

## Pollinator Conservation

by  
Merry Johnson

Pollinator . . . with this word a mental image of a honey bee generally appears in one's mind, but who would imagine that the population of these incredibly beneficial insects is decreasing at an extremely alarming rate?1 In Arizona, feral honey bee losses have increased sixty-one percent in one year.2 Sacramento, California has experienced a seventy-five percent decrease in the number of feral honey bee colonies.3 The introduction of exotic parasites and diseases, the extensive use of herbicides and insecticides, the loss of plant diversity, the cultivation of monocultures, and the development of land for human occupation are a few of the most influential factors in this astounding honey bee decline.4

The blame for a major portion of honey bee decrease can be placed on introduced parasites.5 Varroa and tracheal mites have been responsible for the death of up to ninety percent of feral honey bees.6 Since these mites were introduced to North America in the 1980s, they have created havoc in honey bee colonies.7 When the pin-sized varroa mite attacks a bee, it attaches itself and sucks the bee's hemolymph fluid,8 which causes adults to be badly deformed and sometimes results in death.9 They also feed on developing honey bees and lay eggs inside the brood cells.10 The varroa mite can destroy an entire honey bee colony in only a few seasons.11 The tracheal mite is perhaps an even more serious pest than the varroa mite.12 Tracheal mites infest the bee's trachea in which they lay eggs.13 These microscopic invaders are capable of killing a whole colony before an infestation is even detected.14 The best method to rid a colony of mites is the utilization of an effective, safe miticide15 such as fluvalinate for

varroa mites<sup>16</sup> or menthol crystals for tracheal mites.<sup>17</sup> Such treatments have saved many domestic honey bee colonies,<sup>18</sup> but unfortunately there is no way to detect and treat feral honey bees and as a result many continue to perish.<sup>19</sup>

Diseases prove to play an active role in honey bee population decreases.<sup>20</sup> The American foulbrood is a serious bacterial disease that destroys honey bee larvae and pupae.<sup>21</sup> A bee colony should be treated with an antibiotic every spring for this disease.<sup>22</sup> There is no cure for American foulbrood.<sup>23</sup> If the colony is ever infected, it must be burned<sup>24</sup> because sleeping cells can remain intact for up to seventy years.<sup>25</sup> The European foulbrood shares many of the same symptoms,<sup>26</sup> but this disease is treatable with antibiotics and the hive does not have to be destroyed.<sup>27</sup>

Also, honey bee population is seriously suffering from herbicide and insecticide use.<sup>28</sup> Presently, there are over fifty common pesticides on the market that are toxic to honey bees.<sup>29</sup> Every year since 1971, the amount of pesticides produced and sold has increased.<sup>30</sup> This increase has had a devastating effect on honey bees because more deadly pesticides are patented each year.<sup>31</sup> Cotton spray continues to be especially lethal.<sup>32</sup> In Arizona, before this pesticide program was used, there were 110,000 honey bee colonies; but, in seven short years, only 53,000 were located.<sup>33</sup> California reports the heaviest loss of 62,500 colonies per year.<sup>34</sup> These negative effects may be reduced by the utilization of nontoxic, synthetic pesticides,<sup>35</sup> the elimination of repeated applications of high dosage, broad spectrum pesticides,<sup>36</sup> the ground application of pesticide instead of aerial,<sup>37</sup> and the use of combinations of diluted pesticides.<sup>38</sup> Spraying at night reduces danger to foraging worker bees.<sup>39</sup> Nonchemical control is also a

viable way to control pests. The following are all very successful ways to control insect pests without harming honey bees:<sup>40</sup> insect attractants and repellents,<sup>41</sup> insect pathogens and predators, traps,<sup>42</sup> insect-resistant plants,<sup>43</sup> the manipulation of planting and harvest dates,<sup>44</sup> as well as integrated pest management in which chemicals are used only after all other options have been exhausted.<sup>45</sup>

The loss of plant diversity and the cultivation of monocultures are two closely intertwined issues that are seriously affecting honey bee density.<sup>46</sup> Fragmentation of natural habitats creates a situation in which plants become spread far apart, separating them from their native pollinators; as a result, both plant and honey bee populations decrease.<sup>47</sup> The production of large monocultures, consisting of exotic crops, also assists in the plant diversity loss because bees are attracted away from native plants causing these plants to lose the majority of their vital pollination.<sup>48</sup> Many times, when honey bees are lured to monocultures, pesticides poison them.<sup>49</sup> Conservation of both native plants and honey bee populations are very closely related issues that must be quickly addressed in a unified fashion before any more ecological decline is experienced.<sup>50</sup>

Another factor in pollination conservation is that honey bee decline has also been negatively affected by the development of land for human occupation.<sup>51</sup> Urbanization consistently fragments land vital for honey bee survival, resulting in the invasion of diseases and parasites.<sup>52</sup> This fragmentation of honey bee habitat decreases pollinator density, separates them from their natural environment, and in general completely alters their surroundings.<sup>53</sup> Plant diversity also shrinks as a result of fragmentation and causes honey bees to lose their native nectar sources.<sup>54</sup> The most highly recommended way to combat fragmentation is the creation of

honey bee sanctuaries or pastures.<sup>55</sup> A bee sanctuary consists of an open, undisturbed meadow that has a wide variety of annual and perennial flowering plants which produce large quantities of nectar and pollen.<sup>56</sup> It is vital to select plants with different blooming dates so that the bees will be provided with adequate nectar throughout the season, but the sanctuary should never be in bloom at the same time as local crops as this could result in an ecological conflict between the sanctuary flowers and the crop for pollination rights.<sup>57</sup> It is advised that industrialization occupy no more than seventy-five percent of an agricultural landscape and the remaining twenty-five percent be left as a bee sanctuary.<sup>58</sup>

In conclusion, precautionary measures must be promptly utilized to counteract these disastrous trends that are producing such heavy honey bee population decline. Honey bees have always been of inestimable value to mankind,<sup>59</sup> and they must be conserved at all costs.

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