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A first aproximation for prediction of bloom phenology of *Quillaja saponaria* (quillay), a Chilean native species of beekeeping interest.

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Abstract: Nowadays, the temporal regularity of bloom phenology of Chilean native species of interest in beekeeping has been affected by abiotic stress situations such as extemporaneous rainfall and irregular temperature. A predictive system for diverse blooming states of these species, it would reduce significantly the uncertainty of beekeepers, which will use this information to optimize their production decisions such as disease control and hive development in specific periods.

Here, we present a first approach for prediction of bloom phenology of *Quillaja saponaria*, a native Chilean tree commonly exploited by beekeepers. The system considers three states, the beginning of flowering, peak flowering, and terminal state.

Artificial Neural Networks (ANNs) coupled with Genetic Algorithms (GA) were trained with historical information of three farms of honey production in central area of Chile. The data gathered includes: i) Meteorological data such as temperature, humidity, radiation, and precipitations, and ii) blooming records of previous seasons in the studied areas, sampled weekly considering the previously defined three blooming states. Genetic algorithms were used to adjust the initial training parameters of the ANNs.

The results are quite promising. The predictive models exhibited average errors lower than 7 days in most of the evaluated situations, measured using Root Mean Square Error in each case. This is similar to the sampling frequency of blooming stages on the historical records, which validates the quality of the obtained predictions.

Conflicts of Interest

The authors declare no conflict of interest.

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