Some References on the Use of CO_2 for Medical Entomology Survey

Becker N *et al.* Comparison of carbon dioxide, octenol and a host-odour as mosquito attractants in the Upper Rhine Valley, Germany. Med Vet Entomol 1995;9:377-80.

Abstract: Field studies were conducted in the Upper Rhine Valley to determine the responses of mosquitoes to CDC traps baited with either CO2, octenol, light or paired combinations of these. Among eight mosquito species caught, the attractant effect on trap catches was studied in the four most abundant: *Aedes vexans, Ae. rossicus, Ae. cinereus* and *Culex* pipiens. Traps baited only with light or octenol caught few mosquitoes, whereas many were caught by traps baited with CO2 alone or in combination with either of the other candidate attractants. CO2 baited traps, with or without light, caught the most *Aedes*. The combination of CO2 and octenol attracted most *Cx* pipiens, but this apparent synergy was not significant. Using a caged hamster compared to CO2 as bait in a CDC light-trap with only intermittent fan suction, the hamster attracted less mosquitoes than CO2 emitted at a rate of 225 g/h on days 1 and 2, whereas on days 3 and 4 the smell from the hamster's cage became significantly more attractive than this rate of CO2 for all species of mosquitoes.

Canyon DV, Hii JL. Efficacy of carbon dioxide, 1-octen-3-ol, and lactic acid in modified Fay-Prince traps as compared to man-landing catch of *Aedes* aegypti. J Am Mosq Control Assoc 1997;13:66-70.

Abstract: The attractants 1-octen-3-ol and lactic acid significantly decreased catches of *Aedes* aegypti in Townsville, Australia, by 50% in a controlled laboratory environment and by 100% in the field when compared to carbon dioxide baited bidirectional Fay-Prince trap catches. Evaluation of an omni-directional alteration on a bidirectional Fay-Prince trap revealed no significant improvement in catch size when compared to both the bidirectional trap and man-landing catch (MLC). Cumulative evening MLC (1730-2000 h) was twice that of the morning MLC (0600-0830 h), which has implications on the precise estimation of the man-biting rate. The MLC sampling method is shown to be a quick, simple, effective and cheap alternative to expensive traps in areas not currently experiencing arbovirus transmission.

Costantini C *et al.* Mosquito responses to carbon dioxide in a west African Sudan savanna village. Med Vet Entomol 1996;10:220-7.

Abstract: Mosquito responses to carbon dioxide were investigated in Noungou village, 30 km northeast of Ouagadougou in the Sudan savanna belt of Burkina Faso, West Africa. Species of primary interest were the main malaria vectors *Anopheles gambiae s.s.* and *An. arabiensis*, sibling species belonging to the *An. gambiae* complex. Data for *An. unestus, An. pharoensis, Culex quinquefasciatus* and *Mansonia uniformis* were also analyzed. Carbon dioxide was used at concentrations of 0.04-0.6% (cf. 0.03% ambient concentration) for attracting mosquitoes to odour-baited entry traps (OBETs). The "attractiveness' of whole human odour was also compared with CO2 emitted at a rate equivalent to that released by the human bait. In a direct choice test with two OBETs placed side-by-side, the number of *An. gambiae s.l.* entering the trap with human odour was double the number trapped with CO2 alone (at the human equivalent rate), but there was no significant difference between OBETs for the other species of mosquitoes. When OBETs were positioned 20 m apart, again CO2 alone attracted half as many *An. gambiae s.l.* and only 40% *An. funestus*, 65% *Ma. uniformis* but twice as many *An. pharoensis* compared to the number trapped with human odour. The dose-response for all mosquito species was essentially similar: a linear increase in catch with increasing dose on a log-log scale. The slopes of the dose-response curves were not significantly different between species, although there were significant differences in the relative numbers caught. If the dose-response data are considered in relation to a

standard human bait collection (HBC), however, the behaviour of each species was quite different. At one extreme, even the highest dose of CO2 did not catch more *An. gambiae s.l.* than one HBC. At the other extreme, the three highest doses of CO2 caught significantly more *Ma. uniformis* than did one HBC. *An. pharoensis* and *Cx quinquefasciatus* showed a threshold response to CO2, responding only at doses above that normally released by one man. *An. funestus* did not respond to CO2 alone at any dose in sufficient numbers to assess the dose response. Within the *An. gambiae* complex, *An. arabiensis* "chose' the CO2-baited trap with a higher probability than *An. gambiae s.s.* Also *An. arabiensis*, the less anthropophilic of the two species, was more abundant in CO2-baited OBETs than in human bait collections.

Costantini C *et al.* Odor-mediated host preferences of West African mosquitoes, with particular reference to malaria vectors. Am J Trop Med Hyg 1998;58:56-63.

Abstract: The role of odors in mosquito host preferences was studied in a village near Ouagadougou, Burkina Faso. Two odor-baited entry-traps were put beside one another and a choice of host odor-laden air was blown out of them. Odors of a human and a calf (of similar mass) were drawn from two tents in which each was separately concealed. Allowances were made for trap position, differences in human-subject attractiveness, CO2 levels, and trap contamination with alternative host odors. Choices for the human-baited trap greater than the 0.5 random expectation were made by *Anopheles gambiae s.l.* (0.96) and *An. pharoensis* (0.68). The choices for the human-baited trap of *Culex antennatus* were significantly lower than 0.5 (0.25), whereas for the *Cx. decens* species group (0.56), the difference was not significant. Interpretation of the latter result was complicated by the significant effect of CO2 levels on the index. Species caught in low numbers but whose trap distribution showed a bias towards the human-baited trap were *An. funestus* (total numbers in the human-baited trap to the calf-baited trap = 9:0), *Mansonia africana* (17: 1), *Aedes dalzieli* (22:4), and *Ae. hirsutus* (13:1); species showing bias towards the calf-baited trap were *An. rufipes* (0:11), *Cx. duttoni* (0:17), and *Cx. nebulosus* (2:35). *Mansonia uniformis* was the only species distributed randomly between the two traps. Molecular identification of the *An. gambiae s.l.* samples revealed a marked difference in trap distribution: for the human-baited trap the ratio was 52% *An. arabiensis* to 48% *An. gambiae s.s.*; for the calf-baited trap, it was 92% *An. arabiensis* to 8% *An. gambiae s.s.*

Garcia R, Des Rochers BS, Voigt WG. A bait/carbon dioxide trap for the collection of the Western tree hole mosquito *Aedes* sierrensis. J Am Mosq Control Assoc 1988;4:85-8.

Kline DL *et al.* Field studies on the potential of butanone, carbon dioxide, honey extract, 1-octen-3-ol, L-lactic acid and phenols as attractants for mosquitoes. Med Vet Entomol 1990;4:383-91.

Abstract: Various combinations of six candidate attractants--butanone, carbon dioxide (CO2), honey, octenol, lactic acid and mixed phenols--were tested against natural populations of mosquitoes in Everglades National Park, Florida, U.S.A., using unlighted CDC-baited traps. With few exceptions, the attractancy of these candidate compounds to mosquitoes, when used alone, was less than that of CO2 alone. The exceptions were that octenol and honey extract alone attracted larger numbers of *Coquillettidia perturbans* (Walker). Addition of lactic acid and/or octenol to CO2 increased trap collections of *Aedes* taeniorhynchus (Wiedemann), *Anopheles atropos* D. & K., and *An. crucians* Wiedemann by 1.4-13.8 times. *Culex nigripalpus* Theobald collections were increased 2.7 times by the addition of lactic acid, while the addition of octenol produced mixed results. Whereas the addition of lactic acid reduced collections of *Cx* (*Melanoconion*) *spp.*, the addition of octenol generally increased collections. The opposite happened for *Wyeomyia mitchellii* (Theobald). For the biting midge, *Culicoides furens* (poey), octenol (1.6-23.4 x) and phenol (2.7 x) alone attracted larger numbers, and lactic acid alone attracted approximately the same numbers as CO2 alone. The combinations octenol + phenol and octenol + 200 ml/min CO2 increased C. furens collections c. 100 times over CO2 alone. The

combination of octenol + CO2 increased (1.6 x) collections of the tabanid *Diachlorus ferrugatus* (Fabricius). Butanone appeared to decrease the trap collections of all species when combined with CO2 or octenol + CO2.

Kline DL, Wood JR, Cornell JA. Interactive effects of 1-octen-3-ol and carbon dioxide on mosquito (Diptera: Culicidae) surveillance and control. J Med Entomol 1991;28:254-8.

Abstract: Responses of natural populations of biting Diptera were studied at Everglades National Park, Fla., to three levels (0, 3.0, and 41.1 mg/h) of 1-octen-3-ol (octenol), four levels (0, 20, 200, and 2,000 ml/min) of carbon dioxide (CO2), and their combinations. Catches of mosquitoes (*Aedes* taeniorhynchus (Wiedemann), *Culex* [*Melanoconion*]) *spp., Cx.* nigripalpus Theobald, and *Wyeomyia spp.*) and one tabanid (Diachlorus ferrugatus (F.)) were affected significantly by CO2 and octenol. Significantly greater numbers of all taxa were collected as the level of CO2 was increased. The 3.0-mg/h release rate of octenol alone resulted in increased trap catches relative to no bait for all taxa except *Cx.* (*Melanoconion*) *spp.*, whereas the 41.1-mg/h release rate alone generally reduced trap catches relative to either no bait or 3.0 mg/h octenol. The effect of CO2 and octenol was additive for *Cx.* (*Melanoconion*) *spp.* and D. ferrugatus and synergistic for *Ae.* taeniorhynchus. Six octenol-supplemented CO2 treatments produced mixed results for *Cx.* nigripalpus.

Mboera LE *et al.* Olfactory responses of female *Culex quinquefasciatus* Say (Diptera: Culicidae) in a dual-choice olfactometer. J Vector Ecol 1998;23:107-13.

Abstract: Olfactory responses of individual female (n = 1010) *Culex quinquefasciatus* Say (Diptera: Culicidae) to various odor stimuli were studied in a dual-choice olfactometer. Responses (i.e., the number of mosquitoes entering either of both olfactometer ports) were studied towards clean conditioned air (control), human foot skin emanations (collected on worn stockings), carbon dioxide (4.5% in clean air), moistened air, and various combinations thereof. Skin emanations were significantly more attractive (chi 2 = 23.0, $p < 0.001$) than clean stockings (control). The mosquito was also significantly more attracted (chi 2 = 7.7, $p < 0.01$) to skin emanations than to a clean stocking to which water (an equivalent of that absorbed by a worn stocking) was added. A moistened (1 g H2O) clean stocking, however, was slightly more attractive than a dry stocking (chi 2 = 6, $p < 0.025$). Carbon dioxide (4.5%) did not elicit higher responses than clean air, and no synergistic effect was observed in combination with skin emanations. With the aim of developing an odor-baited trap, our results indicate that *Cx. quinquefasciatus* responds well to human body odors which can be collected on polyamide materials.

Mboera LE, Takken W, Sambu EZ. The response of *Culex quinquefasciatus* (Diptera: Culicidae) to traps baited with carbon dioxide, 1-octen-3-ol, acetone, butyric acid and human foot odour in Tanzania. Bull Entomol Res 2000;90:155-9.

Abstract: The responses of *Culex quinquefasciatus* Say to traps baited with carbon dioxide, 1-octen-3-ol, acetone, butyric acid and human foot odour were studied in the field in Muheza, north-east Tanzania using Counter-flow Geometry (CFG) and Centers for Disease Control (CDC) traps. It was found that significantly more C. *quinquefasciatus* responded to foot odour collected on nylon stockings than to clean nylon stockings ($P < 0.05$). Significantly more mosquitoes were caught in a CFG trap baited with carbon dioxide than in traps with either human foot odour, acetone or butyric acid. It was also found that in an outdoor situation a carbon dioxide baited CDC unlit trap collected over 12 times more C. *quinquefasciatus* than an unbaited CDC unlit trap and nine times more mosquitoes than CDC traps baited with 1-octen-3-ol alone ($P < 0.05$). The number of mosquitoes caught in a CDC trap baited with 1-octen-3-ol did not differ significantly from that of the unbaited CDC trap ($P > 0.05$). These results indicate that the Afrotropical *Cx. quinquefasciatus* respond significantly better to traps baited with

carbon dioxide than to either octenol, acetone or butyric acid, and that human foot odour contains stimuli to which C. *quinquefasciatus* is attracted under field conditions.

Mboera LEG *et al.* Comparison of carbon dioxide-baited trapping systems for sampling outdoor mosquito populations in Tanzania. Med Vet Entomol 2000;14:257-63.

Abstract: For collecting mosquitoes (Diptera: Culicidae) the outdoor catching efficiency of four types of trapping devices baited with carbon dioxide (CO2, 300 ml/ min) was evaluated and compared in two areas of Tanzania. The types of traps employed were: the CDC miniature trap with the incandescent light bulb switched on or off; electric nets (ENT) and a Counterflow Geometry (CFG) trap. In Njage, southeast Tanzania, *Anopheles gambiae* Giles *s.s.* was the most abundant of the seven mosquito species obtained, comprising of 74.3% of the total number caught (n=2,171). In Muheza, north-east Tanzania, *Culex quinquefasciatus* Say was the predominant species (90.9%) among 1,080 caught. At both localities the CFG trap was superior to the CDC trap with light-on or light-off for sampling both *An. gambiae* and *Cx. quinquefasciatus*. Efficiency of the CFG trap and ENT were similar for sampling these species of mosquitoes ($P > 0.05$). However, ENT was superior to the CDC trap with light-off for collecting both species. Significantly more ($P < 0.05$) *Cx. quinquefasciatus* were obtained by the CDC trap with light-off than with light-on, especially outdoors. It is concluded that both ENT and the CFG are effective tools for sampling populations of *An. gambiae* and *Cx. quinquefasciatus* outdoors.

Meyer RP. Urbanization and the efficiency of carbon dioxide and gravid traps for sampling *Culex quinquefasciatus*. J Am Mosq Control Assoc 1991;7:467-70.

Abstract: The efficiency of gravid and CO2 traps for sampling female *Culex quinquefasciatus* was evaluated along 2 parallel 6.4 km long urban (high housing density) to rural (low housing density) transects in east Bakersfield, Kern County, CA. There were no significant differences in the number of female *Cx. quinquefasciatus* collected by gravid traps within urban and rural zones. The number of females collected per trap night ranged from 6.8 to 15.5. The number of females collected by CO2 traps increased significantly from 1.4 to 3.1 per trap night in urban to 31.8 to 111.2 per trap night in rural zones and was inversely correlated with housing density. These results indicate that female *Cx. quinquefasciatus* were effectively sampled by gravid traps in urban subdivisions and by CO2 traps in rural mixed agricultural areas.

Meyer RP, Reisen WK, Milby MM. Influence of vegetation on carbon dioxide trap effectiveness for sampling mosquitoes in the Sierra Nevada foothills of Kern County, California. J Am Mosq Control Assoc 1991;7:471-5.

Abstract: The effect of vegetation on sampling *Culex* tarsalis, *Cx. quinquefasciatus* and *Aedes nigromaculis* by CO2 traps was evaluated at an intermittent stream habitat at the base of the Sierra Nevada foothills. Carbon dioxide traps were spaced along a 450 m transect perpendicular to Poso Creek to determine female attraction to traps placed in 5 different vegetation substrates: 1) open hilltop with sparse growth of grasses and saltbush, 2) open pasture with sparse growth of saltbush, 3) peripheral understory of mule fat, 4) shaded understory of mule fat, and 5) open canopy 5 m above ground in willow and cottonwood trees. Most host-seeking *Cx. tarsalis* and *Cx. quinquefasciatus* females were collected within the open canopy and peripheral understory. Host-seeking *Ae. nigromaculis* females were collected predominately in the open pasture and within the peripheral understory. The association between CO2 trap catch size and vegetation suggested a relationship between the host-feeding patterns and associated hunting strategies of these bird and mammal feeding species.

Mullens BA, Gerry AC. Comparison of bait cattle and carbon dioxide-baited suction traps for collecting *Culicoides variipennis sonorensis* (Diptera: Ceratopogonidae) and *Culex quinquefasciatus* (Diptera: Culicidae). J Med Entomol 1998;35:245-50.

Abstract: Carbon dioxide-baited suction trap collections were related to simultaneous bait cattle collections of *Culicoides variipennis sonorensis* Wirth & Jones. Trap collections varied directly with numbers taken from each of 3 calves. More (3.4x) C. v. sonorensis were taken in a trap with 1,000 ml CO2/min versus a trap baited with approximately 300 ml/min (matched to calves by weight). Numbers of insects taken from three individual calves relative to their equivalent CO2 output did not differ, but engorgement of C. v. sonorensis was higher on 1 calf compared with the other 2 calves. Up to 281 C. v. sonorensis fed on a calf exposed for 10 min. More male (7.7x) and female (6.1x) C. v. sonorensis were collected from the calf relative to its equivalent amount of CO2. Under conditions described here, female C. v. sonorensis caught by a suction trap multiplied by 7.2 approximates numbers expected to be caught near a calf. Engorgement of C. v. sonorensis on individual calves declined as abundance increased. *Culex quinquefasciatus* Say was collected in equal numbers from the calves and their equivalent CO2 output, and none fed on the cattle. Most (85%) C. v. sonorensis in the vicinity of the CO2-baited suction trap were collected in the catch bag, compared with 26% of *Cx. quinquefasciatus*.

Murphy MW *et al.* Attraction of *Anopheles* (Diptera: Culicidae) to volatile chemicals in Western Kenya. J Med Entomol 2001;38:242-4.

Abstract: *Anopheles gambiae s.l.* and *Anopheles funestus* Giles are the primary vectors of malaria in East Africa. Identification of host-location olfactory cues may increase trap sensitivity for vector control and surveillance programs. Solid-state army miniature light traps were operated near sleeping humans in huts at night without lights and augmented with the potential attractants: L-lactic acid, Limburger cheese volatiles, hexanoic acid, and carbon dioxide. Mosquito response varied between species and gender. Female *An. funestus* exhibited a greater response to traps baited with L-lactic acid in combination with carbon dioxide than carbon dioxide alone in two different experiments.

Petric D *et al.* Dependence of CO2-baited suction trap captures on temperature variations. J Am Mosq Control Assoc 1995;11:6-10.

Abstract: In order to provide better standardized CO2-baited trap samples, the relationship between sample size and evening temperatures was studied. Adult mosquitoes were collected for 3 h centered on sunset by an automatic interval suction trap baited with CO2 in the Upper Rhine Valley, Germany. *Aedes vexans* females were most abundant, and their blood-seeking activity showed a significant correlation with the evening's average temperature ($r = 0.76$, $P < \text{or} = 0.05$). A higher degree of correlation was obtained when the number of specimens caught was related to temperature indices ($r = 0.93\text{-}0.98$, $P < \text{or} = 0.01$). A regression equation indicates the lower temperature threshold for *Aedes vexans* was between 9 and 10 degrees C. For each degree of increase in the average temperature index, it was estimated that a 5.5% greater number of mosquitoes would be trapped. An upper temperature threshold for this species was not observed at average temperatures < or = 23 degrees C. A relationship between catches of *Aedes rossicus* and *Aedes cinereus* and temperatures recorded at the site during the study was not found.

Reisen WK *et al.* Effects of trap design and CO2 presentation on the measurement of adult mosquito abundance using Centers for Disease Control-style miniature light traps. J Am Mosq Control Assoc 2000;16:13-8.

Abstract: Centers for Disease Control miniature light traps augmented with CO2 provide an effective method of monitoring *Culex* abundance and may provide a useful supplement to New Jersey light traps used by the California Mosquito Surveillance Program. To assist in standardizing sampling protocols, the present research compared the catch of adult mosquitoes collected using 4 trap designs and 3 CO2 presentation methods. When augmented with dry ice, the Arbovirus Field Station (AFS) trap (consisting of a 3-in. fan mounted into a white polyvinyl chloride pipe and operated without a light source or rain

shield) collected as many or more *Culex* females than similar traps purchased from John W. Hock and American Biophysics, or a trap with a 4.25-in. 2-bladed fan constructed by the Orange County Vector Control District (similar to the Encephalitis Virus Surveillance model distributed by BioQuip). Few blooded or gravid females and males were collected, indicating that CO2 released from the dry ice and not light probably was the primary attractant. Catch of *Culex tarsalis* females in traps baited with CO2 released at 0.5-1.5 liters/min from gas cylinders was significantly greater than in traps baited with dry ice, even though the CO2 release rates from the dry ice at dusk probably were comparable to that released from the cylinders and averaged 0.4-0).5 liters/min for the night. Traps baited with 0.5 liters/ min of CO2 gas released in 15 3- or 2-sec bursts per hour collected the fewest mosquitoes. In all experiments, trap location effects were significant and accounted for as much variability in catch size as trap design or CO2 presentation. Sampling efficiency of all trap designs or CO2 presentations were consistent over time, space, and different levels of mosquito abundance.

Rubio-Palis Y. Evaluation of light traps combined with carbon dioxide and 1-octen-3-ol to collect anophelines in Venezuela. J Am Mosq Control Assoc 1996;12:91-6.

Abstract: A 6-month study was carried out in northcentral Venezuela to evaluate the efficiency of the CDC light trap and the updraft ultraviolet (UV) light trap combined with carbon dioxide (CO2) or 1-octen-3-ol (or both) and human baits to sample outdoor *Anopheles aquasalis* and *Anopheles albimanus* populations. The human baits caught far more mosquitoes than did any of the other trapping methods. Comparing each of the trapping methods to the human bait catches, UV light trap + CO2 gave a closer correspondence of the ratio of *An. aquasalis* to *An. albimanus* compared with the ratio found in human baits than did any of the other trapping methods. The mean parous rate was significantly lower in human bait catches than in all of the trapping methods except for *An.* aquasalis in UV light trap with CO2. We consider the UV light trap with CO2 to be the most reliable substitute for human bait catches.

Takken W, Kline DL. Carbon dioxide and 1-octen-3-ol as mosquito attractants. J Am Mosq Control Assoc 1989;5:311-6.

Abstract: Interval suction traps were used to study the attractant effect of CO2 and 1-octen-3-ol on trap catches of mosquito populations at 2 different locations in Florida. There was no significant increase in the numbers of mosquitoes caught when the concentration of CO2 was increased from 200 to 1,000 cc/min. One-octen-3-ol used by itself attracted mosquitoes in numbers similar to CO2 released at 200 cc/min. One-octen-3-ol and CO2 acted synergistically in attracting significantly greater numbers of *Aedes* taeniorhynchus, *Anopheles spp.* and *Wyeomyia* mitchellii than either bait used singly, although the response of *Culex spp.* to this bait combination was less pronounced. Ceratopogonidae (*Culicoides furens*) and Tabanidae (*Diachlorus ferrugatus*, *Tabanus nigrovittatus* and *Chrysops spp.*) were also attracted to the combined bait.

van den Hurk AF, Beebe NW, Ritchie SA. Responses of mosquitoes of the *Anopheles farauti* complex to 1-octen-3-ol and light in combination with carbon dioxide in northern Queensland, Australia. Med Vet Entomol 1997;11:177-80.

Abstract: In northern Queensland, Australia, three experiments were conducted to determine the response of mosquitoes of the *Anopheles farauti* complex to CDC traps baited with four attractant combinations: octenol + CO2 and light; octenol and light; CO2 and light; or CO2 and octenol without light. A CDC-modified updraft light-trap was also trialed, but did not significantly enhance collections of *An. farauti s.l.*. The combination of light, octenol and CO2 caught significantly more *An. farauti s.l.* (both *An. farauti* No.1 and No.2 sibling species) when compared to CO2 and light alone. Only small numbers of the *An. farauti* complex were captured when CDC traps were baited with octenol alone, i.e. no light or CO2.

Vythilingam I, Chiang GL, Chan ST. Evaluation of carbon dioxide and 1-octen-3-ol as mosquito attractants. Southeast Asian J Trop Med Public Health 1992;23:328-31.

Abstract: CDC Light traps were used to study the attractant effect of CO2 and 1- octen-3-ol on trap catches of mosquito populations at three different locations in Malaysia. There was a significant increase in the number of mosquitoes caught in traps baited with CO2 and CO2 with 1-octen-3-ol. The number of mosquitoes caught in the CDC light trap and in the CDC light trap baited with 1-octen-3-ol alone were very few. 1-octen-3-ol and CO2 acted synergistically in attracting significantly greater numbers of *Culex* tritaeniorhynchus. However *Anopheles* sp. were not very attracted to light traps even with attractants added to them.

Washburn JO *et al.* Correlation of *Aedes sierrensis* captures at human sentinels with CO2- baited Fay-Prince and duplex cone traps. J Am Mosq Control Assoc 1992;8:389-93.

Abstract: The efficiency of the duplex cone and Fay-Prince traps for monitoring adult male and female *Aedes sierrensis* was evaluated at 3 field sites in California. The numbers of females captured by both types of traps were significantly correlated with human sentinel collections. The Fay- Prince trap captured more *Ae. sierrensis* females than the duplex cone trap and was a better tool for estimating female activity levels. There was no significant correlation between the number of males captured in Fay-Prince traps and at humans. Male numbers in duplex cone trap collections explained only 27% of the variation in the number of males collected at sentinels, suggesting that neither trap is a robust tool for estimating male activity around humans.