Appendix 1: Number of researchers who were contacted and who replied in the different regions of the world

Continent	Number of researchers contacted	Number of replies
Africa (Ghana, Kenya, South Africa)	13 (7.6 %)	6 (3.5 %)
Asia (China, Japan, Singapore)	6 (3.5 %)	3 (1.8 %)
Australia (Australia & New Zealand)	4 (2.4 %)	2 (1.2 %)
Europe (Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Spain, Sweden, Switzerland, UK)	87 (51.2 %)	33 (19.4 %)
North America (Canada, USA)	53 (31.2 %)	18 (10.6 %)
South America (Argentina, Brazil, Venezuela)	7 (4.1 %)	4 (2.4 %)
Total	170 (100 %)	66 (38.8 %)

Appendix II. List of questions after first merging. Please note that they are grouped according to preliminary categories

Conservation

1. What legal conservation measures, policy requirements and adaptation of existing agri-environmental funding schemes are needed?
2. How can current land use practices be modified to adequately conserve sufficient pollination services and pollinator diversity in a long term sustainable way?
3. How can we best monitor and document the status, threat and pressures on pollinators including secondary effects on plants and on biodiversity as a whole (interdependencies with threatened plants, red data books, monitoring changes e.g. as result of land use and climate change, pinpointing indicator pollinator species etc).?
4. How important is the richness, diversity and composition of pollinators for plant reproduction (role of generalists, specialists, key pollinators) and plant biodiversity?
5. To what extent is a functional replacement of different species of pollinators possible?
6. To what extent and how does habitat fragmentation, deterioration and habitat loss result in reductions in pollinator diversity, abundance, activity, changes in population structure and genetic diversity and thus in reduced plant sexual reproductive output, fruit-, seed set and dispersal, and which threats result from it?
7. What is the influence of non-native or invasive plant and pollinator species on natural systems and native plant-pollinator interactions?
8. What essential land-management and conservation measures and steps are needed to halt and reverse pollinator decline and stabilize and sustain viable pollinator-plant interactions?
9. How to ensure adequate priorisation, sufficient action and implementation (e.g. Biodiversity action plans, managing protected areas as source populations, necessary changes in agroecosystems, risk management)?

Drivers of pollinator loss

10. Which pollinator taxa are in decline, and what is rate of decline?
11. What are the drivers of pollinator decline, what is their relative importance, how do they interact, and how do they vary in space and time?
12. Do drivers of pollinator decline also drive loss of pollination services and, if so, what is rate and shape of change?
13. Habitat loss, fragmentation and degradation: what are the impacts of direct habitat loss (loss of forage, mating and nesting sites) on pollinator diversity, abundance, behaviour and pollination services?
14. Specifically, what are impacts of forest loss, overgrazing, land abandonment and urbanisation?
15. What are the impacts of invasive species, including managed bees (including *Apis, Bombus, Megachilidae, Meliponini*), introduced pests and diseases, and invasive plants, on native pollinators?
16. What are the indirect consequences of invasive plants on native plant communities - do they compete with native plants for pollination?
17. How do impacts vary spatially and temporally?
18. How will climate change affect spatial and temporal dynamics of plant-pollinator interactions?
19. Can modelling be used to predict direct and indirect impacts on plants and pollinators?
20. What are the lethal and sublethal impacts of agri-chemicals including insecticides (including neonicotinoids), herbicides and fertilizers on pollinators?
21. Are there synergistic impacts when chemicals are mixed?
22. What are the impacts of GMOs on pollinators?
23. What are the impacts of wind power plants (wind farms) & electromagnetic fields on pollinators?

24. When quantifying drivers of decline, how do we scale up from field scale pair wise interactions to assess impacts on entire networks at the landscape scale?
25. How can we reverse pollinator decline?

Status and trends of global pollinators

26. How widespread are pollinator declines?
27. Which species, taxa or functional groups are most at risk and where?
28. How can we set up a global programme to monitor managed and wild pollinators?
29. Are pollinators good indicators of wider biodiversity and ecosystem function?
30. Do managed and wild pollinators compete of the same resources and have negative impacts on each other?

Geographical trends in pollinator diversity

31. How does the diversity of pollinators vary geographically at the level of species and functional groups?
32. What is the relationship between pollinator diversity and plant diversity?
33. What are the geographical patterns of pollinator decline, in relation to anthropogenic influences such as agricultural intensification?
34. How will current geographical patterns of diversity change in the future in relation to global climate change?
35. How and why does plant and pollinator specialisation, ecological redundancy, and other network characteristics vary geographically and what are the consequences for geographically isolated biotas, e.g. oceanic islands?
36. How is the continuing worldwide spread of honeybees affecting plant-pollinator assemblages in different parts of the world?
37. How can we standardise our assessments of pollinator diversity in different parts of the world?
38. What are the geographic units of functional relevance to pollinator diversity, e.g. local, landscape, regional, continental?
39. At what scale is the biotic homogenisation of pollinator biotas observed in Europe occurring?
40. How will political drivers such as the Common Agricultural Policy and environmental drivers such as global climate change affect the type of crops grown in a region and what are the consequences for availability of necessary wild pollinators?
41. How useful are pollination syndromes in different parts of the world?
42. How common are geographical mosaics of plant-pollinator interactions?

The breadth and depth of our current understanding of plant-pollinator assemblages

43. What are the knock-on effects of changes in plant-pollinator assemblages on other species within the same ecological communities?
44. What is the relationship, if any, between genetic diversity within pollinator populations and genetic diversity within the plant populations they service?
45. What is the relationship between pollinator diversity and abundance and plant breeding systems (self compatibility, etc.) at the community level?
46. To what extent are local plant communities dependent upon pollinators?
47. What proportion of the world's flora have pollinations systems that make their reproduction tightly linked to the fate of one or a few pollinators?
48. How frequent is co-evolution in plant-pollinator assemblages?
49. How frequently are local pollinators adapted to local plants and vice versa?
50. How commonly to plants compete for, or facilitate, pollinator services and how important/frequent is pollinator limitation?
51. How commonly do pollinators compete for floral resources and is food limitation common?

52. To what extent does the community context a plant finds itself in affect the diversity and effectiveness of its pollinators?
53. What is the contribution of pollinators to speciation in plants, in terms of reproductive isolation, hybridisation, etc?
54. How do colour and scent interact for floral advertisement?
55. What is the balance between male and female fitness in the evolution of floral traits?
56. What are the proximate and evolutionary determinants of pollination system specialisation or generalisation?
57. What proportion of pollination is undertaken by the different functional groups of pollinators in a community and how does this influence agricultural pollination?
58. How do honeybees impact on other pollinators and plant reproductive success?
59. To what extent are pollinator life cycles synchronised to the phenologies of their forage plants?
60. How resilient are assemblages to environmental change?
61. What ecological and evolutionary processes determine the structure of interactions in an interacting network and how do exotic species affect this structure?
62. Is the composition of pollinator species at the community level a consequence of plant species composition (taxonomy), climatic regime (seasonality) and/or vegetation structure?

Pollination and ecosystem services

63. What are the most important pollinators of different crops and wild flowers?
64. How widespread are pollination deficits in crops and wild flowers?
65. What is the relationship between pollinator diversity and the delivery of pollination services?
66. What is the economic value of pollination services for different crops and in different regions and how stable is this under environmental change?
67. How important is pollination to human nutrition and health through the provision of food and micro-nutrients (e.g. vitamin C)?
68. How will we supply the growing demand from agriculture for pollination services?
69. What is the role of pollination in global food security?
70. In addition to pollination of plants, what other ecosystem services would be impacted by the loss of pollinators?
71. Managing pollination services
72. How can we best manage agro-ecosystems to ensure sustainable provision of pollination services for wild pollinators?
73. How do we match the right pollinators to the right crops?
74. When do we need to use managed pollinators, such as honeybees, when wild pollinators cannot do the job?
75. What alternative species of pollinators can we manage for pollinations services?
76. How can honey beekeepers, and providers of other pollinators, be paid for delivering this ecosystem service?
77. How can the potentially conflicting demands of pollinator diversity conservation and crop pollination be reconciled?
78. How can we protect our managed pollinators form the threats of new diseases?

Pollinators and technological development

79. What are the lethal and sub-lethal effects of pesticides on pollinators?
80. Are there risks of GMOs to pollinators, their interactions with plants and the genetic integrity of taxonomically related plant species?
81. Are consequences of bio energy production for pollinators different from mere agricultural intensification?
82. How can pollinator/pollination technology be applied as biocontrol of agricultural crop pests and diseases?

Pollinator taxonomy

83. How do we solve the taxonomic impediment, e.g. by building a greater taxonomic capacity, developing automated identification tools and make keys easily accessible?
84. Which genes are useful to evaluate inter- and intraspecific diversity?
85. What are the ecological, social and economic impacts resulting from an inability to identify and manage pollinators?
86. How does pollinator phylogeny and biogeography compare with that of the plants they pollinate?
87. Why are some pollinator taxa largely oligolectic while others are mostly polylectic and which ecosystems have a higher degree of one or the other?
88. What determines pollinator species diversity patterns in different parts of the world?
89. How many species of bees have been described and where are new species to describe?

Pollinator behaviour

90. What is the pattern of movement of pollinators across landscapes, how is it influenced, and how does it affect pollen dispersal, gene flow, pollination, and male plant reproductive success?
91. What do spatial and temporal variations look like at the level of entire plant-pollinator communities, i.e., what turnover is there in space and time in the associations of specific plants and pollinators?
92. To what extent are pollinator preferences driven by learned or innate behaviour in different pollinator species (groups)?
93. What factors determine the foraging choices (floral choices, floral constancy or change of forage plants) and behaviour of pollinators, to what extent do these approximate optimal choices, and how do they influence their effectiveness or floral isolation?
94. How and to what extent do pollinator species differ from one another in their cognitive abilities (colour vision, olfactory sensibility, learning speed, accuracy, or capacity, etc.) and how do such differences vary in space and time thereby affecting the evolution of floral traits, mediated through consequent behavioural differences?
95. How and at which distances do chemical, olfactory, visual and tactile characteristics of pollen, nectar (including 'secondary compounds') and flowers influence host-plant choices of pollinators and thereby floral signal evolution?
96. How much legitimate, viable pollen is transferred to flowers and how much is used for the nutrition/reproduction of the pollinator?
97. How does competition for pollination influence patterns of gene dispersal?
98. What are the interactions between different pollinator species?
99. How do plants of different species interact via pollinators used in common, what are the effects of different spatial and temporal scales on the sign of the interaction, and what mechanisms explain whether the interaction is positive or negative?

Abiotic pollination

100. How many zoophilous plant species have cryptic or partial wind pollination?
101. When, where and how did evolutionary shifts from abiotic to biotic pollination systems and vice versa occur?
102. What are the biophysical mechanisms involved in abiotic pollination?
103. What are the relative proportions of biotic vs. abiotic pollination services in crop and wild plants and what are the consequences for fitness, crop production and quality?
104. Methodology in pollination
105. Can we develop more efficient techniques for assessing differences among pollinator species in their effectiveness as pollinators for given plants?
106. What are the best methods for assessing the sizes of pollinator populations?

107. What are the best methods for assessing the pattern of movement of pollinators and pollen across landscapes?
108. Can we develop more efficient methods to understand the fate of pollen grains picked up by pollinators?

Pollen and stigma biology

109. How to asses pollen viability and stigma receptivity under field conditions?
110. What is the effect of climate change on pollen and stigma biology?
111. Does pollen limitation affect plant speciation rates and how?
112. What are key factors driving pollen viability in natural populations and what are their implications for pollen-collecting pollinators?
113. Is the lifespan of pollen grains short enough that pollinators frequently deliver appreciable quantities of inviable grains?
114. How often is “stigma clogging” an important effect in nature?
115. Can we develop more efficient methods to understand the fate of pollen grains picked up by pollinators?

Plant sexual reproduction

116. What role does coevolution play in plant diversification?
117. How many plant species are capable of autonomous pollination – and what are the consequences regarding inbreeding depression and population viability?
118. How many pollen of a plant are viable?
119. What ecological and genetic factors are responsible for maintaining floral polymorphisms?
120. Is male reproductive success always more variable than female RS?
121. What factors result in the shifts from animal-pollinated to wind-pollinated?
122. Environmental effects on pollination
123. How can we better control and integrate environmental effects in "natural experiments" on pollination?
124. What biological factors contribute to the topological features of pollination networks, and how?
125. By what mechanisms do different species of pollinators that overlap in use of floral resources coexist?
126. What are the effects of population size and density on pollination success and how important is competition vs. facilitation?
127. How do pollinator population fluctuations affect pollination?
128. Does pollution (e.g. nitrogen) with consequent alteration of vegetation affect pollinators and what measures should be adopt to mitigate the problem?
129. How does drought affect pollinator diversity?
130. What factors, both abiotic and biotic, influence the quantity and quality of pollen that is moved among individuals in a plant population, above and beyond the activities of animal pollinators or of wind or other abiotic dispersers of pollen—i.e., what else influences the “pollen environment” of a population?

Interactions of plants, pollinators and floral herbivores

131. What is the relative importance of abiotic vs. biotic selection factors in the evolution of floral traits and mating system? Of biotic factors, what is the relative importance of selection by mutualists (pollinators) vs. antagonists (florivores, nectar robbers, pathogens, seed predators, pollinating herbivores)?
    a. Under what conditions do pollinators and floral antagonists exert conflicting vs. reinforcing selection for floral traits?
    b. How do floral antagonists affect inbreeding or mating system in plant populations?

   c. How does a geographic mosaic shape the evolution of floral traits and mating system in response to floral visitors?

132. How does community context alter the outcome of floral interactions with pollinators and antagonists?
   a. What are the direct and indirect effects of floral antagonists and pollinators on plant lifetime reproduction?
   b. How much does the community of pollinators and floral antagonists vary geographically?
   c. How does such variation shape the strength and outcome of interactions?
   d. Will including floral antagonists alter our understanding of pollination networks?
   e. How do floral antagonists affect interactions with other floral antagonists as well as pollinators?
   f. How does visitor resource use (i.e. consuming pollen, nectar, or floral tissue) structure interactions between plants, floral antagonists and pollinators?
   g. How does community context affect pollinator behaviour and performance? What is the relative role of top down vs. bottom up factors for pollinator performance?
133. How do floral traits mediate interactions with pollinators and floral antagonists, and how do pollinators and floral antagonists alter these traits?
   a. What is the relative role of scent, display, colour, morphology, floral longevity, and defence and reward traits (including chemical defences in both nectar and pollen) mediating interactions with floral mutualists and antagonists?
   b. How does resource use (consumption of nectar, pollen, or floral tissue) determine which traits are important for floral visitors?
   c. How are floral traits, including floral scent and nectar, pollen, and corolla chemistry, induced in response to leaf and floral damage?
   d. What levels and timing of damage cause induction?
134. How do pathogens transmitted at flowers affect population dynamics and evolution of plants and pollinators?
   a. To what extent are plants exposed to pathogens via floral organs, and do floral traits affect the frequency of transmission or resistance to infection?
   b. How have pathogens transmitted via flowers affected the evolution of mating system and floral traits including floral longevity, nectar composition, pigmentation, scent, and stigma chemistry and structure?
   c. How frequently are gut pathogens of bees transmitted horizontally at flowers, what are the effects of such pathogens on bee population dynamics, and do floral traits affect the frequency of transmission and infection?
135. Implementation of pollination (education, capacity building, networking, policy support)
136. How can work in the EU and other countries on pollinators best be supported, priorities set and the necessary funds raised in order to promote strategic networking of pollination services in an integrated and interdisciplinary broad band approach?
137. How can we effectively communicate and raise awareness for the coming generations about pollinators and pollination services to policy makers and the general public?
138. What kinds of training and capacities (financing, jobs etc.) for taxonomists, pollination ecologists and students as well as broader educational efforts (training materials, web keys for pollinators, pollen keys, pollination in schools, information centres etc.) are needed to protect the diversity of pollinators and their food plants?
139. How can we best systematically close the enormous knowledge gaps on pollination of crops and other wild plants, focussing not only on bees, but on all pollinator groups?
140. How do we increase the knowledge and best evaluate the economic value of pollinators and built the capacities at all levels for actively managing pollination services in farming and gardening, agriculture and forestry?

Evolution of pollination

141. What roles do pollinators play in selecting for divergence in floral phenotype, and for changes in reproductive isolation between populations of flowering plants, or between subsets of the same population; i.e., what roles do they play in the components of plant speciation?
142. How and why does pollination system specialization evolve and what are the influencing factors?
143. How real are pollination syndromes and can we predict pollinators from floral traits (including morphology, colour, and chemistry)?
144. How do evolutionary shifts between pollination systems come about? (e.g. Was Stebbins right about there always being intermediate phase with both old and new pollinators? What general mechanisms or conditions promote pollinator shifts?)
145. How do apparent positive correlations frequently emerge between floral specialization and species diversity within a clade?
146. When a plant population is visited by a mixture of pollinator species and its composition varies in space and time, as has been frequently observed, then how is it possible for the plant to evolve apparent "pollination syndromes" (= suites of floral traits that seem to enhance pollination by a specific type of pollinators)?
147. What are the ultimate factors determining taxonomic diversity of visitors to a plant species, that is, why some plants are visited by various pollinator species, whereas the others are visited by one or a few species?
148. How is floral diversity generated, or why are there so many kinds of flowers?
149. How is the continuing spread of honeybees worldwide affecting community-wide and continent-wide selection on floral traits?