insect (e.g. honeybee queen) is vaccinated with a dead non-disease causing bacteria *Enterococcus, e.g., Melissococcus sp.*, *e.g.*, *Melissococcus plutonius*. Vaccination of queen bees with dead *Melissococcus plutonius* will protect against brood diseases, e.g., caused by *Enterococcus*, *e.g.*, *Melissococcus sp*. or *Melissococcus plutoinus* and other disease causing bacteria, e.g. *Paenibacillus sp.*, including, but not limited to *Paenibacillus alvei* (PA), *Paenibacillus dentritiformis* (PD), or *Paenibacillus larvae* (PL). In addition, vaccination with *Paenibacillus sp.*, including, but not limited to *Paenibacillus alvei* (PA), *Paenibacillus dentritiformis* (PD), or *Paenibacillus larvae* (PL) will protect against brood diseases caused by disease pathogens other than a disease caused by a *Paenibacillus sp.*, including, but not limited to *Paenibacillus alvei* (PA), *Paenibacillus dentritiformis* (PD), or *Paenibacillus larvae* (PL) or a diseases caused by *Melissococcus plutonius*.

[10a] In one aspect, this disclosure provides the use of a vaccine composition for the manufacture of a medicament for immunizing a queen bee or passing immunity from a queen bee to bee larvae produced by the queen bee against a non-disease causing bacterial disease, wherein the vaccine composition comprises an effective amount of whole cells or antigenic cell wall fragments of a dead, non-disease causing bacterial species, wherein the medicament is to be administered to the queen bee thereby immunizing the queen bee and the bee larvae produced by the queen bee, and wherein the non-disease causing bacterial disease is caused by *Melissococcus plutonius* and the dead non-disease causing bacterial species comprises *Paenibacillus sp*, or the non-disease causing bacterial disease is caused by *Paenibacillus larvae* and the dead non-disease causing bacterial species comprises *Melissococcus sp*.

[10b] In another aspect, this disclosure provides the use of an effective amount of a composition comprising a dead non-disease causing bacteria for the manufacture of a medicament for immunizing a bee larvae produced by a queen bee against Foulbrood disease, wherein the composition is to be administered to the queen bee, thereby immunizing the bee larvae produced by the queen bee, wherein the Foulbrood disease is caused by *Melissococcus plutonius* and the dead non-disease causing bacteria comprises *Paenibacillus sp*, or the Foulbrood disease is caused by

Paenibacillus larvae and the dead non-disease causing bacteria comprises *Melissococcus sp*.

[10c] In another aspect, this disclosure provides the use of a composition comprising whole cells or antigenic cell wall fragments of at least one dead, non-disease causing species of *Paenibacillus* for the manufacture of a medicament for preventing European foulbrood in a population of honeybees produced by a honeybee queen bee, wherein the composition is to be administered to the honeybee queen bee of the population, and wherein the European foulbrood is caused by *Melissococcus plutonius* and the dead non-disease causing bacterial species comprises *Paenibacillus sp*.

[10d] In another aspect, this disclosure provides the use of a composition comprising whole cells or antigenic cell wall fragments of at least one dead, non-disease causing species of *Melissococcus* for the manufacture of a medicament for preventing American foulbrood in a population of honeybees produced by a queen bee, wherein the composition is to be administered to the queen bee of the population, wherein the American foulbrood is caused by *Paenibacillus larvae* and the dead non-disease causing species is *Melissococcus sp.*.

[10e] In another aspect, this disclosure provides a method for preparing a vaccine for an insect or other invertebrate, the method comprising isolating whole cells or antigenic cell wall fragments from at least one dead *Melissococcus plutonius*.

[10f] In another aspect, this disclosure provides a vaccine composition prepared by a method as described herein.

[10g] In another aspect, this disclosure provides a kit comprising the vaccine composition described herein, and instructions for use.

[11] In one aspect, the bacterial species in the vaccine is non-disease causing bacterial species. In one aspect, the vaccine composition comprise a non-disease causing bacterial species and comprises whole cells or cell wall fragments of at least one dead non-disease causing bacterial species. In another aspect, the vaccine composition can comprise dead *Melissococcus plutonius* and dead *Paenibacillus sp.* In one embodiment, the composition also can contain, for example, invertebrate, insect, bee or honeybee feed.

[12] Further, the disclosure relates to generally immunizing invertebrates to protect against disease by using non-disease causing bacteria. In further embodiments, the honeybee as disclosed herein can be substituted with any other insect or invertebrate. In some embodiments, the insect is a social insect.

[13] The disclosure also provides a vaccine composition comprising *Melissococcus plutonius* bacteria that is useful to immunize invertebrates to protect against disease by non-*Melissococus plutonius* bacterial disease causing bacteria. In one aspect, the vaccine composition comprise a non-disease causing bacterial species and comprises whole cells or cell wall fragments. The composition also can contain, for example, invertebrate, insect or honeybee feed. In further embodiments, the honeybee as disclosed herein can be substituted with any other insect or invertebrate. In some embodiments, the insect is a social insect.

WHAT IS CLAIMED IS:

1. Use of a vaccine composition for the manufacture of a medicament for immunizing a queen bee or passing immunity from a queen bee to bee larvae produced by the queen bee against a non-disease causing bacterial disease, wherein the vaccine composition comprises an effective amount of whole cells or antigenic cell wall fragments of a dead, non-disease causing bacterial species, wherein the medicament is to be administered to the queen bee thereby immunizing the queen bee and the bee larvae produced by the queen bee, and wherein the non-disease causing bacterial disease is caused by *Melissococcus plutonius* and the dead non-disease causing bacterial species comprises *Paenibacillus sp*, or the non-disease causing bacterial disease is caused by *Paenibacillus larvae* and the dead non-disease causing bacterial species comprises *Melissococcus sp*.

2. The use of claim 1, wherein the queen bee is a honeybee queen bee and the bee larvae are honeybee larvae produced by the honeybee queen bee.

3. The use of claim 1 or 2, wherein the vaccine composition further comprises whole cells or antigenic cell wall fragments of at least one dead bacterial species selected from *Melissococcus plutonius, Paenibacillus larvae, Paenibacillus alvei Paenibacillus dentritiformis*, or a combination thereof.

4. The use of claim 1 or 2, wherein when the dead non-disease causing bacterial species comprises *Paenibacillus sp*, the dead, non-disease causing bacterial species is selected from the group consisting of *Paenibacillus alvei*, *Paenibacillus dentritiformis, Paenibacillus amylolyticus*, *Paenibacillus campinasensis*, *Paenibacillus chondroitinus*, *Paenibacillus chungangensis*, *Paenibacillus doosanensis*, *Paenibacillus glucanolyticus*, *Paenibacillus humicus*, *Paenibacillus lactis*, *Paenibacillus lautus*, *Paenibacillus lentimorbus*, *Paenibacillus maceran*, *Paenibacillus macerans*-like, *Paenibacillus macquariensis*, *Paenibacillus motobuensis*, *Paenibacillus pabuli*, *Paenibacillus phoenicis*, *Paenibacillus polymyxa*, *Paenibacillus popilliae*, *Paenibacillus puldeungensis*, *Paenibacillus residui*, *Paenibacillus stellife*, *Paenibacillus thiaminolyticus*, *Paenibacillus validus*, *Paenibacillus xylanisolvens*, or a combination thereof.

5. The use of claim 1 or 2, wherein the non-disease causing bacterial disease is caused by *Paenibacillus larvae* and the dead, non-disease causing bacterial species comprises *Melissococcus plutonius.*

6. The use of any one of claims 1-5, wherein the vaccine composition comprises from 1.5 $x10^5$ to 2.0 $x10^{10}$ antigen units of whole cells or antigenic cell wall fragments per dose.

7. Use of an effective amount of a composition comprising a dead non-disease causing bacteria for the manufacture of a medicament for immunizing a bee larvae produced by a queen bee against Foulbrood disease, wherein the composition is to be administered to the queen bee, thereby immunizing the bee larvae produced by the queen bee, wherein the Foulbrood disease is caused by *Melissococcus plutonius* and the dead non-disease causing bacteria comprises *Paenibacillus sp*, or the Foulbrood disease is caused by *Paenibacillus larvae* and the dead non-disease causing bacteria comprises *Melissococcus sp*.

8. The use of claim 7, wherein the queen bee is a honeybee queen.

9. The use of claim 7 or 8, wherein the Foulbrood disease is caused by *Melissococcus plutonius*, wherein the Foulbrood disease is European Foulbrood caused by *Melissococcus plutonius* and the dead non-disease causing bacteria comprises *Paenibacillus sp*, or the Foulbrood disease is American Foulbrood and is caused by *Paenibacillus larvae* and the dead non-disease causing bacteria comprises *Melissococcus sp.*

10. Use of a composition comprising whole cells or antigenic cell wall fragments of at least one dead, non-disease causing species of *Paenibacillus* for the manufacture of a medicament for preventing European foulbrood in a population of honeybees produced by a honeybee queen bee, wherein the composition is to be administered to the honeybee queen bee of the population, and wherein the European foulbrood is caused by *Melissococcus plutonius* and the dead non-disease causing bacterial species comprises *Paenibacillus sp*.

11. The use of claim 10, wherein the dead non-disease species of *Paenibacillus* and from the group of *Paenibacillus alvei*, *Paenibacillus dentritiformis, Paenibacillus amylolyticus*, *Paenibacillus campinasensis*, *Paenibacillus chondroitinus*, *Paenibacillus chungangensis*, *Paenibacillus doosanensis*, *Paenibacillus glucanolyticus*, *Paenibacillus humicus*, *Paenibacillus*

lactis, *Paenibacillus lautus*, *Paenibacillus lentimorbus*, *Paenibacillus maceran*, *Paenibacillus macerans*-like, *Paenibacillus macquariensis*, *Paenibacillus motobuensis*, *Paenibacillus pabuli*, *Paenibacillus phoenicis*, *Paenibacillus polymyxa*, *Paenibacillus popilliae*, *Paenibacillus puldeungensis*, *Paenibacillus residui*, *Paenibacillus stellife*, *Paenibacillus thiaminolyticus*, *Paenibacillus validus*, *Paenibacillus xylanisolvens*, or a combination thereof.

12. The use of claim 11, wherein the dead non-disease species of *Paenibacillus* are from the group of: *Paenibacillus alvei, Paenibacillus dentritiformis*, and *Paenibacillus larvae* or a combination thereof.

13. Use of a composition comprising whole cells or antigenic cell wall fragments of at least one dead, non-disease causing species of *Melissococcus* for the manufacture of a medicament for preventing American foulbrood in a population of honeybees produced by a queen bee, wherein the composition is to be administered to the queen bee of the population, wherein the American foulbrood is caused by *Paenibacillus larvae* and the dead non-disease causing species is *Melissococcus sp.*.

14. The use of claim 13, wherein the dead non-disease causing species is *Melissococcus plutonius*.

15. The use of any one of claims 1 to 14, wherein the administering comprises feeding the queen bee a wafer of queen candy comprising from 1.5 $x10^5$ to 2.0 $x10^{10}$ antigen units per dose of at least one dead non-disease species or fragments thereof.

16. A method for preparing a vaccine for an insect or other invertebrate, the method comprising isolating whole cells or antigenic cell wall fragments from at least one dead *Melissococcus plutonius*.

17. The method of claim 16, further comprising admixing the isolated antigen units with an insect or other invertebrate food, such as a queen bee wafer, optionally wherein the method further comprises formulating the isolated whole cells or antigenic cell wall fragments to provide from 1.5 $x10^5$ to 2.0$x10^{10}$ antigen units per dose.

18. A vaccine composition prepared by a method of claim 16 or 17.

19. A kit comprising the vaccine composition of claim 18, and instructions for use.