

CLAIMS

What is claimed is:

1. A tip setter for installing an injection tool to a plant part, wherein the tip setter comprises a rod,

wherein the rod comprises: a front end and a rear end; and

wherein the front end of the rod is configured to directly or indirectly connect to the injection tool.
2. The tip setter of claim 1, wherein the front end of the rod is configured to directly receive the injection tool.
3. The tip setter of claim 1, wherein the front end of the rod is configured to indirectly receive the injection tool.
4. The tip setter of claim 3, wherein the front end of the rod is configured to receive a chassis housing the injection tool.
5. The tip setter of claim 3, wherein the front end of the rod is configured to receive a tip adapter coupled to the injection tool.
6. The tip setter of any one of claims 1-5, further comprising a grip, wherein the rear end of the tip setter is connected to the grip.
7. The tip setter of any one of claims 1-6, wherein the plant part has a diameter of more than or equal to 8 mm.
8. A tip setter for installing an injection tool to a plant part, wherein the tip setter comprises: an arm, a fixed jaw, a middle grip, and a sliding unit,

wherein the arm comprises: a front end and a rear end;

wherein the fixed jaw is connected to the front end of the arm;

wherein the middle grip is connected to the rear end of the arm;

wherein the sliding unit comprises: a front end and a rear end;

wherein the sliding unit is configured to slide toward the front end of the arm;

wherein the front end of the sliding unit is configured to directly or indirectly connect to the injection tool; and

wherein the sliding unit and the fixed jaw are configured to receive the plant part between the injection tool and the fixed jaw.

9. The tip setter of claim 8, wherein the front end of the sliding unit is configured to directly receive the injection tool.

10. The tip setter of claim 8, wherein the front end of the sliding unit is configured to indirectly receive the injection tool.

11. The tip setter of claim 10, wherein the front end of the sliding unit is configured to receive a chassis housing the injection tool.

12. The tip setter of claim 10, wherein the front end of the sliding unit is configured to receive a tip adapter coupled to the injection tool.

13. The tip setter of any one of claims 8-12, wherein the plant part has a diameter between 8 mm and 20 mm.

14. A tip setter for installing an injection tool to a plant part, wherein the tip setter comprises: an arm, a handle, a locking unit, a sliding unit, and a fixed jaw,

wherein the arm comprises: a first actuating end and a jaw end;

wherein the handle comprises: a second actuating end, a pivoting end, and a sliding end,

wherein the locking unit is connected to the pivoting end of the handle,

wherein the sliding unit is connected to the sliding end of the handle and configured to slide along the arm between the first actuating end and the jaw end, and to directly or indirectly receive the injection tool,

wherein the fixed jaw is connected to the jaw end of the arm, and

wherein the sliding unit and the fixed jaw are configured to receive the plant part between the injection tool and the fixed jaw.

15. The tip setter of claim 14, wherein, when the locking unit is in an adjustable mode, the locking unit can change position on the arm between the first actuating end and the jaw end, and when the locking unit is in a fixed mode, the locking unit is fixed at a position on the arm between the first actuating end and the jaw end.

16. The tip setter of claim 14 or claim 15, wherein, when the first actuating end and the second actuating end are moved toward each other while the locking unit is locked at a position on the arm, the sliding unit is configured to slide along the arm toward the jaw end of the arm, thereby moving the injection tool toward the plant part with sufficient force to penetrate the plant part.

17. The tip setter of any one of claims 14-16, wherein the sliding unit is configured to directly receive the injection tool.

18. The tip setter of any one of claims 14-16, wherein the sliding unit is configured to indirectly receive the injection tool.

19. The tip setter of claim 18, wherein the sliding unit is configured to receive a chassis housing the injection tool.

20. The tip setter of claim 18, wherein the sliding unit is configured to receive a tip adapter coupled to the injection tool.

21. The tip setter of any one of claims 14-20, wherein the plant part has a diameter between 15 mm and 120 mm.

22. A tip adapter for installing an injection tool to a plant part, wherein the tip adapter comprises: a clamp and a connector,
- wherein the clamp comprises a first side, a second side, and a base that form a U-shape having an interior surface and an exterior surface,
- wherein the first side comprises a first lip extruding on the interior surface on the first side,
- wherein the second side comprises a second lip extruding on the interior surface on the second side,
- wherein the first lip and the second lip are configured to clamp on the injection tool, and
- wherein the connector is connected to the exterior surface on the base.
23. A tip setter for installing an injection tool to a plant part, wherein the tip setter comprises: an automatic hammer and a tip adapter,
- wherein the automatic hammer is configured to receive the tip adapter, and
- wherein the tip adapter comprises: a clamp and a connector,
- wherein the clamp has a first side, a second side, and a base that form a U-shape having an interior surface and an exterior surface,
- wherein the first side has a first lip extruding on the interior surface on the first side,
- wherein the second side has a second lip extruding on the interior surface on the second side, and
- the first lip and the second lip are configured to clamp on the injection tool,

wherein the connector is connected to the exterior surface on the base, and the connector is configured to insert into or couple with the automatic hammer.

24. The tip setter of claim 23, wherein the automatic hammer is configured to exert a stroke force without rotation on the tip adapter connected to the injection tool, so as to insert at least a part of the injection tool into the plant part.
25. The tip setter of claim 23 or 24, wherein the automatic hammer is a rotary drill or wrench with an impact mechanism that generates an impact or hammering motion.
26. The tip setter of claim 23 or 24, wherein the automatic hammer is a hammer drill, percussion drill, impact drill, air drill, impact driver, impact wrench, impactor, impact gun, air wrench, air gun, rattle gun, torque gun, or windy gun.
27. The tip setter of any one of claims 23-26, wherein the automatic hammer is an electric device.
28. The tip setter of any one of claims 23-26, wherein the automatic hammer is a pneumatic device.
29. The tip setter of any one of claims 23-28, further comprising the injection tool interfaced with the tip adapter.
30. The tip setter of claim 29, wherein the injection tool is releasably interfaced with the tip adapter.
31. The tip setter of claim 29 or 30, wherein the injection tool comprises a tool body having a portion designed to be lodged into the plant part and at least one port connectable to tubing, wherein the portion designed to be lodged into the plant part is positioned externally to the tip adapter and the at least one port is positioned internally in the tip adapter.
32. The tip setter of claim 31, further comprising tubing, wherein at least a portion of the tubing is positioned within the tip adapter.

33. The tip setter of claim 29 or 30, wherein the injection tool comprises:
- a tool body having a portion designed to be lodged into the plant part; and
 - a tool base connected to the tool body.
34. The tip setter of claim 33, wherein the tool base comprises at least one port configured to receive active ingredient; and
- wherein the tool body comprises a channel system connected to at least one port, and the channel system is configured to distribute the active ingredient through the tool body into the plant part.
35. The tip setter of claim 33 or 34, wherein the tool base comprises at least one structural element configured to interface with the tip adapter.
36. The tip setter of claim 33 or 34, wherein one or both sides of the tool base comprise a groove designed to engage with the first lip and/or the second lip of the tip adapter, so as to secure the injection tool within the tip adapter.
37. A method of using the tip setter of any one of claims 1-7, the method comprising:
- (a) coupling the injection tool and the front end of the rod;
 - (b) placing the injection tool near the plant part;
 - (c) pushing the rod in the direction from the rear end of the rod to the front end of the rod to push the injection tool toward the plant part;
 - (d) inserting at least a part of the injection tool into the plant part; and
 - (e) releasing the injection tool from the tip setter.
38. A method of using the tip setter of any one of claims 8-13, the method comprising:
- (a) coupling the injection tool and the front end of the sliding unit;

- (b) placing the plant part in between the injection tool and the fixed jaw;
 - (c) pushing the sliding unit in the direction from the rear end of the arm to the front end of the arm to push the injection tool toward the plant part;
 - (d) inserting at least a part of the injection tool into the plant part; and
 - (e) releasing the injection tool from the tip setter.
39. A method of using the tip setter of any one of claims 14-21, the method comprising:
- (a) coupling the injection tool and the sliding unit;
 - (b) placing the plant part in between the injection tool and the fixed jaw;
 - (c) moving the first actuating end and the second actuating end toward each other to push the sliding unit and the injection tool toward the plant part;
 - (d) inserting at least a part of the injection tool into the plant part; and
 - (e) releasing the injection tool from the tip setter.
40. A method of using the tip adapter of claim 22, the method comprising:
- (a) inserting the injection tool between the first lip and the second lip;
 - (b) bringing the injection tool close to the plant part;
 - (c) pushing the tip adapter toward the plant part to insert at least a part of the injection tool into the plant part; and
 - (d) releasing the injection tool from the tip adapter.
41. The method of claim 40, wherein pushing the tip adapter toward the plant part is in the same direction as the longitudinal axis of the tip adapter.

42. The method of claim 40 or 41, wherein pushing the tip adapter toward the plant part is performed manually.
43. The method of claim 40 or 41, wherein pushing the tip adapter toward the plant part is performed using a hammer.
44. The method of claim 40 or 41, wherein pushing the tip adapter toward the plant part is performed using a pneumatic device.
45. The method of claim 40 or 41, wherein pushing the tip adapter toward the plant part is performed using a tip setter.
46. The method of claim 45, wherein the tip setter is the tip setter of any one of claims 1-36.
47. A method of using the tip setter of any one of claims 23-36, the method comprising:
- (a) coupling the injection tool and the tip adapter;
 - (b) placing the injection tool near the plant part;
 - (c) operating the automatic hammer to push the injection tool toward the plant part;
 - (d) inserting at least a part of the injection tool into the plant part; and
 - (e) releasing the injection tool from the tip setter.