Spuit toediening op Pekanneut bome

Beginsels en kalibrasie teorie

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Die toedieningsproses

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Moeilik en kompleks?

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Bome (3D gewasse) belemmer effektiewe toediening

Komplekse proses

- Lower (Canopy) eienskappe
- Hoogte; Breedte en wydte (Lower volume)
- Digtheid – (Deurligting, spuit vriendelikheid)
- Vorm (Oop kelk, Spindle)

- Varieer tussen gewas, kultivars en aanplanting styl (Rywydte x Plantwydte)

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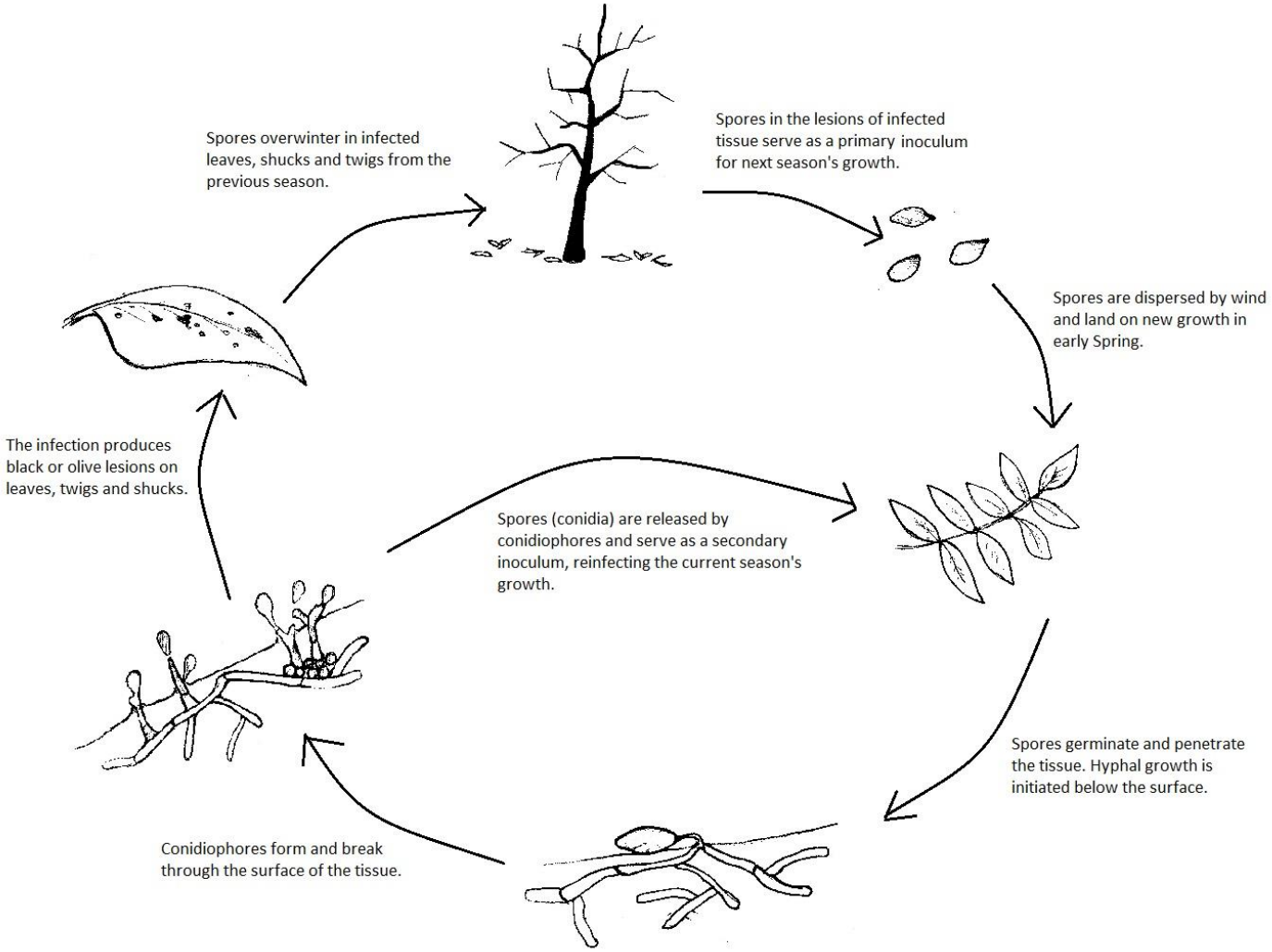
Patogeen of pes wat bestuur moet word



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Proposed strategy for the control of Apple scab

Phenological growth stage of tree	WK nr.	Standard Program	Medium to high Pressure	Very High Pressure
Autumn	WK15-WK18	Difenconazole x 3*	Difenconazole x 3*	Difenconazole x 3*
Early greentip	WK36			Mancozeb
Greentip	WK37	Mancozeb	Mancozeb + Dodine	Mancozeb + Dodine
Mouse ear	WK38	Mancozeb	Mancozeb + Dodine	Mancozeb + Dodine
Pink tip	WK39	Mancozeb	Mancozeb + Cyprodinyl	**Fluxapyroxad**
30% Bloom	WK40	Mancozeb	Mancozeb + Cyprodinyl	**Fluxapyroxad**
Full bloom	WK41	Dithianon + Krezoxim-methyl	Dithianon + Krezoxim-methyl	Dithianon + Krezoxim-methyl
75% Petal drop	WK42	Dithianon + Krezoxim-methyl	Dithianon + Krezoxim-methyl	**Fluxapyroxad**
100% Petal drop	WK43	Dithianon + Krezoxim-methyl	Dithianon + Krezoxim-methyl	Dithianon + Krezoxim-methyl
7 Days later	WK44	Mancozeb	Mancozeb	Mancozeb
7 Days later	WK45		Mancozeb	Mancozeb
7 Days later	WK46	Mancozeb	Mancozeb	Mancozeb
7 Days later	WK47			Mancozeb
7 Days later	WK48		Mancozeb	Mancozeb

* Difenconazole sprays are applied every 2 years. If leaf infestation is high in the off season, 1 x Urea spray should be applied in the same spray window at a concentration of 5%.

NOTE: If no leaf lesions are visible by Wk 47, spraying can be stopped. If leaf lesions do occur, Mancozeb sprays should be continued every 28 days to 21 days before harvest to protect fruit. If, due to circumstances, an orchard in the period from WK44 to WK47 is exposed to a wet period without adequate Mancozeb coverage, an EBI product must be sprayed curatively within 72 hours after the start of the wet period.

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Mark toegang + aktiewes beskikbaar vir gebruik

Residue Specifications

		Max. %MRL / individual residue	Max. %MRL / sum of all residues	Max. % ARfD[3] [4]/ individual residue	Max. % ARfD / sum of all residues	Number of residues
Aldi		70%	80%	80%	80%	3-5 per product group (see below) (Negative List)
Dohle Hit		70%		100%		3-5 per product group (see below)
Edeka/ Netto		70% (50% private labels)		100%		max. 5
Globus		70%		100%		max. 5 (Negative List)
Lidl		33%	80%	100%		max. 5 (Negative List – timeline for substitution)
Kaufland		33%	80%	50%	50%	max. 5 (Negative List)
Metro		50%	80%	100%	100%	max. 5
Norma			70%		70%	max. 5
Rewe		50% (25% for critical actives)	100% (does NOT apply for citrus surface treatments)	70%	100%	max. 5 (Recommended Negative List)
Tegut		70%		70%		max. 4

Product groups	Max. number of residues (ALDI, Dohle)
Pome fruits	4
Stone fruits	4
Berries (also table grapes)	5
Citrus fruits	4
Other fruits	4

Verlies van aktiewe bestanddele a.g.v. deregistrasie en mark verwante beperkings

Thiacloprid

PAGE CONTENTS

- Status under Reg
- Authorisation
- Maximum Residue Levels
- Classification
- Toxicological information

Related resources

Search Active Substances

Download MRLs Data

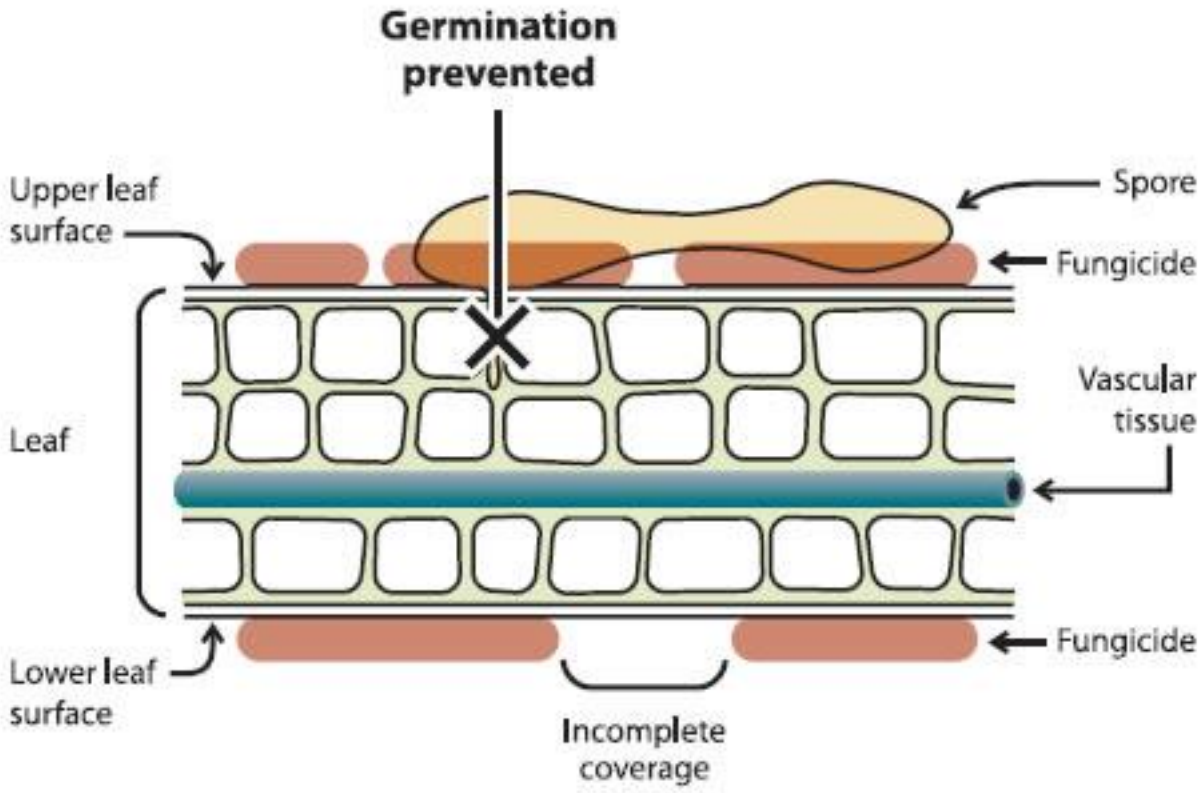
Status under Reg. (EC) No 1107/2009

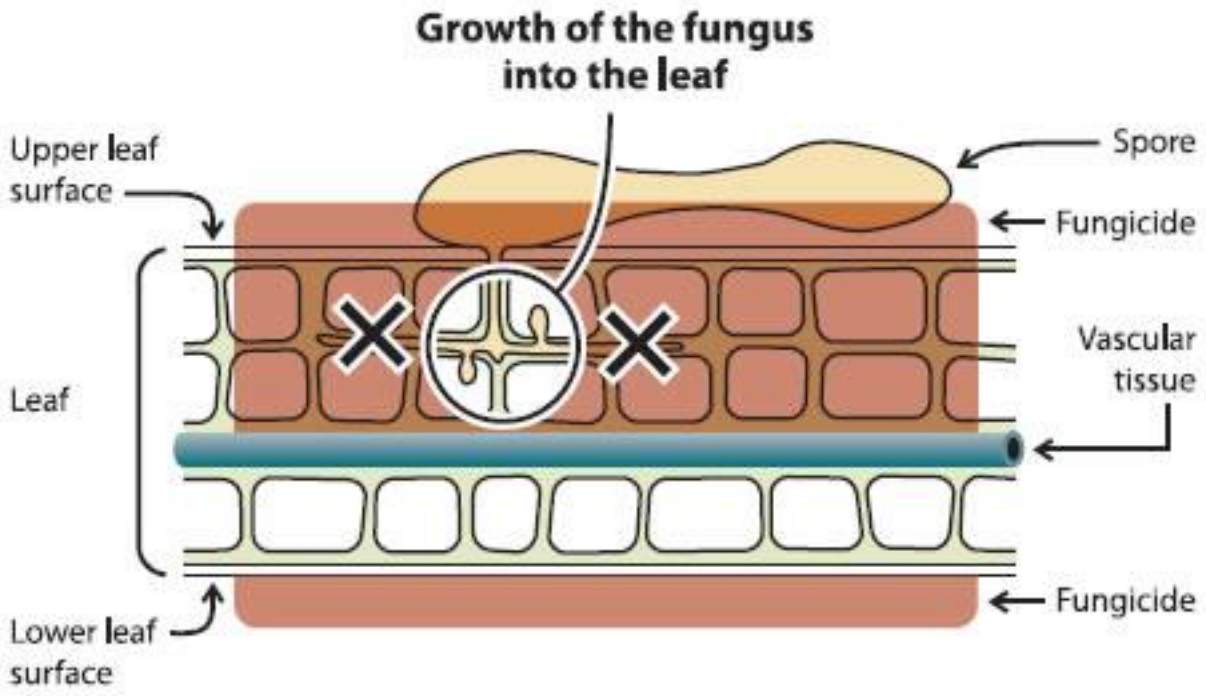
(repealing Directive 91/414/EEC)

Not approved

Legislation	Reg. (EU) 2020/23	**Old legislation**	04/99/EC Reg. (EU) No 540/2011 Reg. (EU) 2016/2016 Reg. (EU) 2018/524 Reg. (EU) 2019/168 Reg. (EU) No 1197/2012
Date of approval		**Expiration of approval**	03/02/2020
RMS	DE	**Co-RMS**	DE
Category	IN - Insecticide	**Risk Assessment**	
Type	Candidate for Substitution		
Remarks	The original RMS was UK. Reg. (EU) 2020/23 shall enter into force on 03/02/2020 Withdrawal of authorisations by 3 August 2020.		

Tipe aktief wat gebruik word





Kontak *vs* Sistemies

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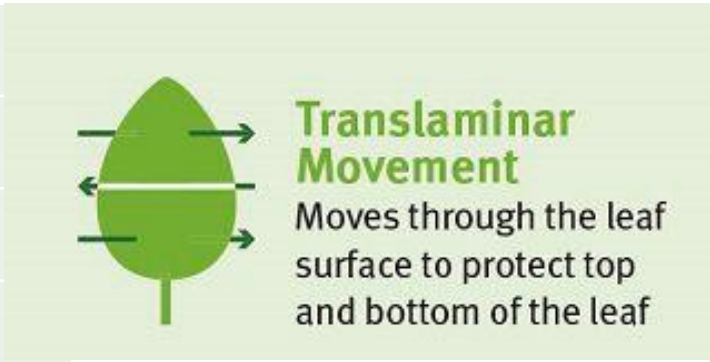
Tipe aktief wat gebruik word

Kontak	Sistemies
Nie geabsorbeer	Absorbeer
Immobiel	Mobiel
Voorkomend	Voorkomend + geneesend
Meervoudige setels van inwerking	Gewoontlik een setel van inwerking
Weerstand risiko laag	Weerstand risiko



Teiken spesifieke toediening

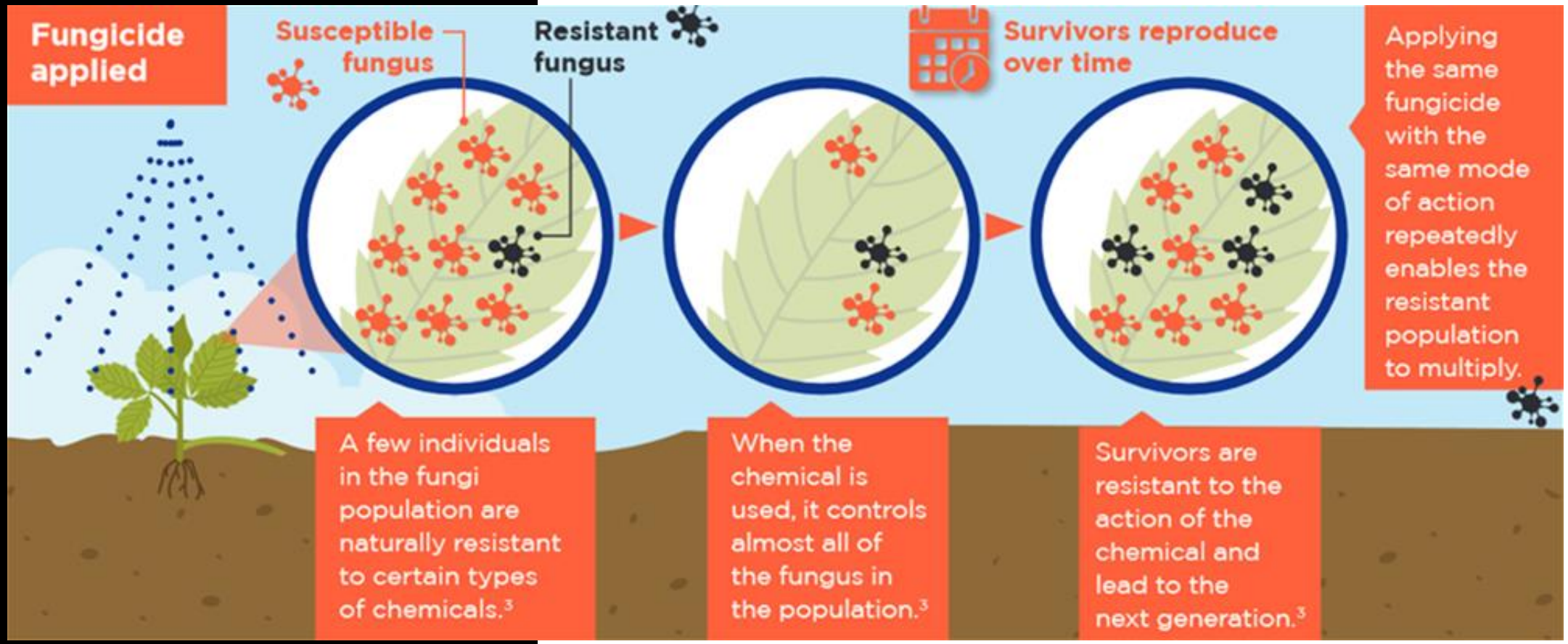
Mobile	Variably mobile	Immobile
Nitrogen	Copper	Calcium
Phosphorus	Zinc	Boron
Potassium	Sulphur	Manganese
Magnesium	Molybdenum	
Iron		

Mobile = Retranslocated from old leaves to new growth under all conditions.

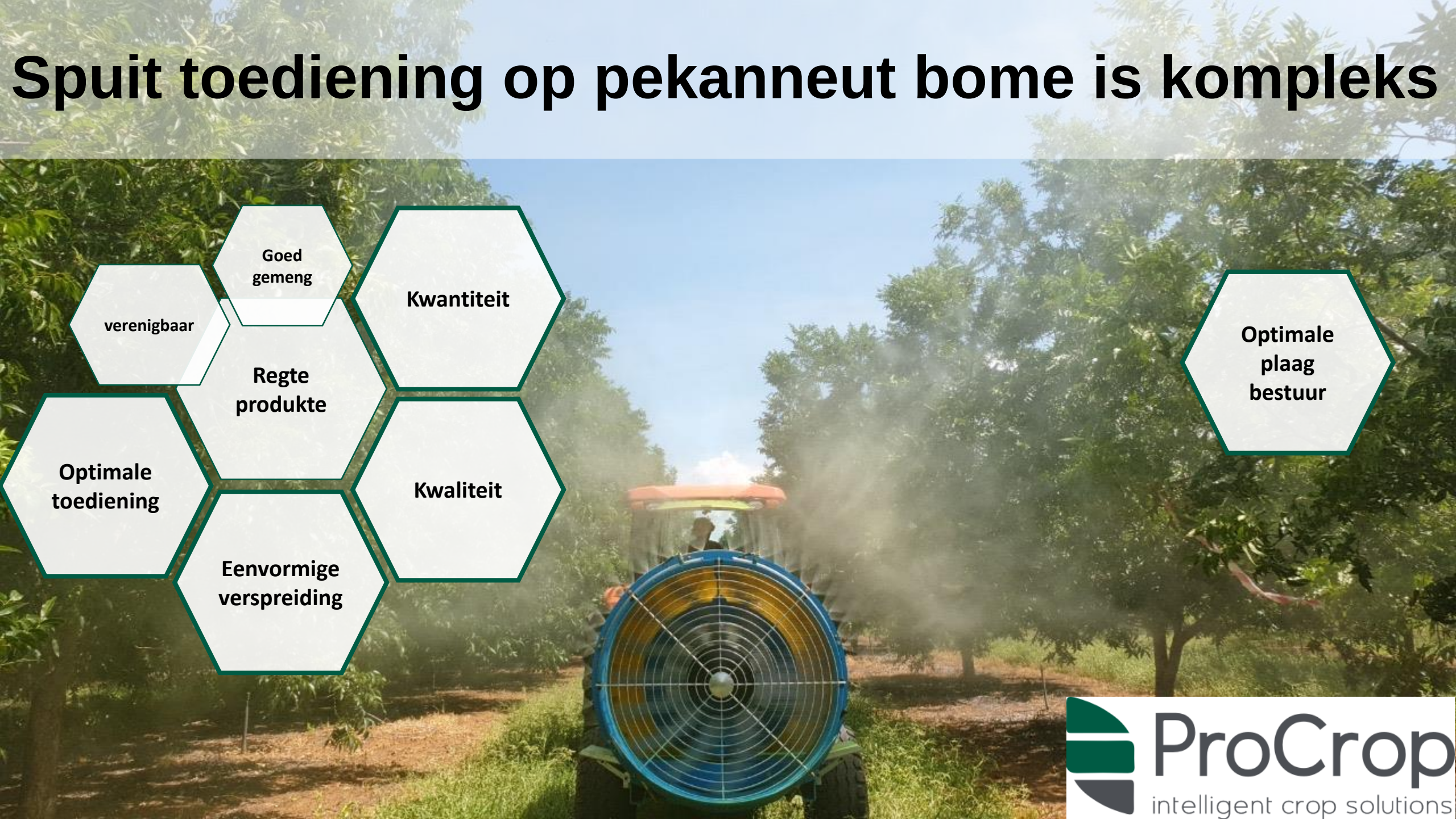
Variable mobility = Retranslocated from old leaves to new growth only under some conditions.

Immobile = Not retranslocated from old leaves to new growth under any conditions.

Weerstand bestuur



Spuit toediening op pekanneut bome is kompleks



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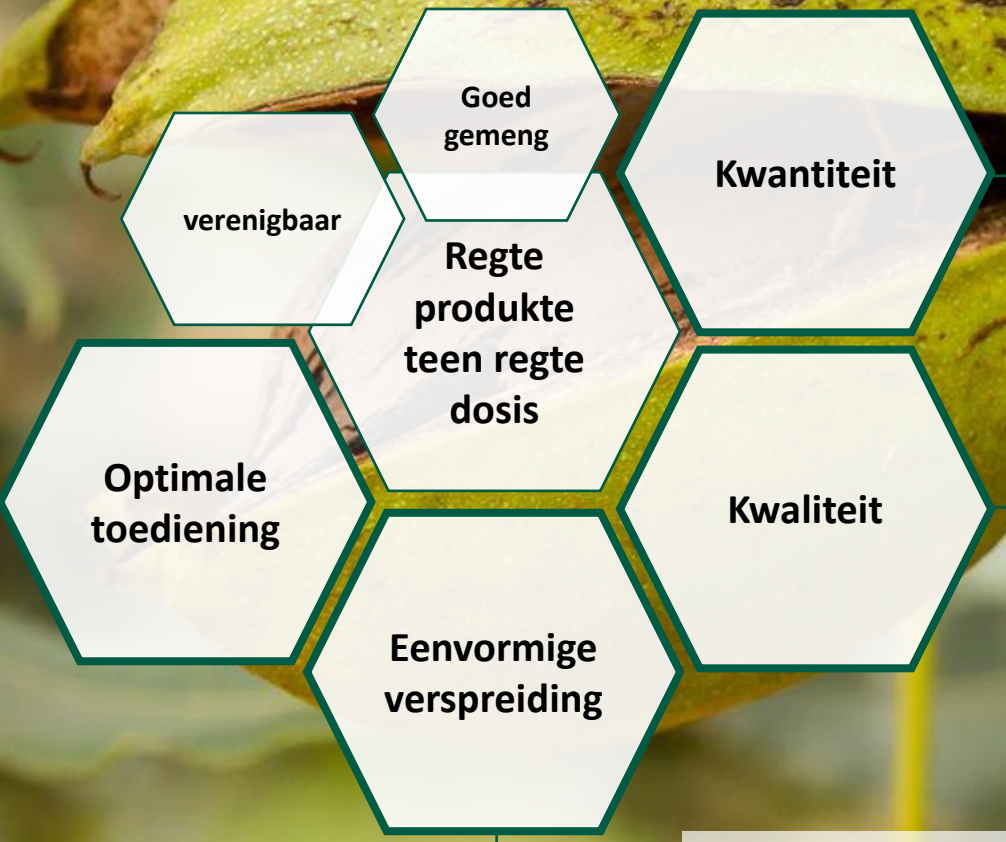

Hoeveelheid aktiewe bestandeel wat nodig is om te beskerm of genees

Eenvormigheid/verspreiding van die aktiewe bestandeel op die teiken oppervlak (blare/lote/vrugte/stam)

Eenformigheid/verspreiding van die aktiewe bestandeel tussen teikens in die boom lower (blaar tot blaar/ vrug tot vrug)

Optimale plaag bestuur

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Die persentasie blaar/vrug/neut area wat bedek is met pigment partikels (percentage fluorescent particle coverage; FPC%)

Deposisie kwantiteit

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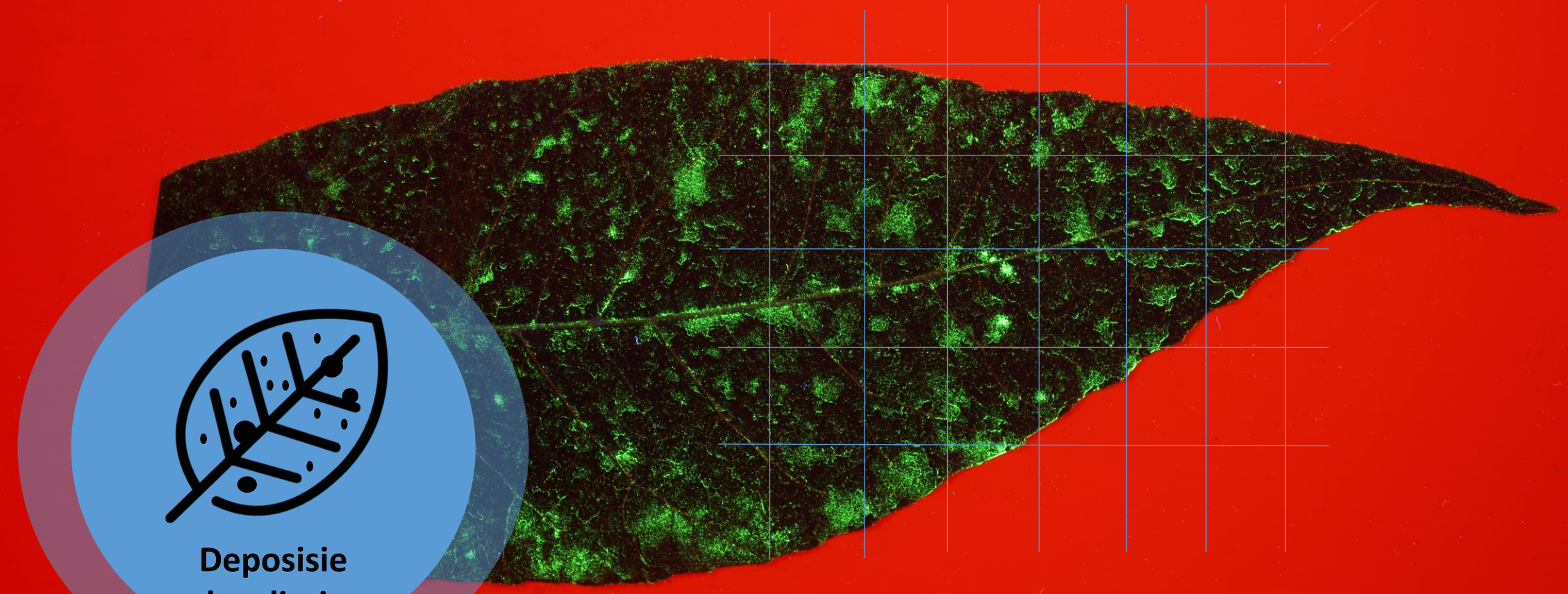
Eenvormigheid/verspreiding van die aktiewe bestandeel op die teiken oppervlak (blare/lote/vrugte/stam) (Interquartile range of distribution - ICD%)



Deposisie kwaliteit

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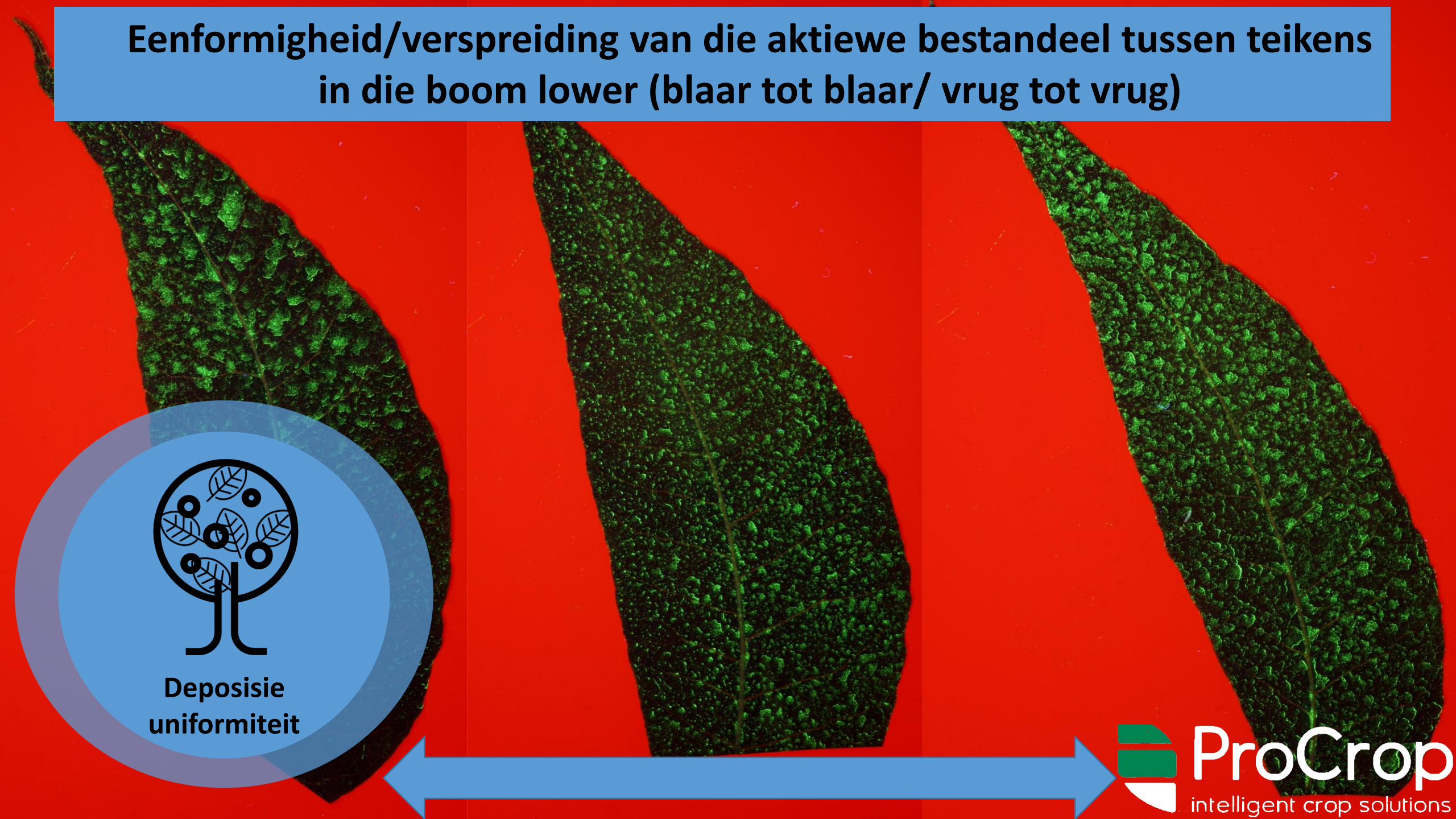
Eenformigheid/verspreiding van die aktiewe bestandeel tussen teikens in die boom lower (blaar tot blaar/ vrug tot vrug)



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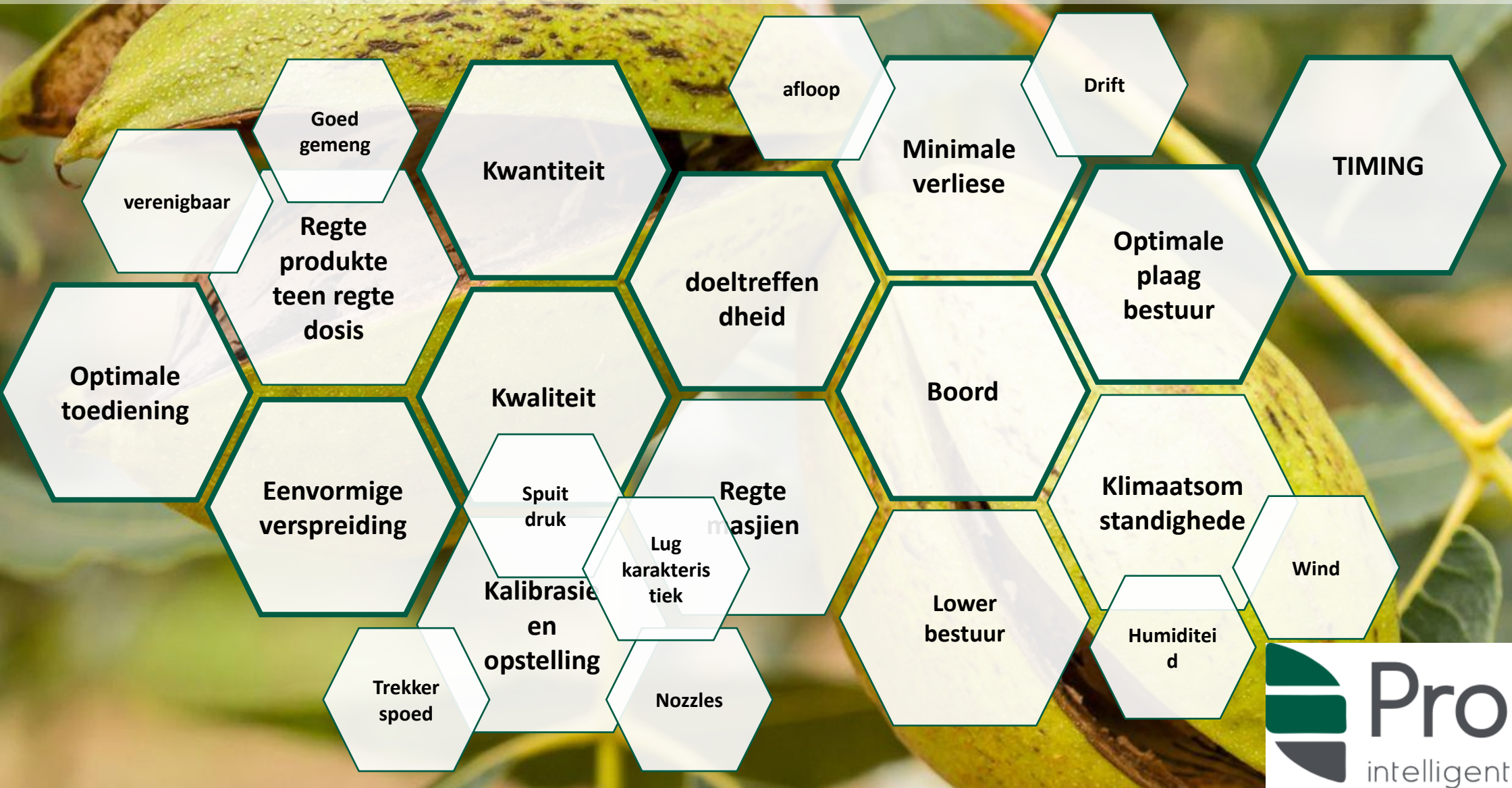
Spuit toediening matriks



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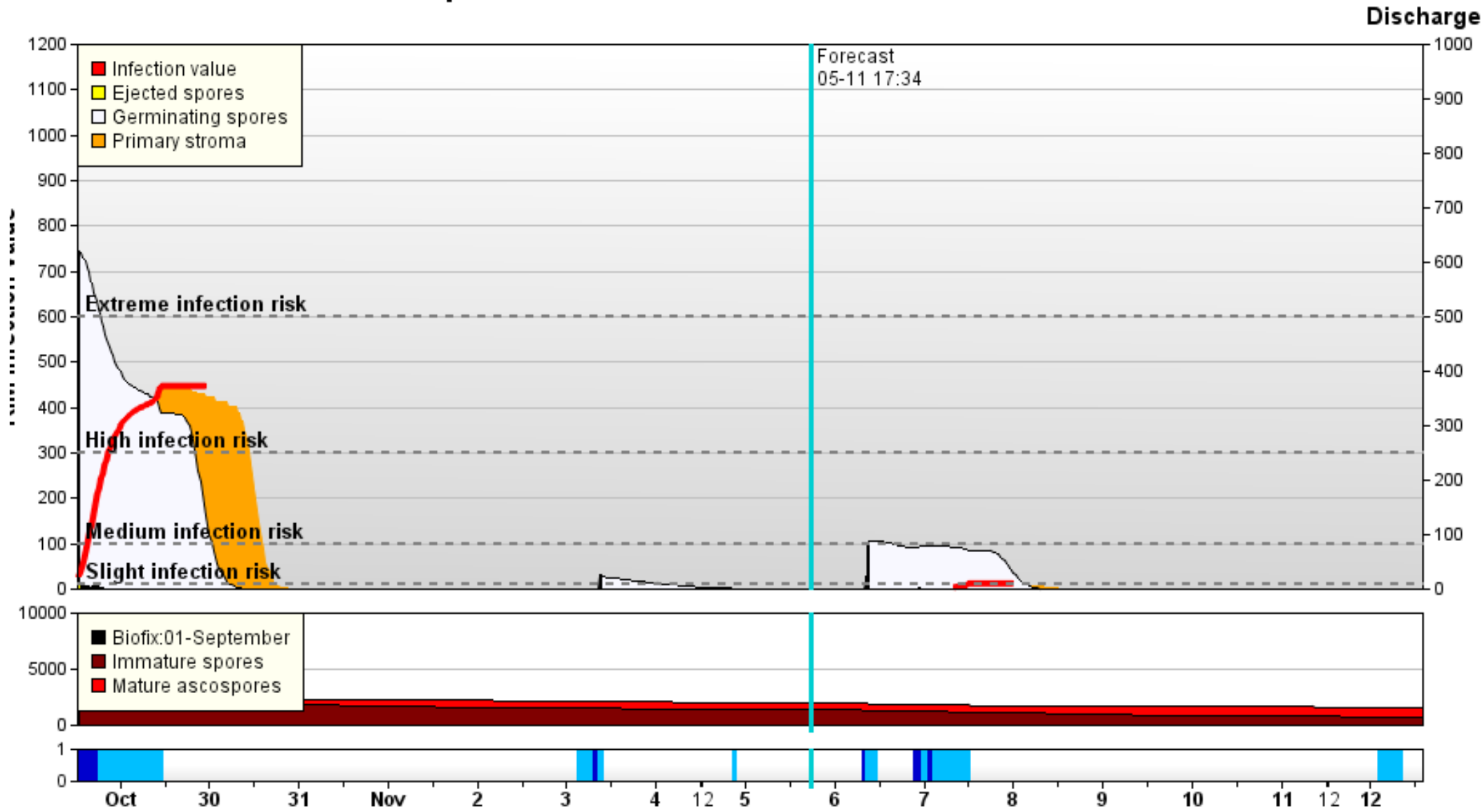
RIMpro-Venturia location: De Keur - 2019



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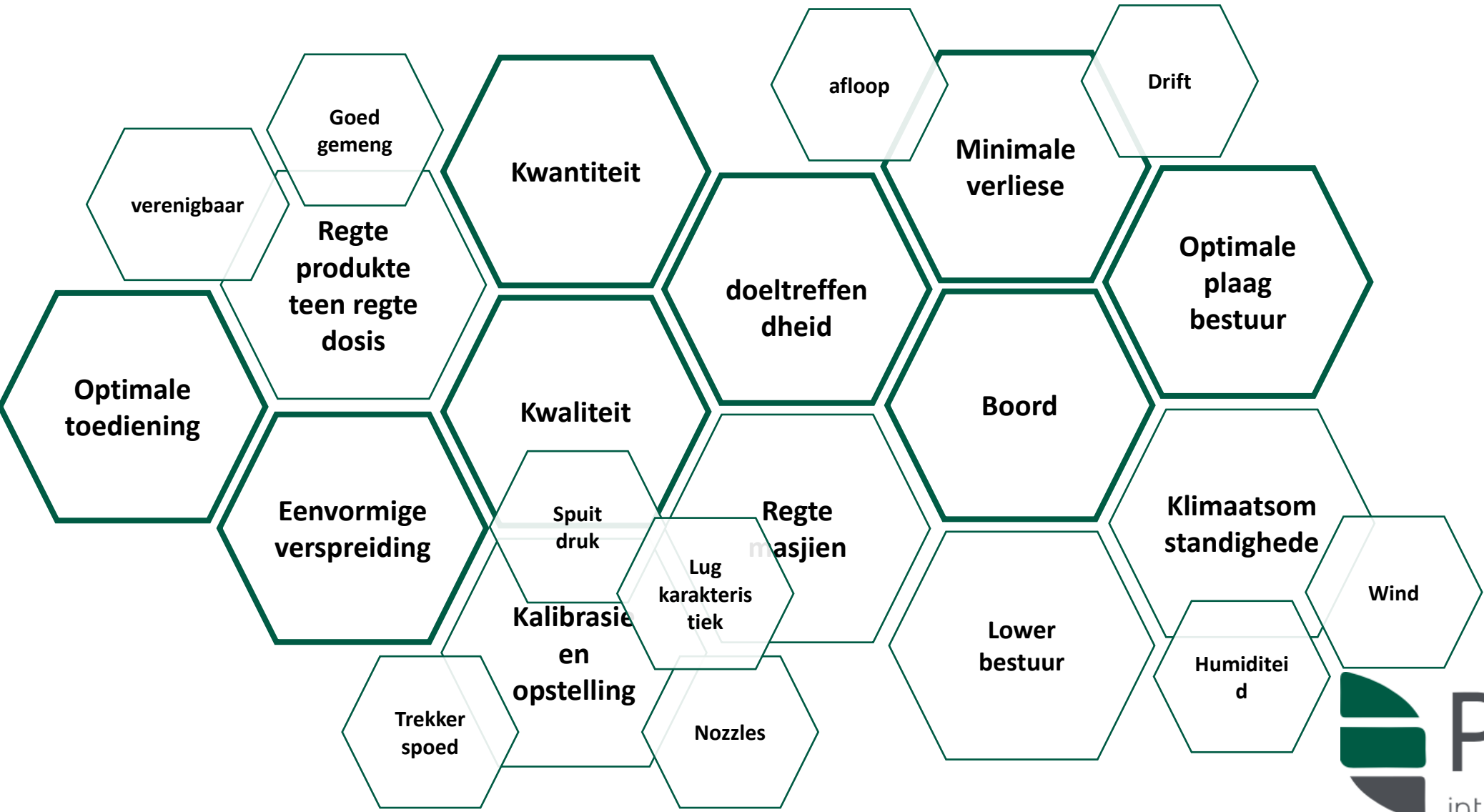
Spuit toediening matriks



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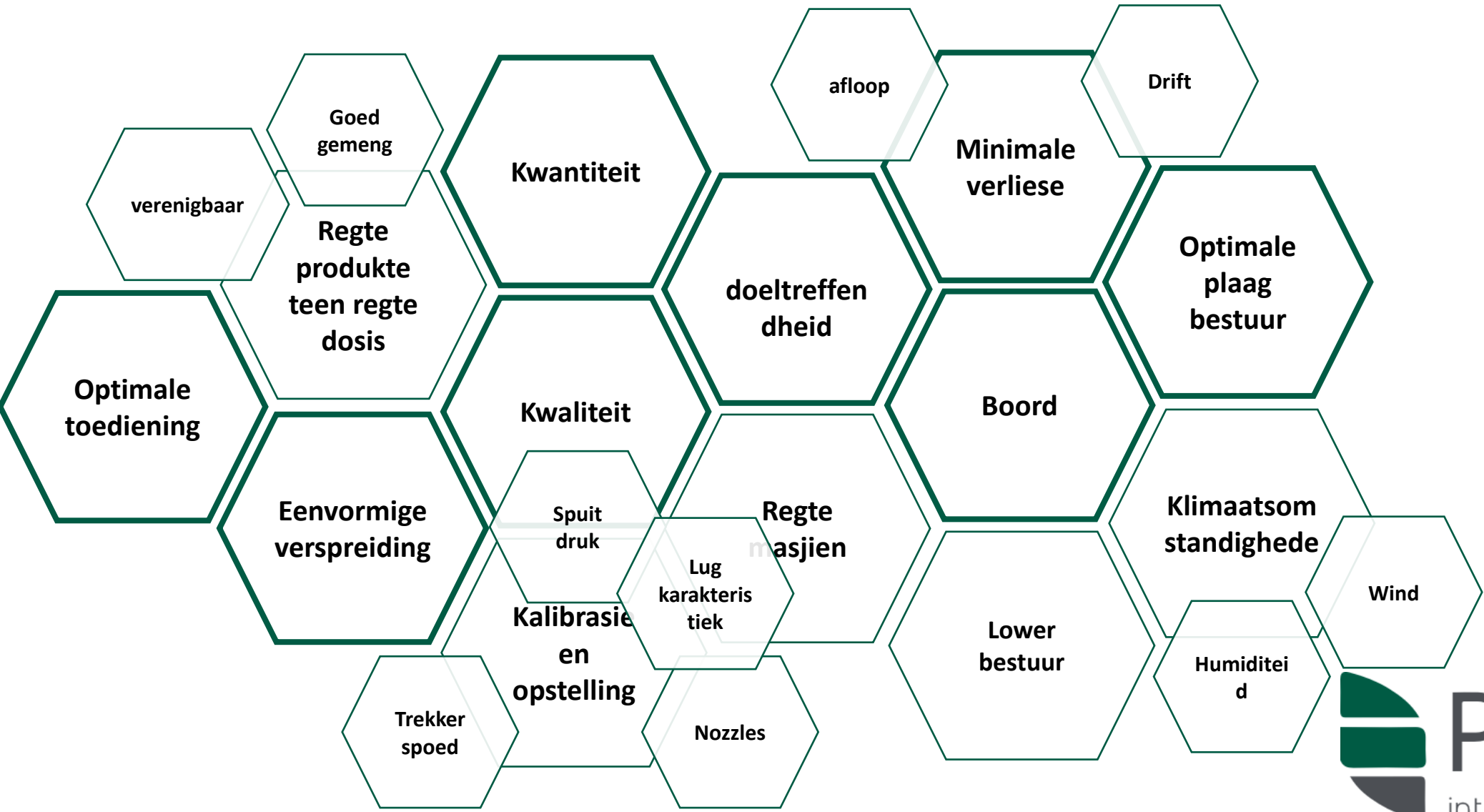
Spuit toediening matriks



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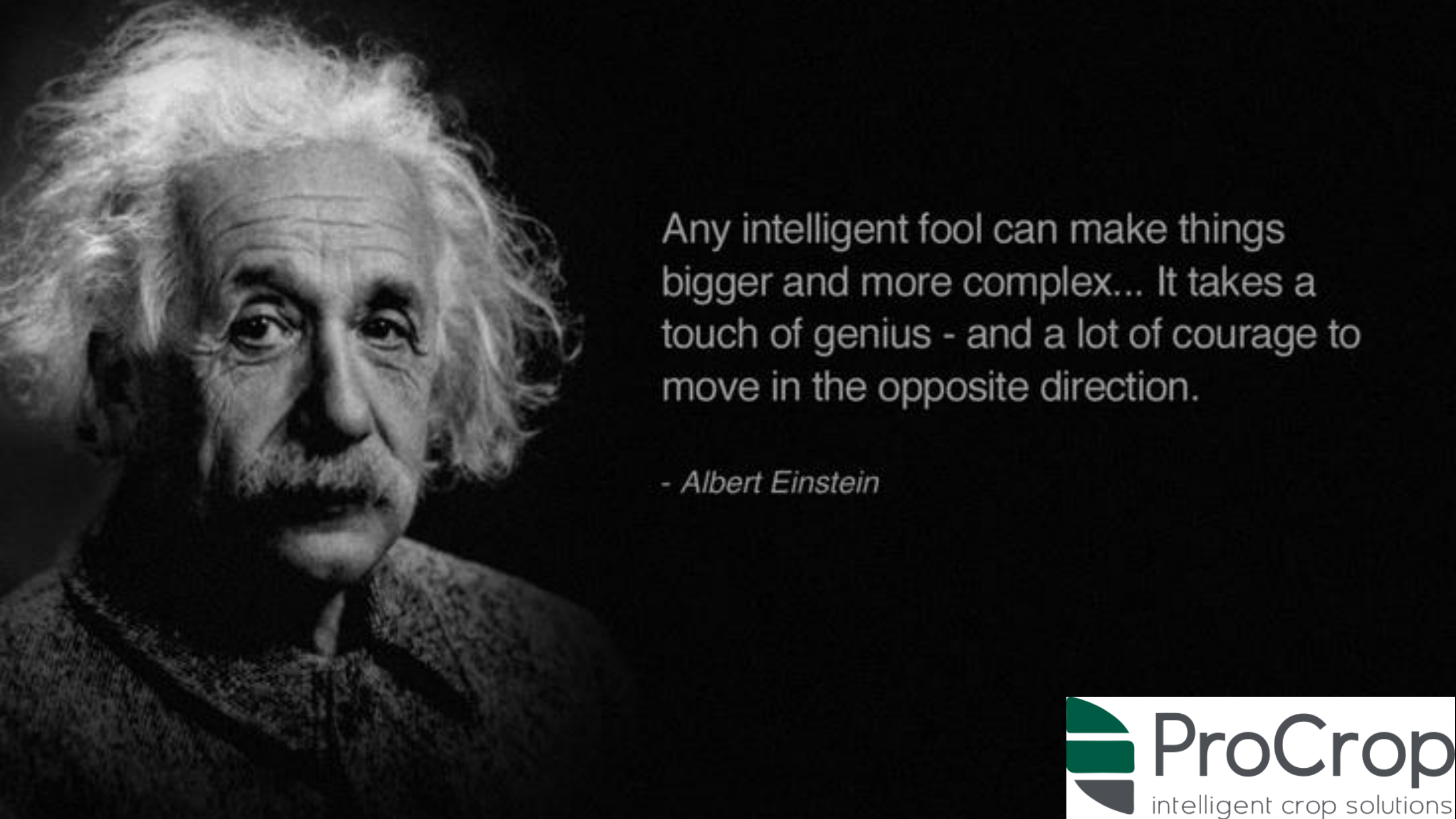

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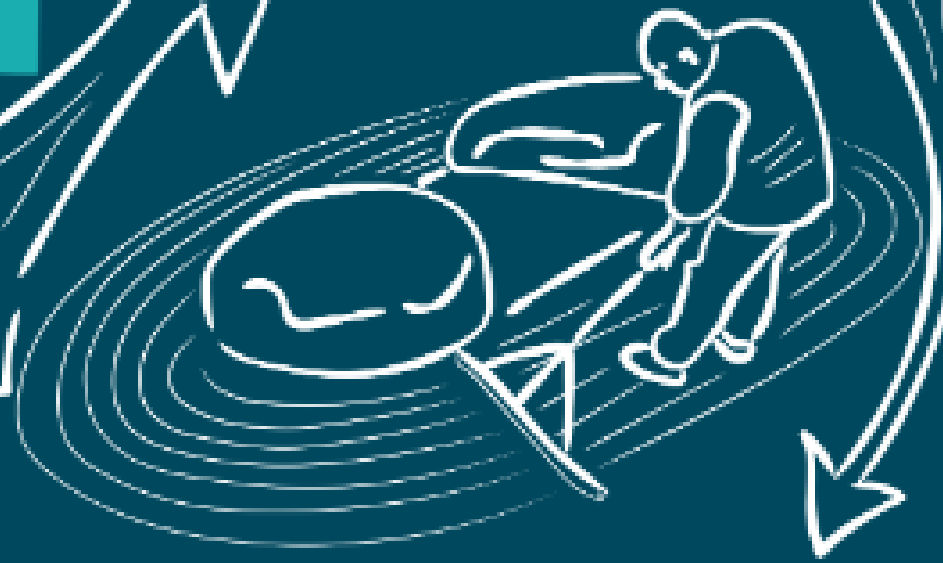
- FOCUS ON GOAL
- GOOD FOR ACHIEVEMENT & BEING PRACTICAL
- IMPORTANT FOR WORK

- CAN RESULT IN FRUSTRATION & CUTTING CORNERS

OUTCOME VS PROCESS FOCUS

- APPRECIATE THE MOMENT
- IMPORTANT FOR WELLBEING

- GOOD FOR QUALITY & CONTINUOUS IMPROVEMENT



Force

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BACK TO BASICS

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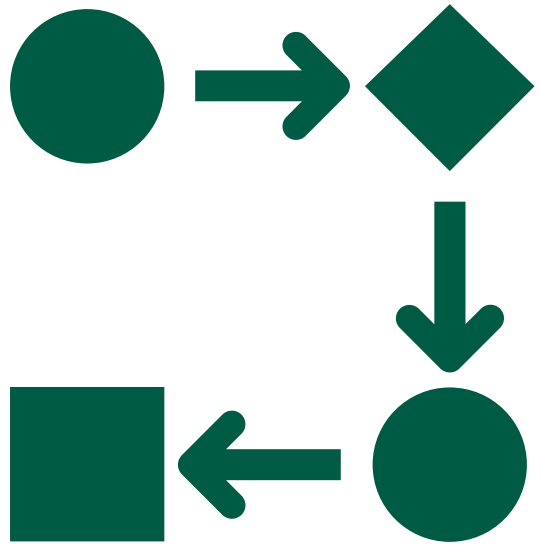
Spuitpomp opstelling en kalibrasie

- Die opstelling en kalibrasie proses vir boord spuite kan in die volgende stappe opgedeel word:

1. Spuitpomp keuse.
2. Inspeksie en onderhoud van die spuitpomp.
3. Lower aangepaste toediening:
   - Bepaal ideale lug momentum en grond spoed vir betrokke lower.
   - Boom ry volume bepaling – Pekanneut model.
4. Besluit op water volume.
5. Maak spuit kop keuse.
6. Doen fisiese kalibrasie.
7. Dosering.



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Spuitpomp opstelling en kalibrasie

- ’n Spuitpomp moet opgestel en gekalibreer word om te verseker:
  - Dat die spuitpomp reg opgestel is om die aktief so effektief as moontlik te land op die teiken. Hierdie behels:
  - Keuse van spuitpomp.
  - Optimisering van die lugkolom, lug spoed en volume en spuit spoed volgens die teiken volume. Hierdie staan bekend as ***lower aangepaste toediening***.
  - Spuit volume en spuit kop seleksie
  - Die spuit koppe in werkende toestand is volgens die betrokke spuit kop se standaarde.

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Spuitpomp opstelling en kalibrasie

- ’n Spuitpomp moet opgestel en gekalibreer word om te verseker:
- Die opstelling en kalibrasie proses help ook met begroting en logistieke doeleindes. Die kalibrasie inligting word gebruik om te beplan of bepaal hoeveel spuite, tenke, water en chemie word benodig vir ’n betrokke spuit/spuite.

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Spuitpomp opstelling en kalibrasie

Waar beland die spuitstof?

- Van 100% van die spuitstof beland:
- 20-55% op die teiken
- 4-6% verdamp
- 2-5% drift weg
- 30-70% beland op die boord op plant vloer.

Optimale spuit opstelling en kalibrasie kan % wat op die teiken land verbeter en die verliese verminder.

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HINDSIGHT IS AN EXACT SCIENCE

Hersien die vorige seisoen

- Plaag + siekte hersiening (wat, waar en wanneer?)
- Spuit program (Tydsberekening, mengbaarheid, verenigbaarheid)
- Deposisie parameters soos beïnvloed deur kalibrasie
- Werk effektiwiteit? Het jy deurgekom in tyd?

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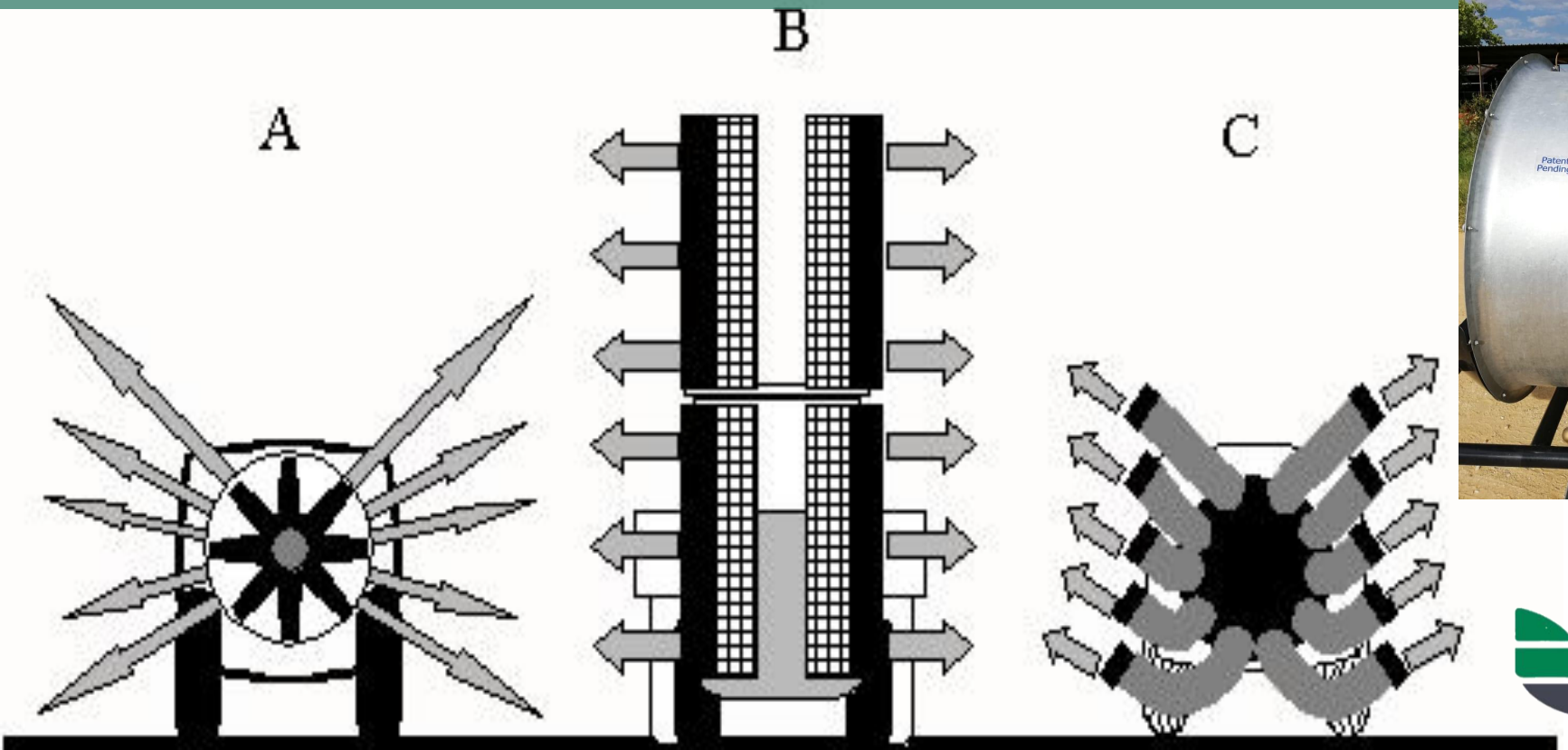
Watter spuit moet ek gebruik?

- Gebruik wat jy het
- ’n goed opgestelde masjien kan n wêreld se verskil maak
- Hoë vs lae profiel



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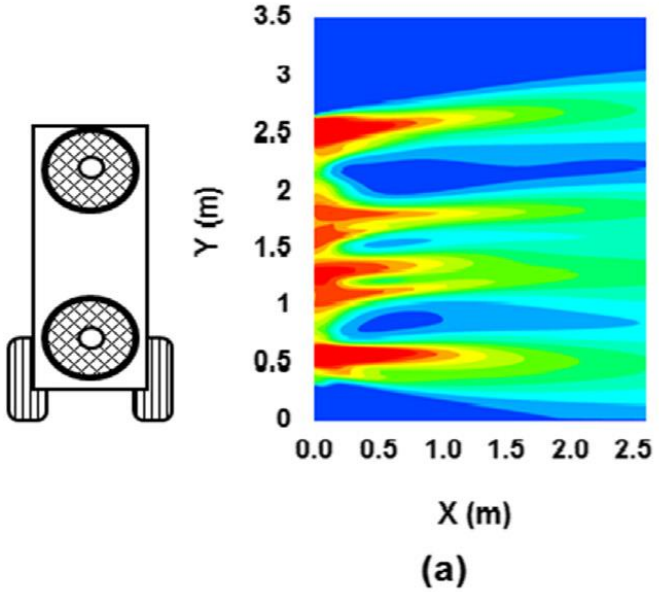
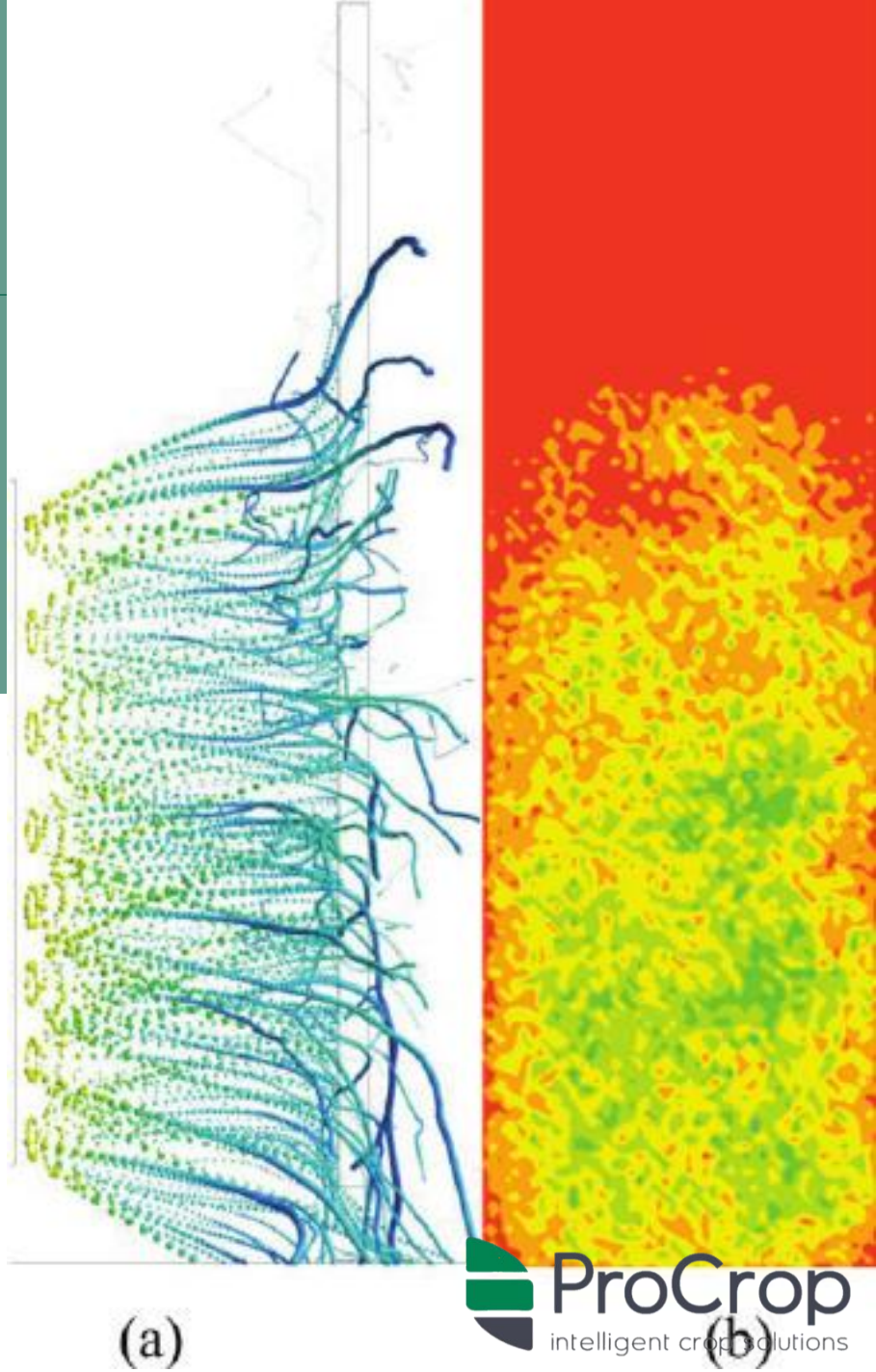
Watter spuit moet ek gebruik?

- Indien spuit gekoop moet word
  - Slegs stelsels wat goed geëvalueer is
  - Deur ingenieur ontwikkel is
  - Geen ‘backyard’ wonder masjiene!
  - ’n masjien wat by jou bome pas





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Inspeksie en onderhoud

- Gereelde en deeglike onderhoud van spuitpompe is nooit ‘n mors van tyd nie.
- Dit verseker ‘n spuitpomp wat altyd in werkende toestand is met minimale staantyd vir herstel.
- Die oorsaak van swak plaag bestuur kan in baie gevalle blameer word op swak onderhoud bv. foutiewe druk meters en krane of ‘n roer of meng stelsel wat nie werk nie.

Inspeksie en onderhoud

- Gereelde inspeksie en onderhoud van toerusting
  - Voor, tydens en na seisoen (Proses vs uitkomste)

Meganies	**Spuitkoppe**
Is die spuitpomp goed gehak aan trekker?	Sluit en draai die eenhede sonder lekkasie?
Is daar enigiets fout met die spuitpomp raam?	Anti drip" koppe in werkende toestand?
Is die wiele en bande in 'n werkende toestand?	Is die spuitkoppe reg georiënteer?
Is die PTO se kous vas en onbeskadig?	Is die spuit kop uitleg reg van bo na onder?
Is die PTO gekoppel en vas?	Is enige spuitkoppe geblok?
Is die PTO gesmeer?	IS elke spuit kop se spuit patroon reg?
Hidroulies (die pomp en pype)	**Krane en meters**
Is daar enige lek plekke onder druk?	Werk die hoof kraan?
Is daar enige barste of krake in een van die lyne?	Werk die lyn krane?
Is alle krane en filters op die pype skoon?	Is die drukmeter leesbaar?
Is die pomp gesmeer/geolie?	Tel die drukmeter druk op?
Spuit tenk	Is die drukmeter naald stabiel?
Is die tenk goed vas aan die spuit raam?	**Filters**
Enige lek plekke?	Alle filters gespoel?
Is die deksel in goeie toestand en maak dit goed toe?	Is die filters skoon?
Is die tenk volume meter skoon en leesbaar?	Moet een van die filters vervang word?
Werk die meng stelsel?	**Elektries**
	Is die bedrading onbeskadig?
	Skop die elektriese krane oop?

PRE-SEASON MAINTENANCE **Operator Checklist for Canopy Sprayer**

Owner ..... Operator ..... Date .....

Make ..... Model ..... Serial No.....

Key: ☑ Checked/Completed ☒ Needs Attention Ⓐ Adjusted Ⓝⓐ Not Applicable

Regularly Check

Mechanical

- ☐ Is the attachment to tractor secure?
- ☐ Are the chassis and structure free of cracks and rust?
- ☐ Are the wheels and tyres in good condition?
- ☐ Are guards, including PTO shaft guard, secure and undamaged?

Hydraulic System

- ☐ Is it free from leaks under pressure?
- ☐ Are the hoses and connections worn or cracked?

Electrical System

- ☐ Is the wiring undamaged and are all connections properly insulated?

Sprayer Tank

- ☐ Are the tank/chassis fasteners secure?
- ☐ Free from leaks?
- ☐ Does the lid fit securely and is it free from leaks?
- ☐ Is the contents gauge clearly legible?

Spray Lines

- ☐ Are they free from leaks under pressure?
- ☐ No hoses and connectors worn or cracked?
- ☐ Are all valves and filters in good condition?

Nozzles

- ☐ Are all fittings in good condition?
- ☐ Are all nozzles correctly oriented?
- ☐ Are all check valves working properly?
- ☐ Is the spray/distribution pattern visually correct?

Controls and Valves

- ☐ Are the master on/off switches working correctly?
- ☐ Are left and right manifold switches functioning?
- ☐ Can you read the pressure gauge easily?
- ☐ Are all labels appropriate and legible?
- ☐ Is the pressure adjustment stable?
- ☐ Pressure gauge reading zero?

Chemical Induction System (if fitted)

- ☐ Are the system and controls working properly?
- ☐ Is it free from leaks under pressure?
- ☐ Are all labels appropriate and readable?
- ☐ Are the rinse system and container wash system working properly?

Tank Rinse System (if fitted)

- ☐ Is the system functioning properly?

Periodically Check

- ☐ Calibration–Jug test all nozzle outputs.
  Date completed .....
- ☐ Formally complete and file checklist.

Comments/Notes/Specific Items Requiring Attention:

Lower aangepaste toediening (LAT)

Lower aangepaste toediening

Lower aangepaste toediening is waar ons die lug uitset en vorentoe spoed van die spuit “pas” tot die betrokke gewas lower.

Die doel hiervan is om te verseker dat ‘n maksimum aantal van die totale vrygestelde druppels die teiken bereik en die aantal druppels wat verlore gaan d.m.v. deur spuit, afblaas of drift tot ’n minimum hou.

Lower aangepaste toediening (LAT)

Lower aangepaste toediening

- Lug momentum geproduseer deur die waaier **transport** druppels na die teiken en beskerm die druppels ook tot ‘n mate van heersende omgewingstoestande tydens toediening.
- Dit skud of vou die lower oop en help met penetrasie in die lower in.
- In die geval van ‘n lug momentum wat te veel is, is daar ‘n risiko dat dit die druppels deur die lower kan blaas, die lower te veel skud en selfs die druppels wat klaar geland is op die teiken afblaas.
- In digte lowers kan ongepaste lug momentum ook blaar vou veroorsaak wat lower penetrasie onmoontlik maak. Die lugstroom is die transport stelsel vir die druppels na en in die teiken struktuur. Dit moet nie die druppels van die teiken verwyder nie.

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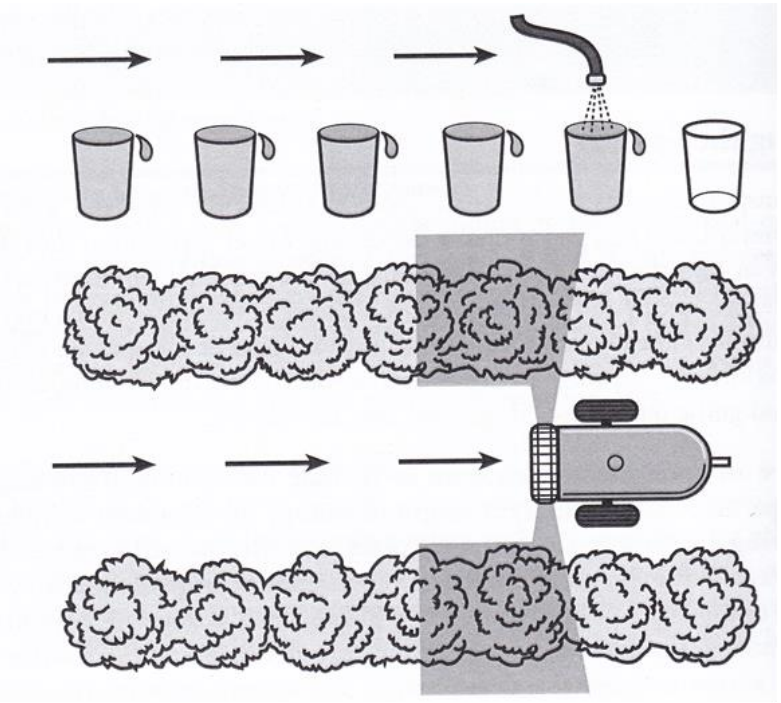
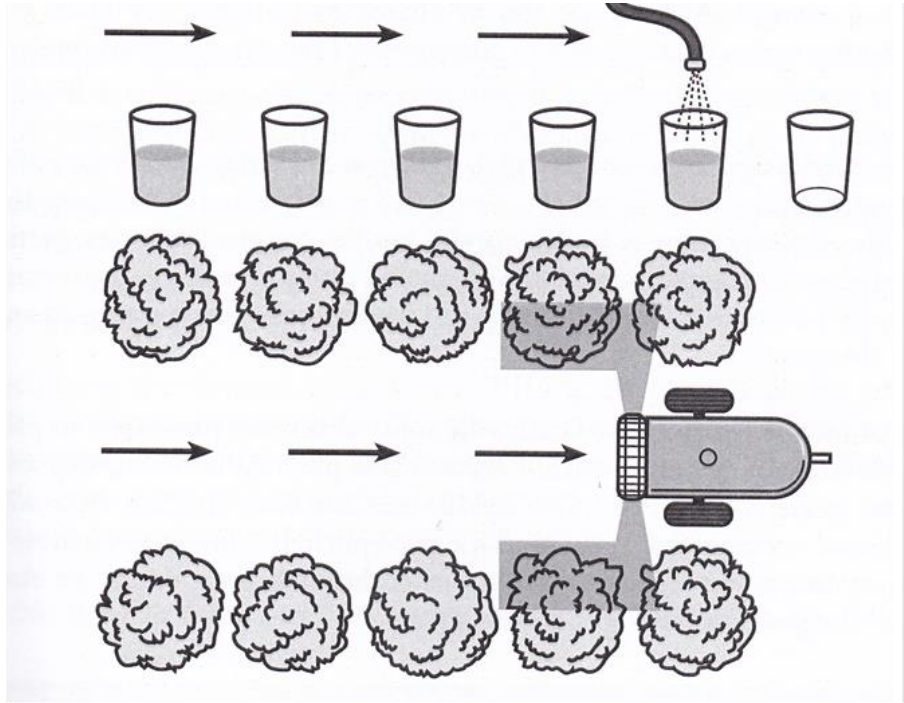
Lower aangepaste toediening (LAT)

Lower aangepaste toediening

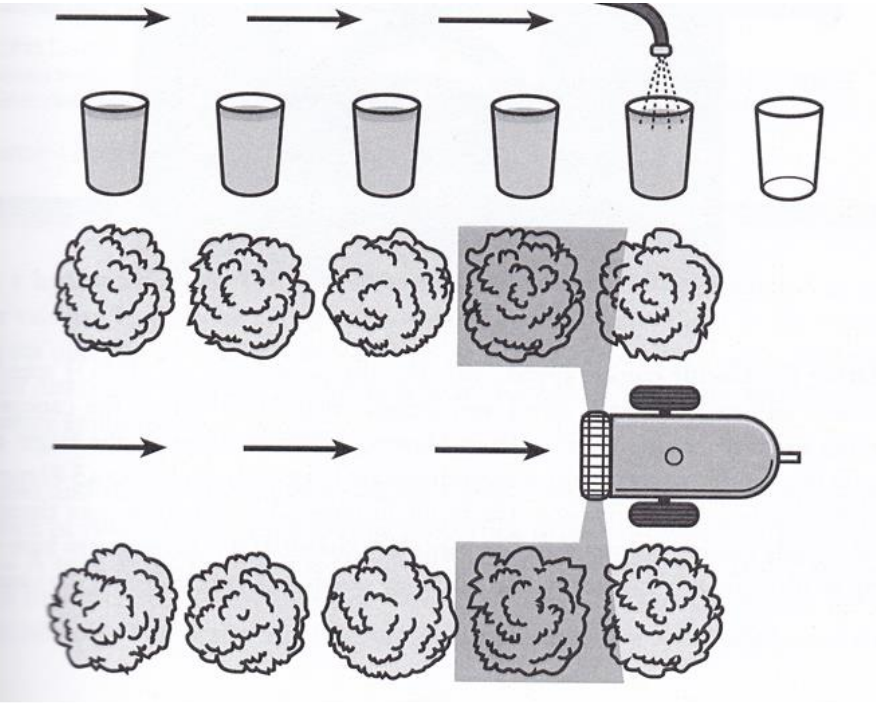
Spoed en lugstroom moet aangepas word laat die spuit wolk die boom verswelg maar nie tot in die volgende ry deurblaas nie.



Waaier spoed te hoog, spuit spoed te laag, spuit blaas deur lower



Waaier spoed te laag, spuit spoed te hoog, onvoldoende penetrasie



Waaier spoed gepas, spuit spoed gepas, spuit verswelg lower

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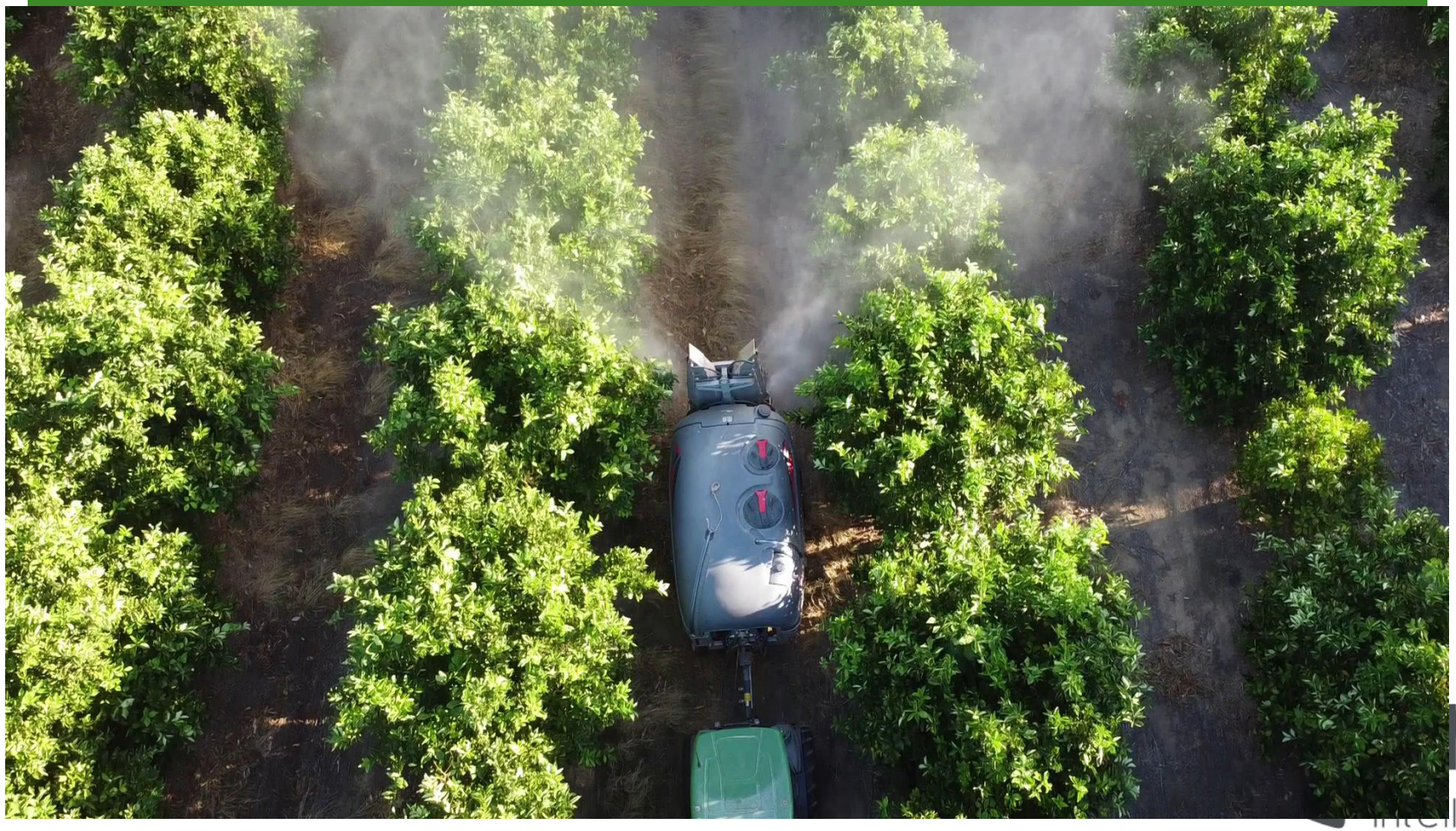
Lower aangepaste toediening

Spoed en lugstroom moet aangepas word laat die spuit wolk die boom verswelg maar nie tot in die volgende ry deurblaas nie.

Lower aangepaste toediening (LAT)

Lower aangepaste toediening

Spoed en lugstroom moet aangepas word laat die spuit wolk die boom verswelg maar nie tot in die volgende ry deurblaas nie.



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Trekker spoed

SLOW IS SMOOTH
SMOOTH IS FAST

Spuit spoed is ‘n kritiese faktor om te verseker dat akkurate spuit volumes gelewer word en optimaal op die lower geland word. Spuit spoed beïnvloed deposisie op die volgende wyse:

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Trekker spoed

- Belangrik
  - Beïnvloed deposisie, veral aan die binnekant van die lower
- **Stadiger**
  - Beter penetrasie, deposisie, uniformiteit
  - Meer afblaas aan buite lower (afloop)
  - Meer deurblaas van lower (drift)
- **Vinniger**
  - Swakker penetrasie, deposisie, uniformiteit
  - Verminder afblaas en deurblaas
  - Vinniger werksverrigting

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Trekker spoed

Elke lower of boord groep het ‘n optimale spuit spoed. Spuit spoed word bepaal deur die volgende faktore:

- Beskikbare lug momentum van die spuitpomp:
- Die spuitpomp wat gebruik gaan word moet die vermoë hê om die lug uit die betrokke lower te dryf en te vervang met lug gelaai met spuitstof.
- Die spuitpomp se beskikbare lug lewering moet die lower pas wat gespuit gaan word.
  - Te lae lug volume vir ‘n betrokke lower benodig stadige spuit spoed wat moontlik logisties nie sinvol is nie.
  - Te hoë lug volumes wat oorbodig kan wees vir die betrokke lower wat onveilige spuit spoed kan realiseer of te veel deur en afblaas.

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Trekker spoed

Elke lower of boord groep het ‘n optimale spuit spoed. Spuit spoed word bepaal deur die volgende faktore:

- Die volgende formule word kan gebruik word om te bepaal of die spuitpomp in staat is om hierdie funksie te verrig teen ‘n logisties sinvolle, realisties veilige spoed.
- **Hierdie spoed moet nie oorskry word nie, tensy ‘n visuele toets in die boord dit anders bewys.**

$$\text{Toelaatbare spoed (km/h)} = \frac{Beskikbare\ lugvolume\left(\frac{m^3}{h}\right)}{1000 \times Boomdiepte\ (m) \times Boomhoogte\ (m)}$$

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Trekker spoed

Voorbeeld:

- ‘n spuit met ‘n maksimum lug volume lewering van 68 000 m^3/h teen 540 r.p.m. kan pekanneut met ‘n lower diepte van 7 m en hoogte van 10 m spuit teen 0.97 km/h.
- **Hierdie spoed is logisties te stadig. Dus is dit belangrik om die spoed buite in die aanplanting te evalueer. Pekanneut bome is minder dig as ander gewasse wat toelaat dat die spuitstof beter deur lower beweeg.**

$$\text{Toelaatbare spoed (km/h)} = \frac{Beskikbare\ lugvolume\ \left(\frac{m^3}{h}\right)}{1000 \times Boomdiepte\ (m) \times Boomhoogte\ (m)}$$

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Trekker spoed

Profiel van die spuit vs. die hoogte en diepte van die lower (lae of hoë profiel spuit).

- Die spuitpomp se profiel moet die lower pas of *vice versa*.
- Deur die regte spuit te kies kan die optimale spoed gebruik word.
- Lae profiel spuite se spoed is afhanklik van die hoogte van die lower.
  - Hoër lowers benodig stadiger spoed om te verseker dat die spuitstof die toppe bereik.
  - Vinniger spoed kan die lug kolom te veel terugbuig en daar is ‘n kans dat die spuitstof nie die toppe bereik nie.
  - Neem in ag dat die stadiger spoed deposisie negatief kan beïnvloed aan die onderste gedeeltes van die lower a.g.v. deurblaas en afblaas.

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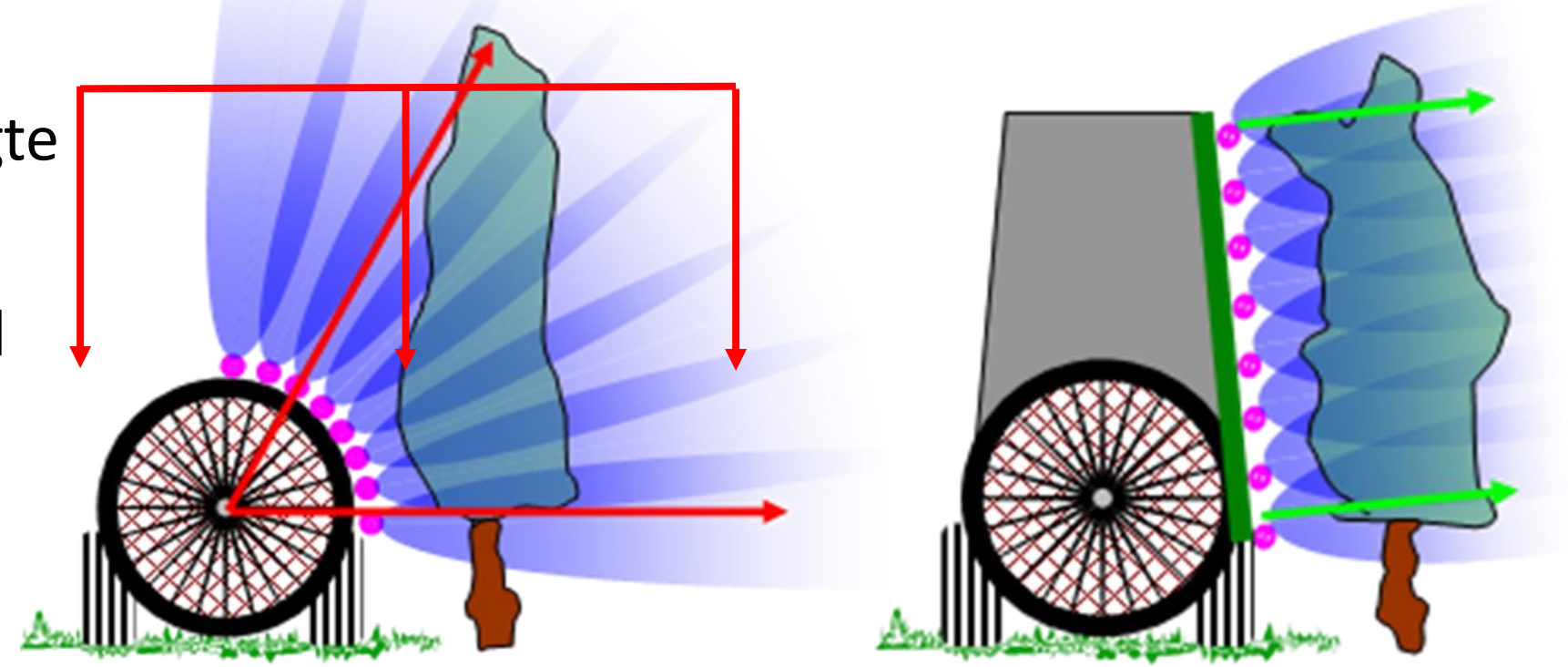
Trekker spoed

SLOW IS SMOOTH
SMOOTH IS FAST

Profiel van die spuit vs. die hoogte en diepte van die lower (lae of hoë profiel spuit).

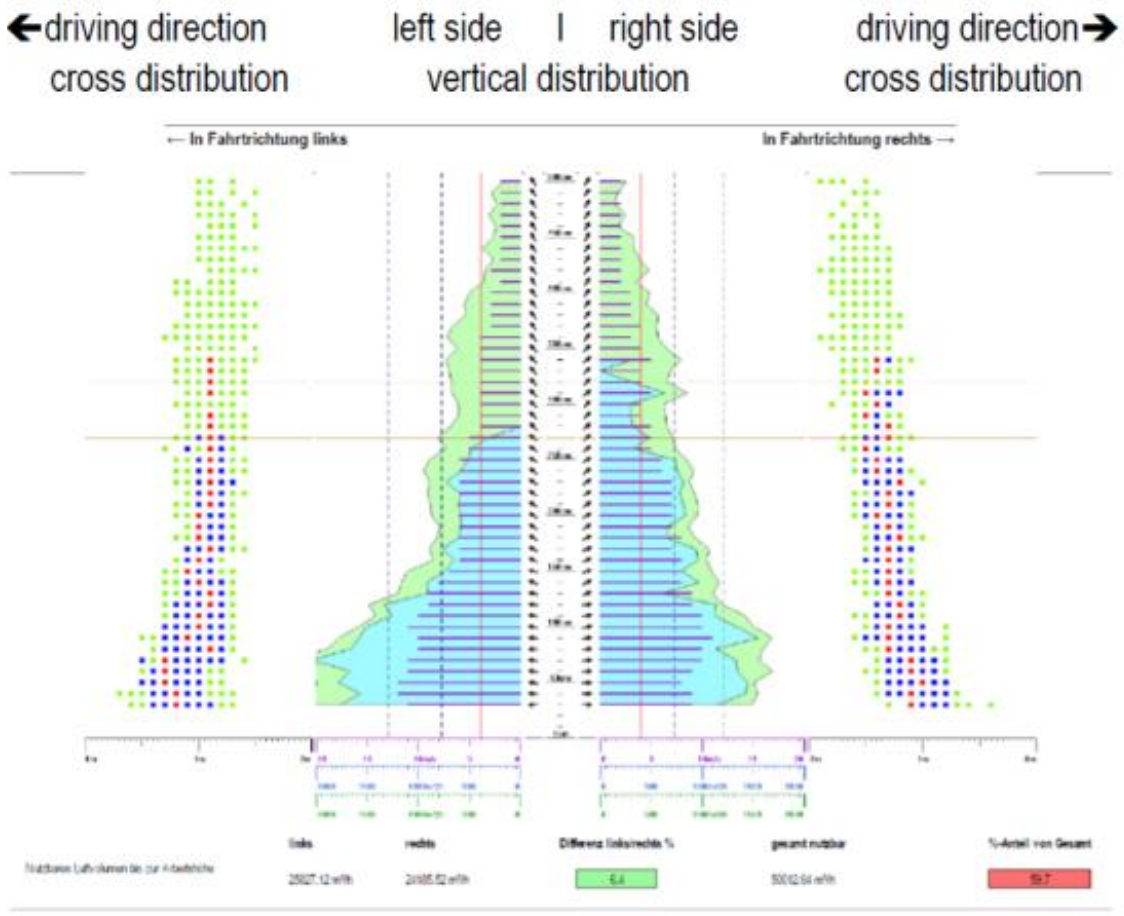
- Lug kolom se werk hoogte raak laer met met toenemende spoed

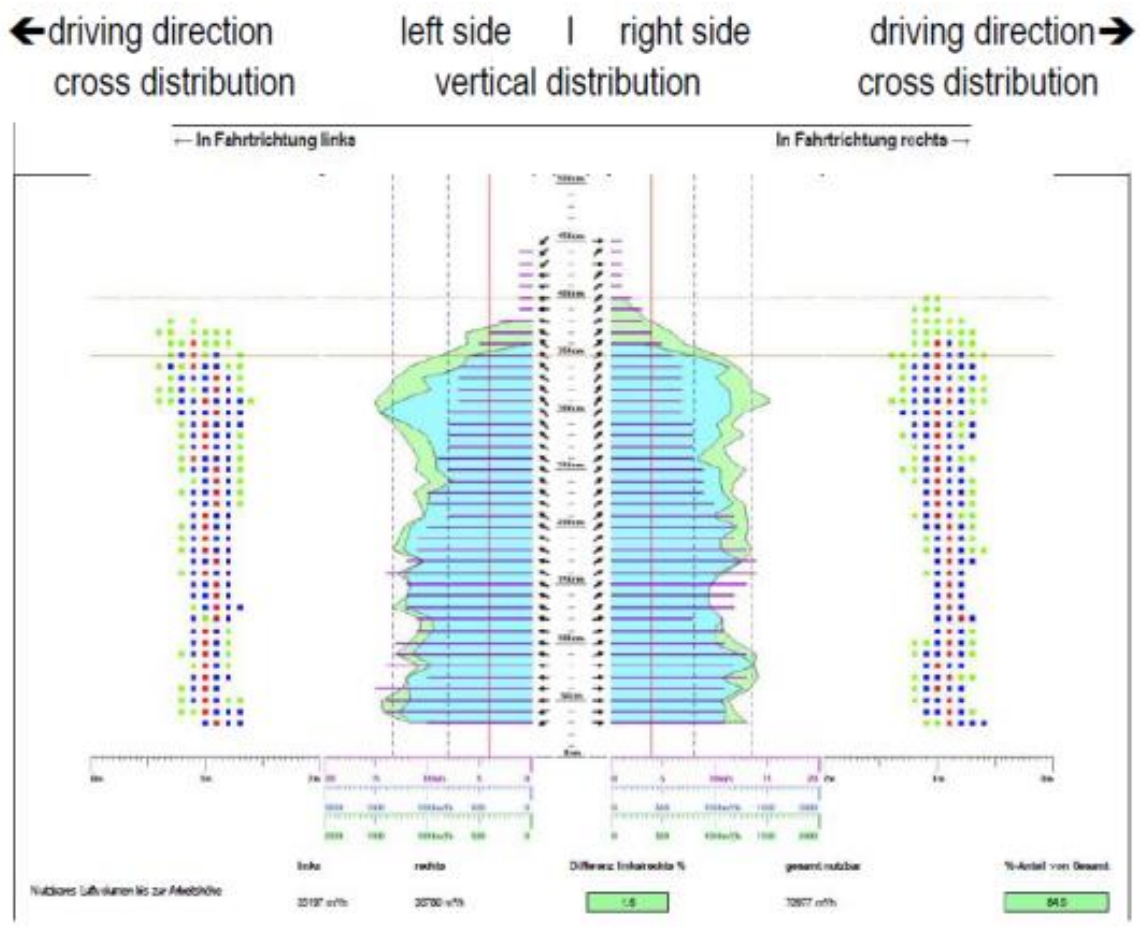


Trekker spoed

SLOW IS SMOOTH
SMOOTH IS FAST

Profiel van die spuit vs. die hoogte en diepte van die lower (lae of hoë profiel spuit).





Trekker spoed

Trekker PTO verstelling: Standaard vs. Ekonomies

- Die trekker wat die spuit sleep moet kan krag lewer aan die waaier en pomp. Maak seker dat die enjin krag (Kw) van die trekker voldoen aan die krag benodig deur die pomp en waaier.
- Daarvolgens kan besluit word of standaard of ekonomies gebruik kan word.

Spuitpomp krag bendig (Kw) by PTO 540 r.p.m.				
Waaier diameter (mm)	**Pitch (°)**	**Lae rat (1:3)**	**Hoë rat (1:4)**	**Pomp @ 20 Bar**
940	28.5	4.05	9.6	6
940	38.5	7.89	18.7	6

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Trekker spoed

Gewas faktore (bv. Bloubessies, wingerd, tamaties, steenvrugte, kernvrugte, sitrus, pekanneute of makadamia).

- Lower volume (Hoogte en breedte van die gewas).
  - Hoër gewasse benodig stadiger spoed as laer gewasse, afhangende van die spuit se profiel. Dieselfde geld vir die breedte van die gewas.
- Lower vorm of opleistelsel.
  - Groter lowers soos oop kelk stelsels benodig ‘n stadiger spoed as die van kleiner/dunner opgeleide lowers.
- Kompleksiteit van die gewas (Lower digtheid).
  - Digter lowers benodig stadiger spoed om effektiewe penetrasie te verseker. Hierdie is sinvol tot op ‘n punt waar die spoed so stadig is dat die lugstroom begin blaar vou veroorsaak en geen penetrasie meer moontlik is nie.
- Ry spasiëring
  - Wyer rye benodig stadiger spoed as nouer rye om rede die spuitstof langer vat om die teiken te bereik en penetreer.
- Kondisie en helling van die boord vloer.
  - Swak, ongelyke boord vloere belemmer spoed. Dit geld ook vir steil hellings. Die spoed moet aangepas word volgens die boord oppervlaktes om slytasie en moontlike veiligheids risiko’s uit te skakel.
- Teiken plaag (Hoë of lae volume toediening).
  - Met hoë volume spuite word stadiger spoed gebruik om penetrasie in die lower in te verseker bv. dopluis en witluis spuite op sitrus.
- Logistiek

Trekker spoed

Hoe om spuit spoed pas by die lower:

1. Hierdie is ‘n visuele toets wat gedoen word binne die boord.
2. Die spuit pluim moet die lower verswelg maar nie te vêr die lower oor penetreer nie.
3. Indien lae profiel spuite gebruik word, maak seker die pluim kom bo in die boom uit.
4. Hierdie moet gedoen word teen 540 r.p.m. met die waaier verhouding gestel volgens die lower (hoog of laag).
5. Begin by die stadige ratte en gaan oor na vinniger ratte totdat die pluim pas.
6. Hierdie spoed moet nie die toelaatbare grond spoed formule oorskry nie – Uitsonderding Pekans en ander hoë gewasse - toets visueel
7. Neem die boord oppervlak en helling in ag. Veiligheid eerste.
8. Swak omgewingstoestande moet in ag geneem word (wind).
9. Indien die maksimum veilig haalbare spoed nie voldoende is nie, sal die lugstroom gemanipuleer moet word (volgende afdeling).

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Trekker spoed

Trekker spoed

- PTO spoed moet gekontroleer word voor trekker spoed bepaal kan word
  - Sommige speedometers is onakkuraat – merk verlangde PTO met merker
- Trekker spoed moet ten minste 2 maal in n seisoen gekontroleer word
- Alle ratte moet bepaal word
- Spoed moet bepaal word met pomp gehak, 1/3 vol water en teen gekose PTO
- Hoe langer die toets afstand, hoe kleiner die foutfaktor
- GPS of stopwatch

$$\text{Trekker spoed (km/h)} = \frac{Afstand\ (m) \times 3.6}{Tyd\ (sek)}$$

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Die lugstroom

Spuit spoed moet altyd eerste aangepas word om die lugstroom te pas tot die lower.

Indien dit nie voldoende is nie kan die lugstroom aangepas word binne die perke van die pomp se kapasiteit.

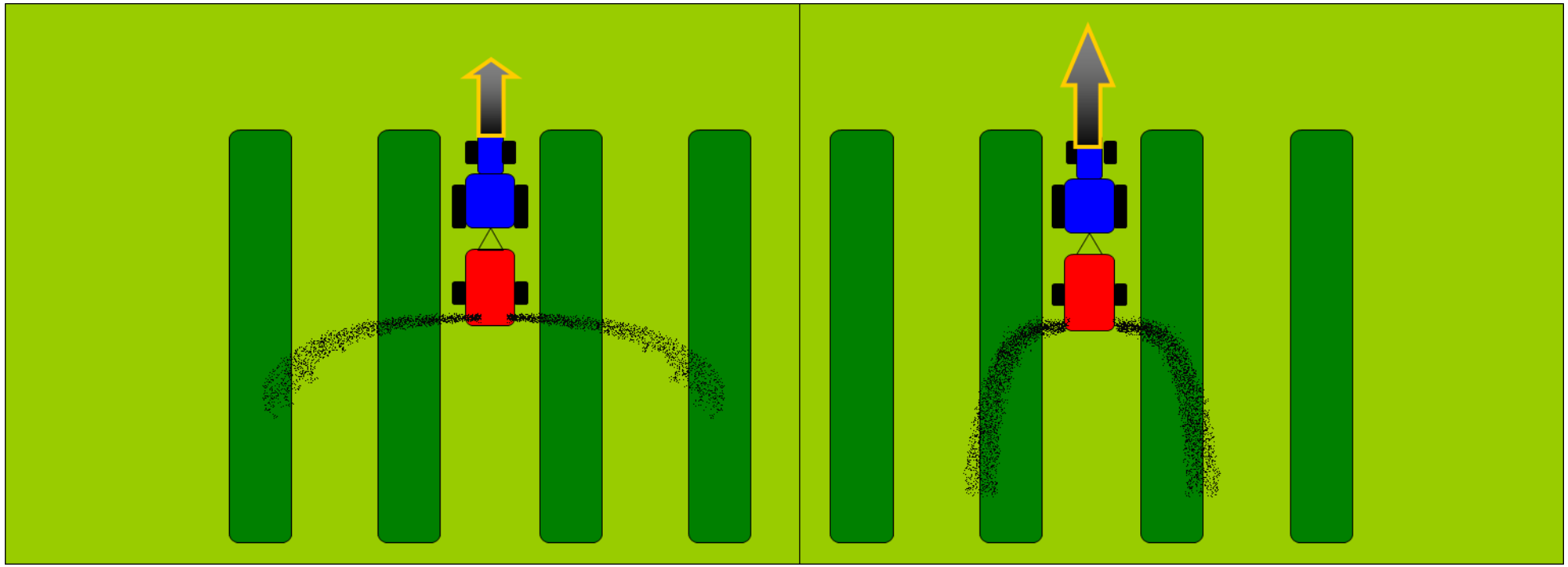
Hierdie word gedoen deur binne in die betrokke boord visueel die lugstroom vol spuitstof te evalueer.

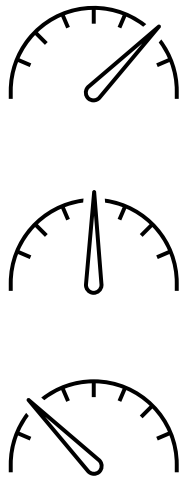
Die lugstroom moet aangepas word sodat die spuit wolk die boom verswelg maar nie tot in die volgende ry deurblaas nie.

Die lugstroom

LAT

Die lugstroom kan met skoon water te spuit geëvalueer word.





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Die lugstroom

LAT

Die lug volume (en spoed) kan gemanipuleer word as volg:

- Waaier spoed aanpas deur rat keuse op die pomp.
  - Meeste moderne aksiale spuite het ‘n twee spoed ratkas wat gebruik kan word om ‘n lae of hoë waaier spoed te kies.
- Die lem hoek (“pitch”) te verstel.
  - Nouer hoeke lewer laer lug volumes en wyer hoeke hoër volumes.
- ‘n Groter of kleiner waaier te gebruik (waaier diameter).
  - Groter diameters lewer hoër volumes lug en kleiner diameters laer volumes lug.

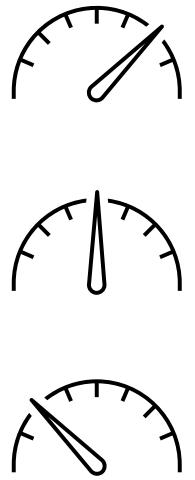
Lug volume (m^3/h) @ Trekker PTO 540 r.p.m.			
Waaier diameter (mm)	**Pitch (°)**	**Lae rat (1:3)**	**Hoë rat (1:4)**
800	28.5	21000	26000
940	28.5	26600	36200
940	38.5	36100	48100

Die lugstroom

LAT

Deur die trekker PTO r.p.m. te manipuleer.

- Die PTO r.p.m. kan afgebring word vanaf 540 r.p.m. Hierdie sal die waaier spoed r.p.m. verlaag.
- Hierdie gaan wel ook die pomp se volume lewering (L/min) verlaag.
- Dus indien PTO r.p.m verlaag word moet dit binne die pomp se lewerings perke gedoen word om te verseker dat die pomp nog kapasiteit het om die verlangde water volume, druk en meng kapasiteit kan lewer.
- Die PTO r.p.m. moet bepaal word met ‘n toereteller.
- Indien die PTO r.p.m. verlaag word moet die trekker spoed gemeet word daarby.



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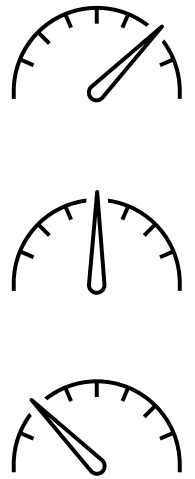
Die lugstroom

LAT

Indien die lugstroom gemanipuleer moet word om die lower te pas, verstel altyd in die volgende volgorde:

1. Pomp ratkas
2. Lem hoek
3. PTO spoed.



Monitor die hoogte van die spuit pluim om te verseker die spuitstof bereik die boonste gedeelte van die lower. Indien die pomp kapasiteit nie bekend is nie, speel dit veilig en moet laer as 400 PTO r.p.m. gaan nie.

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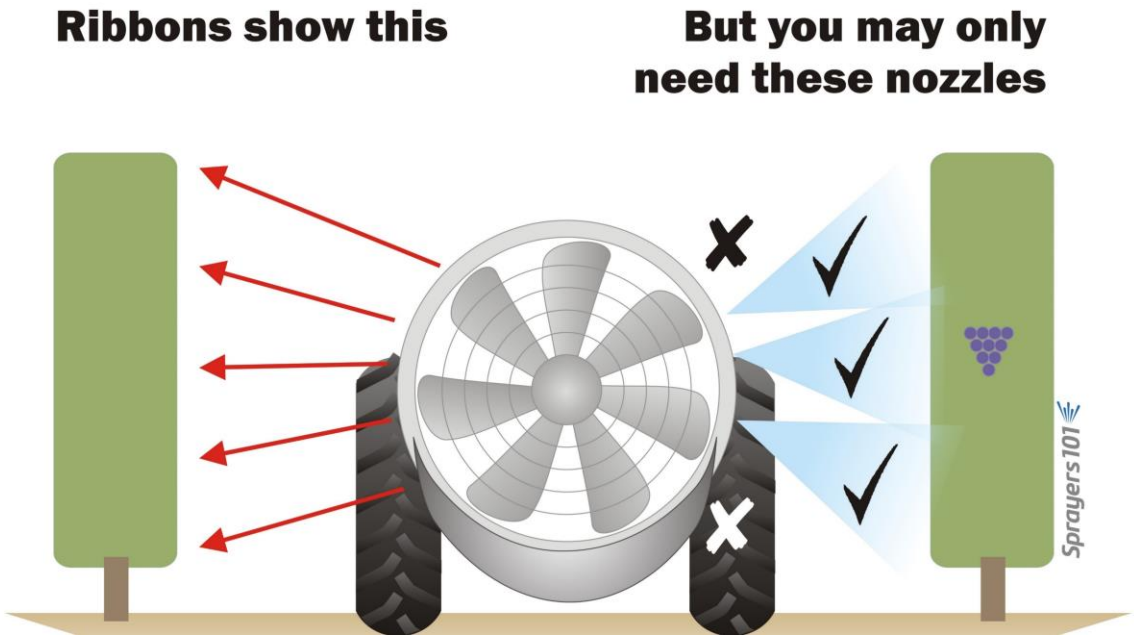
Die lugstroom

LAT

Evaluasie van die lugstroom rigting of profiel.

- Dit is nodig om die lugstroom se rigting en profiel op die spuit te meet. Dit sal uitwys of die profiel (indien moontlik) aangepas moet word om die lower te pas.
  - Die lug profiel en rigting kan aangepas word deur die defleksie spane te verstel bo aan die spuit (indien die spuit spane het).



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Boom Ry Volume en water volume

BRV

- **Pekan neute:**
- Pekanneut bome verlang hul eie formule. Die rede hiervoor is dat alhoewel die bome baie groot is dit nie so dig is of totaal gevul is met blare en neute nie. As gevolg hiervan, is die BRV model gewoonlik oorbodig vir hierdie strukture.
- Deposisie in pekanneut bome sal altyd baie varieer van teiken tot teiken (blaar tot blaar, neut tot neut) a.g.v. die groot struktuur waarin/deur druppels effektief gedra moet word. Hierdie is veral waar in die toppe van die bome (hoër as 8 m). Om druppels hoër te dra verg baie groot lug volumes wat ‘n negatiewe effek op deposisie in die onder en middel lower sal hê a.g.v. afblaas en deurblaas.
- Die volgende formule kan gebruik word om pekanneut water volumes te bereken:

$$spray\ volume\ \left(\frac{l}{ha}\right) = \frac{10000}{\text{Row width (m)}} \times Tree\ hight\ (m) \times Tree\ depth\ (m) \times\ 0.018\ L$$

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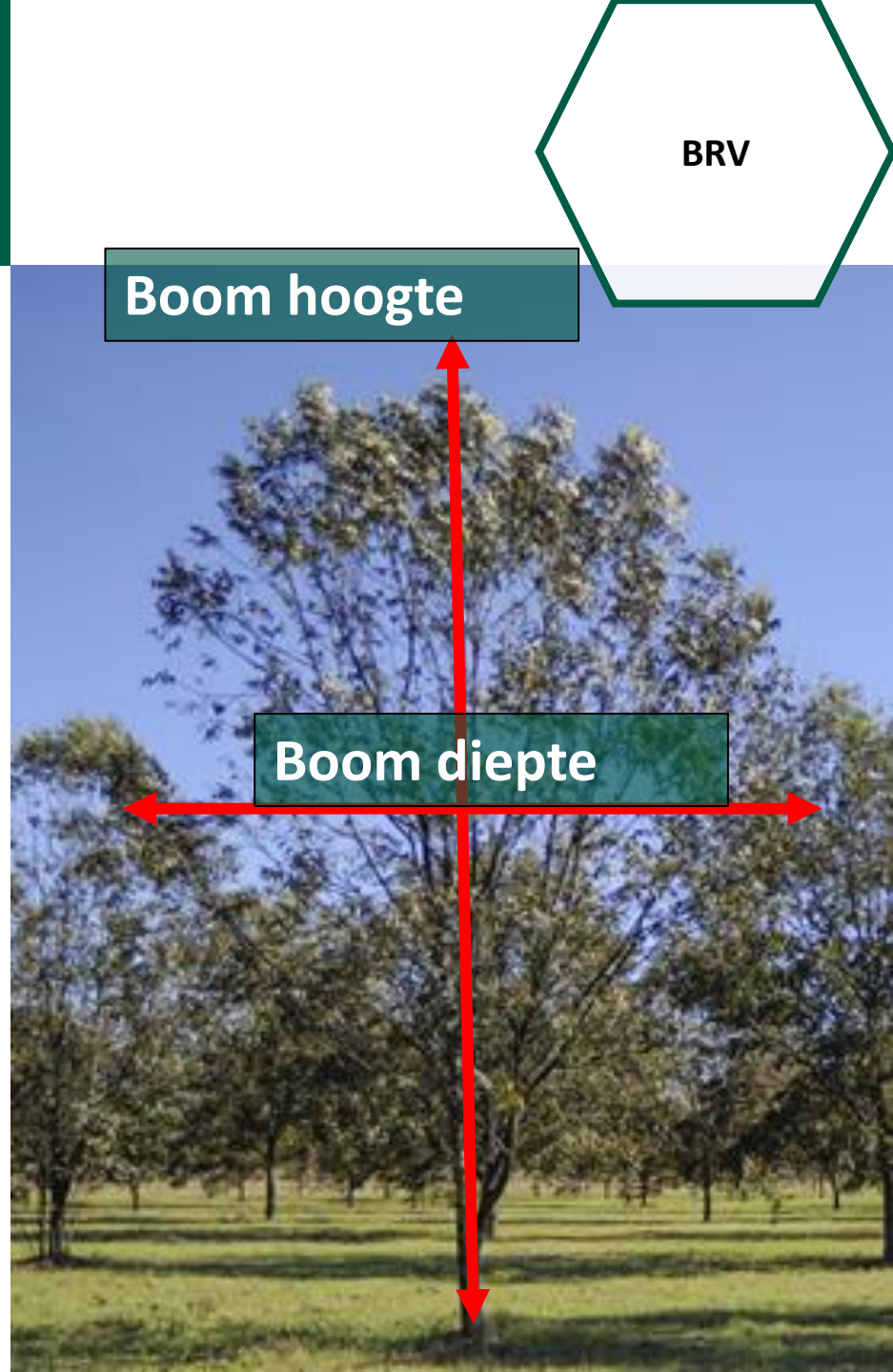
Boom Ry Volume en water volume

- Voorbeelde:
  - Boom hoogte 9 meter
  - Boom diepte 7 meter
  - Ry wydte 10 meter

$$spray\ volume\ \left(\frac{l}{ha}\right) = \frac{10000}{\text{Row width (m)}} \times Tree\ hight\ (m) \times Tree\ depth\ (m) \times\ 0.018\ L$$

$$Spray\ volume\ \left(\frac{l}{ha}\right) = \quad \frac{10000}{10\ \text{m}} \times \quad 9\text{m}\ \times 7\text{m}\ \times \quad 0.018L$$

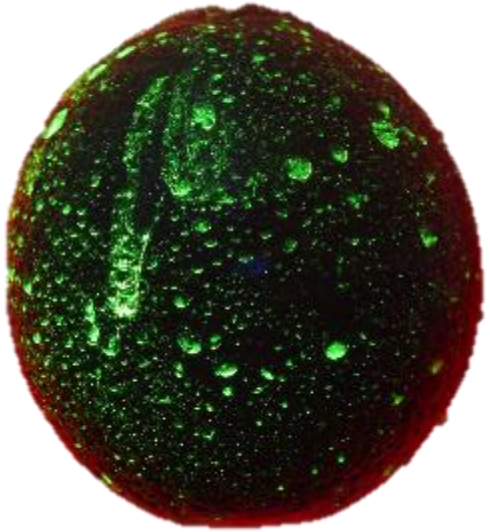
$$Spray\ volume\ \left(\frac{l}{ha}\right) \ = \quad 1134\ l/ha$$

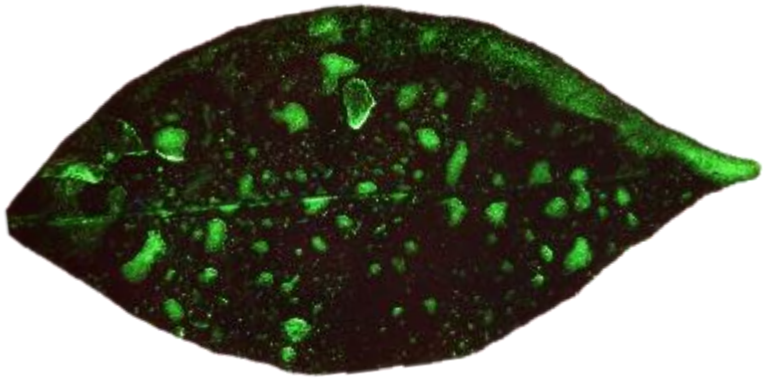


Water volume

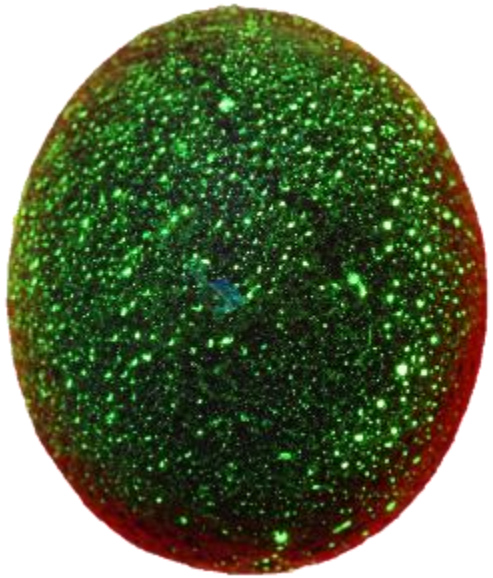
Water volume

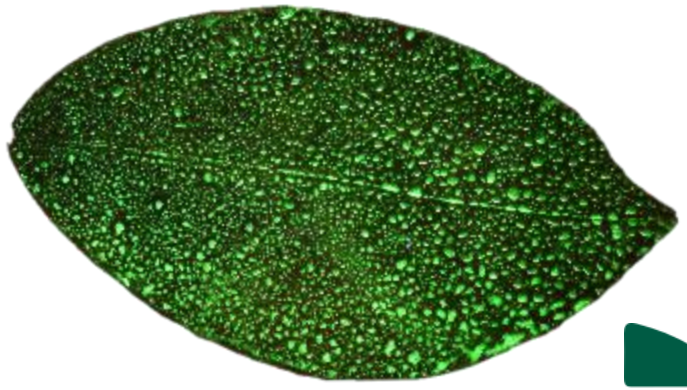
Hoë volume
Afloop
Swak kwaliteit
Goeie uniformiteit





Lae volume
Geen afloop
Goeie kwaliteit
Gemiddelde uniformiteit





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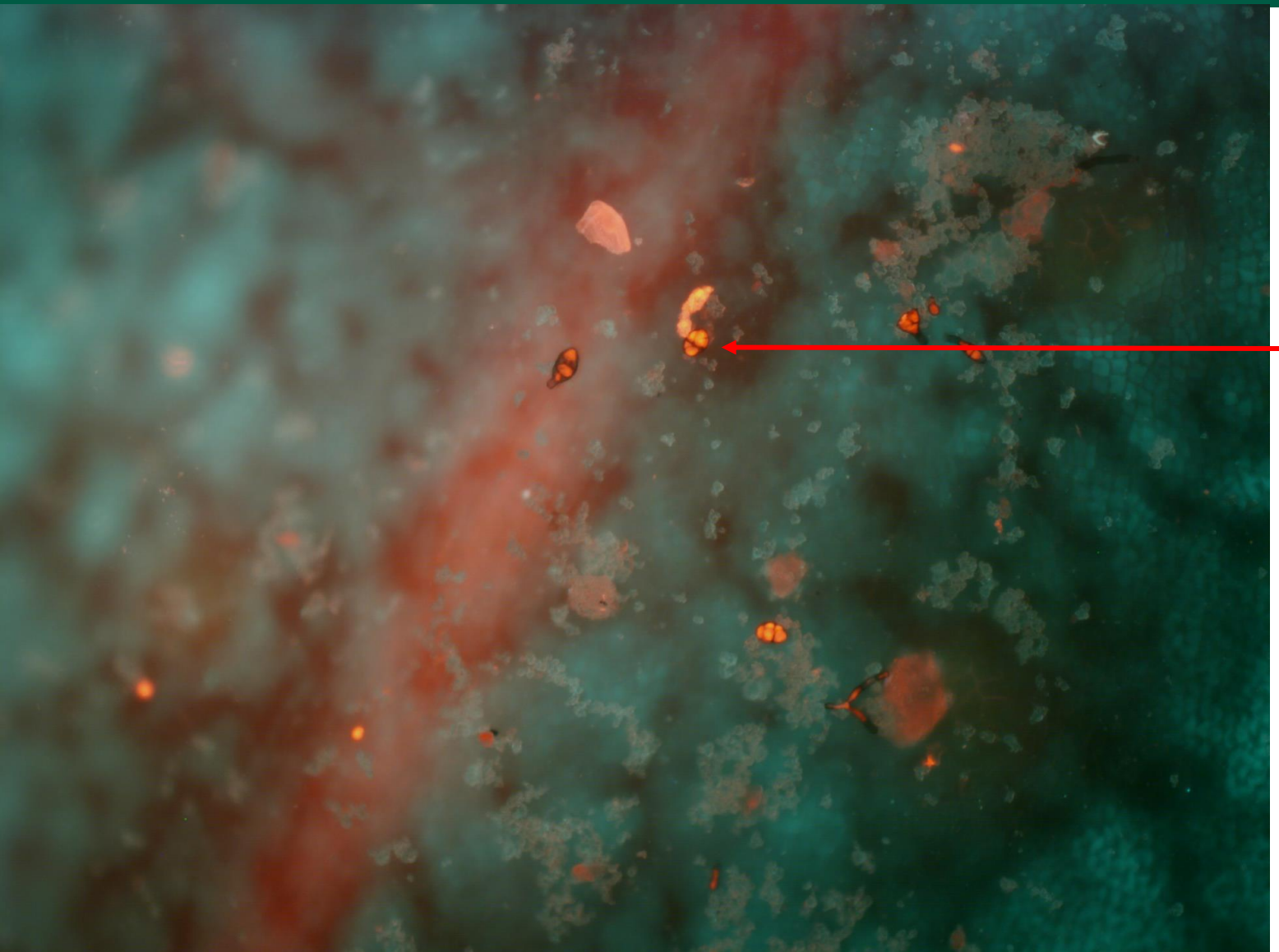
Water volume



Water volume

Swam spore in kotak met swamdoder

Voldoende deposisie – regte water volume

Geen penetrasie en ontkieming

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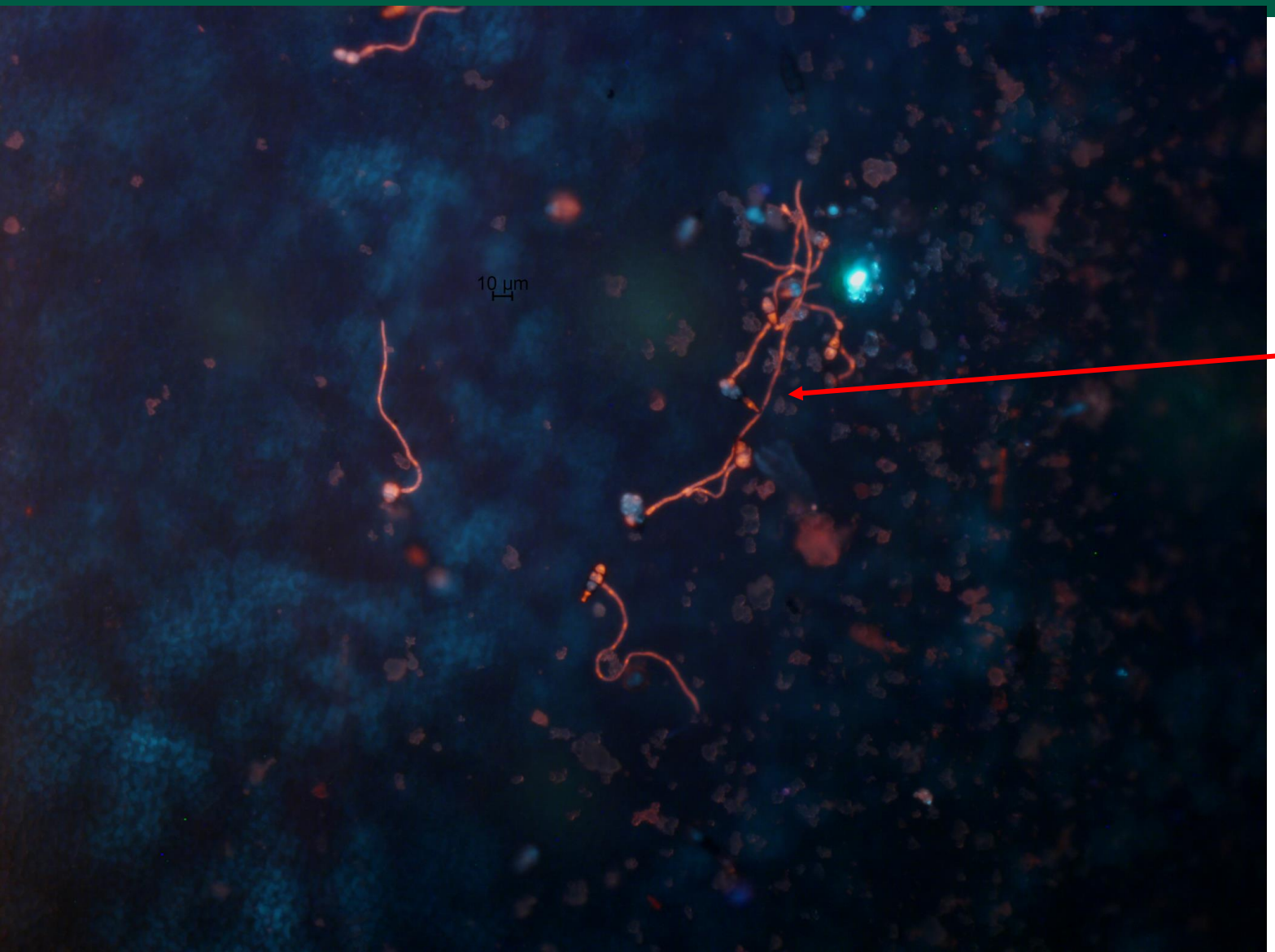
Water volume



Water volume

Swak deposisie kwaliteit – te hoë water volume

Swam spore ontkiem **– groot spasie tussen swamdoder partikels**

Penetrasie en infeksie

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Water volume

Water volume

Swak deposisie kwaliteit – te hoë water volume

Swam spore ontkiem **– groot spasie tussen swamdoder partikels**

Penetrasie en infeksie

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Water volume keuse

Water volume

- Water volume besluit en uitset
- Groot volume verandering
  - Nozzle seleksie
- Medium en klein volume verandering
  - Druk en spoed

Water volume keuse

Water volume

$$L/\text{min}\ per\ nozzle = \frac{\text{Speed (k m/h)} \times \text{Row spacing (m)} \times \text{Spray volume (L/h a)}}{\text{Factor (600)} \times \text{No. open nozzles}}$$

- Maak nozzle keuse op lewering
  - Groot volume verandering
  - Teen druk soos aanbeveel op nozzle chart
  - Nozzle charts is NB!

$$1.3\ L/\text{min} = \frac{4.5\ (\text{k m/h}) \times 4\ (\text{m}) \times 700\ (\text{L/h a})}{\text{Factor (600)} \times 16}$$

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Nozzles

Nozzles

- Nozzle funksies
  - Een van die belangrikste komponente van spuit toediening.
  - Bepaal die vloei tempo (l/min) van die spuitstof (diafragma grootte)
  - Breek die spuitstof op in druppels
  - Versprei die druppels in ’n spesifieke patroon
  - Dryf die druppels na die teiken

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Nozzles

Nozzles

- Nozzles het drie basiese werkings meganismes
  - Grootte van die opening bepaal die vloeitempo
    - Groter opening = hoër vloei tempo en growwer druppels
    - Kleiner opening = laer vloei tempo en kleiner druppels
  - Druk
    - Hoër druk = fyner druppels/Meer druppels
    - Laer druk = growwer druppels/Minder druppels
  - Hoek van die spuit
    - 80 vs 90 vs 110˚
    - Bepaal die dekkings area
    - Overlapping

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Nozzles

Nozzles

- Nozzle materiaal
  - Formulering van chemie wat gaan gebruik word?
  - Hoe lank moet die nozzle hou?

Nozzle materiaal	Koste	Duursaamheid (Leeftyd)	Akkuraatheid (druppel grootte spektrum)	Verhoging in vloeitempo na 40 uur (%)
Keramiek	Hoog	Hoog	Hoog	3
Hoë gehalte plastiek	Medium	Medium	Hoog	6
“Knock-off’s”	Laag	Laag	Laag	10
Vlekvrye staal	Medium	Laag	Medium	11
Brass	Medium	Laag	Medium	17

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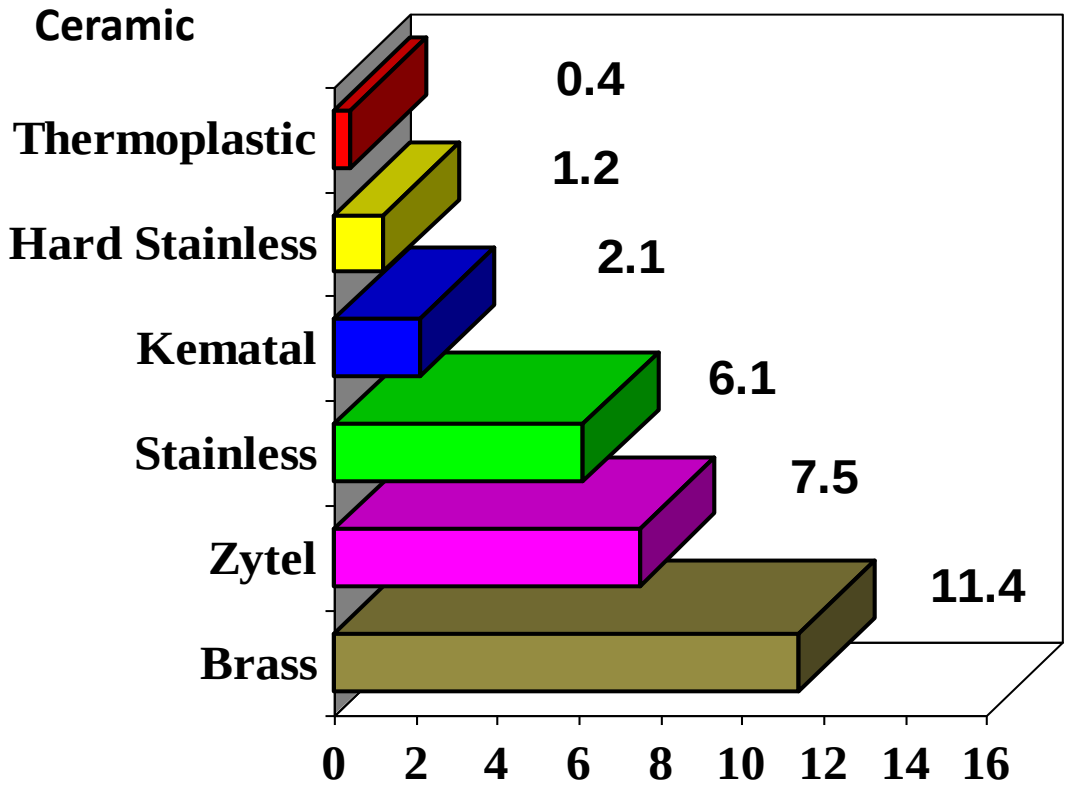
Nozzles

Nozzles



Keramiek nozzles het die beste leeftyd, maar slyt later ook uit

Percent increase in nozzle flow rate
Flat-fan spray nozzles after 40 hour test

Application Technology Group
NYSAES, Geneva, NY

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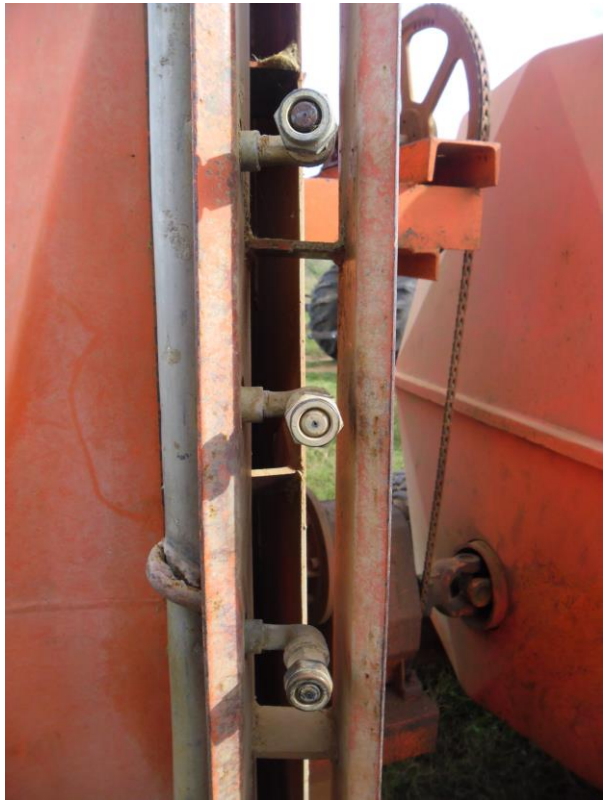
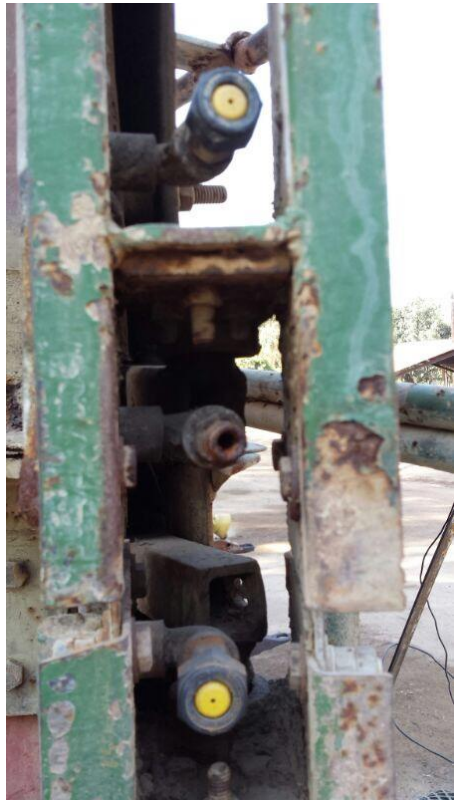
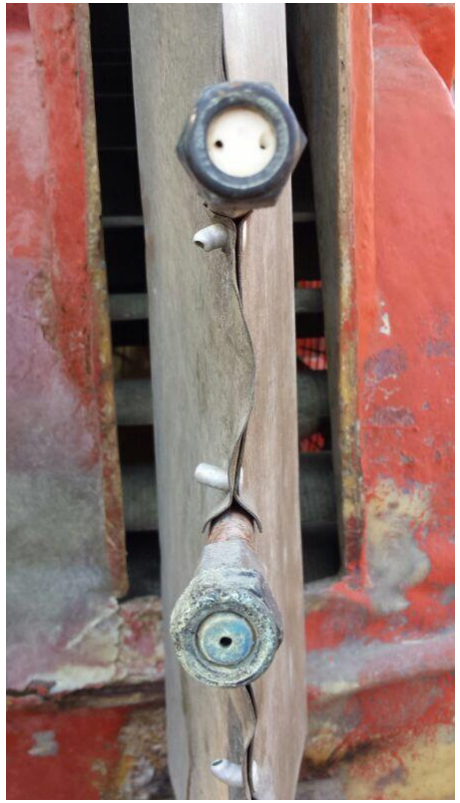
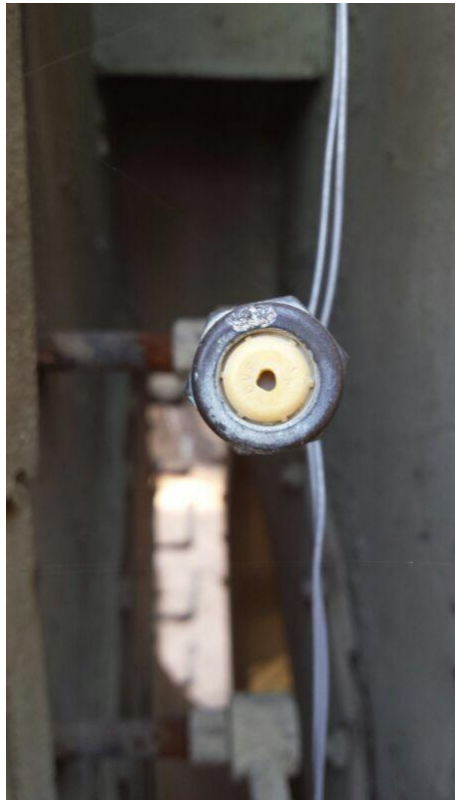
Nozzles

Nozzles



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Nozzle tipes

Nozzles

- “Cone pattern” nozzles
  - Bestaan uit twee dele – Disk en ’n core
    - Disk – bepaal vloeitempo
    - Core – Breek vloeistof op in druppels en bepaal druppelgrootte
  - Of een deel – langer leeftyd, beter materiaal, minder wrywing
  - Werk teen laer drukke (7-10 Bar)
- Full cone
  - Word gebruik vir hoë druk (0.7 tot 35 bar), hoë volume spuite
  - 30 tot 120˚ spuit hoek
  - Hoe kleiner die hoek, hoe beter die lower penetrasie
  - Weier hoeke help met swak bestuurde lowers naby aan die spuit
  - Ronde vol spuit patroon
  - Drift werend tot ’n mate

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Nozzle tipes

Nozzles

- “Cone pattern” nozzles
  - Hollow Cone
    - Ronde “hol” spuit patroon (geen spuitstof aan die binnekant)
    - Fyn en meer uniforme druppel spektrum as Full Cone nozzles
    - Werk beter teen laer drukke (0.7 tot 15 bar)
    - Kan in kombinasie gebruik word saam met full cone nozzles
    - Werk beter saam met benatbare poeiers
    - ATR 60 en 80˚

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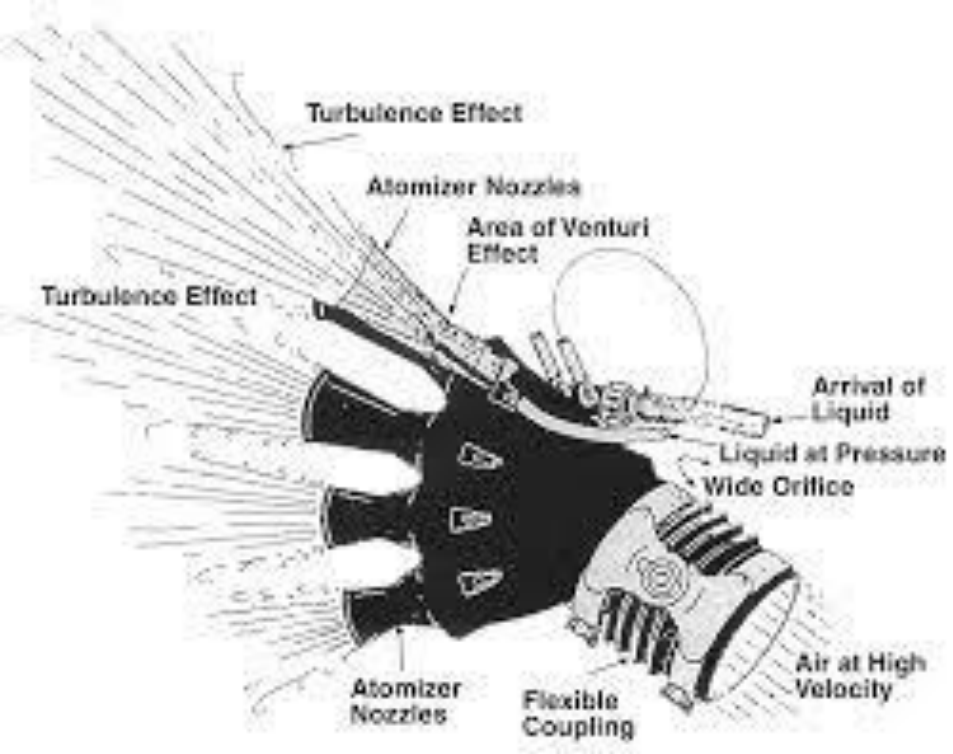
Nozzle tipes

Nozzles

- “Air shear” nozzles
  - Kan slegs gebruik word saam met hoë lugspoed spuite
  - Spuitstof word vrygelaat in die hoë lugspoed lugstroom
    - Breek die spuitstof op in druppels deur ’n skeur aksie
    - Druppel grootte hang af die hoek van vrylating van die spuitstof in die lugstroom
      - Groter druppels – spuitstof word saam met die lugstroom vrygestel (180˚)
      - Medium druppels – Spuitstof word teen 90˚ met die lugstroom vrygestel
      - Kleiner druppels – spuitstof word teen <90˚ met die lugstroom vrygestel
    - Werk teen laedruk- spektrum (1 tot 4 Bar)



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Nozzle tipes

Nozzles

- “Elektrostatiese stelsels
  - Druppels word gelaai met ’n hoë volt/lae stroom naby die nozzle tuit
  - Konsep
    - Negatief gelaaide druppels word aangetrek deur ’n positiewe gelaaide teiken oppervlak
    - Baie fyn druppels < 50 mikron
    - Die druppels kan gelaai word deur kontak, induksie of deur ’n “corona” bv. Martignani

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Nozzle tipes

Kalibrasie

- “Drift verwerende of verlagende nozzles”
- “Air induction” nozzles (Venturi nozzles)
  - Flat fan of hollow cone
  - Venturi veroorsaak ’n vakuum binne die nozzle
  - Veroorsaak dat lug ingesuig word deur 1 of 2 gaatjies
  - Dit meng die lug met die spuit mengsel
- Vorm groot druppels gevul met lug (375 micron)
  - Drift beperkend
  - Bars sodra dit land op teiken

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Nozzle klasifikasie

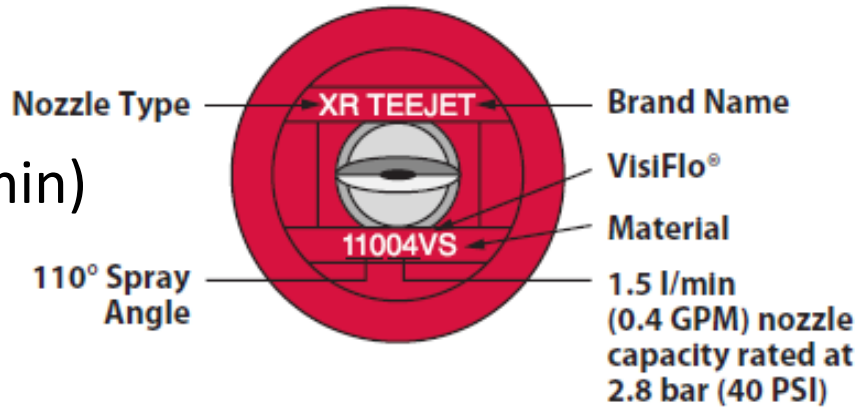
Nozzles

- ISO standaard vir nozzle klasifikasie

Nozzle size	ISO colour	BCPC nozzle code
02	Yellow	F110/0.8/3
025	Lilac	F110/1.0/3
03	Blue	F110/1.2/3
04	Red	F110/1.6/3

Category	Symbol	Color Code
Extremely Fine	XF	
Very Fine	VF	
Fine	F	
Medium	M	
Coarse	C	
Very Coarse	VC	
Extremely Coarse	XC	
Ultra Coarse	UC	

- BCPC kode voorbeeld: Blou 03
  - F = Flat van
  - 110 = Spuit hoek
  - 1.2 = Lewering by 3 bar (L/min)
  - 3 = Druk (Bar)



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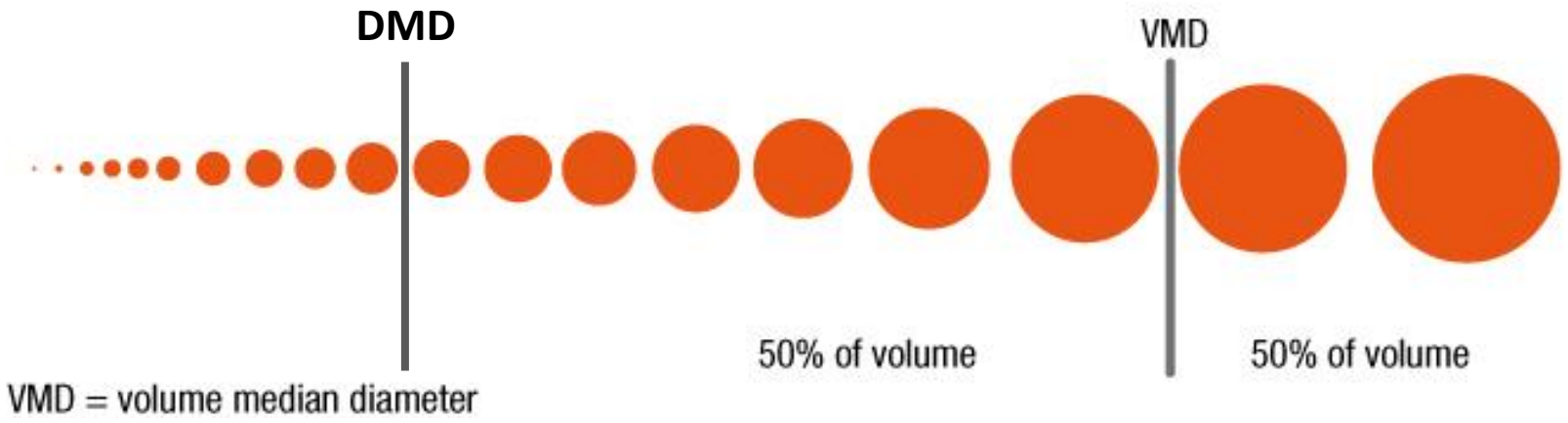
Druppel grootte

Druppel grootee

- Druppels word geklassifiseer volgens:
  - Druppel Mediaan Diameter (DMD) = Die druppel diameter waar die helfte van die totale hoeveelheid druppels kleiner is en die ander helfte groter is
  - **Volume Mediaan Diameter (VMD) = Die druppel diameter waar die helfte van die volume kleiner is en die ander helfte groter is**
  - 10% Volume Diameter (Dv.1) = Die druppel diameter waar 10% van die volume dieselfde grootte het (die baie fyn druppel spektrum)
    - Word gebruik om drift potensiaal te meet



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Druppel grootte

Nozzles

- The British Crop Protection Council Spray Classification Categories

Spray Quality	Droplet size	VMD (Micron)	Drift Potential	Droplet composition	Use
Very Fine	Small	140 to 160	High	>Small	Fungicides
Fine		180 to 220		>small	Fungicides+Pesticides
Medium		240 to 260			Fungicides+Pesticides
Coarse		280 to 320		>Large	Herbicides
Very Coarse	Large	Over 400	Low	>Large	Liquid Fertilisers

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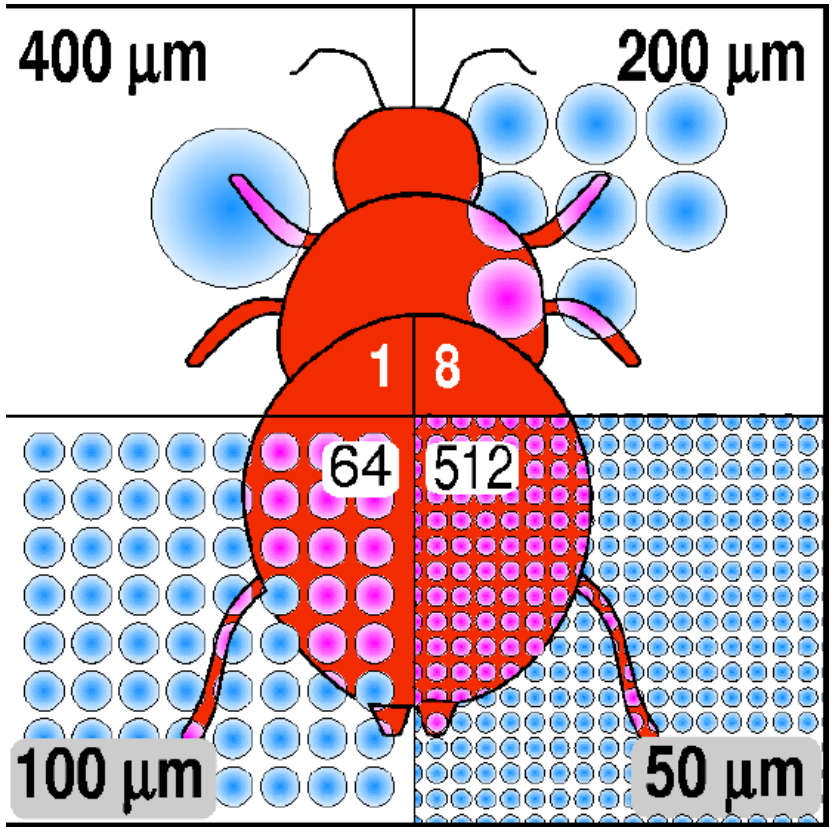
Druppel grootte

Ideale situasie

- Ons wil so veel as moontlik van die nodige druppel grootte hê in die druppel spektrum



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Nozzle oriëntasie

Nozzles opstelling

Sentrifugale spuite

- Geen nozzle seleksie
- Verstel Gaatjie plaat om lewering te manipuleer
- Gebruik alle uitlate
- Dit is belangrik om spuit newel in die boord te evalueer
  - Maak seker dat daar geen ‘streaking’ is nie
  - ‘Overlapping’ moet minimaal wees
  - Trek spuit in boord ry om te evalueer
  - Verstelling gaan verskil met boom hoogte en rywydte!
  - Hierdie verstelling moet gedoen word in elke boord voor bespuiting

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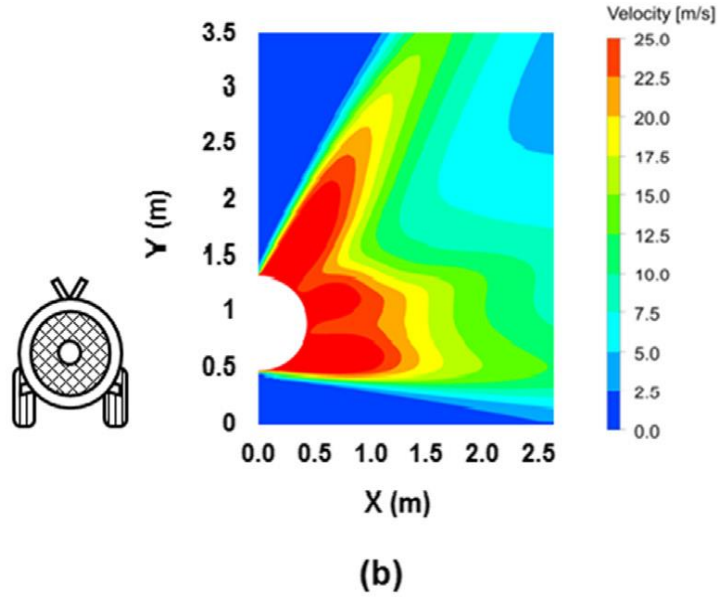
Nozzle oriëntasie

Nozzle opstelling

Aksiale spuite

- Lae profiel (waaiergat)
  - Hollow of full cone nozzles
  - Nozzle keuse sal afhang van verlangde lewering per hektaar
    - Hoogte van die teiken
    - Bome 3.5 m en laer = gebruik selfde nozzle tipe – ***Jong Pekan bome***
    - Bome hoër as 3.5 m = varieer nozzle uitleg
      - 70/30% van totale lewering konsep
      - 80% bo (2/3 van nozzles) en 20% (onderste 1/3 van nozzles) onder vir groot Pekan bome
      - Persentasie konsep gebaseer op lug uitset
      - Waaiergat spuite sal altyd swak deposisie kwantiteit, kwaliteit en uniformiteit in die toppe hê



(b)

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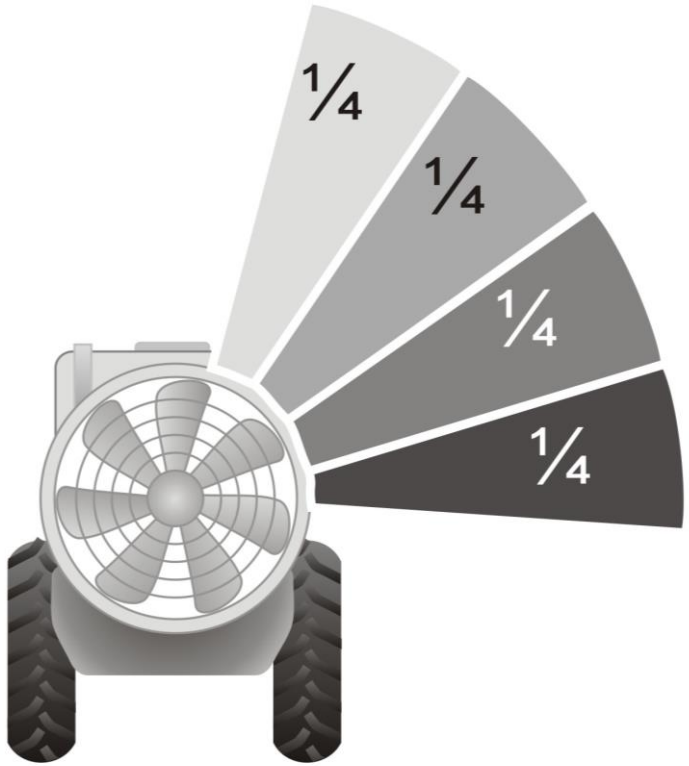
Nozzle oriëntasie

Nozzle opstelling

- Nozzle setup
- Hoogte van teiken
  - 3.5 m en laer
- Vorm van lower
  - Tall spindle



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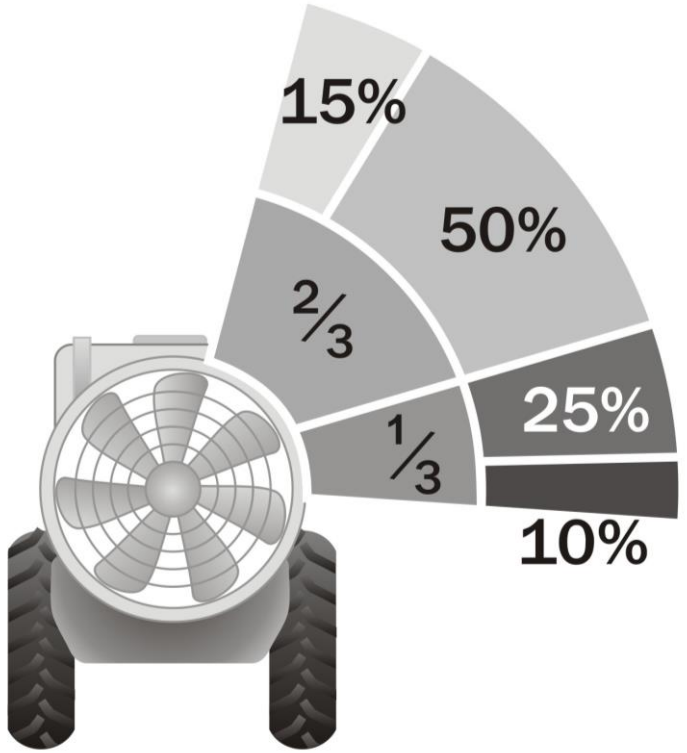
Nozzle oriëntasie

Nozzle opstelling

- Nozzle setup
- Hoogte van teiken
  - 3.5 m en hoër
- Vorm
  - Oop kelk, lollipop
  - Waar sit die vegetatiewe groei
  - Gebruik ‘common sense



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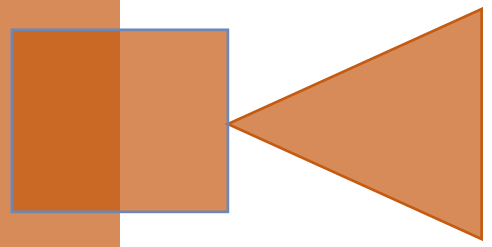
Nozzle oriëntasie

Nozzle opstelling

Aksiale spuite

- Lae profiel (waaiergat)
  - Lugstroom sal aanwys waar nozzles benodig word
    - Moet nie nozzles plaas in lugstroom wat NIE teiken gerig is nie!
    - Vermeerder Drift
    - Nozzles moet geplaas word om elke 30 tot 45 cm te dek (met 5% ‘overlapping’)
    - Minimum van 8 nozzles (Groter vloeitempo)
    - Maximum van 12 nozzles (Kleiner vloeitempo)

Nozzle keuse

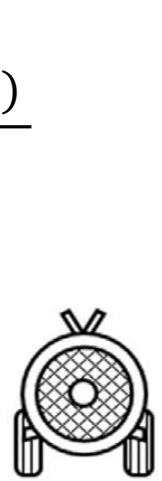


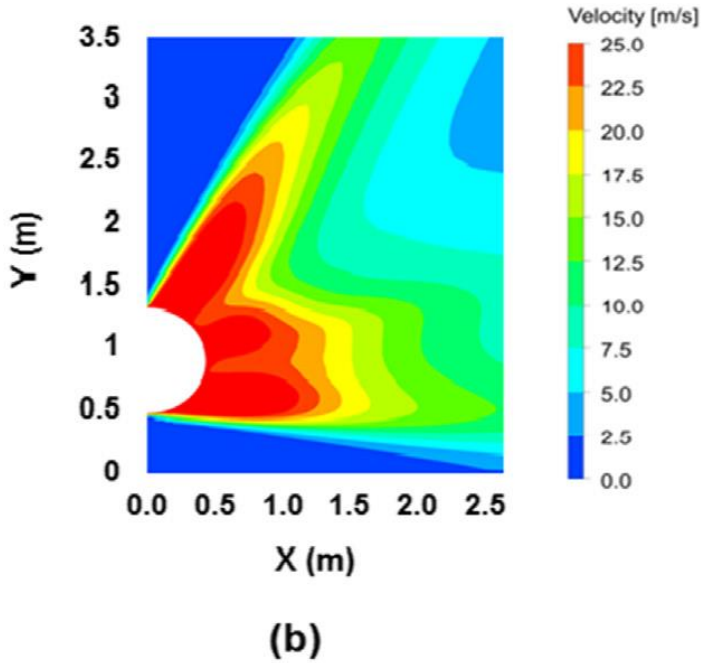
Nozzle keuse

Aksiale spuite

- Lae profiel (waaiergat)

$$L/\min per\ nozzle = \frac{\text{Speed (km/h)} \times \text{Row spacing (m)} \times \text{Spray volume (L/ha)}}{\text{Factor (600)} \times \text{No. open nozzles}}$$





(b)

- Maak nozzle keuse op lewering
  - Groot volume verandering
  - Teen druk soos aanbeveel op nozzle chart
  - Nozzle charts is NB!

$$1.3\ L/\min = \frac{4.5\ (\text{km/h}) \times 4\ (\text{m}) \times 700\ (\text{L/ha})}{\text{Factor (600)} \times 16}$$

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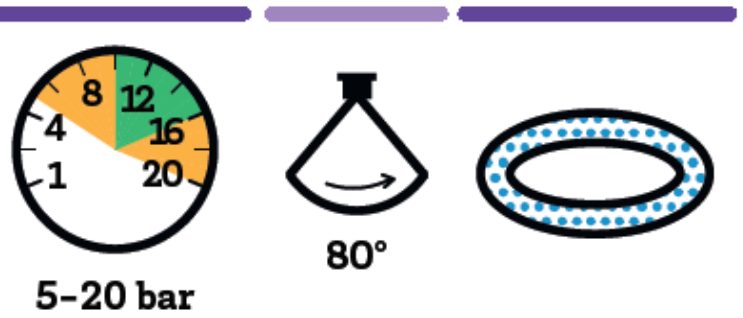
Nozzle keuse

Nozzle keuse

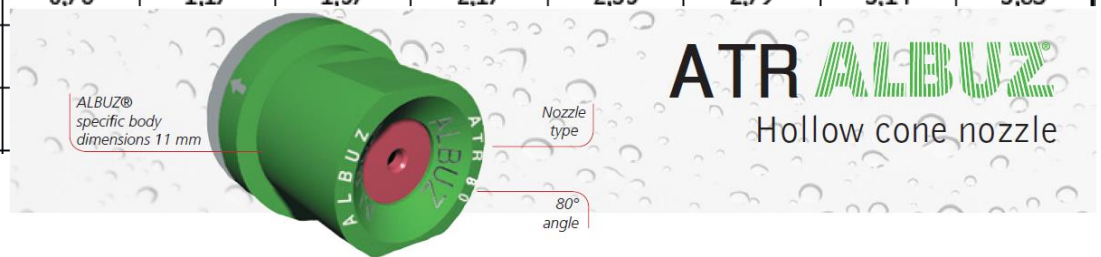
Aksiale spuite

- Lae profiel (waaiergat)
- Bv Albuz ATR

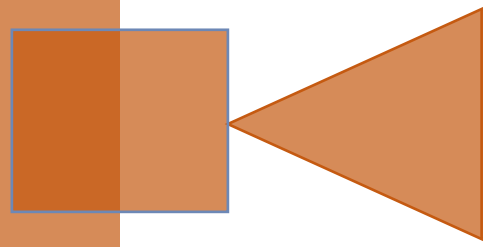


bar	ATR 80°									
	WHITE	LILAC	BROWN	YELLOW	ORANGE	RED	GREY	GREEN	BLACK	BLUE
5	VF	VF	VF	VF	VF	F	F	F	F	F
7	VF	VF	VF	VF	VF	F	F	F	F	F
10	VF	VF	VF	VF	VF	F	F	F	F	F
15	VF	VF	VF	VF	VF	VF	F	F	F	F
20	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF

bar	l/mn									
	WHITE	LILAC	BROWN	YELLOW	ORANGE	RED	GREY	GREEN	BLACK	BLUE
		G 1348	G 1349	G 1350	G 1351	G 1352		G 1353		G 1354
5	0,27	0,36	0,48	0,73	0,99	1,38	1,50	1,78	2,00	2,45
6	0,29	0,39	0,52	0,80	1,08	1,51	1,63	1,94	2,18	2,67
7	0,32	0,42	0,56	0,86	1,17	1,62	1,76	2,09	2,35	2,87
8	0,34	0,45	0,60	0,92	1,24	1,73	1,87	2,22	2,50	3,06
9	0,36	0,48	0,64	0,97	1,32	1,83	1,98	2,35	2,64	3,24
10	0,38	0,50	0,67	1,03	1,39	1,92	2,08	2,47	2,78	3,40
11	0,39	0,52	0,70	1,07	1,45	2,01	2,17	2,58	2,90	3,56
12	0,41	0,55	0,73	1,12	1,51	2,09	2,26	2,69	3,03	3,71
13	0,43	0,57	0,76	1,17	1,57	2,17	2,35	2,79	3,14	3,85
14	0,44	0,59								
15	0,46	0,61								



Nozzle keuse



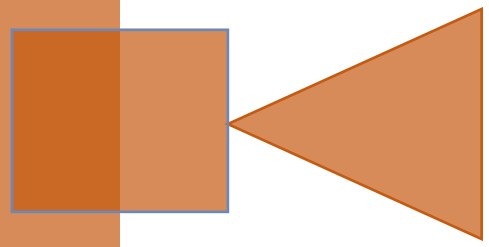
Nozzle keuse

		l/min																		
		2 bar	3 bar	4 bar	5 bar	6 bar	7 bar	8 bar	9 bar	10 bar	11 bar	12 bar	13 bar	14 bar	15 bar	16 bar	17 bar	18 bar	19 bar	20 bar
TX-VS1	100	0.055	0.065	0.074	0.081	0.087	0.093	0.098	0.103	0.108	0.112	0.116	0.120	0.124	0.127	0.131	0.134	0.137	0.140	0.143
		VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TX-VS2	100	0.110	0.131	0.148	0.164	0.177	0.189	0.201	0.211	0.221	0.231	0.240	0.248	0.256	0.264	0.272	0.279	0.286	0.293	0.299
		VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TX-VK3	100	0.164	0.196	0.223	0.245	0.266	0.284	0.301	0.317	0.332	0.346	0.359	0.372	0.384	0.396	0.407	0.418	0.429	0.439	0.449
		F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TX-VK4	50	0.218	0.262	0.299	0.331	0.360	0.386	0.410	0.433	0.454	0.474	0.493	0.512	0.529	0.546	0.562	0.578	0.594	0.608	0.623
		F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TX-VK6	50	0.327	0.393	0.448	0.496	0.539	0.579	0.615	0.649	0.681	0.711	0.740	0.767	0.794	0.819	0.844	0.867	0.890	0.912	0.934
		F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TX-VK8	50	0.433	0.525	0.603	0.671	0.732	0.788	0.840	0.888	0.934	0.978	1.02	1.06	1.10	1.13	1.17	1.20	1.24	1.27	1.30
		F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TX-VK10	50	0.541	0.657	0.753	0.838	0.915	0.985	1.05	1.11	1.17	1.22	1.27	1.32	1.37	1.42	1.46	1.50	1.55	1.59	1.63
		F	F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TX-VK12	50	0.649	0.788	0.904	1.01	1.10	1.18	1.26	1.33	1.40	1.47	1.53	1.59	1.65	1.70	1.75	1.81	1.86	1.90	1.95
		F	F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TX-VK18	50	0.968	1.18	1.37	1.53	1.67	1.80	1.93	2.04	2.15	2.25	2.35	2.45	2.54						
		F	F	F	F	F	VF	VF	VF	VF	VF	VF	VF	VF						
												3.40	3.54	3.67						
												VF	VF	VF						

ConeJet® VisiFlo® Hollow Cone Spray Tips

TeeJet® TECHNOLOGIES

Nozzle keuse



Nozzle keuse

		l/min																				
		2 bar	3 bar	4 bar	5 bar	6 bar	7 bar	8 bar	9 bar	10 bar	11 bar	12 bar	13 bar	14 bar	15 bar	16 bar	17 bar	18 bar	19 bar	20 bar	21 bar	22 bar
TXR800053VK	100	0.173	0.209	0.239	0.265	0.289	0.310	0.330	0.349	0.367	0.383	0.399	0.414	0.429	0.443	0.457	0.470	0.483	0.495	0.507	0.519	0.530
		VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TXR800071VK	50	0.230	0.280	0.321	0.357	0.390	0.419	0.447	0.473	0.497	0.521	0.543	0.564	0.584	0.604	0.623	0.641	0.659	0.676	0.693	0.709	0.725
		F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TXR8001VK	50	0.325	0.394	0.452	0.503	0.549	0.591	0.630	0.666	0.701	0.733	0.764	0.794	0.823	0.850	0.877	0.903	0.928	0.952	0.976	0.999	1.02
		F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TXR80013VK	50	0.433	0.525	0.603	0.671	0.732	0.788	0.840	0.888	0.934	0.978	1.02	1.06	1.10	1.13	1.17	1.20	1.24	1.27	1.30	1.33	1.36
		F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TXR80015VK	50	0.487	0.591	0.678	0.754	0.823	0.886	0.944	0.999	1.05	1.10	1.15	1.19	1.23	1.28	1.32	1.35	1.39	1.43	1.46	1.50	1.53
		F	F	F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TXR80017VK	50	0.541	0.657	0.753	0.838	0.915	0.985	1.05	1.11	1.17	1.22	1.27	1.32	1.37	1.42	1.46	1.51	1.55	1.59	1.63	1.67	1.70
		F	F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TXR8002VK	50	0.649	0.788	0.904	1.01	1.10	1.18	1.26	1.33	1.40	1.47	1.53	1.59	1.65	1.70	1.75	1.81	1.86	1.90	1.95	2.00	2.04
		F	F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TXR80028VK	50	0.893	1.08	1.24	1.38	1.51	1.62	1.73	1.83	1.93	2.02	2.10	2.18	2.26	2.34	2.41	2.48	2.55	2.62	2.68	2.75	2.81
		F	F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF
TXR8003VK	50	0.968	1.18	1.37	1.53	1.67	1.80	1.93	2.04	2.15	2.26	2.35	2.45	2.54	2.63	2.72	2.80					
		F	F	F	F	F	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF	VF					
TXR80036VK	50	1.15	1.41	1.62	1.81	1.98	2.14	2.29	2.42	2.55	2.68	2.79	2.91	3.02	3.12	3.22	3.32					
															VF	VF	VF					
															3.51	3.62	3.73					
															VF	VF	VF					
															4.28	4.42	4.55					
															VF	VF	VF					

TXR ConeJet® Hollow Cone Spray Tips

TeeJet® TECHNOLOGIES

Hollow Cone Type Spray Tips

		mm	l/min												
			0.7 bar	1 bar	2 bar	3 bar	4 bar	5 bar	6 bar	10 bar	15 bar	20 bar	1 bar	10 bar	20 bar
D1	DC13	0.79	—	—	0.22	0.26	0.29	0.32	0.34	0.43	0.50	0.57	—	66°	68°
D1.5	DC13	0.91	—	—	0.25	0.29	0.33	0.36	0.39	0.48	0.56	0.63	—	70°	72°
D2	DC13	1.0	—	0.22	0.29	0.33	0.37	0.41	0.44	0.53	0.63	0.70	41°	74°	75°
D3	DC13	1.2	—	0.24	0.30	0.35	0.41	0.44	0.48	0.59	0.68	0.77	45°	77°	78°
D4	DC13	1.6	0.27	0.31	0.40	0.47	0.53	0.59	0.63	0.76	0.89	1.0	64°	84°	85°
D1	DC23	0.79	—	—	0.24	0.28	0.32	0.34	0.38	0.46	0.54	0.61	—	63°	65°
D1.5	DC23	0.91	—	—	0.28	0.34	0.39	0.42	0.46	0.58	0.69	0.78	—	66°	67°
D2	DC23	1.0	—	0.28	0.37	0.43	0.49	0.53	0.57	0.70	0.83	0.93	43°	72°	72°
D3	DC23	1.2	0.25	0.29	0.39	0.46	0.52	0.58	0.62	0.78	0.93	1.1	56°	77°	77°
D4	DC23	1.6	0.32	0.37	0.51	0.61	0.70	0.77	0.83	1.1	1.3	1.4	62°	88°	88°
D5	DC23	2.0	0.37	0.44	0.59	0.72	0.82	0.91	0.98	1.3	1.5	1.7	73°	96°	95°
D6	DC23	2.4	0.42	0.50	0.69	0.83	0.95	1.1	1.2	1.5	1.8	2.0	79°	100°	99°
D1	DC25	0.79	—	—	0.33	0.40	0.45	0.50	0.54	0.69	0.83	0.95	—	49°	51°
D1.5	DC25	0.91	—	—	0.45	0.53	0.61	0.67	0.73	0.91	1.1	1.2	—	54°	55°
D2	DC25	1.0	—	0.37	0.51	0.62	0.71	0.79	0.86	1.1	1.3	1.5	32°	61°	61°
D3	DC25	1.2	0.39	0.45	0.63	0.75	0.86	0.95	1.0	1.3	1.6	1.8	47°	69°	69°
D4	DC25	1.6	0.57	0.68	0.94	1.1	1.3	1.4	1.6	2.0	2.4	2.8	63°	82°	82°
D5	DC25	2.0	0.64	0.81	1.1	1.4	1.6	1.7	1.9	2.4	2.9	3.3	70°	85°	84°
D6	DC25	2.4	0.87	1.0	1.5	1.8	2.0	2.3	2.5	3.2	3.8	4.4	77°	89°	88°
D7	DC25	2.8	1.0	1.2	1.7	2.0	2.3	2.6	2.9	3.7	4.5	5.1	83°	92°	91°
D8	DC25	3.2	1.2	1.4	2.0	2.4	2.8	3.1	3.4	4.4	5.3	6.2	89°	96°	95°
D10	DC25	4.0	1.5	1.7	2.4	3.0	3.5	3.9	4.2	5.5	6.7	7.7	94°	102°	101°
D12	DC25	4.8	1.8	2.2	3.0	3.7	4.3	4.8	5.2	6.7	8.2	9.5	101°	111°	110°
D14	DC25	5.6	1.9	2.3	3.3	4.1	4.7	5.2	5.8	7.5	9.1	10.2	105°	113°	112°
D1	DC45	0.79	—	—	—	0.48	0.56	0.61	0.67	0.84	1.0	1.2	—	39°	40°
D1.5	DC45	0.91	—	—	0.53	0.64	0.74	0.81	0.90	1.1	1.4	1.7	—	48°	50°
D2	DC45	1.0	—	0.43	0.66	0.80	0.91	1.0	1.1	1.4	1.7	2.0	26°	58°	58°
D3	DC45	1.2	—	0.53	0.74	0.91	1.0	1.2	1.3	1.6	2.0	2.3	34°	62°	62°
D4	DC45	1.6	0.67	0.80	1.1	1.4	1.6	1.8	2.0	2.5	3.1	3.6	59°	73°	72°
D5	DC45	2.0	0.87	1.0	1.5	1.8	2.0	2.3	2.5	3.2	3.9	4.5	63°	76°	75°
D6	DC45	2.4	1.1	1.3	1.9	2.3	2.7	3.0	3.3	4.3	5.3	6.1	70°	80°	79°
D7	DC45	2.8	1.3	1.5	2.2	2.7	3.1	3.5	3.9	5.0	6.2	7.2	78°	86°	85°
D8	DC45	3.2	1.6	1.9	2.7	3.3	3.9	4.3	4.8	6.2	7.6	8.9	84°	89°	88°
D10	DC45	4.0	2.0	2.5	3.5	4.4	5.0	5.6	6.2	8.0	9.8	11.5	88°	92°	91°
D12	DC45	4.8	2.5	3.1	4.4	5.3	6.2	6.9	7.6	9.8	12.1	14.0	95°	101°	100°
D14	DC45	5.6	2.8	3.4	4.9	6.0	7.0	7.8	8.6	11.2	13.6	15.9	99°	104°	103°
D16	DC45	6.4	3.3	4.0	5.7	7.1	8.2	9.3	10.2	13.2	16.3	19.1	106°	111°	110°
D1	DC46	0.79	—	—	—	0.58	0.66	0.74	0.81	1.0	1.3	1.5	—	17°	17°
D1.5	DC46	0.91	—	—	—	0.84	0.97	1.1	1.2	1.5	1.8	2.1	—	18°	18°
D2	DC46	1.0	—	—	0.89	1.1	1.2	1.3	1.5	1.9	2.2	2.5	—	20°	18°
D3	DC46	1.2	—	—	1.0	1.3	1.5	1.6	1.8	2.3	2.8	3.2	—	23°	21°
D4	DC46														
D5	DC46														
D6	DC46														
D7	DC46														
D8	DC46														
D10	DC46														

TeeJet® Disc-Core Type Hollow Cone Spray Tips

Full Cone Type Spray Tips

		mm	l/min												
			0.7 bar	1 bar	2 bar	3 bar	4 bar	5 bar	6 bar	10 bar	15 bar	20 bar	1 bar	10 bar	20 bar
D1	DC31	0.79	0.31	0.36	0.49	0.59	0.67	0.74	0.80	1.0	1.2	1.4	42°	40°	38°
D1.5	DC31	0.91	0.39	0.45	0.63	0.76	0.86	0.95	1.0	1.3	1.6	1.8	54°	46°	40°
D2	DC31	1.0	0.45	0.53	0.72	0.86	0.98	1.1	1.2	1.5	1.8	2.0	56°	54°	49°
D3	DC31	1.2	0.49	0.58	0.80	0.95	1.1	1.2	1.3	1.6	1.9	2.2	58°	67°	58°
D1	DC33	0.79	0.32	0.36	0.46	0.56	0.64	0.71	0.78	0.98	1.2	1.4	24°	37°	37°
D1.5	DC33	0.91	0.42	0.47	0.63	0.75	0.85	0.95	1.0	1.3	1.6	1.9	34°	46°	45°
D2	DC33	1.0	0.47	0.56	0.78	0.95	1.1	1.2	1.3	1.7	2.0	2.3	42°	55°	52°
D3	DC33	1.2	0.57	0.68	0.95	1.1	1.3	1.5	1.6	2.0	2.5	2.8	46°	57°	56°
D4	DC33	1.6	0.78	0.91	1.3	1.5	1.7	1.9	2.1	2.7	3.3	3.7	49°	63°	63°
D1	DC35	0.79	0.30	0.36	0.48	0.58	0.65	0.71	0.78	0.97	1.2	1.3	16°	27°	27°
D1.5	DC35	0.91	0.41	0.47	0.63	0.76	0.85	0.94	1.0	1.3	1.5	1.7	19°	30°	30°
D2	DC35	1.0	0.53	0.62	0.83	0.99	1.1	1.2	1.3	1.7	2.0	2.2	38°	45°	40°
D3	DC35	1.2	0.58	0.72	0.98	1.2	1.3	1.5	1.6	2.0	2.4	2.8	42°	48°	42°
D4	DC35	1.6	1.0	1.2	1.6	2.0	2.3	2.5	2.8	3.5	4.2	4.8	65°	68°	60°
D5	DC35	2.0	1.3	1.6	2.2	2.6	3.0	3.3	3.6	4.5	5.5	6.3	65°	69°	62°
D2	DC56	1.0	—	—	0.80	0.98	1.1	1.2	1.4	1.8	2.2	2.5	—	18°	16°
D3	DC56	1.2	—	—	1.1	1.3	1.6	1.7	1.9	2.4	3.0	3.4	—	24°	22°
D4	DC56	1.6	—	1.3	1.8	2.2	2.5	2.8	3.1	4.0	4.8	5.6	18°	30°	28°
D5	DC56	2.0	1.4	1.8	2.5	3.0	3.5	3.9	4.3	5.5	6.7	7.8	24°	35°	33°
D6	DC56	2.4	2.2	2.7	3.7	4.5	5.3	5.9	6.5	8.5	10.2	11.9	31°	40°	38°

TeeJet® Disc-Core Type Full Cone Spray Tips

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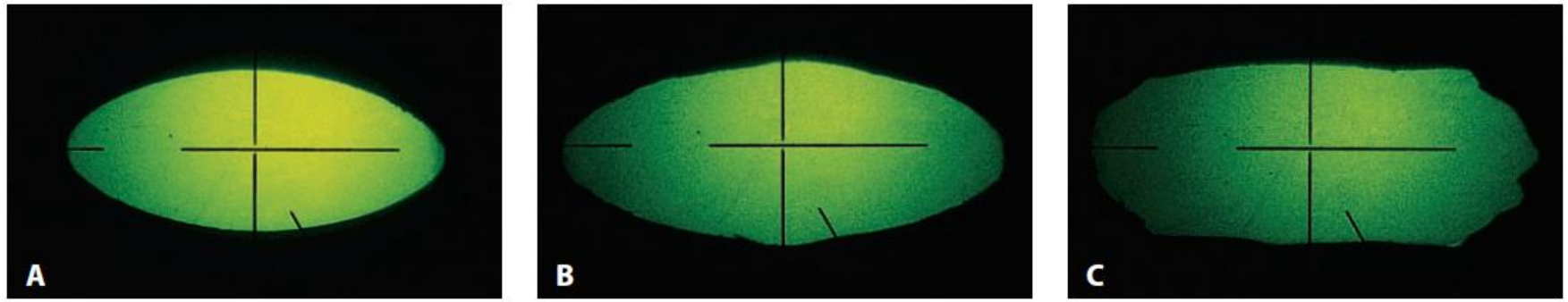
Werklike lewering

Werklike lewering

Aksiale spuite

- Toets lewering van nozzles oor tyd (60 sek)
  - Moet ooreenstem met lewering op nozzle tabel by spesifieke druk
- +/- 5% afwyking vanaf lewering (l/min) = verstel druk of spoed
- >10% afwyking vanaf lewering (l/min) = vervang nozzles
  - VMD druppelgrootte spektrum is nie meer akkuraat nie!



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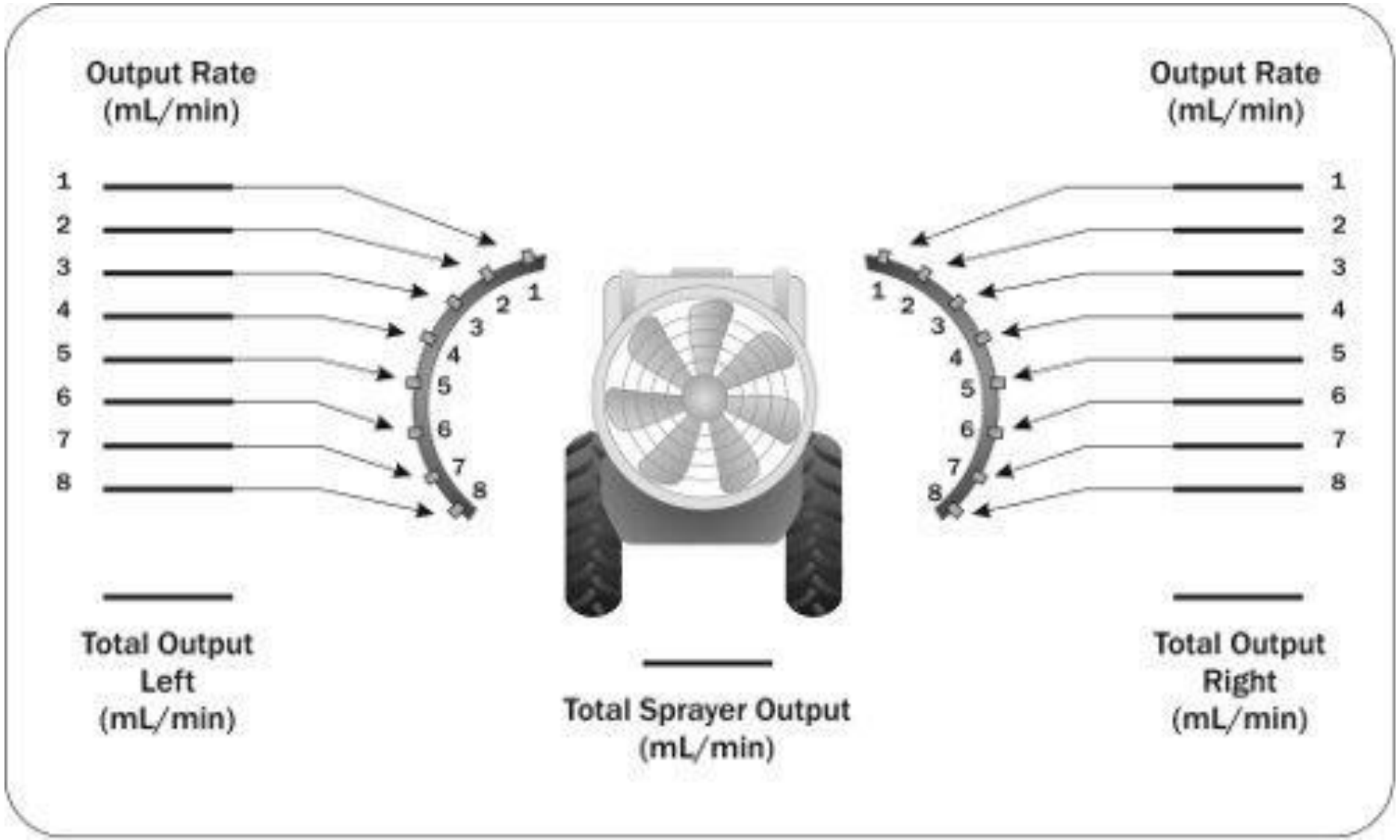
Werklike lewering

Werklike lewering



Werklike lewering

Werklike lewering

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Werklike lewering

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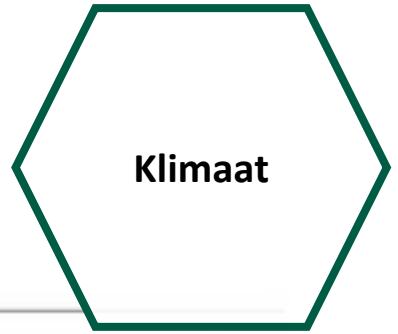
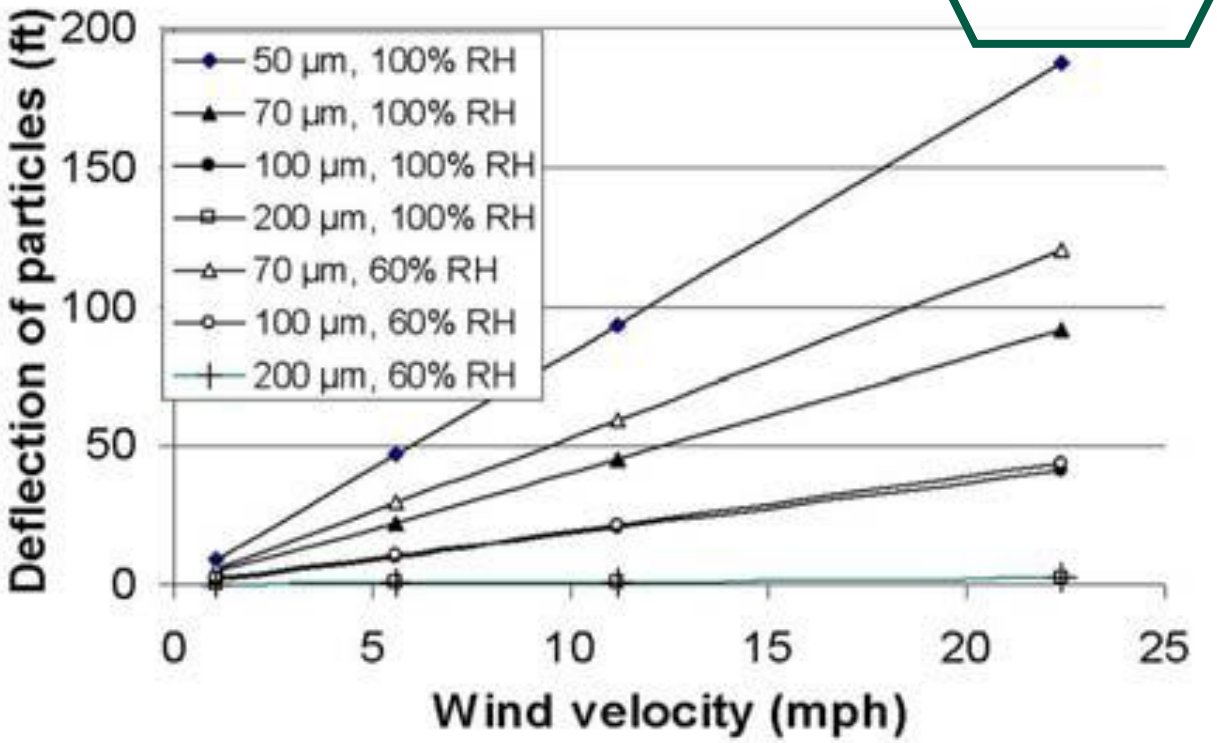
Omgewingstoestande



Wind, relatiewe humiditeit, en temperatuur beïnvloed die eienskappe van die spuit pluim en hoe dit reageer

- Wind
  - Wind spoed so laag as 8 km/h kan spuit drif veroorsaak en sodoende deposisie beïnvloed
  - Veral op druppels kleiner as 200 mikron
  - Wind parallel tot die boord ry het (loodreg tot die spuit pluim) het die grootste invloed
  - Hoe hoër die windspoed, hoe meer die exo en endo drift
  - Ideaal = 3-16 km/h
  - Wind rigting na sensitiewe areas



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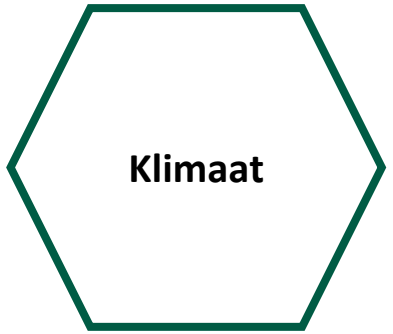
Omgewingstoestande



- Relatiewe humiditeit en temperatuur
  - Bepaal hoe vinnig druppels verdamp
  - Hoë temperature (>28˚C) = kleiner druppels verdamp baie vinnig
  - Lae humiditeit = kleiner druppels verdamp vinniger
  - Druppels groter as 200 mikron verdamp moeiliker agv korter reis tyd na teiken maar kan verdamp op teiken
  - Verdamping kan vererger word op windstil dae (2 km/h <)

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PROCESS IS *more important* THAN OUTCOME

Verstaan – Evalueer - Optimiseer

- **Kry die basics reg**
  - Onderhoud
  - Goeie en tydsame kalibrasie
  - Lower bestuur
  - Kry ’n gevoel vir toediening
- **Sodra jy die basics reg het**
  - Optimiseer
- Optimale siekte bestuur is altyd **no. 1**

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Evaluation and optimization of spray application on pecan nuts

Philip Rebel, Gideon van Zyl & Bekker Wessels

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Evaluation of current spray application methodologies

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Van Breda Ultraspray 2000

Left side				Right side	
Delivery (L/min)	Nozzle type/colour	Nozzle port		Nozzle port	Nozzle type/colour
2.14	AITXB8003blou	1	Top	1	AITXB8003bl
2.14	AITXB8003blou	2		2	AITXB8003bl
2.14	AITXB8003blou	3	pressure	3	AITXB8003bl
2.14	AITXB8003blou	4	10 Bar	4	AITXB8003bl
2.14	AITXB8003blou	5		5	AITXB8003bl
2.14	AITXB8003blou	6	Tractor speed	6	AITXB8003bl
2.14	AITXB8003blou	7	3.84 km/h	7	AITXB8003bl
2.14	AITXB8003blou	8		8	AITXB8003bl
2.14	AITXB8003blou	9		9	AITXB8003bl
2.18	1-2 Geoline	10		10	1-2 Geoli
2.18	1-2 Geoline	11		11	1-2 Geoli
2.18	1-2 Geoline	12		12	1-2 Geoli
2.18	1-2 Geoline	13		13	1-2 Geoli
4.37	1-5 Geoline	14	bottom	14	1-5 Geoli
32.35	Delivery left (L/min)		Total delivery L/ha)		Delivery right (L/mi
			64.7		
			Delivery per ha (L/ha)		
			1010.9375		

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Van Breda Ultraspray 2000

Left side				Right side		
Delivery (L/min)	Nozzle type/colour	Nozzle port		Nozzle port	Nozzle type/colour	Delivery (L/min)
2.14	AITXB8003blou	1	Top	1	AITXB8003blou	2.14
2.14	AITXB8003blou	2		2	AITXB8003blou	2.14
2.14	AITXB8003blou	3	pressure	3	AITXB8003blou	2.14
2.14	AITXB8003blou	4	10 Bar	4	AITXB8003blou	2.14
2.14	AITXB8003blou	5		5	AITXB8003blou	2.14
2.14	AITXB8003blou	6	Tractor speed	6	AITXB8003blou	2.14
2.14	AITXB8003blou	7	3.84 km/h	7	AITXB8003blou	2.14
2.14	AITXB8003blou	8		8	AITXB8003blou	2.14
2.14	AITXB8003blou	9		9	AITXB8003blou	2.14
2.18	1-2 Geoline	10		10	1-2 Geoline	2.18
2.18	1-2 Geoline	11		11	1-2 Geoline	2.18
2.18	1-2 Geoline	12		12	1-2 Geoline	2.18
2.18	1-2 Geoline	13		13	1-2 Geoline	2.18
4.37	1-5 Geoline	14	bottom	14	1-5 Geoline	4.37
32.35	Delivery left (L/min)		Total delivery L/ha)		Delivery right (L/min)	32.35
			64.7			
			Delivery per ha (L/ha)			
			1010.9375			

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Nobili 2000 sprayer

Left side				Right side		
Delivery (L/min)	**Nozzle type/colour**	**Nozzle port**		**Nozzle port**	**Nozzle type/colour**	**Delivery (L/min)**
10	D7/56	1	**Top**	1	D7/56	10
10	D7/56	2		2	D7/56	10
10	D7/56	3	**Pressure**	3	D7/56	10
4	D6/45	4	**10 Bar**	4	D6/45	4
4	D6/45	5		5	D6/45	4
4	D6/45	6	**5.63 km/h**	6	D6/45	4
4	D6/45	7		7	D6/45	4
2.93	D5/45	8	**Bottom**	8	D5/45	2.93
48.93	**Delivery left (L/min)**		**Total delivery L/ha)**		**Delivery right (L/min)**	61.2
			97.86			
			Delivery per ha (L/ha)			
			1042.912966			

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Nobili 2000 sprayer

Left side				Right si	
Delivery (L/min)	Nozzle type/colour	Nozzle port		Nozzle port	Nozzle type/
10	D7/56	1	Top	1	
10	D7/56	2		2	
10	D7/56	3	Pressure	3	
4	D6/45	4	10 Bar	4	
4	D6/45	5		5	
4	D6/45	6	5.63 km/h	6	
4	D6/45	7		7	
2.93	D5/45	8	Bottom	8	
48.93	Delivery left (L/min)		Total delivery L/ha)		Delivery right (
			97.86		
			Delivery per ha (L/ha)		
			1042.912966		

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Tifone Veder Big 4000

Left side				Right side		
Delivery (L/min)	**Nozzle type/colour**	**Nozzle port**		**Nozzle port**	**Nozzle type/colour**	**Delivery (L/min)**
2.85	AIXB rooi 8004	1	**Top**	1	AIXB rooi 8004	2.85
2.85	AIXB rooi 8004	2		2	AIXB rooi 8004	2.85
1.93	TXR Rooi	3	**Pressure**	3	TXR Rooi	1.93
1.93	TXR Rooi	4	**10 Bar**	4	TXR Rooi	1.93
3.95	1-8 Nozzle	5		5	1-8 Geoline	3.95
3.35	unkown	6	**Speed**	6	unkown	3.35
2.15	TXR grys	7	**4.47 km/h**	7	TXR grys	2.15
2.87	TXR swart	8		8	TXR swart	2.87
1.93	TXR rooi	9		9	TXR rooi	1.93
1.93	TXR rooi	10		10	TXR rooi	1.93
1.93	TXR rooi	11	**Bottom**	11	TXR rooi	1.93
27.67	**Delivery left (L/min)**		**Total delivery L/ha)**		**Delivery right (L/min)**	27.67
			55.34			
			Delivery per ha (L/ha)			
			700.5063291			

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Tifone Veder Big 4000

Left side				Right side	
Delivery (L/min)	Nozzle type/colour	Nozzle port		Nozzle port	Nozzle type/colou
2.85	AIXB rooi 8004	1	Top	1	AIXB rooi 800
2.85	AIXB rooi 8004	2		2	AIXB rooi 800
1.93	TXR Rooi	3	Pressure	3	TXR Roo
1.93	TXR Rooi	4	10 Bar	4	TXR Roo
3.95	1-8 Nozzle	5		5	1-8 Geolin
3.35	unkown	6	Speed	6	unkow
2.15	TXR grys	7	4.47 km/h	7	TXR gry
2.87	TXR swart	8		8	TXR swar
1.93	TXR rooi	9		9	TXR roo
1.93	TXR rooi	10		10	TXR roo
1.93	TXR rooi	11	Bottom	11	TXR roo
27.67	Delivery left (L/min)		Total delivery L/ha)		Delivery right (L/min
			55.34		
			Delivery per ha (L/ha)		
			700.5063291		

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Cima pecan extreme

Cima								
	Hole	Top Left	Hole		Hole	Top Right	Hole	
Delivery (L/min)	5.23		5.23		5.23		5.23	Delivery (L/min)
	Hole	Bottom left	Hole		Hole	Bottom right	Hole	
Delivery (L/min)	5.35		5.35	Total delivery (L/min	5.35		5.35	Delivery (L/min)
				42.32				
				Delivery per ha				
				686.2702703				

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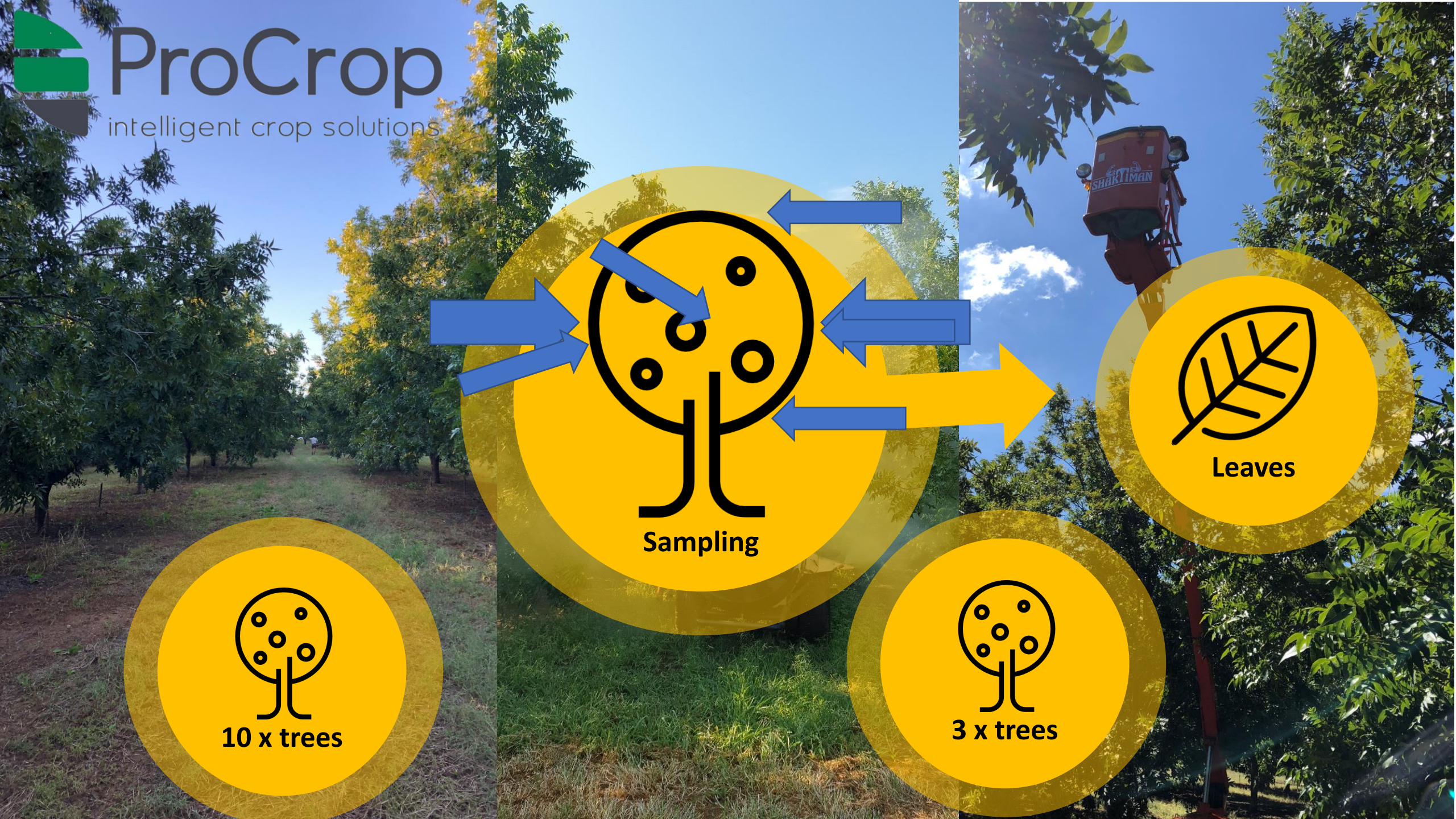
Cima normal

Cima								
	Hole	Top Left	Hole		Hole	Top Right	Hole	
Delivery (L/min)	5.2		5.2		5.2		5.2	Delivery (L/min)
	Hole	Bottom left	Hole		Hole	Bottom right	Hole	
Delivery (L/min)	12.3			Total delivery (L/min			12.3	Delivery (L/min)
				45.37				
				Delivery per ha				
				735.7297297				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10 x trees
Sampling
3 x trees
Leaves

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SARDI yellow fluorescent pigment as tracer @ 1 ml/L

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Spray deposition assessment and benchmarks for control of Alternaria brown spot on mandarin leaves with copper oxychloride

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SARDI yellow fluorescent pigment as tracer @ 1 ml/L

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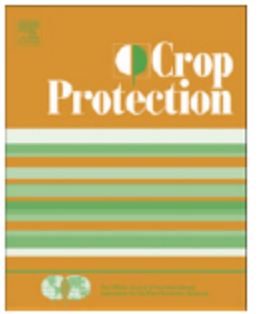

Assessment of retention and persistence of copper fungicides on orange fruit and leaves using fluorometry and copper residue analyses

Gerhardus C. Schutte [a,*], Charl Kotze [a], J. Gideon van Zyl [b], Paul H. Fourie [a,b]

[a] Citrus Research International, P.O. Box 28, Nelspruit 1200, South Africa
[b] Department of Plant Pathology, Stellenbosch University, Stellenbosch 7602, South Africa

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SARDI yellow fluorescent pigment as tracer @ 1 ml/L

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journal homepage: www.elsevier.com/locate/cropro

Evaluation of two organosilicone adjuvants at reduced foliar spray volumes in South African citrus orchards of different canopy densities

J. Gideon van Zyl [a, b, *], Ewald G. Sieverding [d], David J. Viljoen [c], Paul H. Fourie [a, b]

[a] Department of Plant Pathology, Stellenbosch University, Private Bag X1, Stellenbosch 7602, South Africa
[b] Citrus Research International, P.O. Box 28, Nelspruit, South Africa
[c] Evonik Africa (Pty) Ltd, P.O. Box 3739, Somerset West 7129, South Africa
[d] Evonik Industries AG, Goldschmidtstraße 100, 45127 Essen, Germany

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journal homepage: www.elsevier.com/locate/cropro

Rainfastness of mancozeb on apple seedlings determined through deposition quantification of mancozeb residue and a fluorescent pigment

Cornelius J. Rossouw[a], Paul H. Fourie[a,b], J. Gideon Van Zyl[a,b], J. Eduard Hoffman[c], Adéle McLeod[a,*]

[a] Department of Plant Pathology, Stellenbosch University, Private Bag X1, Matieland, 7602, South Africa
[b] Citrus Research International, P.O. Box 28, Nelspruit 1200, South Africa
[c] Department of Soil Science, Stellenbosch University, Private Bag X1, Matieland, 7602, South Africa

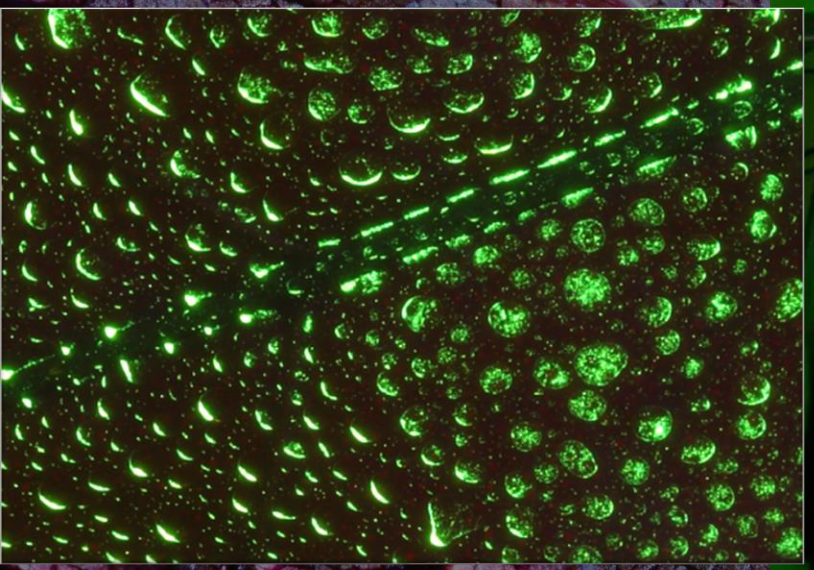
TRV calculated as (6676.13 L/ha) = (H 9.5 m x W 7.5 m x 937)/ RS 10m

Dose rate was determined using TRV volume (2000 L/ha) for all sprayers.

- **Van Breda 1.98 ×**
- **Nobili 1.92 ×**
- **Cima Pecan extreme 2.92 ×**
- **Tifone Veder Big 4000 2.86 ×**
- **Cima normal setup 2.72 ×**

Methodology

- Digital photography
  - Labino black light (365 nm) illumination
  - Upper/lower surface of leaves is photographed
  - Canon EOS 5DSR with 100 mm macro lens - 28 mb *.raw image



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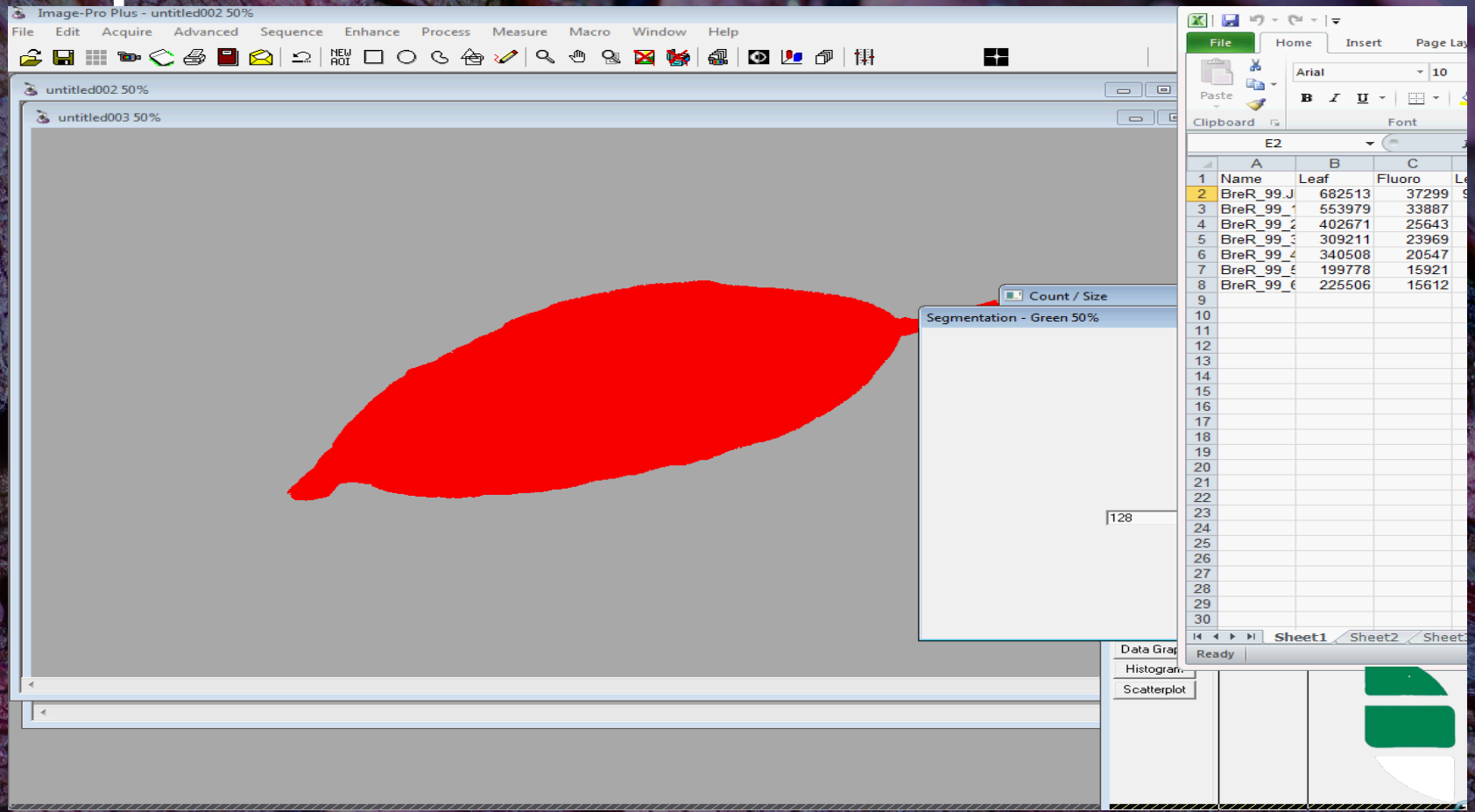
- Digital image analysis
  - *.raw images converted to *.tiff files (35 mb)
  - *.tiff files used in image analysis using Image Pro-plus software
- Deposition parameters determined

Methodology



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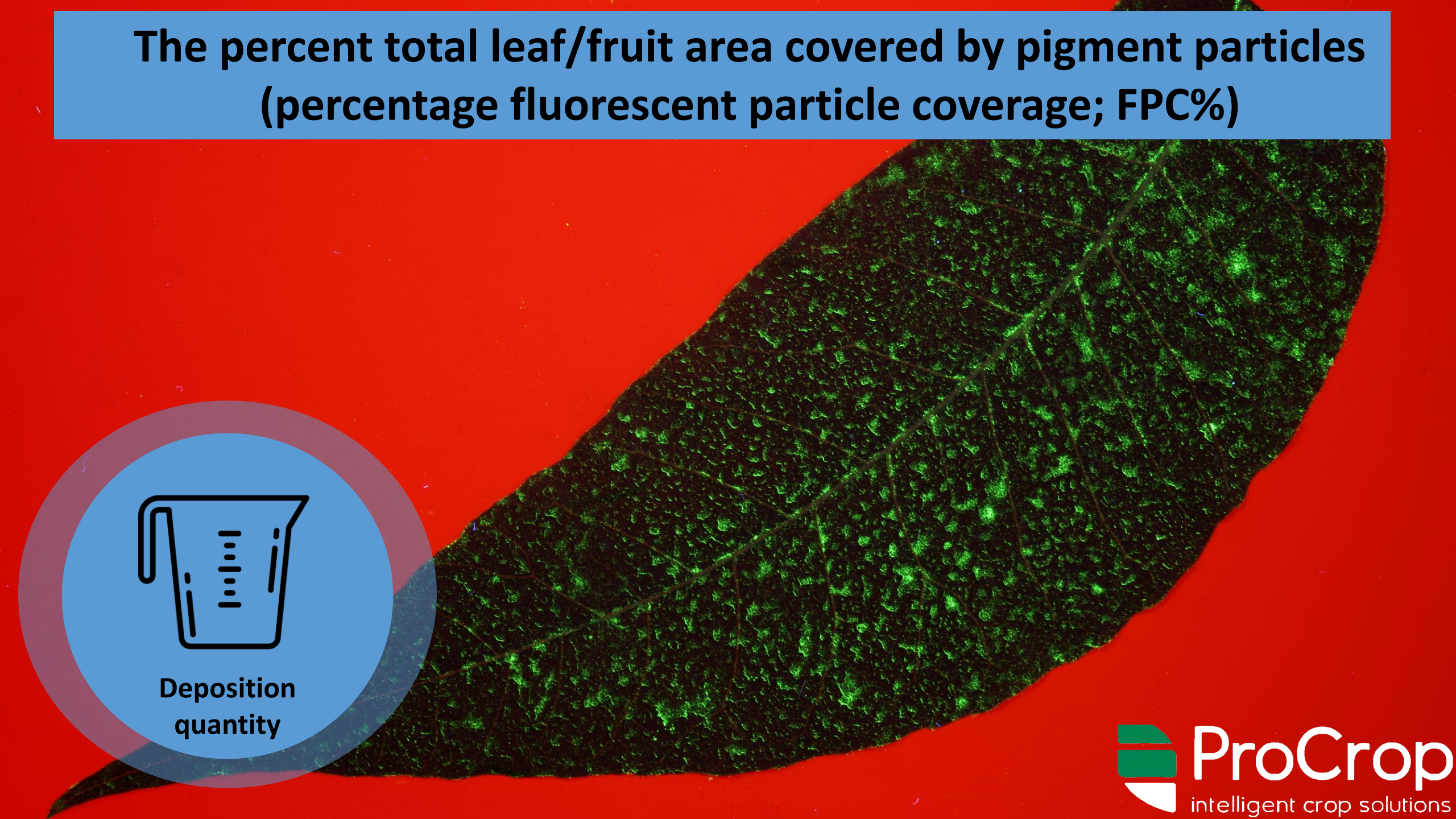
The percent total leaf/fruit area covered by pigment particles (percentage fluorescent particle coverage; FPC%)



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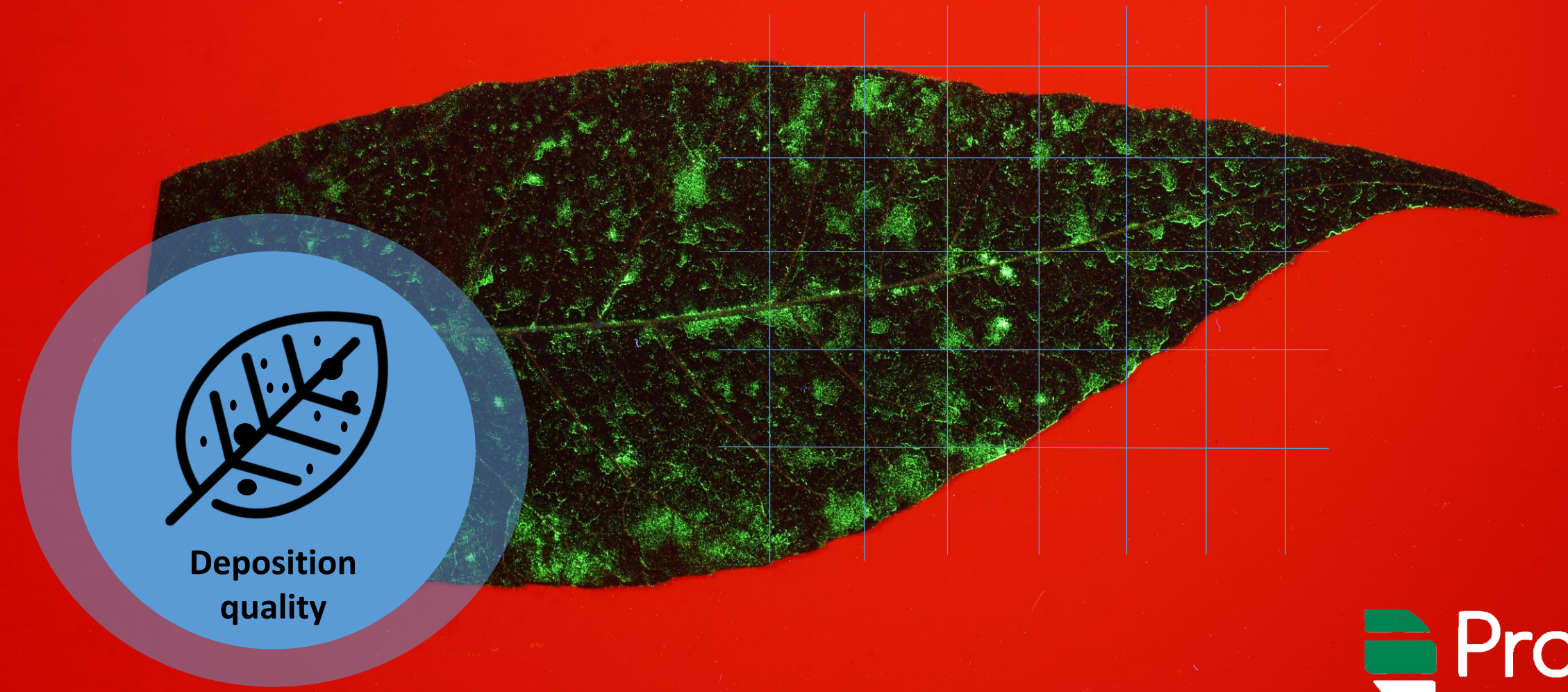
Variation in deposition on a target leaf/fruit
Interquartile range of distribution (ICD%)



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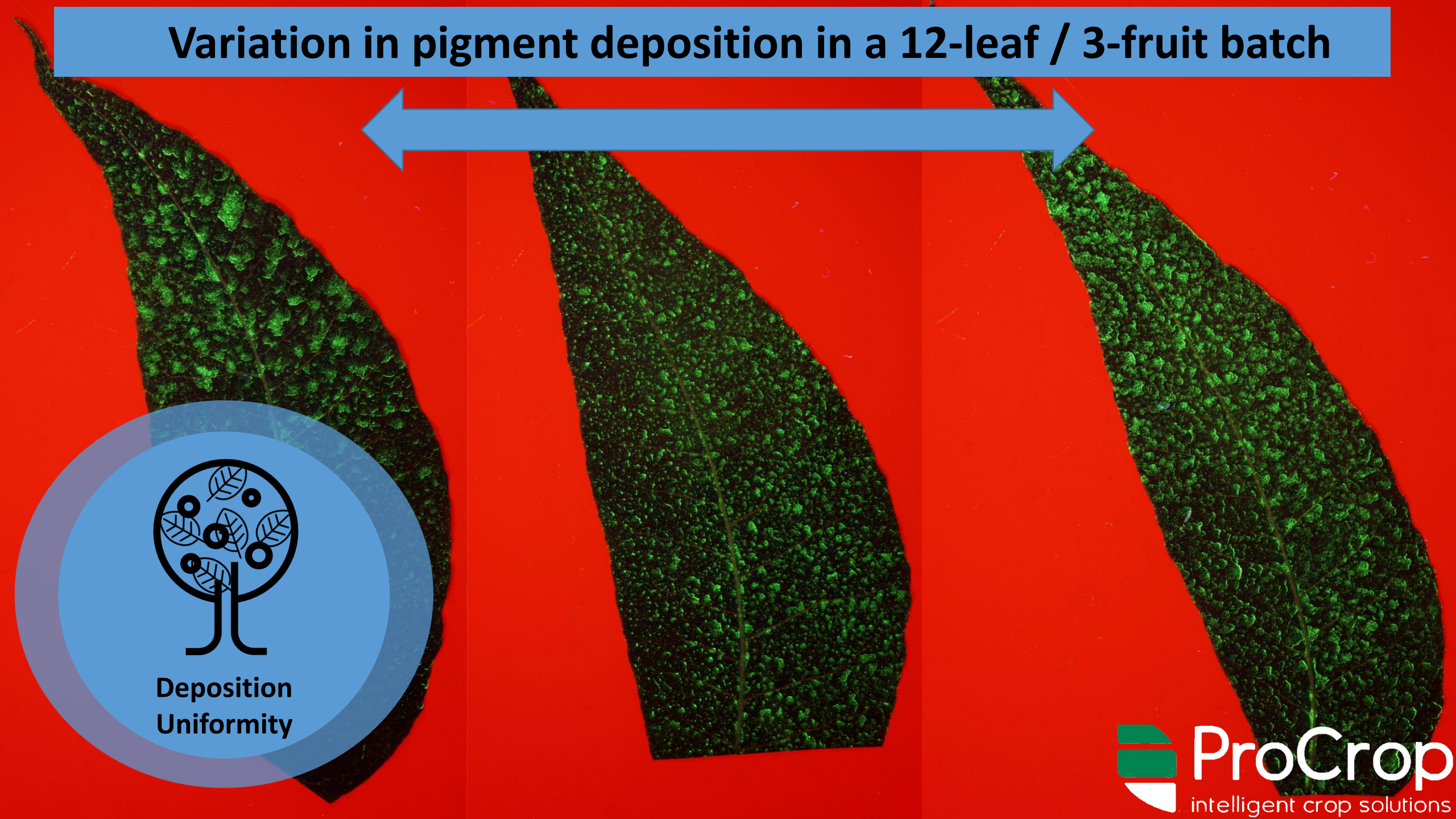
Variation in pigment deposition in a 12-leaf / 3-fruit batch



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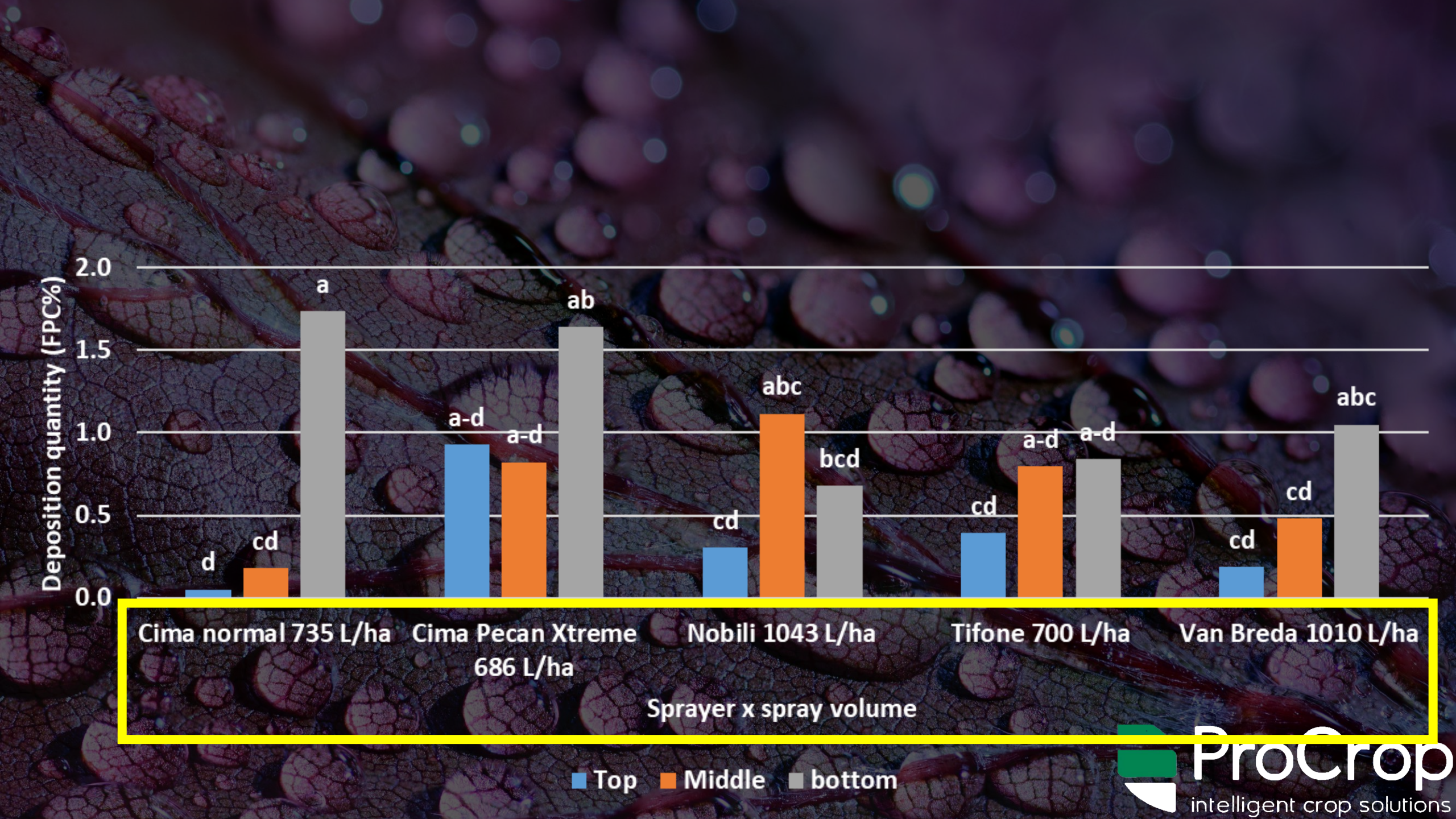
Deposition quantity (FPC%)
2.0
1.5
1.0
0.5
0.0
d
cd
a
a-d
a-d
ab
cd
abc
bcd
cd
a-d
a-d
cd
cd
abc
Cima normal 735 L/ha
Cima Pecan Xtreme 686 L/ha
Nobili 1043 L/ha
Tifone 700 L/ha
Van Breda 1010 L/ha
Sprayer x spray volume
Top
Middle
bottom
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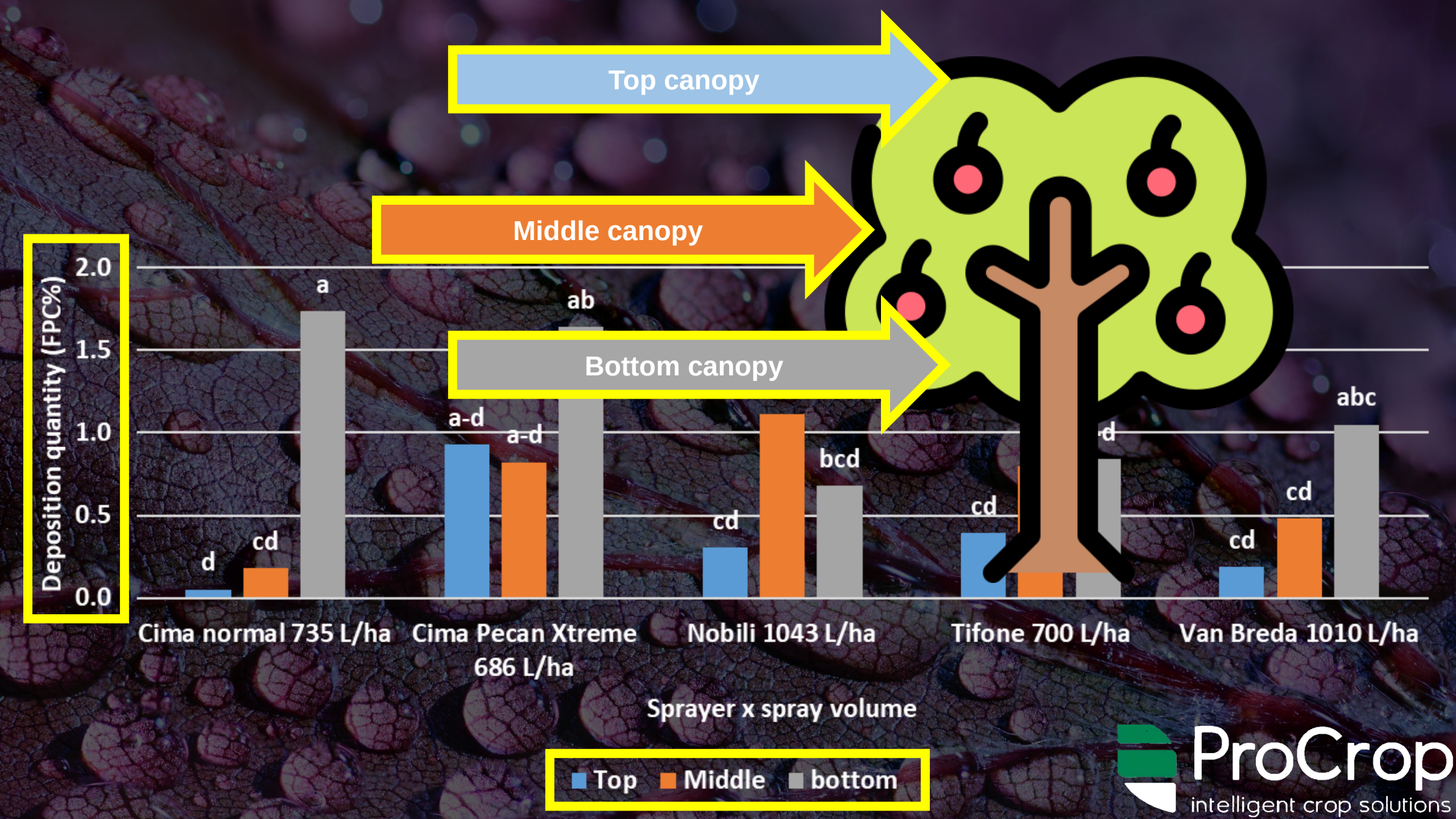
Top canopy
Middle canopy
Bottom canopy
Deposition quantity (FPC%)
2.0
1.5
1.0
0.5
0.0
d
cd
a
ab
a-d
a-d
cd
bcd
cd
d
cd
cd
abc
Cima normal 735 L/ha
Cima Pecan Xtreme 686 L/ha
Nobili 1043 L/ha
Tifone 700 L/ha
Van Breda 1010 L/ha
Sprayer x spray volume
Top
Middle
bottom
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SARDI yellow fluorescent pigment as tracer @ 1 ml/L

Plant Disease • 2019 • 0:1-11 • https://doi.org/10.1094/PDIS-04-19-0873-RE

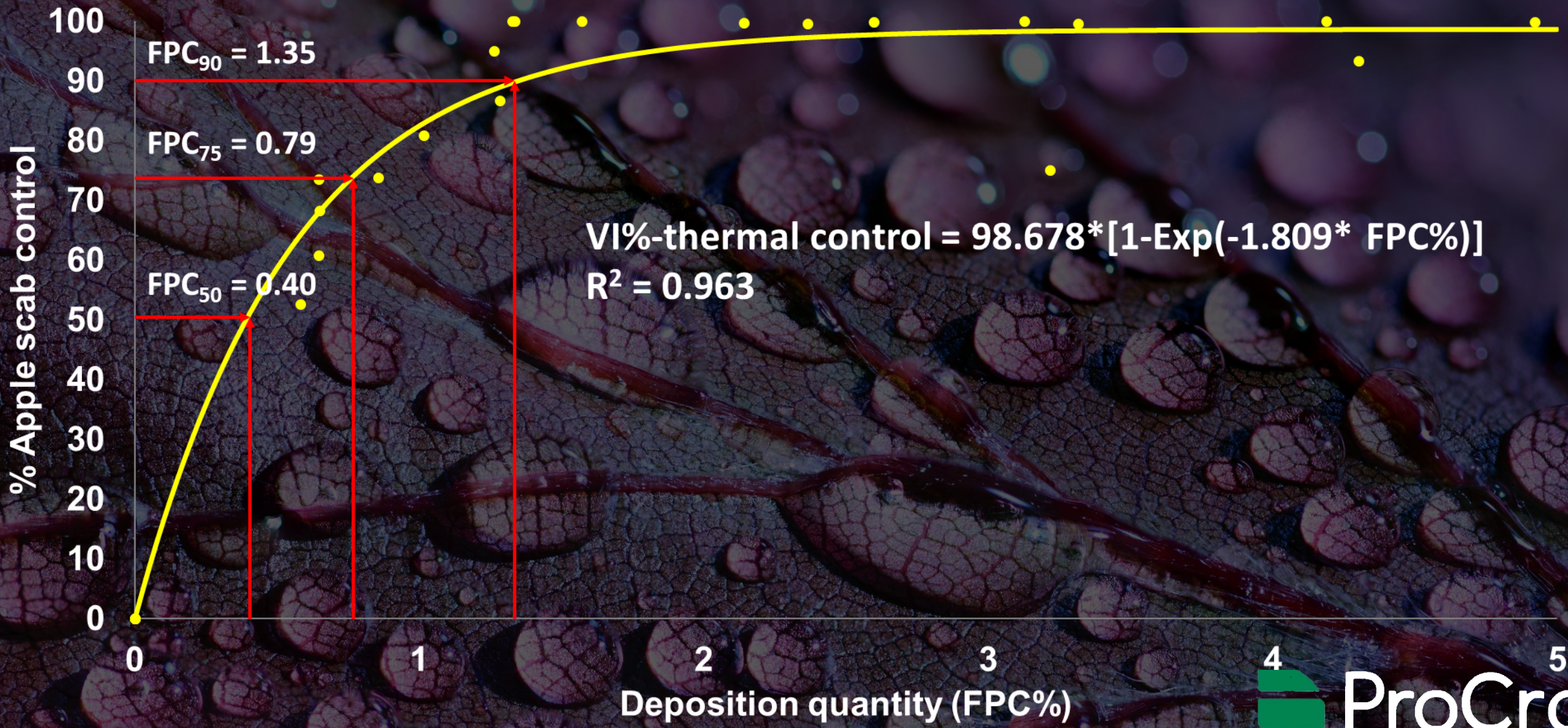
e-Xtra*

Determining Mancozeb Deposition Benchmark Values on Apple Leaves for the Management of *Venturia inaequalis*

P. Rebel,[1] C. Poblete-Echeverría,[2] J. G. van Zyl,[3] J. P. B. Wessels,[3] C. Coetzer,[1] and A. McLeod[1,†]

[1] Department of Plant Pathology, Stellenbosch University, Matieland, 7600, South Africa
[2] Department of Viticulture and Oenology, Stellenbosch University, 7600, South Africa
[3] ProCrop, Somerset West, 7130, South Africa

Deposition benchmarks indicative of biological control



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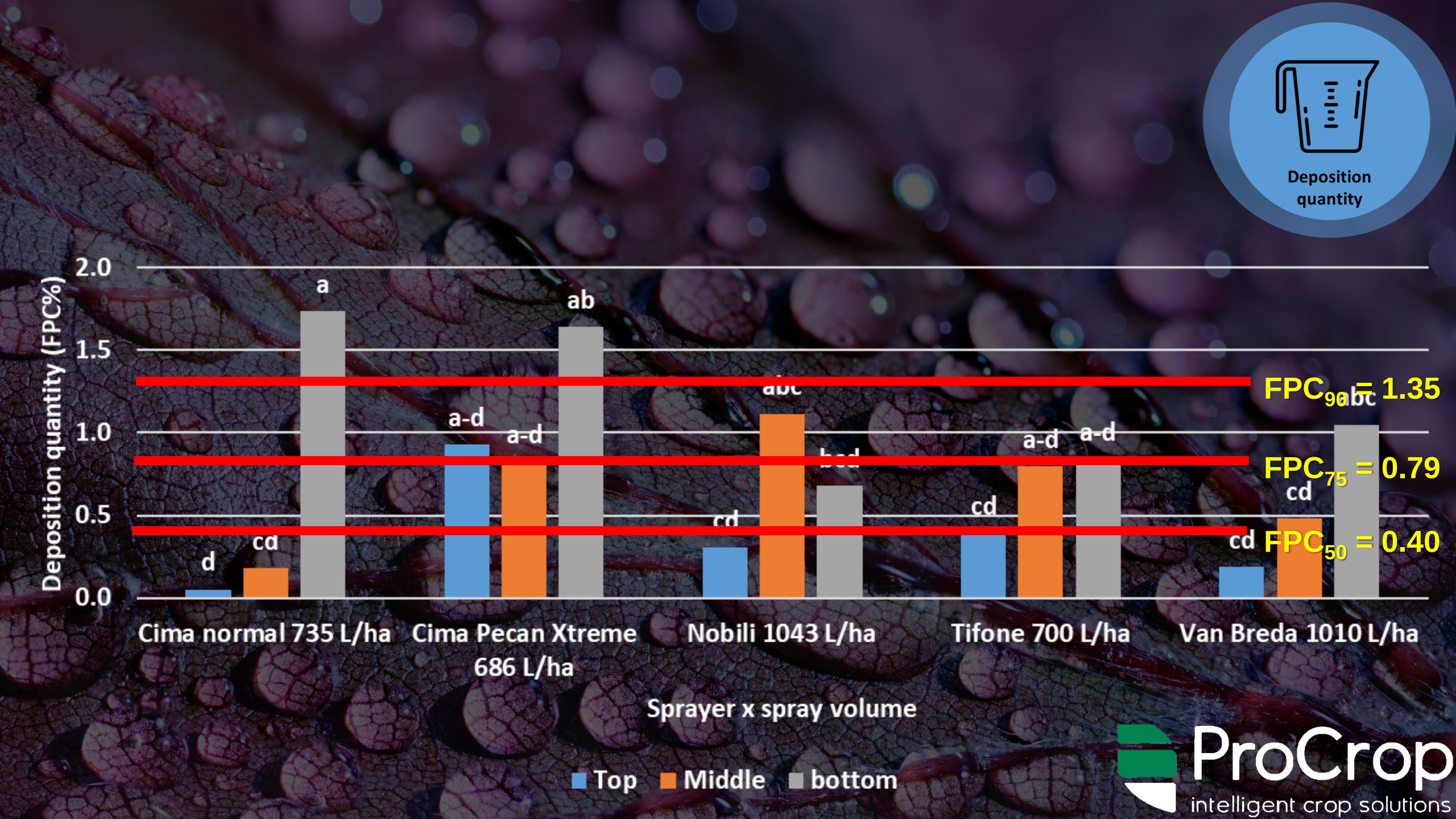
Deposition quantity
Deposition quantity (FPC%)
2.0
1.5
1.0
0.5
0.0
d
cd
a
a-d
a-d
ab
cd
abc
bcd
cd
a-d
a-d
cd
cd
abc
FPC90 = 1.35
FPC75 = 0.79
FPC50 = 0.40
Cima normal 735 L/ha
Cima Pecan Xtreme 686 L/ha
Nobili 1043 L/ha
Tifone 700 L/ha
Van Breda 1010 L/ha
Sprayer x spray volume
Top
Middle
bottom
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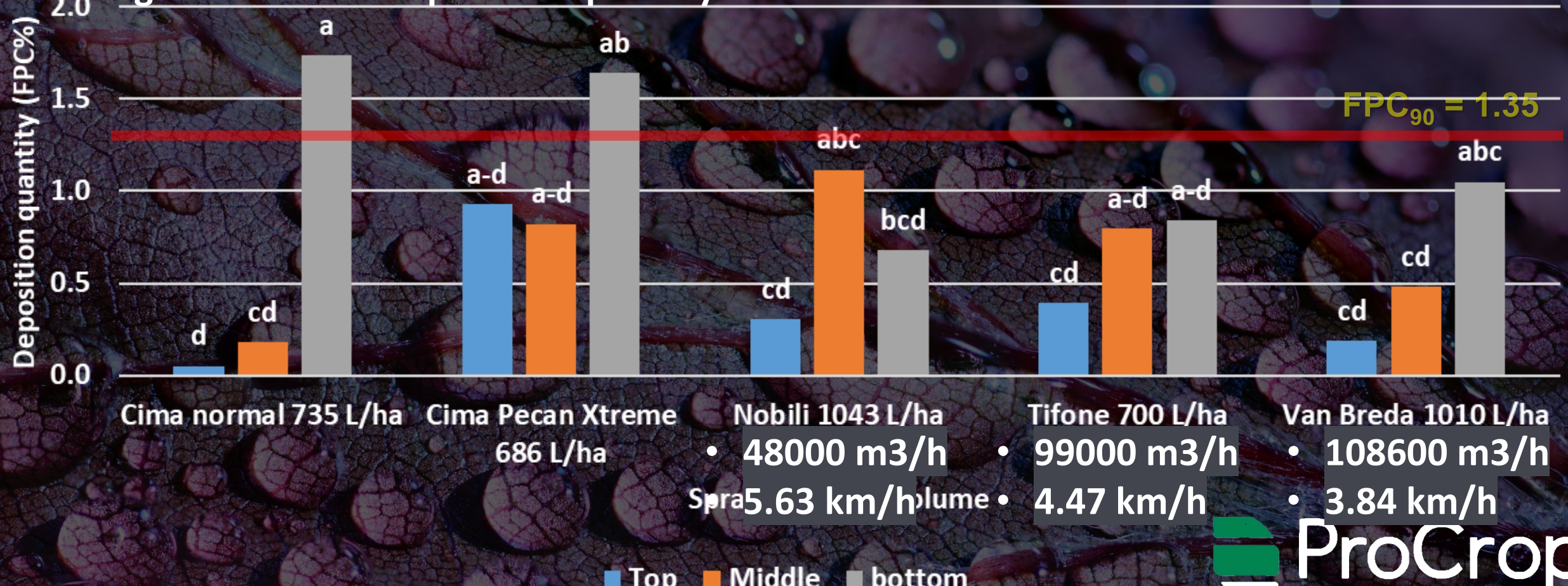
- Low deposition quantity achieved
- Reduction in deposition from bottom to top of canopy
  - Droplet carry distance/low profile sprayers
  - High air volumes blow off on lower canopy parts
  - High air volumes vs Forward speed
  - High variation in deposition quantity data



- Spray volume
  - 48000 m3/h
  - 5.63 km/h
  - 99000 m3/h
  - 4.47 km/h
  - 108600 m3/h
  - 3.84 km/h

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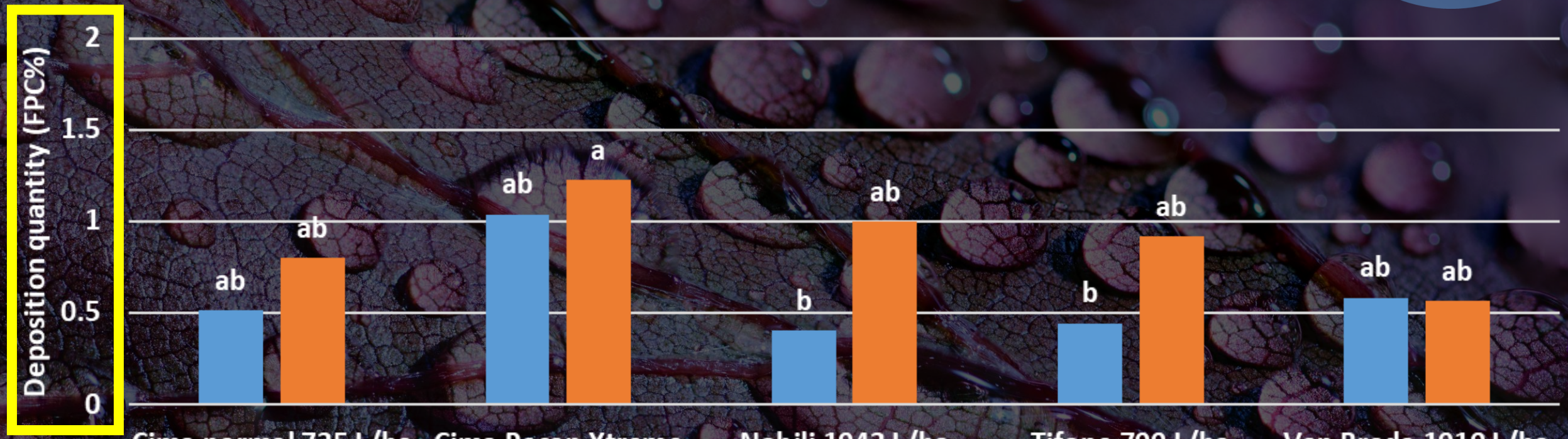
Deposition quantity



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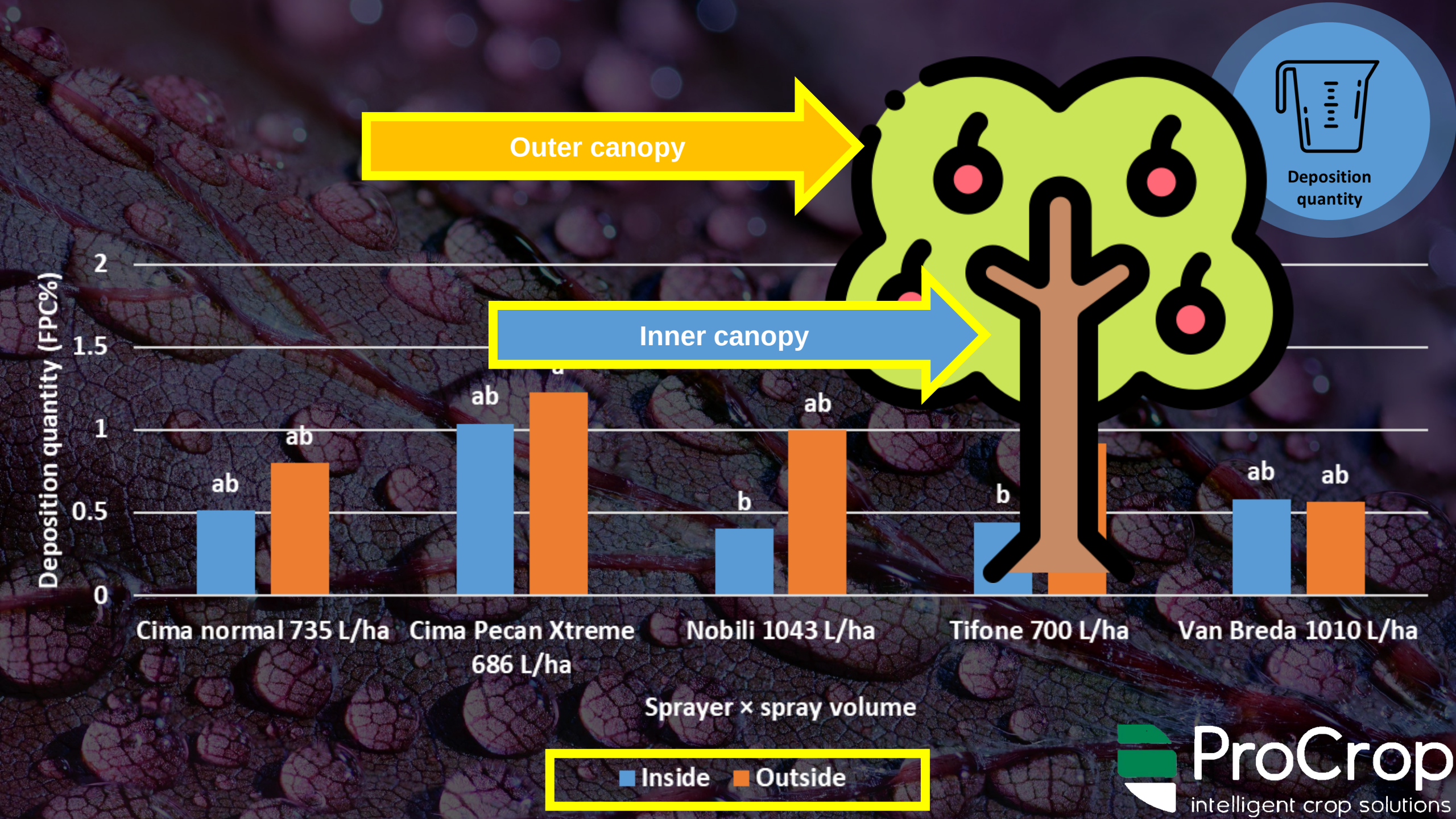
Outer canopy
Inner canopy
Deposition quantity
Deposition quantity (FPC%)
2
1.5
1
0.5
0
ab
ab
ab
ab
b
ab
b
ab
ab
Cima normal 735 L/ha
Cima Pecan Xtreme 686 L/ha
Nobili 1043 L/ha
Tifone 700 L/ha
Van Breda 1010 L/ha
Sprayer × spray volume
Inside
Outside
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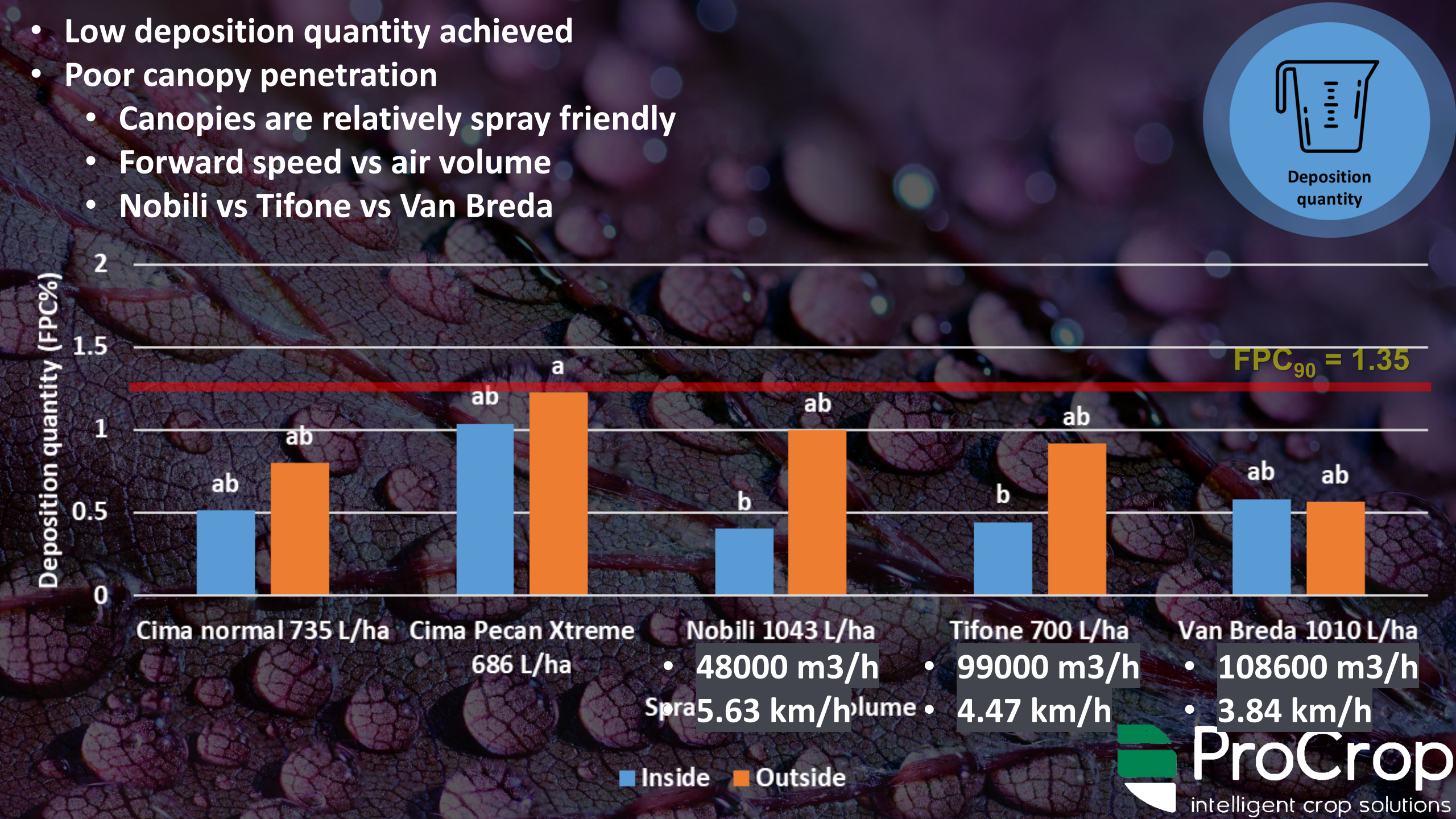
- Low deposition quantity achieved
- Poor canopy penetration
  - Canopies are relatively spray friendly
  - Forward speed vs air volume
  - Nobili vs Tifone vs Van Breda



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Observations from current application methodologies used

- Lack of guidance of spray application theory in pecan nuts
  - Range of volumes used (686 to 1010 L/ha)
  - Range of nozzles/droplet sizes used
  - Range of forward speed used (3.7 to 5.63 km/h)
  - No calibration or (theoretical or physical)
  - No canopy adapted spraying

- Deposition parameters
  - Deposition quantity below FPC90 for mancozeb and FPC75 for copper oxychloride (4.14 FPC%)

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Optimizing spray application methodologies to improve deposition parameters

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The concept of optimization

- Separate the concepts of spray application and drift reduction
  - The more effective spray application is the less efficient drift reduction will be
- Improve spray application in order to maximize the ratio of deposited vs released droplets
- After maximizing droplet deposition, adapt reference dose rates of PPPs to crop characteristic methodology
- Hereafter try to reduce drift in a way that would not negatively affect above mentioned factors

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Figure 8.2 Fan Speed Too High, Forward Speed Too Slow, Spray Passes Through Canopy

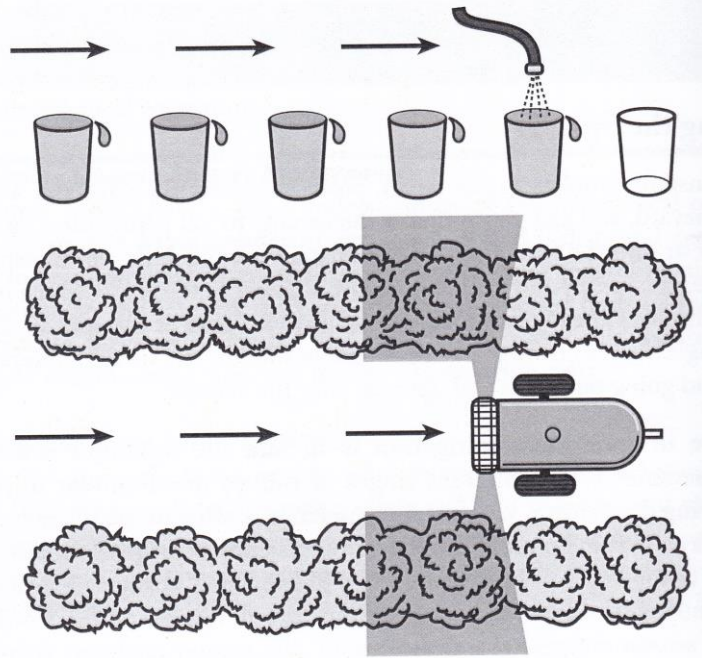


Figure 8.3 Fan Speed Too Low, Forward Speed Too Fast, Spray Reaches Only Half the Canopy

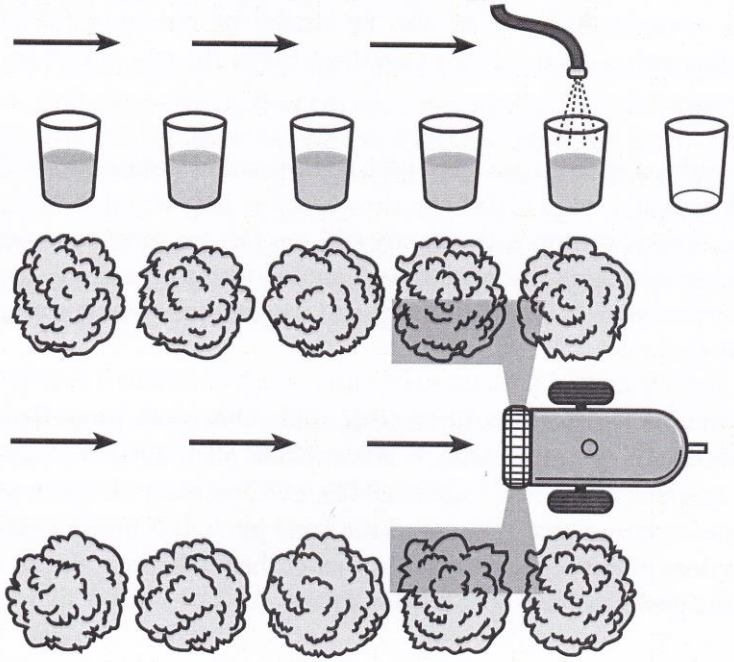
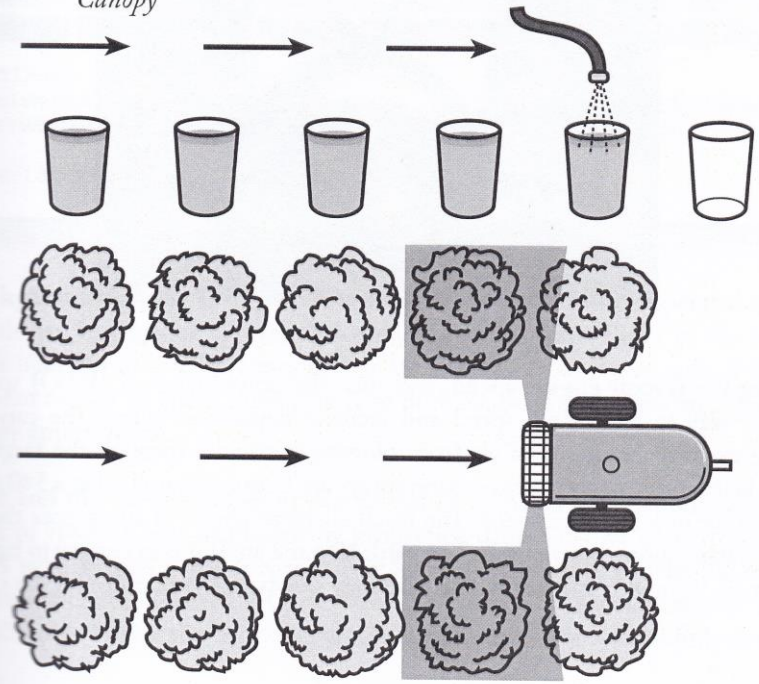


Figure 8.4 Fan Speed Correct, Forward Speed Correct, Spray Fills the Canopy



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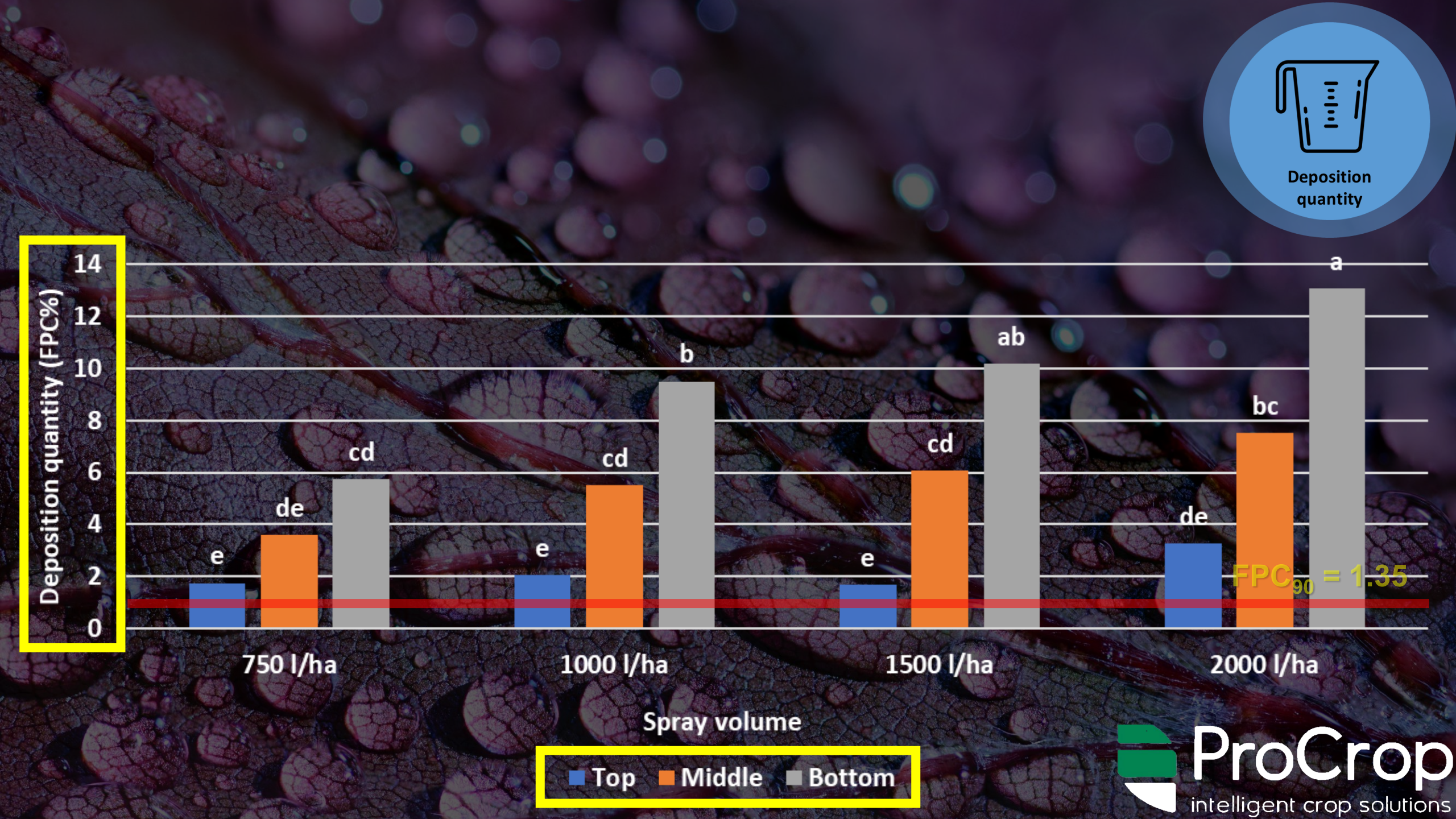
The calibrations used were as follows (3.84 km/h)

- **750 L/ha: 10 ALBUZ ATR 80 red nozzles (1.92 L/min) and 5 ALBUZ ATR 80 yellow nozzles (1.03 L/min) @ 10 Bar per side**
- **1000 L/ha: 10 ALBUZ ATR 80 green nozzles (2.47 L/min) and 5 ALBUZ ATR 80 orange nozzles (1.39 L/min) @ 10 Bar per side**
- **1500 L/ha: 10 ALBUZ ATR 80 blue nozzles (3.71 L/min) and 5 ALBUZ ATR 80 red nozzles (2.09 L/min) @ 12 Bar per side**
- **2000 L/ha: 10 Teejet Disc&Core 7/45 nozzles (5.12 L/min) and 5 ALBUZ ATR 80 green nozzles (2.5 L/min) @ 10 Bar per side**


Deposition quantity
Deposition quantity (FPC%)
14
12
10
8
6
4
2
0
e
de
cd
e
cd
b
e
cd
ab
de
bc
a
FPC90 = 1.35
750 l/ha
1000 l/ha
1500 l/ha
2000 l/ha
Spray volume
Top
Middle
Bottom
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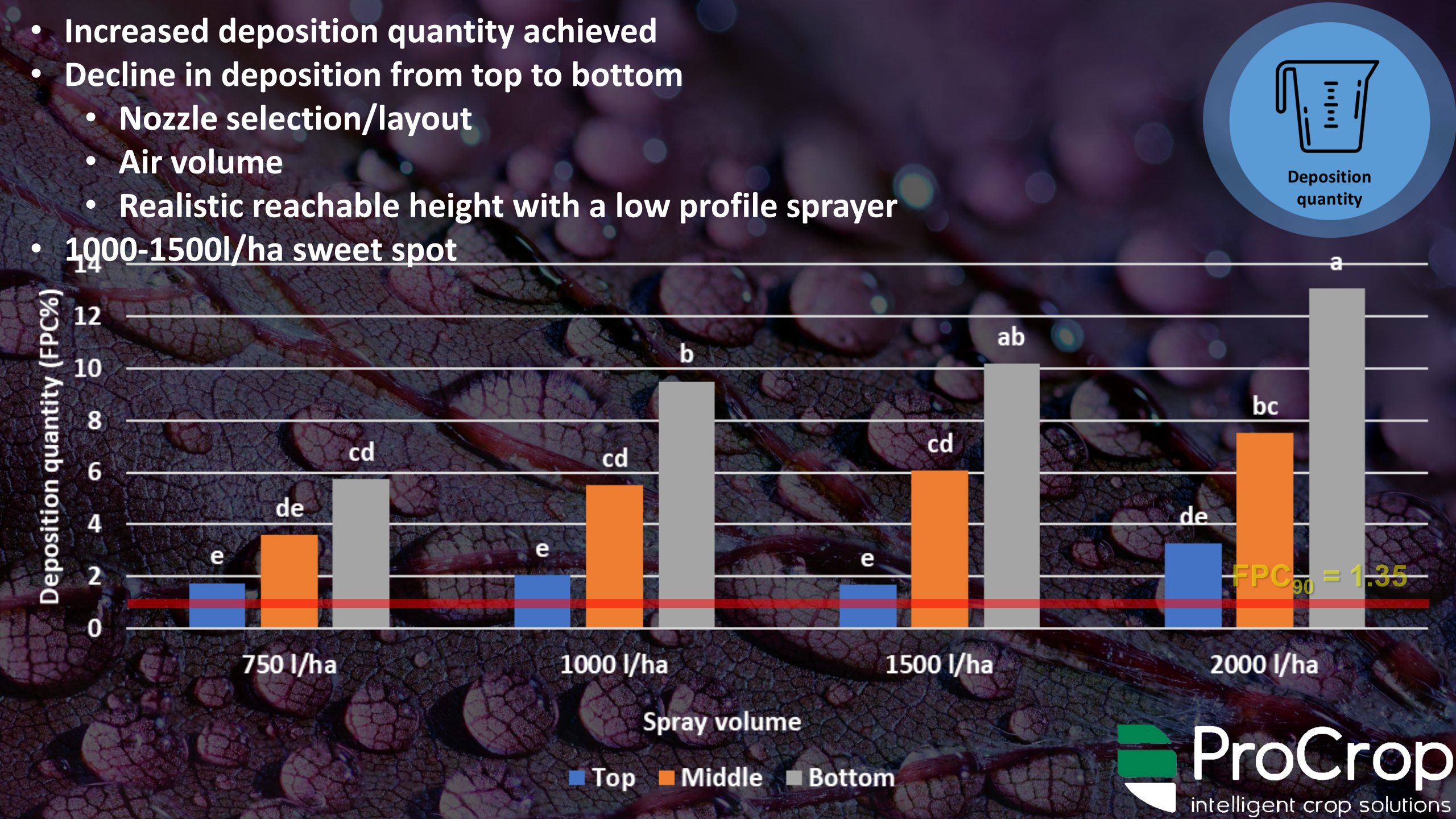
- Increased deposition quantity achieved
- Decline in deposition from top to bottom
  - Nozzle selection/layout
  - Air volume
  - Realistic reachable height with a low profile sprayer
- 1000-1500l/ha sweet spot



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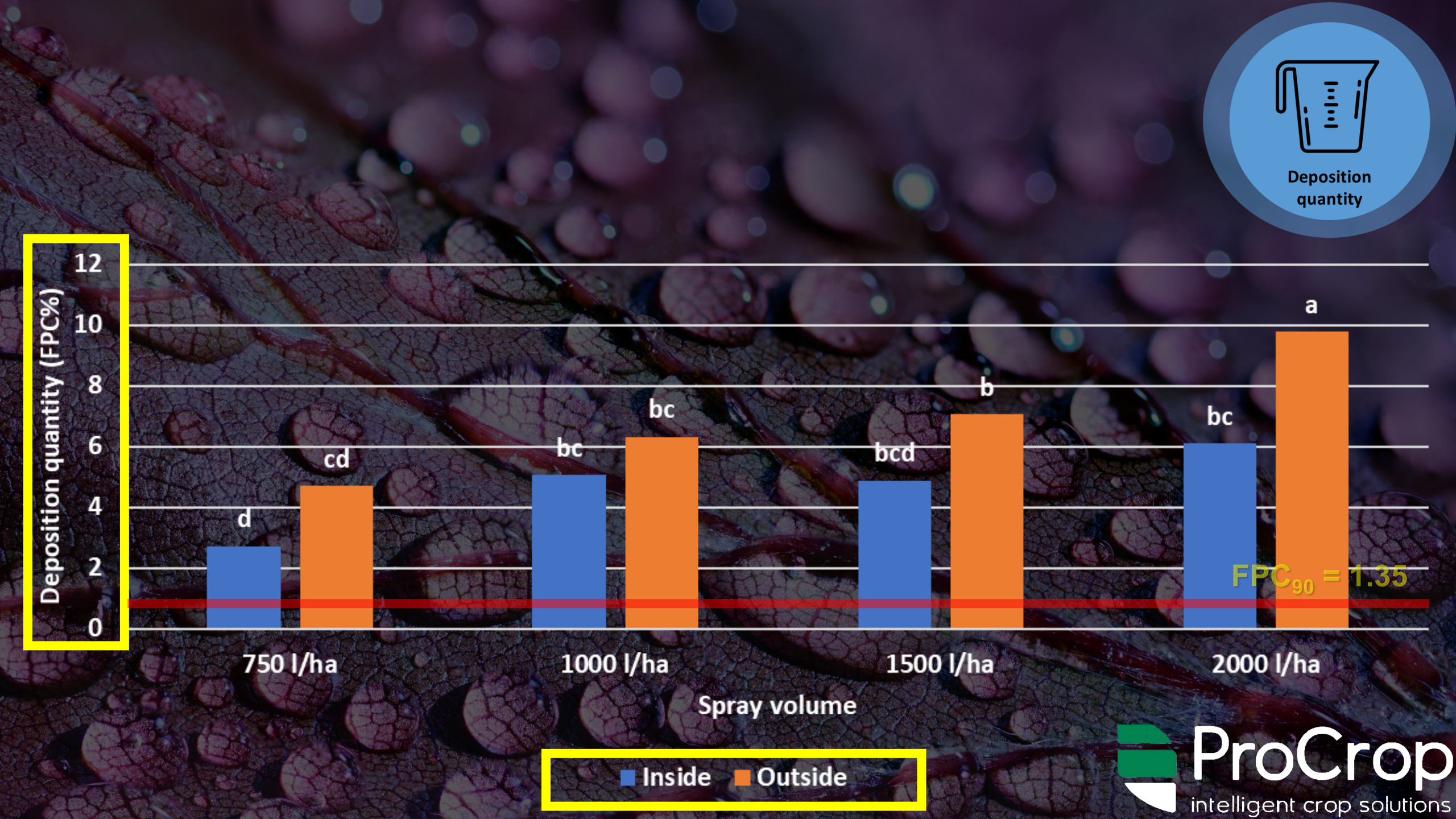
Deposition quantity
Deposition quantity (FPC%)
12
10
8
6
4
2
0
d
cd
bc
bc
bcd
b
bc
a
FPC90 = 1.35
750 l/ha
1000 l/ha
1500 l/ha
2000 l/ha
Spray volume
Inside
Outside
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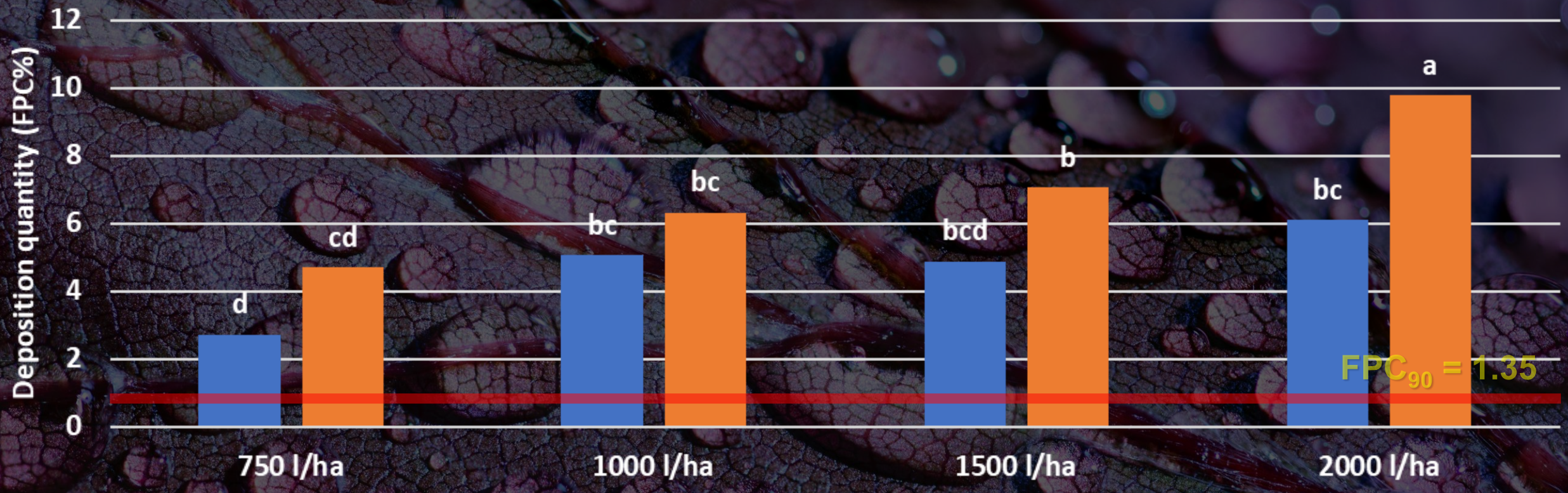
- Increased deposition quantity achieved
- 1000-1500 L/ha sweet spot
- Canopy penetration

Deposition quantity



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Observation from data:

- **Deposition quantity**
  - **Optimal spray volume 1000-1500 l/ha**
  - **Lower volumes would increase variation in deposition parameters**
  - **Higher volumes wasteful/super optimal**

- **Deposition uniformity**
  - **1000-1500 l/ha**
  - **Lower or higher volumes will not make a significant improvement**

- **Deposition quality**
  - **1000-1500 l/ha**
  - **Lower or higher volumes will not make a significant improvement**

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Observation from data:

- High variation in data
  - Large canopies
  - Many targets (leaves and nuts) distributed throughout canopy
  - Difficult to reach all targets with similar quantity and distribution
- High profile sprayers + optimal nozzle selection
- Formula to determine water volume for specific tree volume

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Formula for determining optimal spray volume for pecan nut orchards:

- Theoretical – needs to be evaluated
- Based of assumption that 1000-1500 l/ha is optimal for tree size evaluated
- Based on TRV – can only be implemented in tree rows that have already filled (continuous leaf wall)
- Used similar methodologies as Byers (1971), Unrath (1984), Scapin et al (2015) and Behlau et al (2020)

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Formula for determining optimal spray volume for pecan nut orchards:

- **Formula:**
  - **[10 × 7 m trees (H×W), 10 m row spacing] 1000 to 1500 L/ha was enough for achieving sufficient deposition parameters.**
  - **Test orchard has a tree row volume (m3/ha) of 70 000 m3/ha.**

$$spray\ volume\ \left(\frac{l}{ha}\right) = \frac{10000}{\text{Row width (m)}} \times Tree\ hight\ (m) \times Tree\ depth\ (m) \times\ 0.018\ L$$

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Optimized parameters for spray application in pecan nuts

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Results from previous three trials lead to the following improvements:

- **Helping growers to determine spray speed**
- **Water delivery rate**
- **Nozzle selection**
- **Nozzle layout**
- **Importance of correct droplet size and number (volume) that can be distributed throughout large spatial volume pecan nut tree canopies**

Goal:

- **Evaluate improved spray methodology**
- **If deposition parameters on leaves emulate deposition on nuts**

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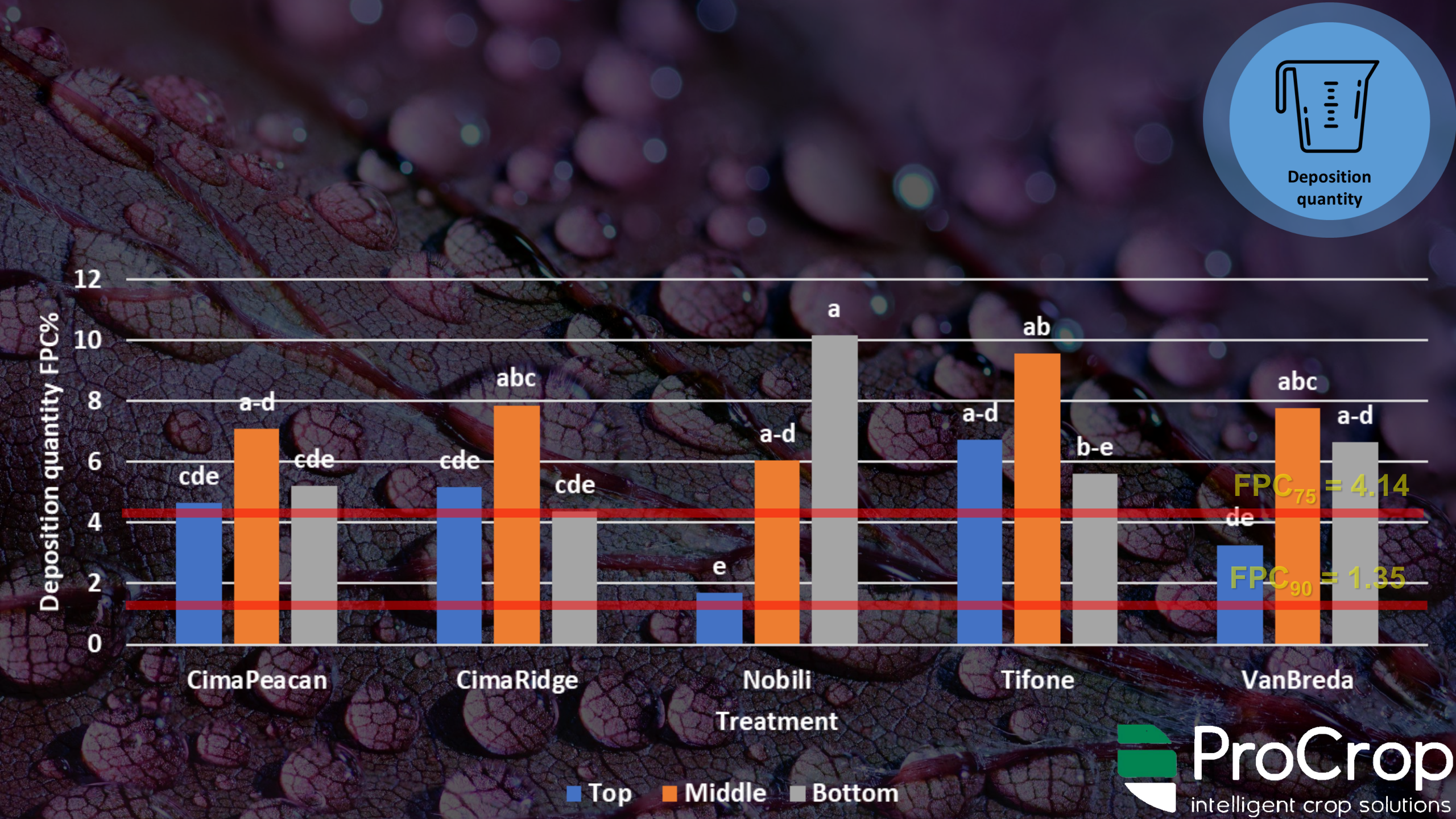
Improved setups:

- Speed adapted to canopy – 3.84 km/h (this would differ from sprayer to sprayer)

- Nozzle layout and droplet selection
  - Fine droplet spectrum used
  - 80/20 layout (due to close prox. of bottom canopy leaves to sprayer)

- Water volume – formula selected to fit canopy (1500 l/ha)
- Dosing – Dosing was done on a TRV of 3000 L/ha (half 6677 l/ha)


Deposition quantity
Deposition quantity FPC%
12
10
8
6
4
2
0
cde
a-d
cde
cde
abc
cde
e
a-d
a
a-d
ab
b-e
de
abc
a-d
FPC75 = 4.14
FPC90 = 1.35
CimaPeacan
CimaRidge
Nobili
Tifone
VanBreda
Treatment
Top
Middle
Bottom
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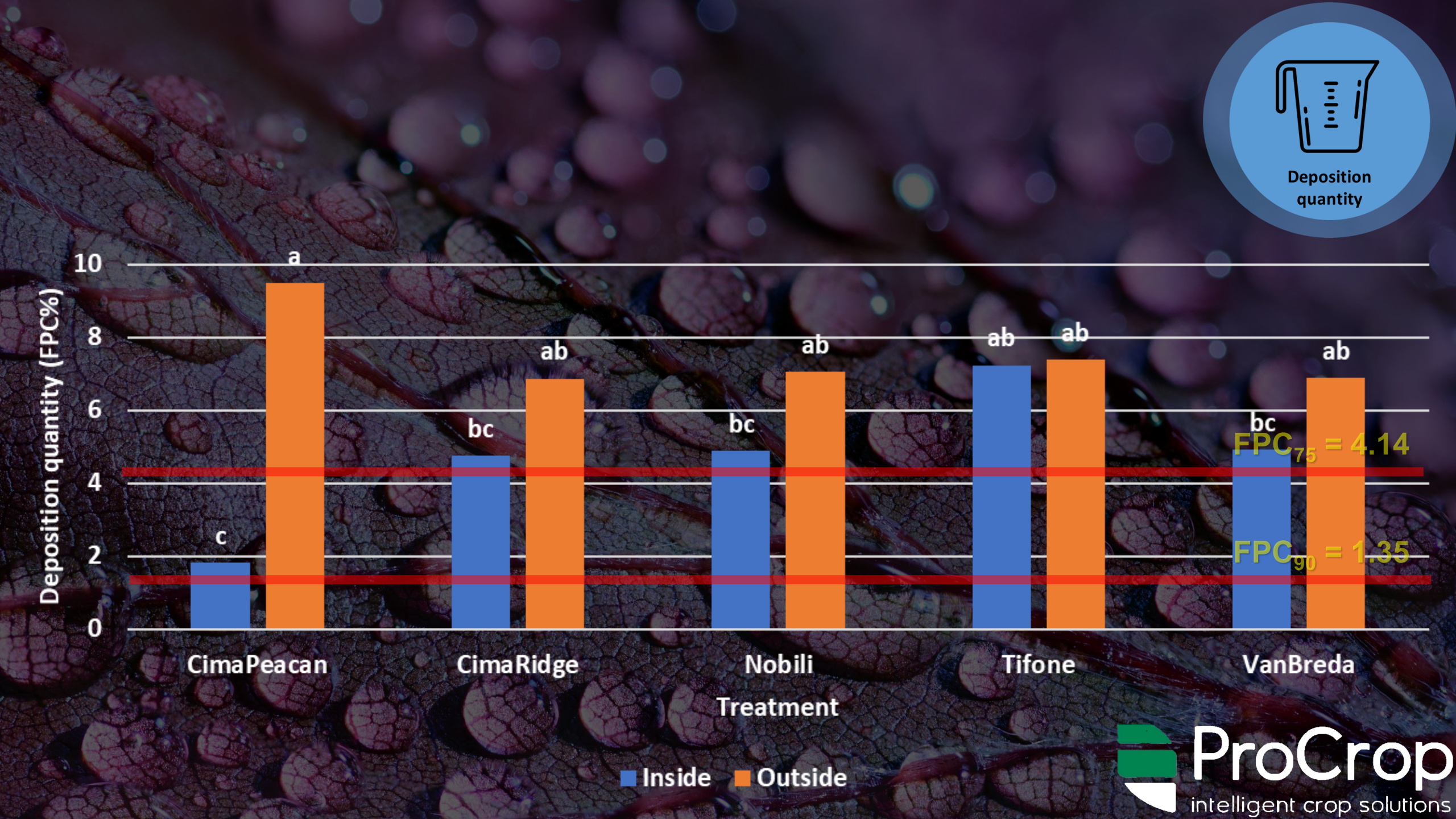
Deposition quantity
Deposition quantity (FPC%)
10
8
6
4
2
0
a
c
bc
ab
bc
ab
ab
ab
bc
ab
FPC75 = 4.14
FPC90 = 1.35
CimaPeacan
CimaRidge
Nobili
Tifone
VanBreda
Treatment
Inside
Outside
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General discussion

- Deposition parameters of all sprayers improved
- General trend of deposition similar on leaves and nuts

- Liquid flow rate distributed according to tree canopy volume
- 80% to top 2/3, 20% lower 1/3
- Can be fine tuned even more

- Danger of directed air and nozzle ports (banding, streaking)
- Height of trees continued difficulty and limitation
  - Spray speed
  - Machine design

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General discussion

- Improvement trend in all crops:
  - Citrus, tomatoes, stone and pome fruit, blueberries, potatoes, soya and winter grains
  - Understanding the process has the biggest impact on improvement
  - Will the grower adopt the system e.g. Citrus?
  - Basics!