Update 04/22

1. Check how well model fits the data (lots of zeroes; mites are count data) and try using models with distributions that fit the data (zero-inflated, Poisson, negative binomial?); assess model fit to ensure we are using appropriate models.
2. Kathy also suggested log-transforming mites (and Nosema?) as a possible fix.
3. Kathy suggested including year as a fixed effect: added
4. Given that results seem similar whether sunflower is used as a continuous or categorical predictor, for the sake of efficiency I suggest using as continuous (sunflower acreage).

Results on the next page

1. Limiting to blooming month: log mites regression(added in state fixed effect)



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| OLS | Negative binomial | Poisson |

1. Limiting to blooming month: log nosema regression (added in state fixed effect)



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|  |  |  |
| OLS | Negative binomial | Poisson |

1. All month: mites regression (added in state fixed effect)



1. All month: nosema regression



1. Restricting analysis to only states that grow sunflower (above some minimum bar of acreage for the state), now that we have a larger sample size.

|  |  |  |
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| **1** | SD | 30422062 |
| **2** | ND | 30416667 |
| **3** | CA | 16559001 |
| **4** | NE | 10785600 |
| **5** | CO | 884700 |
| **6** | AZ | 800100 |
| **7** | MN | 423821.34 |
| **8** | MT | 409100 |
| **9** | OK | 319332.88 |
| **10** | TX | 261900 |
| **11** | MI | 214565.38 |
| **12** | NJ | 211500 |
| **13** | NY | 87300 |
| **14** | AL | 63900 |
| **15** | WI | 22236.24 |
| **16** | GA | 21600 |
| **17** | TN | 17100 |
| **18** | UT | 12236.98 |
| **19** | WY | 9000 |
| **20** | AR | 7200 |
| **21** | IL | 6300 |
| **22** | IN | 5400 |
| **23** | VA | 4500 |
| **24** | NC | 3600 |
| **25** | PA | 3600 |
| **26** | MD | 2700 |
| **27** | NH | 900 |
| **28** | OR | 900 |
| **29** | CT | 0 |
| **30** | DE | 0 |
| **31** | FL | 0 |
| **32** | IA | 0 |
| **33** | ID | 0 |
| **34** | KY | 0 |
| **35** | LA | 0 |
| **36** | MA | 0 |
| **37** | NM | 0 |
| **38** | NV | 0 |
| **39** | OH | 0 |
| **40** | SC | 0 |
| **41** | VT | 0 |
| **42** | WA | 0 |
| **43** | WV | 0 |



