Why Varroa become a problem in late summer to early fall.

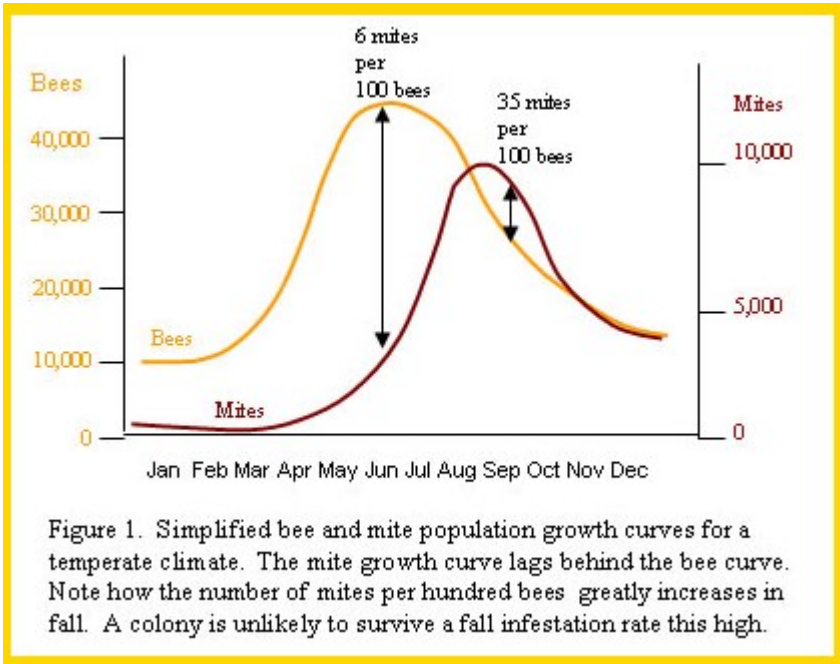

Figure 1. Simplified bee and mite population growth curves for a temperate climate. The mite growth curve lags behind the bee curve. Note how the number of mites per hundred bees greatly increases in fall. A colony is unlikely to survive a fall infestation rate this high.

Both the mite and bee population are at their lowest just before the first brood emerges in spring. The bee population climbs at a faster rate than the mite population until midsummer, when the bees start to slow down brood production. The mites get off to a slower start, and then hit their stride during drone rearing season in spring and summer. Note how the mite to bee infestation ratio climbs dramatically in August and September. When that occurs, the bees really feel the impact of Varroa—brood is stressed or dies, viruses run rampant, and the generation of bees that will form the winter cluster is weakened and vulnerable.

A key point to remember is that the relative infestation (percent, or mites per 100 bees) is more important than total mite population—a large colony can handle more mites than a small one. At much above a 2% infestation in spring, honey production drops off severely. At much above 5% in fall, colony winter survival suffers (although the fall "economic injury threshold" numbers by various authors range from 1% to 11%) (Currie & Gatien 2006).

Unchecked, varroa can really multiply! A 12-fold increase is typical in a short season consisting of 128 days of brood rearing (Martin 1998). However, its population can increase 100- to 300-fold if brood rearing is continuous! (Martin and Kemp 1997).

There are also major confounding factors. Some years, mite populations are low across the board (possibly due to hot, dry weather) and no treatment is required. In any apiary, there is usually huge colony-to-colony variation in mite levels, especially if one is using a variety of queen lines. If there is a reservoir of collapsing colonies nearby, mite invasion can make your best mite-fighting efforts moot. Finally, tracheal mites, nosema, viruses, and chemically contaminated combs can cause even relatively low mite levels to be fatal to the colony.