Claims

1. An injection tool, comprising:

a base including an inlet port; and

a penetrating distribution body having a distal end away from the base and a proximal end near the base, wherein the penetrating distribution body includes:

a cutting edge at the distal end of the penetrating distribution body,

a penetrating element that extends from the cutting edge to the proximal end of the penetrating distribution body,

wherein the cutting edge and the penetrating element form a wedge type body profile extending along a longitudinal axis of the injection tool,

opposing faces that extend from the base and meet at the cutting edge,

a distribution element that includes:

a main channel that runs longitudinally through the center of the penetrating distribution body;

distribution ports; and

two distribution reservoirs, one on each side of the main channel, wherein each distribution reservoir is an opening that extends through both opposing faces of the penetrating distribution body.

2. The injection tool of claim 1, wherein the two distribution reservoirs are configured to retain a liquid formulation in residence proximate to adjacent plant tissues.

3. The injection tool of claim 1, wherein the penetrating element increases in thickness from the distal end of the penetration distribution body toward the proximal end of the penetration distribution body and the base.

4. The injection tool of claim 1, wherein the inlet port has a ribbed outer structure.

5. The injection tool of claim 1, wherein a transition between the base and the penetrating distribution body forms an abutting face that extends away from the longitudinal axis of the injection tool.

6. A plant injection system, comprising:

an injection tool of claim 1; and

a delivery device connected to the injection tool, wherein the delivery device includes a container configured to store a liquid formulation.

7. The plant injection system of claim 6, further comprising: an attachment interface connected to the container, wherein the attachment interface is configured for coupling with the inlet port of the injection tool.

8. The plant injection system of claim 7, wherein the delivery device further includes a dosing device interposed between the container and the attachment interface, wherein the dosing device is configured to deliver a specified quantity of the liquid formulation to the injection tool for lateral distribution from one or more distribution ports.

9. A method of distributing a liquid formulation to a plant, comprising:

penetrating the plant with an injection tool of claim 1; and

distributing the liquid formulation through the injection tool to the plant.

10. The method of claim 9, wherein penetrating the plant comprises:

piercing the plant with the cutting edge, wherein the penetrating element is moved along the longitudinal axis of the injection tool.

11. The method of claim 9, wherein distributing the liquid formulation to the plant comprises:

transmitting the liquid formulation from the inlet port of the injection tool to the distribution ports of the penetrating distribution body; and

delivering the liquid formulation from the distribution ports transversely relative to the longitudinal axis into the two distribution reservoirs.

12. The method of claim 9, further comprising:

retaining the liquid formulation along a plant tissue of the plant.

13. The method of claim 9, wherein the liquid formulation is distributed over one or more hours.

14. The method of claim 9, wherein the liquid formulation is continuously distributed.

15. The injection tool of claim 1, wherein the distribution ports are oriented at an angle between around 100 degrees to around 180 degrees relative to a penetrating movement direction.

16. The injection tool of claim 15, wherein the distribution ports are oriented at an angle of about 125 degrees relative to the penetrating movement direction.

17. The injection tool of claim 1, wherein each distribution port is recessed within a wall of one of the two distribution reservoirs.

18. The injection tool of claim 1, wherein the penetrating distribution body has a lance tip shape.

19. The injection tool of claim 5, wherein the abutting face is flat.

20. The injection tool of claim 5, wherein the abutting face has a corresponding shape to a portion of the plant where the tool is intended for insertion.

21. The injection tool of claim 1, wherein the distribution ports are configured to receive a liquid formulation from the main channel and direct the liquid formulation in a transverse direction relative to the longitudinal axis into the two distribution reservoirs.

22. The injection tool of claim 1, wherein the penetrating distribution body increases in width from cutting edge toward the proximal end of the penetrating distribution body and the base.

23. The injection tool of claim 1, wherein the injection tool is configured to direct a liquid formulation from the inlet port to the main channel of the distribution element, through the main channel to the distribution ports, and through the distribution ports into the two distribution reservoirs.

24. The injection tool of claim 23, wherein the injection tool is configured to deliver at least a portion of the liquid formulation from the distribution ports into the two distribution reservoirs in a transverse direction relative to the longitudinal axis of the injection tool.