respectively. Mosquito flight behaviour on exposure to PermaNet 3.0 sides was comparable to untreated controls. Composite video analysis revealed that contact with the pyrethroid-PBO net was greatly reduced in comparison with untreated controls, but this brief exposure is enough to rapidly knock down and kill highly pyrethroid-resistant vectors. The implications of these results for the design of next-generation bed nets for targeting insecticide resistant mosquitoes are considered.

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PYRIPROXYFEN REDUCES FECUNDITY IN ANOPHELES ARABIENSIS: A NEW POTENTIAL TOOL FOR MALARIA CONTROL IN ETHIOPIA

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Insecticide resistance poses a major threat to current malaria control campaigns. Insecticides with novel modes of action are therefore needed to improve malaria control. Pyriproxyfen (PPF), a conventional juvenile mosquitocide, has a unique mode of action that also sterilizes adult mosquitoes upon direct contact. However, the application of PPF on larval vs adult mosquitoes has not been well studied. This study investigated the rate of fecundity of Anopheles arabiensis after PPF exposure to determine the potential of PPF-induced sterilization in malaria mosquitoes control. Larvae of An. arabiensis were collected from field and two treatment regimens were tested. First, we placed 60 larvae each in 12 washbasins (used as larval breeding habitat) half-filled with water treated with 0.0001% of PPF in the malariasphere and evaluated the rate of larval development and mortality. Second, we released adult An. arabiensis into the malariasphere with a wall dusted with PPF and evaluated autodissemination of the PPF by mosquitoes from the wall to breeding habitats in the malariasphere. Fecundity was measured as the number of viable eggs laid by the mosquitoes after blood feeding. The results showed that 92% An. arabiensis larvae placed in breeding habitats treated with PPF died either at their larval or pupal stage compared to only 15% of the larvae that died in the control breeding habitats (with no PPF treatment). The average number of eggs laid by An. arabiensis resting on PPF dusted walls was 32.4 eggs/batch compared to 189.6 eggs/batch in controls without the PPF. None of the eggs laid by mosquitoes subjected to PPF dusted walls were developed to larvae when placed in breeding habitats while 102 eggs/batch in the control developed to larvae and 72% of them pupated. Our study found out that PPF autodessemination is effective in controlling An. arabiensis mosquitoes, the major malaria vector in Ethiopia.

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ENTOMOLOGICAL EVALUATION OF INDOOR RESIDUAL SPRAYING (PYRIMIPHOS-METHYL) ON MALARIA TRANSMISSION IN DIEBOUGOU DISTRICT, SOUTHWEST BURKINA FASO

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The rapid spread of insecticide resistance in malaria vectors and the possible recent increase in malaria cases in Africa require to develop and evaluate new vector strategies able to manage resistance. The combination of two insecticides targeting different time of the life cycle of the *Anopheles* vector is one possibility. A randomized controlled trial was performed with the objective to evaluate in communities, the effect of indoor residual spraying (IRS) with pyrimiphos-methyl (PM) in combination with Long-Lasting Insecticidal Nets (LLINs) on malaria transmission and the vectors diversity, resistance and behaviour. The study took place in

13 villages (5 sprayed and 8 control) between November 2017 to June 2018. We performed 4 surveys of hourly mosquito collection following the implementation of IRS using the human-landing collection technique from 17:00 to 09:00 in each village. Malaria vectors species, Plasmodium infection, blood-meal source, kdr-west, kdr-east and ace1 target-site mutations were searched by molecular technique. Residual activity of PM was monitored with susceptible "Kisumu" and wild strains using the WHO cone wall bioassay technique. The residual efficacy of the PM ranged 88-100% for 7 months on mud and cement walls against both susceptible and wild strains of Anopheles gambiae s.l. Average densities of Anopheles sp were 0.69 bites per human per night in the sprayed villages, significantly lower than in the control villages (3.2 b.h⁻¹.n⁻¹; RR= 0.38 ; 95%CI[0.15-0.94]). The majority of biting activities of Anopheles occurred between 02:00 to 3:00h and 06:00 to 7:00h in the control villages and sprayed villages respectively. Overall, entomological inoculation rate was lower in the sprayed villages (0.14 infective bites per human per night) compared to the control villages (0.84 ib.h⁻¹.n⁻¹). PM insecticide IRS allowed to drastically reduce malaria transmission in our trial. PM should be considered as a potential good complementary tool to LLINs in high transmission areas of Burkina Faso but in association with surveillance of malaria vector behaviour.

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FEEDING AND RESTING BEHAVIOR OF ANOPHELES GAMBIAE S.L. IN AREAS GETTING INDOOR RESIDUAL SPRAYING FOR MALARIA VECTOR CONTROL AND AREAS NOT SPRAYED IN NORTHERN GHANA

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Since 2008, Ghana has implemented indoor residual spraying (IRS) in the Northern region, where a 48% decrease in parasite prevalence was observed from 2011 to 2016 along with significant reductions in entomological indices of malaria transmission. However, preference of Anopheles gambiae s.l. for outdoor biting has also been observed. To better understand how mosquito outdoor behavior relates to the dynamics of malaria transmission, we investigated the feeding and resting activity of An. gambiae s.l. in selected sprayed and unsprayed rural areas of Northern Ghana, during the rainy and dry seasons of 2017 and 2018. We collected mosquitoes monthly using prokopack aspiration and used enzyme-linked immunosorbent assay to measure human blood index (HBI). An. gambiae s.l. (93%) was the predominant species, primarily collected from places outside of sleeping rooms in both sprayed (94.9%) and unsprayed (82.7%) areas (P<0.001). Of those mosquitoes collected outside sleeping rooms, most were caught in animal shelters; 89% in sprayed and 77% in unsprayed areas (P<0.001). The indoor resting density was 0.17 and 0.95 mosquitoes per room per day for sprayed and unsprayed houses respectively (p<0.05). An. gambiae s.l. was further identified by polymerase chain reaction (PCR) as An. gambiae (81%), An. coluzzii (18 %) and An. arabiensis (1%). The HBI was lower in the sprayed areas (82%) compared to the unsprayed areas (94%) (p=0.001). Mortality of mosquitoes collected alive from non-sleeping shelters and held for 24hrs was 55% and 13% in IRS and unsprayed areas, respectively (p<0.05); indicating that even some of the mosquitoes resting outdoors have been

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