

Plasmodium falciparum infection status
comparing abdominal statuses of
Anopheles mosquitoes in Western Kenya

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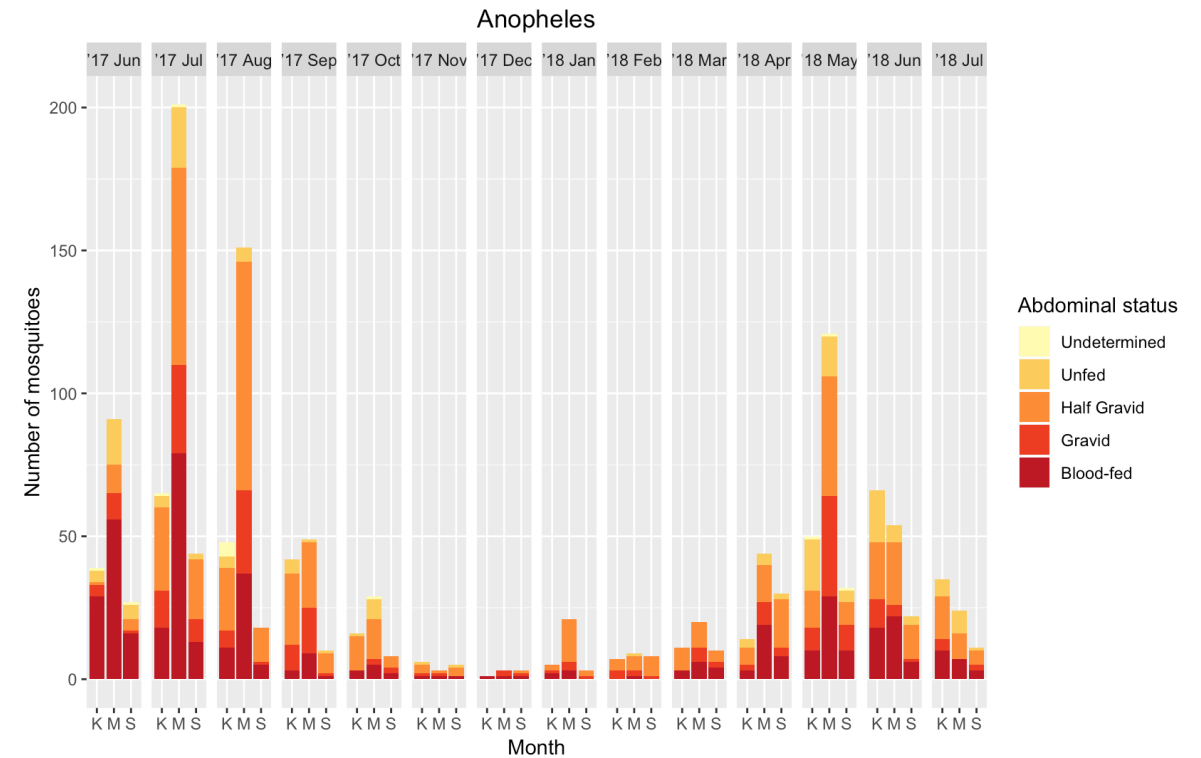
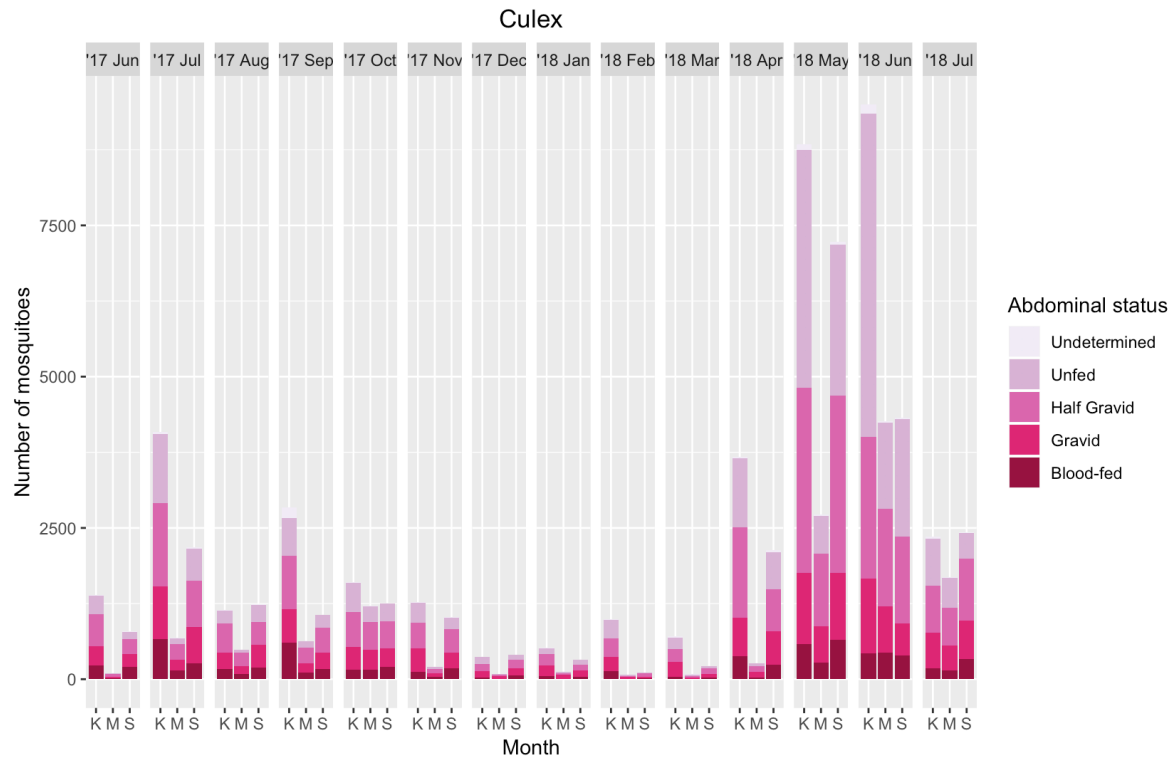
April 8, 2019

Study Site and Mosquito Sampling

- Webuye, Kenya
- June 2017 to July 2018
- Weekly mosquito collections
 - 38 households in 3 villages
 - Vacuum aspiration via Prokopak
 - *Culex* and *Anopheles* mosquitoes



Summary of Female *Culex* and *Anopheles* Mosquitoes Collected

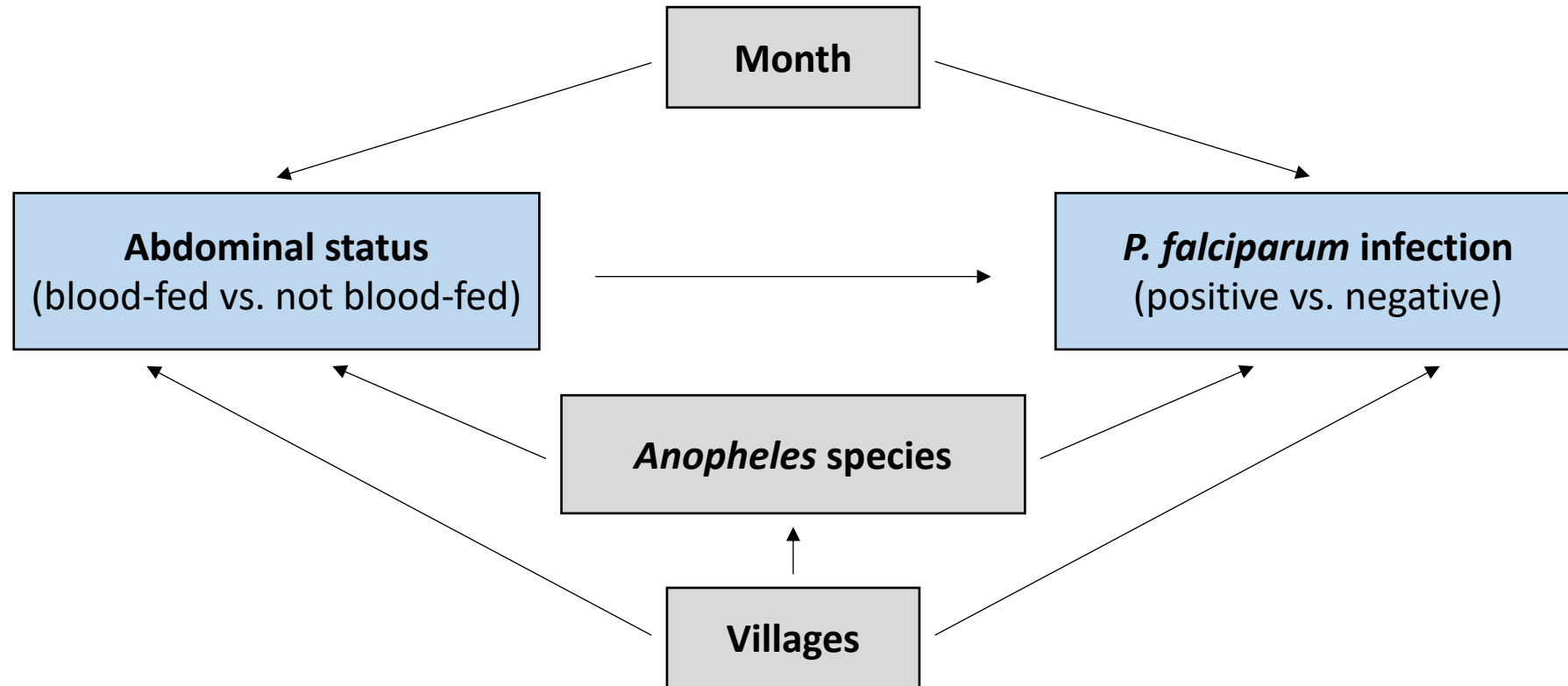


Parasite DNA Extraction and Sample Processing

- Mosquito homogenization
- Chelex gDNA extraction
- Quantitative polymerase chain reaction

Causal Inference Analysis

- Assessed relationship between female *Anopheles* mosquito abdominal status and *P. falciparum* infection status in mosquito



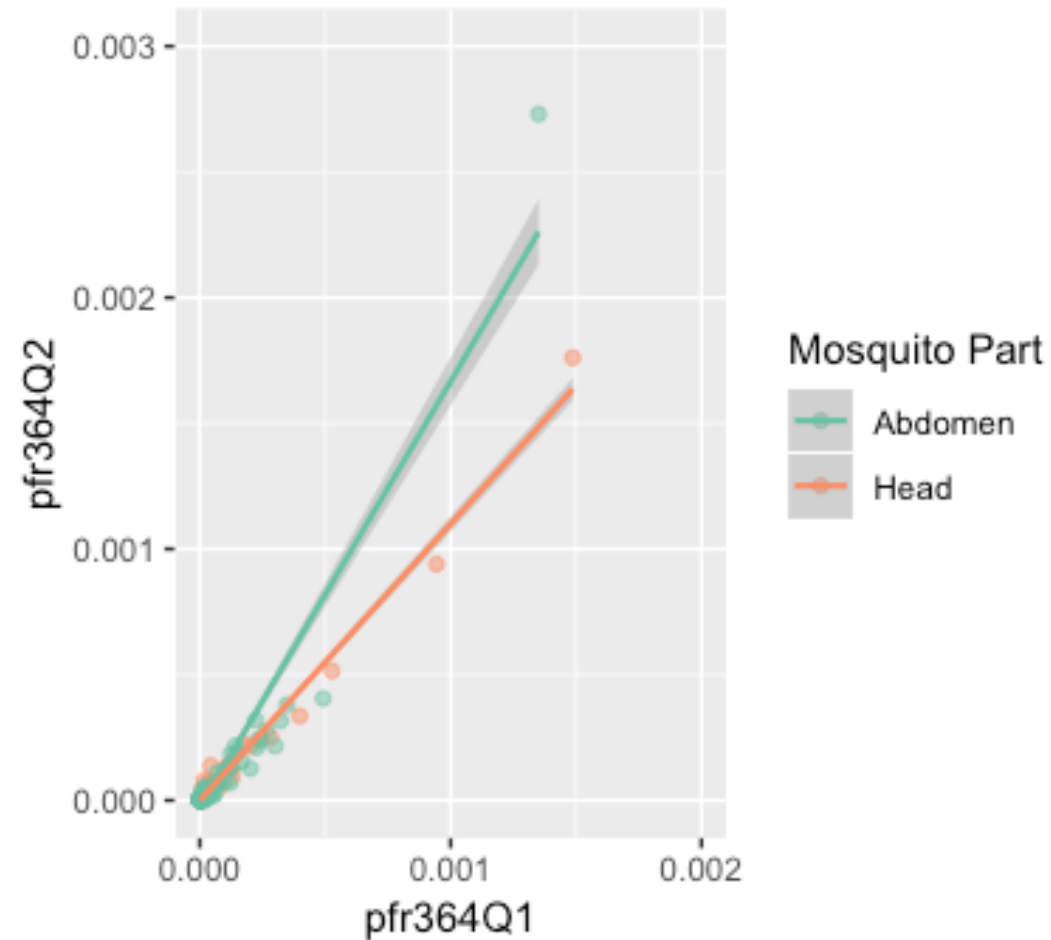
Log-risk Regression Model

- Main exposure: Abdominal status (blood-fed vs. not blood-fed)
- Main outcome: *P. falciparum* infection status (positive vs. negative)
- Controlled for confounders: Month, village, and *Anopheles* species
- **Estimates prevalence ratio of *P. falciparum* infection in the mosquitoes**

Distribution of Covariates Across *P. falciparum* Infection Status

	Kinesamo	Maruchi	Sitabicha	Total						
Blood-fed	113	297	67	477						
Gravid	59	158	38	255						
Half Gravid	163	320	104	587						
Unfed	66	81	21	168						
Undet.	3	2	2	7						
Total	404	858	232	1494						
					Blood-fed	Gravid/HG	Human-fed	Head Infected	Abd Infected	Total Infected
<i>An. gambiae</i>	298	545	180	1023	276	628	613	90	120	150
<i>An. funestus</i>	14	55	2	71	27	39	42	6	8	11
<i>An. pretoriensis</i>	1	11	1	13	4	8	9	2	3	4
<i>An. demeilloni</i>	3	6	3	12	3	9	2	0	0	0
Other	3	14	3	20	3	14	9	1	1	1
Unidentified	85	227	43	355	164	144	214	35	68	79

Correlation Between Parasite Density in Replicates 1 and 2



Regression Model Results

Variable	Estimate (exp)	Standard Error	P-value
Exposure (Blood-fed)	4.765	0.3711	2.58×10^{-5}
Maruti	1.132	0.1676	0.4598
Sitabicha	0.639	0.2531	0.0768
<i>An. dandalicus</i>	0.626	1429.6761	0.9997
<i>An. demeilloni</i>	5.091×10^6	949.7860	0.9870
...

Prevalence Ratio: 4.77 (95% Confidence Interval: 2.45 to 8.54)

Conclusions

- **Prevalence Ratio: 4.77 (95% Confidence Interval: 2.45 to 8.54)**
- The 14-month prevalence of *P. falciparum* infection in female *Anopheles* mosquitoes that were blood-fed (recently blood-fed or gravid) was 4.77 times that among *Anopheles* mosquitoes that were unfed

Acknowledgments

- Kelsey Sumner
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