CLAIMS

1. A method for the selection of one or more microorganisms capable of imparting one or more beneficial property to a plant, the method comprising at least the steps of:

(a) subjecting one or more plant to a growth medium in the presence of one or more microorganisms;

(b) applying one or more selective pressure during step (a);

(c) selecting one or more plant following step (b);

(d) isolating one or more microorganisms or obtaining one or more microorganism in crude form from the one or more plant and/or plant rhizosphere of the one or more plant selected in step (c);

in which steps (a) to (d) are repeated one or more times, in which the one or more microorganisms isolated or obtained in step (d) are used in step (a) of any successive repeat.

2. A method according to Claim 1, in which the one or more plant is a seed, seedling, cutting, propagule and/or any other plant material or tissue capable of growing.

3. A method according to Claim 1 or 2, in which the step of subjecting one or more plant to a growth medium involves growing or multiplying the plant.

4. A method according to Claim 1, 2 or 3, in which one selective pressure is applied in step (b).

5. A method according to any preceding claim, in which the selective pressure is biotic.

6. A method according to Claim 5, in which the selective biotic pressure includes exposure to one or more organisms that are detrimental to the plant.

7. A method according to Claim 6, in which the organisms are selected from fungi, bacteria, viruses, insects, mites and nematodes.

8. A method according to any of Claims 1 to 4, in which the selective pressure is abiotic.

9. A method according to Claim 8, in which the abiotic selective pressure is selected from exposure to or changes in the level of; salt concentration, temperature, pH, water, minerals, organic nutrients, inorganic nutrients, organic toxins, inorganic toxins, and metals.

10. A method according to any preceding claim, in which the selective pressure is applied during substantially the whole time during which the one or more plant is subjected to the growth medium and one or more microorganisms.

11. A method according to any of Claims 1 to 9, in which the selective pressure is applied during substantially the whole growth period of the one or more plant.

12. A method according to any of Claims 1 to 9, in which the selective pressure is applied at a discrete time point.

13. A method according to any preceding claim, in which the one or more plant is selected on the basis of one or more phenotypic trait.

14. A method according to any preceding claim, in which the one or more microorganisms are isolated or obtained from the root, stem and/or foliar (including reproductive) tissue, or whole plant tissue of the one or more plants selected.

15. A method according to any preceding claim, in which the one or more microorganisms are isolated or obtained from the one or more plants any time after germination.

16. A method according to any preceding claim, where two or more microorganisms are isolated or obtained in step (d), the method further comprises the steps of separating the two or more microorganisms into individual isolates, selecting two or more individual isolates, and then combining the selected two or more isolates.

17. A method according to any preceding claim, in which the one or more selective pressure applied in successive repeats of steps (a) to (d) is different.

18. A method according to any of Claims 1 to 16, in which the one or more selective pressure applied in successive repeats of steps (a) to (d) is the same.

19. A method according to any preceding claim, in which prior to step (a) the method comprises subjecting the one or more plant to a growth medium in the presence of one or

more microorganisms, and after a desired period, isolating one or more microorganisms or obtaining one or more microorganism in crude form from the one or more plant and/or plant rhizosphere of the one or more plant.

20. A method according to Claim 19, in which the one or more microorganisms isolated or obtained from the one or more plant, are used in step (a) of the process.

21. A method according to any preceding claim, in which two or more methods are performed separately and the one or more microorganisms isolated or obtained in step (d) of each separate method are combined.

22. A method according to Claim 21, in which the combined microorganisms are used in step (a) of any successive repeat of steps (a) to (d) of the method.

23. A method for the selection of a composition which is capable of imparting one or more beneficial property to a plant, the method comprising at least the steps of:

(a) culturing one or more microorganism in one or more media;

(b) separating the one or more microorganism from the one or more media after a period of time to provide one or more composition;

(c) subjecting one or more plant to the one or more composition;

(d) selecting one or more composition if it is observed to impart one or more beneficial property to the one or more plants;

(e) identifying which one or more microorganisms separated in step (b) correspond with the composition selected in step (d);

in which, steps (a) to (d) are repeated one or more times, in which the one or more microorganism identified in step (e) are used in step (a) of any successive repeat.

24. A method for the selection of one or more microorganisms which are capable of producing a composition which is capable of imparting one or more beneficial property to a plant, the method comprising at least the steps of:

(a) culturing one or more microorganism in one or more media;

(b) separating the one or more microorganism from the one or more media after a period of time to provide one or more composition;

(c) subjecting one or more plant to the one or more composition;

(d) selecting one or more microorganisms associated with one or more composition observed to impart one or more beneficial property to the one or more plants;

in which, steps (a) to (d) are repeated one or more times, in which the one or more microorganisms selected in step (d) are used in step (a) of any successive repeat.

25. A method for assisting in the improvement of one or more plants, comprising arranging for the evaluation of the plant(s) in the presence of one or more microorganism and/or one or more composition, in which the evaluation comprises performing a method of any preceding claim.

26. A method according to Claim 25, in which the plant(s) are for growing in a first region.

27. A method according to Claim 25, in which the microorganism(s) may or may not be present in the first region.

28. A method according to any of Claims 25 to 27 in which the evaluation is performed in a second region.

29. A method according to any of Claims 25 to 28 in which, the step of arranging comprises arranging for one or more of:

- receipt or transmission of an identity of one or more plants or plant types to be evaluated;

- receipt or transmission of plant material from one or more plants or plant types to be evaluated;

- identification and / or selection of the microorganism(s) and/or composition(s);

- acquisition of the microorganism(s) and/or composition(s); and

- associating the microorganism(s) and/or composition(s) with the plant material.

30. A method according to any of Claims 25 to 29, in which the method comprises evaluating the plant(s) in the presence of the microorganism(s) and/or composition(s).

31. A method according to any of Claims 25 to 30, in which the method comprises arranging for the evaluation of the plant(s) in the presence of the microorganism(s) and/or composition(s).

32. A method according to any of Claims 25 to 31 in which the steps are performed by a single entity.

33. A method according to any of Claims 25 to 31 in which the steps are performed by at least two parties, a first which makes a request and a second which actions the request.

34. A method according to any of Claims 25 to 33, further comprising one or more of:

- receiving or sending one or more microorganisms or at least the identity thereof and/or composition(s) to the first region, including in combination with plant material; and

- growing the plant(s) or other plants in the first region in the presence of the microorganism(s) and/or composition(s).

35. A method according to any of Claims 25 to 34, in which a first party:

- identifies a need for an improvement in a plant(s);

- sends the identity thereof and / or relevant plant material to a second party together with any relevant information, and

- receives plant material and / or one or more microorganisms and / or the identities thereof and/or composition(s).

36. A method of Claim 35, in which the step of receiving is performed following or as a result of an assessment of plant/microorganism and/or plant/composition associations.

37. A method according to any of Claims 25 to 36 in which a second party:

- receives an identity of a plant(s) and / or relevant plant material from a first party together with any relevant information, and

- sends plant material and / or one or more microorganisms and / or the identities thereof and/or composition(s) to the first party.

38. A method according to Claim 37, in which the step of sending is performed following or as a result of an assessment of plant / microorganism and/or plant/composition associations.

39. A system for implementing the method of any of Claims 25 to 38, comprising:

- means for receiving or transmitting an identity of one or more plants or plant types to be evaluated;

- means for identifying and / or selecting microorganism(s) and/or composition(s);

- means for acquiring the microorganism(s) and/or composition(s);

- means for associating the microorganism(s) and/or composition(s) with the plant material; and

- means for evaluating the plant(s) in the presence of the microorganism(s) and/or composition(s).

40. A system according to Claim 39, including one or more of:

- means for receiving or transmitting plant material from one or more plants or plant types to be evaluated;

- means for receiving or sending one or more microorganisms (or at least the identity thereof) and/or composition(s) to the first region, including in combination with plant material; and

- means for growing the plant(s) or other plants (preferably having similar properties) in the first region in the presence of the microorganism(s) and/or composition(s).

41. A system according to Claim 39 or 40 in which the system is embodied by a facility configured to transmit request(s) for an improvement in a plant(s) and subsequently to receive plant material and / or one or more microorganisms and / or the identities thereof and/or composition(s).

42. A system according to Claim 39 or 40 in which the system is embodied by a facility configured to receive an identity of a plant(s) and / or relevant plant material from together

with any relevant information; and send plant material and / or one or more microorganisms and / or the identities thereof and/or composition(s), preferably following or as a result of an assessment of plant / microorganism and/or plant/composition associations.

43. A microorganism selected by a method according to any of Claims 1 to 22, or Claim 24.

44. A method for the production of a composition to support plant growth and/or health, the method comprising the steps of a method according to any of Claims 1 to 22 and 24 and the additional step of combining the one or more microorganisms selected with one or more additional ingredients.

45. A composition comprising one or more microorganism according to Claim 43.

46. A combination of two or more microorganisms selected by the method according to any of Claims 1 to 22, and Claim 24.

47. A method according to Claim 23 or Claim 24, in which the one or more plant is a seed, seedling, cutting, propagule and/or any other plant material or tissue capable of growing.

48. A composition selected by a method according to Claim 23.

49. Use of one or more microorganism selected by a method of any of Claims 1 to 22 and 24 for imparting a beneficial property to one or more plant.

50. Use as claimed in Claim 49 in which the one or more microorganism is chosen from the group consisting of the microorganisms listed in tables 2, 3, 5, 6 and 7.

51. Use as claimed in Claim 49 in which the one or more microorganisms is chosen from the group consisting of the microorganisms listed in tables 2, 3, and 7 and the beneficial property is improved growth in nitrogen deficient or nitrogen limited growth media.

52. Use as claimed in Claim 49 in which the one or more microorganisms is chosen from the group consisting of the microorganisms listed in tables 5 and 6 and the beneficial property is improved growth in growth media in which phosphate is present substantially only in insoluble form.

53. Use as claimed in Claim 51 in which the microorganism is *Duganella* sp.

54. Use as claimed in Claim 51 in which a combination of *Arthrobacter* sp, *Duganella* sp, *Acinetobacter* sp, *Pantoea* sp, and *Stenotrophomonas* sp is used.

55. Use of a composition selected by a method of Claim 23 for imparting one or more beneficial property to a plant.

56. The use of one or more microorganism selected by a method of Claim 24 as the set of one or more microorganisms in step (a) of a method of any of Claims 1 to 22.

57. The use of one or more microorganisms identified in step (e) of Claim 23 as the set of one or more microorganisms in step (a) of a method of any of Claims 1 to 22.

58. The use of one or more microorganisms selected in a method of any of Claims 1 to 22 in step (a) of a method of Claim 23 or 24.

59. A plant comprising one or more microorganism selected by a method of any of Claims 1 to 22 and 24.

60. A plant according to Claim 59, in which the plant is a seed, seedling, cutting, propagule and/or any other plant material or tissue capable of growing.

CLAIMS

1. A method for the selection of one or more microorganisms capable of imparting one or more beneficial property to a plant, the method comprising at least the steps of:

(a) subjecting one or more plant to a growth medium in the presence of one or more microorganisms;

(b) applying one or more selective pressure during step (a);

(c) selecting one or more plant following step (b);

(d) isolating one or more microorganisms or obtaining one or more microorganism in crude form from the one or more plant and/or plant rhizosphere of the one or more plant selected in step (c);

in which steps (a) to (d) are repeated one or more times, in which the one or more microorganisms isolated or obtained in step (d) are used in step (a) of any successive repeat.

2. A method according to Claim 1, in which the one or more plant is a seed, seedling, cutting, propagule and/or any other plant material or tissue capable of growing.

3. A method according to Claim 1 or 2, in which the step of subjecting one or more plant to a growth medium involves growing or multiplying the plant.

4. A method according to Claim 1, 2 or 3, in which one selective pressure is applied in step (b).

5. A method according to any preceding claim, in which the selective pressure is biotic.

6. A method according to Claim 5, in which the selective biotic pressure includes exposure to one or more organisms that are detrimental to the plant.

7. A method according to Claim 6, in which the microorganisms are selected from fungi, bacteria, viruses, insects, mites and nematodes.

8. A method according to any of Claims 1 to 4, in which the selective pressure is abiotic.

9. A method according to Claim 8, in which the abiotic selective pressure is selected from exposure to or changes in the level of; salt concentration, temperature, pH, water, minerals, organic nutrients, inorganic nutrients, organic toxins, inorganic toxins, and metals.

10. A method according to any preceding claim, in which the selective pressure is applied during substantially the whole time during which the one or more plant is subjected to the growth medium and one or more microorganisms.

11. A method according to any of Claims 1 to 9, in which the selective pressure is applied during substantially the whole growth period of the one or more plant.

12. A method according to any of Claims 1 to 9, in which the selective pressure is applied at a discrete time point.

13. A method according to any preceding claim, in which the one or more plant is selected on the basis of one or more phenotypic trait.

14. A method according to any preceding claim, in which the one or more microorganisms are isolated or obtained from the root, stem and/or foliar (including reproductive) tissue, or whole plant tissue of the one or more plants selected.

15. A method according to any preceding claim, in which the one or more microorganisms are isolated or obtained from the one or more plants any time after germination.

16. A method according to any preceding claim, where two or more microorganisms are isolated or obtained in step (d), the method further comprises the steps of separating the two or more microorganisms into individual isolates, selecting two or more individual isolates, and then combining the selected two or more isolates.

17. A method according to any preceding claim, in which the one or more selective pressure applied in successive repeats of steps (a) to (d) is different.

18. A method according to any of Claims 1 to 16, in which the one or more selective pressure applied in successive repeats of steps (a) to (d) is the same.

19. A method according to any preceding claim, in which prior to step (a) the method comprises subjecting the one or more plant to a growth medium in the presence of one or more microorganisms, and after a desired period, isolating one or more microorganisms or

obtaining one or more microorganism in crude form from the one or more plant and/or plant rhizosphere of the one or more plant.

20. A method according to Claim 19, in which the one or more microorganisms isolated or obtained from the one or more plant, are used in step (a) of the process.

21. A method according to any preceding claim, in which two or more methods are performed separately and the one or more microorganisms isolated or obtained in step (d) of each separate method are combined.

22. A method according to Claim 21, in which the combined microorganisms are used in step (a) of any successive repeat of steps (a) to (d) of the method.

23. A method for the selection of a composition which is capable of imparting one or more beneficial property to a plant, the method comprising at least the steps of:

(a) culturing one or more microorganism in one or more media;

(b) separating the one or more microorganism from the one or more media after a period of time to provide one or more composition;

(c) subjecting one or more plant to the one or more composition;

(d) selecting one or more composition if it is observed to impart one or more beneficial property to the one or more plants;

(e) identifying which one or more microorganisms separated in step (b) correspond with the composition selected in step (d);

in which, steps (a) to (d) are repeated one or more times, in which the one or more microorganism identified in step (e) are used in step (a) of any successive repeat.

24. A method for the selection of one or more microorganisms which are capable of producing a composition which is capable of imparting one or more beneficial property to a plant, the method comprising at least the steps of:

(a) culturing one or more microorganism in one or more media;

(b) separating the one or more microorganism from the one or more media after a period of time to provide one or more composition;

(c) subjecting one or more plant to the one or more composition;

(d) selecting one or more microorganisms associated with one or more composition observed to impart one or more beneficial property to the one or more plants;

in which, steps (a) to (d) are repeated one or more times, in which the one or more microorganisms selected in step (d) are used in step (a) of any successive repeat.

25. A method for assisting in the improvement of one or more plants, comprising arranging for the evaluation of the plant(s) in the presence of one or more microorganism and/or one or more composition, the method comprising at least the steps of a method of any preceding claim.

26. A method according to Claim 25, in which the plant(s) are for growing in a first region.

27. A method according to Claim 25, in which the microorganism(s) may or may not be present in the first region.

28. A method according to any of Claims 25 to 27 in which the evaluation is performed in a second region.

29. A method according to any of Claims 25 to 28 in which, the step of arranging comprises arranging for one or more of:

- receipt or transmission of an identity of one or more plants or plant types to be evaluated;

- receipt or transmission of plant material from one or more plants or plant types to be evaluated;

- identification and / or selection of the microorganism(s) and/or composition(s);

- acquisition of the microorganism(s) and/or composition(s); and

- associating the microorganism(s) and/or composition(s) with the plant material.

30. A method according to any of Claims 25 to 29, in which the method comprises evaluating the plant(s) in the presence of the microorganism(s) and/or composition(s).

31. A method according to any of Claims 25 to 30, in which the method comprises arranging for the evaluation of the plant(s) in the presence of the microorganism(s) and/or composition(s).

32. A method according to any of Claims 25 to 31 in which the steps are performed by a single entity.

33. A method according to any of Claims 25 to 31 in which the steps are performed by at least two parties, a first which makes a request and a second which actions the request.

34. A method according to any of Claims 25 to 33, further comprising one or more of:

- receiving or sending one or more microorganisms or at least the identity thereof and/or composition(s) to the first region, including in combination with plant material; and

- growing the plant(s) or other plants in the first region in the presence of the microorganism(s) and/or composition(s).

35. A method according to any of Claims 25 to 34, in which a first party:

- identifies a need for an improvement in a plant(s);

- sends the identity thereof and / or relevant plant material to a second party together with any relevant information, and

- receives plant material and / or one or more microorganisms and / or the identities thereof and/or composition(s).

36. A method of Claim 35, in which the step of receiving is performed following or as a result of an assessment of plant/microorganism and/or plant/composition associations.

37. A method according to any of Claims 25 to 36 in which a second party:

- receives an identity of a plant(s) and / or relevant plant material from a first party together with any relevant information, and

- sends plant material and / or one or more microorganisms and / or the identities thereof and/or composition(s) to the first party.

38. A method according to Claim 37, in which the step of sending is performed following or as a result of an assessment of plant / microorganism and/or plant/composition associations.

39. A system for implementing the method of any of Claims 25 to 38, comprising:

- means for receiving or transmitting an identity of one or more plants or plant types to be evaluated;

- means for identifying and / or selecting microorganism(s) and/or composition(s);

- means for acquiring the microorganism(s) and/or composition(s);

- means for associating the microorganism(s) and/or composition(s) with the plant material; and

- means for evaluating the plant(s)or plant type(s) or plant material in the presence of the microorganism(s) and/or composition(s).

40. A system according to Claim 39, further comprising:

- means for receiving or transmitting plant material from one or more plants or plant types to be evaluated;

- means for receiving or sending one or more microorganisms (or at least the identity thereof) and/or composition(s) to the first region, including in combination with plant material; and

- means for growing the plant(s) or other plants (preferably having similar properties) in the first region in the presence of the microorganism(s) and/or composition(s).

41. A system according to Claim 39 or 40 in which the system is embodied by a facility configured to transmit request(s) for an improvement in a plant(s) and subsequently to receive plant material and / or one or more microorganisms and / or the identities thereof and/or composition(s).

42. A system according to Claim 39 or 40 in which the system is embodied by a facility configured to receive an identity of a plant(s) and / or relevant plant material from together with any relevant information; and send plant material and / or one or more microorganisms and / or the identities thereof and/or composition(s), preferably following or as a result of an assessment of plant / microorganism and/or plant/composition associations.

43. A microorganism selected by a method according to any of Claims 1 to 22, or Claim 24.

44. A method for the production of a composition to support plant growth and/or health, the method comprising the steps of a method according to any of Claims 1 to 22 and 24 and

the additional step of combining the one or more microorganisms selected with one or more additional ingredients.

45. A composition comprising one or more microorganism according to Claim 43.

46. A combination of two or more microorganisms selected by the method according to any of Claims 1 to 22, and Claim 24.

47. A method according to Claim 23 or Claim 24, in which the one or more plant is a seed, seedling, cutting, propagule and/or any other plant material or tissue capable of growing.

48. A composition selected by a method according to Claim 23.

49. Use of one or more microorganism selected by a method of any of Claims 1 to 22 and 24 for imparting a beneficial property to one or more plant.

50. Use as claimed in Claim 49 in which the one or more microorganism is chosen from the group consisting of the microorganisms listed in tables 2, 3, 5, 6 and 7.

51. Use as claimed in Claim 49 in which the one or more microorganisms is chosen from the group consisting of the microorganisms listed in tables 2, 3, and 7 and the beneficial property is improved growth in nitrogen deficient or nitrogen limited growth media.

52. Use as claimed in Claim 49 in which the one or more microorganisms is chosen from the group consisting of the microorganisms listed in tables 5 and 6 and the beneficial property is improved growth in growth media in which phosphate is present substantially only in insoluble form.

53. Use as claimed in Claim 51 in which the microorganism is *Duganella* sp.

54. Use as claimed in Claim 51 in which a combination of *Arthrobacter* sp, *Duganella* sp, *Acinetobacter* sp, *Pantoea* sp, and *Stenotrophomonas* sp is used.

55. Use of a composition selected by a method of Claim 23 for imparting one or more beneficial property to a plant.

56. The use of one or more microorganism selected by a method of Claim 24 as the set of one or more microorganisms in step (a) of a method of any of Claims 1 to 22.

57. The use of one or more microorganisms identified in step (e) of Claim 23 as the set of one or more microorganisms in step (a) of a method of any of Claims 1 to 22.

58. The use of one or more microorganisms selected in a method of any of Claims 1 to 22 in step (a) of a method of Claim 23 or 24.

59. A plant comprising one or more microorganism selected by a method of any of Claims 1 to 22 and 24.