

Redberry Mite Population Differences in Two *Rubus* spp. on California's Central Coast

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Abstract

Concern about redberry mites (RBM) (*Acalitus essigi* Hassan) has remained steady among blackberry (*Rubus* spp.) growers on California's central coast. Current spray recommendations are based on the plant's physiological stage of development as these visual cues are less perplexing than following the lifecycle and movement of RBM. This study compared RBM populations in two common blackberry cultivars, 'PrimeArk® 45' – a primocane fruiting cultivar - and 'Ouachita' – a floricanes fruiting cultivar - to understand seasonal activity of RBM and to determine possible effects of cane management on population densities. Wild *Rubus* spp. was added as an alternate floricanes in May 2015 as 'Ouachita' was taken out of production on December 2014. Initial samples of fruit, flowers, and vegetative buds from both cultivars in September and October 2014 indicated that RBM numbers on 'Ouachita' were 90% greater than those on 'PrimeArk® 45'. RBM was observed in 100% of the 'Ouachita' samples and in less than 10% of 'PrimeArk® 45' samples. A tape extraction method began in November 2014 and found RBM emerged from 53% of 'Ouachita' fruit and 3% of vegetative buds and from 6% of 'PrimeArk® 45' fruit and 16% of vegetative buds. RBM did not emerge from 'PrimeArk® 45' samples from January through May 2015, but was found on wild *Rubus* spp. in May. RBM emerged from 90% of wild *Rubus* spp. vegetative buds, 67% of flowers at the petal fall, and from 100% of green fruit sampled. RBM was present in greater numbers in both floricanes, than in 'PrimeArk® 45', a primocane. These results suggest that the absence of annual pruning in floricanes provides a stable habitat and allows RBM populations to build up over time. Conversely, the RBM lifecycle is interrupted with the annual mow down performed on primocane fruiting cultivars, thereby eliminating overwintering sites and reducing subsequent populations.



Figure 1. Wild *Rubus* spp., San Luis Obispo, CA.

Methods

- Fruit, flowers and vegetative buds were sampled from floricanes fruiting Ouachita in fall 2014 (Santa Maria, CA) and from primocane fruiting Prime Ark 45 in winter and spring 2015 (Santa Maria and San Luis Obispo, CA). Sampling of wild *Rubus* spp. began in May 2015 (San Luis Obispo, CA).
- The tape method was used to extract RBM to determine their presence and population density during the season.
- Samples were collected once a month and examined weekly for RBM

Data Collected

- Number of RBM extracted
- Presence of other mites and insects noted



Figure 2. Vegetative buds and flower buds set on tape on a glass panel collected from wild *Rubus* spp. Inset: photo of vegetative bud excised and fixed to glass panel.



Figure 3. Glass panels set on metal shelf and stored in a pop up bug tent.

Results

RBM Extracted

Redberry mites emerged from vegetative buds and developing fruits of 'Ouachita' and 'PrimeArk® 45' in fall 2014. Emergence was detected from vegetative buds, flowers at petal fall, and developing fruit of wild *Rubus* spp. in May, 2015.

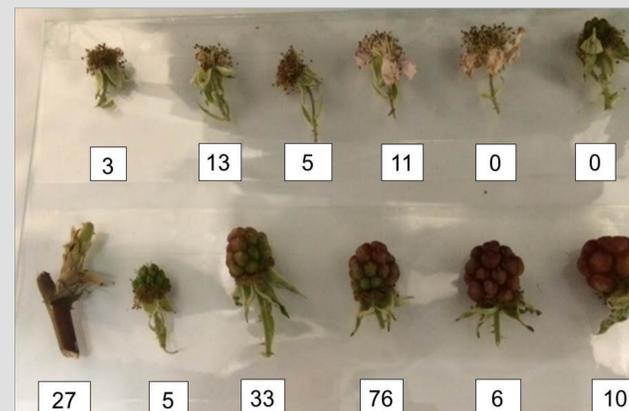


Figure 4. Number of RBM extracted from each fruit and flower at petal fall from wild *Rubus* spp. in May 2015.

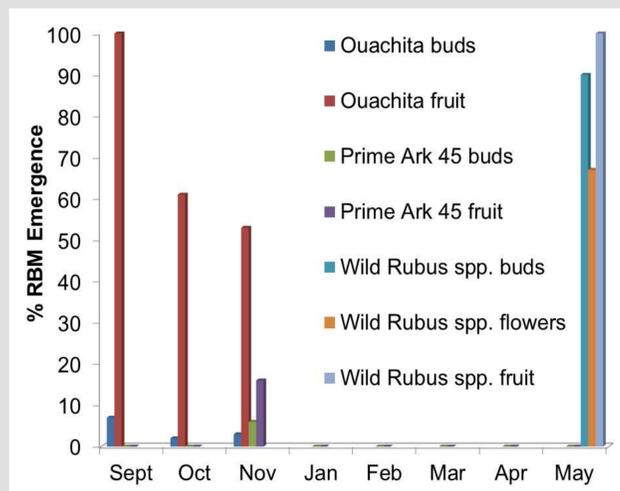


Figure 5. Percentage of vegetative buds, fruit and flowers of 'Ouachita' and 'Prime Ark® 45' with RBM present. Samples were not collected in December. Sampling of Prime Ark 45 resumed in January and no RBM was located from January through May. Wild *Rubus* spp. samples were collected in May and RBM was extracted from buds, flowers, and fruit.

Results

Table 1. Other mites and insects found on blackberry buds, fruit, and flowers.

Collection Date	Cultivar	Other Mites and Insects on Blackberry	
2014	Sept	'Ouachita'	Phytoseiids, tydeids, thrips
	Oct	'Prime Ark® 45'	Phytoseiids, tydeids, thrips
	Nov	'Ouachita'	Spotted wing drosophila, spider mites, phytoseiids, scale, thrips
	Nov	'Prime Ark® 45'	Spotted wing drosophila, spider mites, phytoseiids, scale, thrips
2015	Jan	'Prime Ark® 45'	----
	Feb	'Prime Ark® 45'	----
	Mar	'Prime Ark® 45'	----
	Apr	'Prime Ark® 45'	Thrips
	May	'Prime Ark® 45'	----
		Wild <i>Rubus</i> spp.	Orius spp., thrips, tydeids

Results and Conclusions

- Initial results show RBM was more abundant in the fruit of floricanes than in primocanes.
- RBM emerged from primocanes in fall 2014 and from floricanes in fall 2014 and late spring 2015.
- Cultivar selection, cane management, and field sanitation may be key to effective RBM management.
- RBM lifecycle is interrupted when primocane fruiting cultivars are mowed down annually, greatly reducing overwintering sites and subsequent population development.
- Further research is needed to establish economic thresholds for RBM.
- The presence of phytoseiids and *Orius* spp. suggests the need to evaluate their potential for biological control of RBM. Augmentative releases could be tested during migration periods.