How to use M5?

M5 Stem Injection Usage Guidelines

A) Equipment Needed:

- 60 ml injection syringes – preferably with an off-centre nozzle.
    - Prepare new syringes by burning one hole in the top of the syringe tube on opposite sides and three holes spaced along the plunger shaft using a hot nail (Fig 1)
- 18V battery-powered hand drill.
- Battery chargers and spare batteries.
- Drill bits (5.5 mm for off-centre nozzle, 6.5 mm for centre nozzle).
    - Control drill depth by cutting the drill shaft to the correct length or placing a pipe over the drill bit.
- 20 L plastic buckets to pour product into.
- Tarp for workspace.
- Containers and cart to transport syringes.
- Silicone or glycerine lubricant.
- Wire, pliers, and/or nails.
- Protective clothing:
    - Mixing team: PVC gloves, aprons, face shields.
    - Injection team: face shields.

Figure 1: Prepare syringes with holes

B) Planning & Application timing:

- Apply according to horticulturist's recommendation: 2–3 applications per year:

    1. After harvest (Feb – Apr)
    2. Three months after first injection (Jul – Sept)
    3. Only for sick trees or late cultivars (Oct – Dec)

- Only trees with a trunk diameter larger than 7.5 cm are injected.
- Ensure soil moisture is optimal on the application day to allow proper product absorption through transpiration.
- Wear protective clothing during handling.

C) Ordering and Mixing:

- Dry M5 product can be ordered from NEM and has a shelf life of about 6 months if stored properly.
- Dissolve content of container in the quantity of clean water (e.g. 2.5 kg in 25 L; 5 kg in 50 L and 10 kg in 100 L water). This is the final solution to be used for trunk injection.
- Buffering with a suitable buffer may be required. Follow horticulturalist's advice.
- Once mixed with water, M5 has a shelf life of only 2 weeks.

D) Injection Process:

1. Drilling (Fig 2)
    1. Drill holes at a 25–30° downward angle into the trunk, 4–5 cm deep.
    2. Space holes evenly around the trunk, never in a vertical line.
    3. Do not drill too low (where the trunk divides) or too close to old holes.
    4. Drill only into healthy, live areas of the trunk.
    5. Drilling team should not drill more than 10 trees ahead of injection team, as holes dry and seal, preventing product absorption.

Figure 2: Drilling holes at an angle

2. Syringes
    1. Draw 20 ml of M5 solution into the syringe and fully extend the plunger to fill the remaining volume with air (Fig 3).
    2. Insert syringe tightly into the drilled stem hole, push plunger back to align with syringe holes, and secure with wire or nail (Fig 4).
    3. If leakage occurs when placing syringe under pressure, replace with a full syringe.
    4. Remove syringe once all the product has been absorbed (process is slower in cloudy or rainy weather) (Fig 5).
    5. Clean syringes with soapy water.
    6. Lubricate syringes with silicone/glycerin as needed.

Figure 3 (left): 20ml M5 drawn up in syringe with air space above.
Figure 4 (right): Syringe fixed in hole with plunger compressed and wire pin fitted to maintain pressure.

Figure 5: M5 nearly fully absorbed by tree.

Estimated Quantities Based on Tree and Row Spacing

Tree spacing (m)	Row spacing (m)	Trees/ha	Syringes / tree	Syringes / ha
1.75	7	816	3	2449
2	6	833	3	2500
2	7	714	3	2143
2.5	10	400	5	2000
3	6	556	4	2222
3	7	476	4	1905
3.5	3.5	816	2	1633
3.5	7	408	5	2041
4	6	417	5	2083
4.5	9	247	8	1975
5	5	400	5	2000
5	7	286	6	1714
5	9	222	8	1778
5	10	200	8	1600
5	10.5	190	9	1714
5	11	182	9	1636
6	6	278	Determine per Tree: Drip area cross-section (m) x 1.5	
7	7	204		
8	8	156		
9	9	123		
10	10	100		
10	10.5	95		
11	11	83		