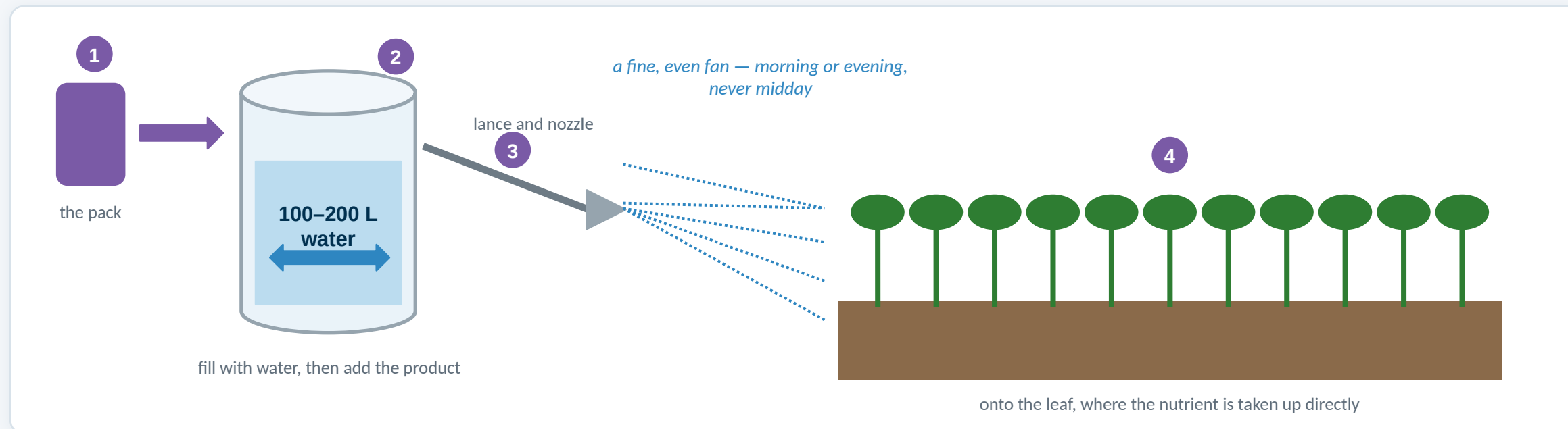
The published stages, by crop group. Calcium timing is unusually unforgiving.



Applied foliar or through fertigation. Because calcium does not redistribute inside the plant, repeat applications across the window beat one large one.

Water first, product second — never the other way round.

Calcium is immobile in the plant. It has to land where the fruit is forming.



1 Water first

100–200 L of clean water in the tank. Always water first, product second — never the other way round.

2 Add and keep agitating

1 L per acre. A tank that settles sprays the last acre at a different rate from the first.

3 A fine, even fan

Cover the leaf without running off it. Morning or evening — midday is the wrong half of the day.

4 At the right stage

From flowering through fruit fill, and every 4–6 weeks on orchards.

Doses are per acre, from VAN agronomy. The dilution is part of the rate: cutting the water to save a pass doubles the concentration on the leaf.

Four things that decide whether it works.

1

Timing beats rate

Calcium arriving after the fruit has formed cannot move into it. A modest dose inside the window beats a large one after it.

2

Repeat, do not concentrate

Several applications across flowering and fruit fill, rather than one. This is a consequence of immobility, not a sales preference.

3

Watch the potash

A heavy potash programme suppresses both calcium and magnesium. If you are pushing potash hard, this is the product that keeps the balance.

4

Do not fix pH upward

The acidity of the carrier is doing work. Tank-mixing it towards neutral will drop the calcium out of solution before it reaches the leaf.

What is behind the bottle.

1

PS 5469-2020

Registered against the Pakistan Standard for liquid nutrient supplements.

2

Licence CM/L-4299/2026

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

Balanced, not blended

Calcium and magnesium in a ratio set so that neither blocks the other — which is the difference between a formulation and a mixture.

2

Boron included

Boron is what helps calcium reach and fix into new tissue. Sending calcium without it is sending it half-equipped.

3

Acidic and soluble

pH 2–4 and fully soluble, so the calcium is still calcium when it arrives at the leaf.

4

Aimed at grade

Firmness, shelf life and appearance — the attributes that decide what a horticultural crop is paid.

SOURCES

Where every figure in this deck came from.

Analysis, standard, licence	van.com.pk guaranteed-analysis table — Ca 6% · Mg 4% · B 1% · N 10%, PS 5469-2020, CM/L-4299/2026
Calcareous soils	Bolan, N. et al. (2023). Distribution, characteristics and management of calcareous soils. Advances in Agronomy 182, 81–130
Ca and Mg uptake curves	As compiled in VAN's Cala-Mag V technical deck, references 16–23 of that deck
Calcium in potato	Calcium Uptake by Potato Tubers, Crop Intellect
Onion nutrition	Nutrient Management for Onions in the Pacific Northwest — Pacific Northwest Extension Publication
Nutrient interactions	After Mulder's chart — established relationships
Law of the minimum	Carl Sprengel (1840), popularised by Justus von Liebig
Boron	Named on the registered label with no figure against it, so no percentage is published — named, never numbered
Ca / Mg — settled	The printed label (artwork 25-3-24) declares Ca 6% w/v and Mg 4% w/v. The 2025 training deck transposed them; the website was right

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