Beekeeping and colony losses in Saudi Arabia

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Introduction

- The global population of managed honey bee hives has increased steadily during the last half century (Figure A) [1]
- However, managed honey bee colonies have declined in the US and in Europe during the last few decades.[2,3,4,5]

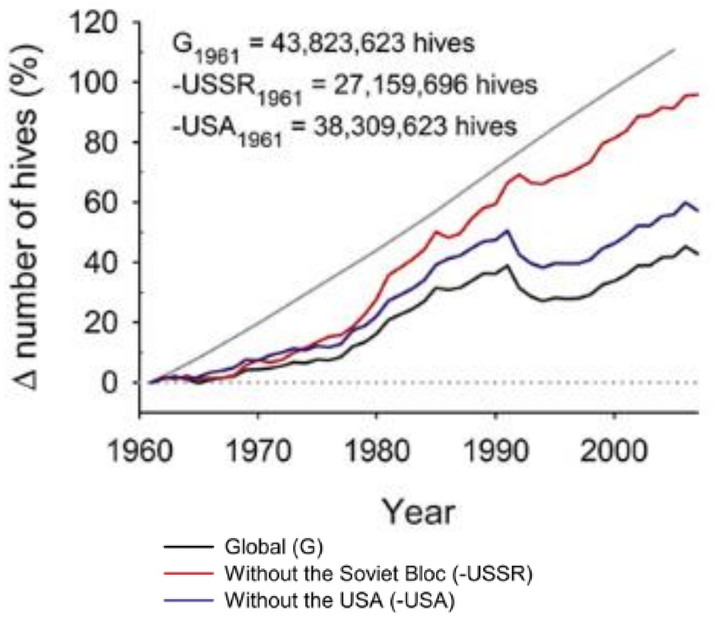

Figure A: Estimated number of bee hives 1960-2010[1]

Factors responsible for colony loss in Europe

- Underlying causes are poorly understood, but believed to be the results of multiple factors, including:[5]
  - Harsh winter
  - Varroa mite
  - Queen problems
  - Treatment of Varroa
  - Pesticides used on crops
  - Colony Collapse Disorder (CCD).

Factors responsible for colony loss in the US

- Though harsh weather has not been identified as a factor for colony loss in the US, there are some common factors in Europe and the US (Figure B).[2]

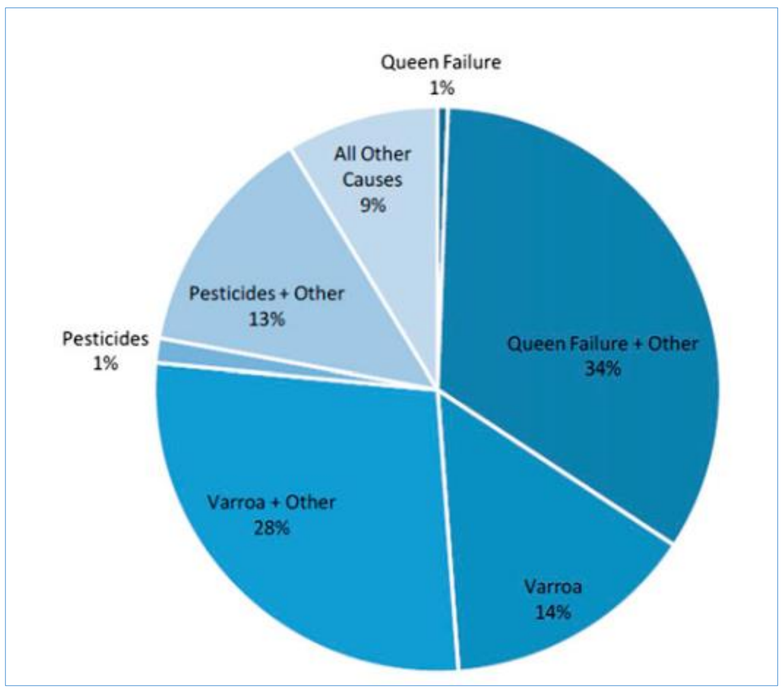

Figure B: Estimated number of colonies lost due to each commonly self-reported colony health risk factor in the US[2]

Figure C: *Apis mellifera jemenitica*[8]

Beekeeping in Saudi Arabia

- Beekeeping in Saudi Arabia is a growing industry[6]
- Estimated 4000 beekeepers and 700,000 bee hives[7]
- Produce 3500 tons of honey per year[7]
- Main (indigenous) honey bee race is *Apis mellifera jemenitica (Figure C)* [7,8]
- Imported honey bee race is *Apis mellifera carnica* (Figure D)
- Indigenous race is more tolerant and well adapted to the environmental conditions of Saudi Arabia[7]
- Beekeepers often migrate from one area to another to adjust environmental conditions and to improve foraging capacity (Figure E). [6,8]
- Suitable beehive type (insulated cover box, thermoregulatory beehive, etc.) can save honey bees in the hot season (Figures F, G).[6,7,9]

Figure E: Migratory beekeeping in Saudi Arabia[8]

Factors related to colony loss in Saudi Arabia

- A number of pests, including the Varroa mite (Figure H)[6]
- Harsh weather[6,8]
  - Low erratic rainfall
  - Long dry period
  - High temperature and low humidity
- Little knowledge of CCD, but there is some study of losses generally.

Gap in knowledge about beekeeping and losses in Saudi Arabia

- National level colony loss data is limited
- There is a lack of standardized survey methods to estimate colony loss and study associated risk factors in Saudi Arabia.

Aim of this work

- Review beekeeping in Saudi Arabia
- Adapt COLOSS (www.coloss.org) questionnaire to estimate national level colony loss in Saudi Arabia and field test it
- Plan and implement a beekeeper survey
- Analyse data and identify factors contributing to colony loss.

Figure D: *Apis mellifera carnica*

Work so far

- Studying background to beekeeping in Saudi Arabia and colony loss generally
- Familiarisation with questionnaire programs
- Establishing contacts with
  - Local beekeepers and
  - Beekeeping associations in Saudi Arabia
- Translating the COLOSS questionnaire into Arabic
- Carrying out some small scale pilot work to gather information for use in planning
- The next steps will involve planning and implementation of a first survey in Saudi Arabia, in collaboration with COLOSS colleagues in nearby hot countries.

Figure F: Traditional beekeeping in Saudi Arabia[7]

Figure G: Box hives in permanent apiaries[6]

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Figure H: Varroa mites on a honey bee