



Guide to GM Insect literature

1 Transgenic mosquitoes

General reviews:

(Alphey, 2009) *Short review outlining several approaches to use of mosquito genetic engineering for disease control, including population suppression/population replacement and self-limiting/self-sustaining methods.*

(Alphey et al., 2002)

(Knols et al., 2007) *Opinion piece. Argues for international coordination of introduction and use of GM mosquitoes for disease control.*

(Catteruccia, 2007) *Review of molecular genetic research in Anopheles mosquitoes, including transgenic mosquitoes.*

(James, 2007) *Video interview with Tony James. Discusses various aspect of potential use of transgenic mosquitoes.*

(Marshall and Taylor, 2009) *John Marshall and Charles Taylor review recent advances in the development of transgenic mosquitoes for malaria control.*

(Gould and Schliekelman, 2004)

(Curtis, 1994)

(Knols and Louis, 2006) *Proceedings of the joint WHO/TDR, NIAD, IAEA and Frontis workshop on bridging laboratory and field research for genetic control of disease vectors, Nairobi, Kenya 14-16 July 2004*

(Olson et al., 2006)

(Wimmer, 2003)

1.1 Transformation

Reviews:

(Atkinson et al., 2001)

(Handler, 2002)

Primary literature:

- (Catteruccia et al., 2000) *First transformation of Anopheles stephensi. Used Minos.*
- (Allen et al., 2001) *First transformation of a Culex mosquito.*
- (Miller et al., 1987) *First genetic transformation of Anopheles gambiae. Used a P element vector but insertion appears not to have been transposon-mediated and does not form a reliable or reproducible method.*
- (Morris et al., 1989) *Transformation of Aedes aegypti with P element plasmids. Integration not easily reproducible; probably not transposon-mediated.*
- (Jasinskiene et al., 1998) *One of a pair of papers describing the first transformation of a mosquito (Aedes aegypti). This paper uses Hermes; Coates et al 1998 PNAS used mariner).*
- (Coates et al., 1998) *One of a pair of papers describing the first transformation of a mosquito (Aedes aegypti). This paper uses mariner; Jasinskiene et al 1998 PNAS used Hermes).*
- (Jasinskiene et al., 2003) *Shows cre-loxP recombination system works in Aedes aegypti for site-specific excision of chromosomal insertion. Did not detect excision with FLP/FRT in similar experiments.*
- (Grossman et al., 2001) *First transposon-mediated transformation of Anopheles gambiae.*
- (Perera et al., 2002) *First transformation of Anopheles albimanus.*
- (Nimmo et al., 2006) *First description of a site-specific integration system in a non-Drosophila insect. Phage C31 integrase system in the mosquito Aedes aegypti.*
- (Kokoza et al., 2001) *Transformation of Aedes aegypti using piggyBac.*
- (Lobo et al., 2002) *Transformation of Aedes aegypti using piggyBac*
- (Lobo et al., 2006) *Optimised protocols for mosquito transformation*
- (Lycett et al., 2004) *Conditional expression in Anopheles stephensi with Tet-on and Tet-off*
- (Nolan et al., 2002) *piggyBac-mediated transformation of Anopheles stephensi*
- (Pinkerton et al., 2000) *EGFP as transformation marker in Aedes aegypti*
- (Rodrigues et al., 2006) *First transformation of Aedes fluviatilis. Used piggyBac.*
- (Smith et al., 2007) *Fluorescent-labelled sperm in Aedes aegypti.*

1.2 SIT/RIDL

Sterile insect methods

Reviews:

(Alphey et al., 2010) *Comprehensive review of sterile-insect methods for mosquito control. Includes use of Wolbachia, genetic engineering (including RIDL) and other advance. Poses and addresses a series of specific questions about sterile-insect methods.*

(Alphey et al., 2008) *Open access review on sterile-insect methods, esp RIDL, for vector (mosquito) control*

(Catteruccia et al., 2009) *Review of potential use of transgenic methods for inducing 'genetic sterility' in mosquitoes for sterile-insect methods (replacing radiation). Negative impact of radiation is noted. Focuses on the authors' research interests: genetic sexing by sex-limited expression of a fluorescent protein; embryo-specific RIDL and dominant male sterility (I-Ppol)*

(Alphey, 2000) *Early, accessible, review of RIDL*

(Alphey, 2002)

(Alphey, 2007) *Review of the potential application of transgenic methods to SIT. RIDL. Focuses primarily on agricultural insects.*

(Alphey and Andreasen, 2002) *Review of SIT-RIDL for mosquitoes. Now partially superseded by Alphey, Nimmo, O'Connell and Alphey (2008) [Chapter in Aksoy book] and Alphey, Benedict et al (2010) Vector-Borne and Zoonotic Disease*

(Wilke et al., 2009) *Evaluates classical and transgenic SIT (RIDL) for Aedes aegypti control. Concludes that RIDL would be a valuable component of an integrated control program.*

Primary literature:

(Windbichler et al., 2008) *Expressed the homing endonuclease I-Ppol in male germline of Anopheles gambiae. Intended to get X-shredding and male bias in progeny. Observed complete dominant male sterility. Molecular data indicate some preferential cutting of X chromosome. Lack of male progeny may be due to carry-over of enzyme to embryos.*

(Phuc et al., 2007) *Show by mathematical modelling that late-acting lethality would be advantageous in sterile male (RIDL/SIT) control of mosquitoes. Construct a transgenic strain of Aedes aegypti with the necessary repressible, late-acting dominant lethality.*

(Fu et al., 2010) *Develop a conditional female-specific flightless strain for sterile-male (RIDL/SIT) control of Aedes aegypti.*

(Fryxell and Miller, 1995) *Early proposal to use conditional lethals for insect population control. Focused on a cold-sensitive allele of Notch.*

1.2.1 Genetic sexing

Reviews:

(Papathanos et al., 2009)

Primary literature:

(Catteruccia et al., 2005) *Describes transgenic Anopheles stephensi mosquitoes expressing fluorescent protein in their gonads and sperm. Allows sex-separation based on gonadal fluorescence from late larval stage.*

1.3 Refractory genes/constructs

General reviews

(Dimopoulos, 2007) *Video interview with George Dimopoulos. Discusses refractory genes and transgenic mosquitoes.*

1.3.1 Molecular

Reviews:

(James, 2002)

Primary literature:

(Franz et al., 2006) *Expression of a hairpin RNA from dengue-2 confers good refractoriness (resistance) to dengue-2 virus in transgenic Aedes aegypti.*

(Moreira et al., 2002) *Describes construction of transgenic Anopheles stephensi mosquitoes refractory to transmission of a rodent malaria due to expression of a bee venom phospholipase. Later shown to impose significant fitness penalty (Moreira et al Genetics 2004); may be possible to overcome this by modifying the phospholipase.*

(Rodrigues et al., 2008) *Describes use of mutated (enzymatically inactive) version of bee venom PLA₂ to confer refractoriness to Plasmodium berghei in Aedes fluviatilis. No fitness cost was observed, in contrast to previous study with unmodified PLA₂ (Moreira et al JBC 2002 and Moreira et al Genetics 2004).*

(Ito et al., 2002)

1.3.1.1 Promoters

Primary literature:

(Abraham et al., 2005) *Describes use of promoter fragment from Anopheles gambiae adult peritrophic matrix protein 1 (AgAper1) to drive expression in midgut of transgenic mosquitoes. With PLA₂, gave ~80% reduction in (refractoriness to) P. berghei oocyst formation.; Moreira et al., 2000) *Describes use of promoter fragments from Aedes aegypti and Anopheles gambiae carboxypeptidase genes to drive blood meal-inducible midgut expression in transgenic Aedes aegypti.**

(Lycett et al., 2004) *Conditional expression in Anopheles stephensi with Tet-on and Tet-off*

(Lai et al., 1991)

1.3.1.2 Effectors (not full refractory systems)

Reviews:

(James, 2002)

Primary literature:

(Capurro et al., 2000)

(Kim et al., 2004)

1.3.2 Theory only

1.4 Gene drivers

General reviews:

(James, 2007) *Video interview with Tony James. Discusses various aspect of potential use of transgenic mosquitoes.*

(Sinkins and Gould, 2006)

(Braig and Yan, 2001)

(James, 2005)

(Curtis et al., 2006)

(Boëte and Koella, 2002)

1.4.1 Molecular and theory

Reviews:

Primary literature:

(Chen et al., 2007) *Synthetic MEDEA-like gene drive system in Drosophila melanogaster.*

(Adelman et al., 2007) *A mariner/Mos1 transposon expressing Mos1 transposase under control of a nanos-derived promoter fragment in Aedes aegypti can mobilise injected Mos1 transgenes but not itself.*

1.4.2 Theory only

Reviews:

Primary literature:

(Medlock et al., 2009)

(Marshall, 2009)

(Marshall, 2008) *Models spread of a transposon-based gene drive system*

(Li, 2004)

(Curtis, 1968)

(Davis et al., 2001)

(Rasgon, 2009)

(Burt, 2003) *Potential uses of engineered strains carrying homing endonucleases for manipulating wild populations.*

(Marshall, 2008) *Models spread of a transposon-based gene drive system*

(Struchiner et al., 2005) *Models invasion and spread of autonomous transposons.*

1.5 Other

Reviews:

Primary literature

(Alphey et al., 2009) *Follows Alphey et al JEE (2007); describes potential use of release of engineered insects, e.g. RIDL, to manage actual or potential resistance to other interventions. Explores a wider range of scenarios, primarily in the context of Bt crops.*

(Alphey et al., 2007) *Describes the potential use of released engineered insects, e.g. female-specific RIDL, to manage potential or actual resistance against other interventions, e.g. Bt crops.*

Opinion:

(Benedict and Robinson, 2003)

(Knols et al., 2007) *Opinion piece. Argues for international coordination of introduction and use of GM mosquitoes for disease control.*

1.5.1 Molecular

1.5.1.1 Stability

Reviews:

Primary literature:

(Franz et al., 2009) *Describes loss of refractoriness over time in a transgenic line of Aedes aegypti expressing a hairpin RNA derived from dengue-2. Transgenic line originally described by Franz et al PNAS (2006).*

(Sethuraman et al., 2007)

(O'Brochta et al., 2003)

(Adelman et al., 2007) *A mariner/Mos1 transposon expressing Mos1 transposase under control of a nanos-derived promoter fragment in Aedes aegypti can mobilise injected Mos1 transgenes but not itself.*

(Adelman et al., 2004) *Describes a single non-canonical insertion event of a piggyBac-based construct in Aedes aegypti. Multi-copy array including transposase helper. Array is unstable; possibly due to recombination events.*

1.5.1.2 Fitness

Reviews:

(Marrelli et al., 2006) *Reviews literature on laboratory studies of fitness costs for transgenic insects. Concludes that strains with low fitness costs can be constructed; fitness cost is not an unsurmountable obstacle to beneficial field use of transgenic insects.*

(Scott et al., 2002)

(Scott et al., 2008)

Primary literature:

(Catteruccia et al., 2003) *Examined some aspects of fitness of four lines of transgenic mosquitoes. Concluded fitness was poor. This study has been taken to mean that all transgenic mosquitoes will have poor fitness/performance, but this conclusion would be inappropriate due to (i) low number of lines studied and (ii) confounding effects of inbreeding. Irvin et al (PNAS 2004) is a similar study with similar limitations. Several papers from Marcelo-Lorena lab and others demonstrate opposite. Marrelli et al (TiPS 2006) discuss.*

(Marrelli et al., 2007) *Transgenic refractoriness to Plasmodium can confer a net fitness advantage. Effect considered by others to be restricted to specific lab circumstances only (e.g. Lambrechts et al 2008) and not to remove need for gene driver.*

(Lambrechts et al., 2008) *Commentary, with additional modelling, on Marrelli et al (Jacobs-Lorena) PNAS paper indicating that malaria refractoriness can provide an overall fitness advantage. Conclude that gene driver will still be required.*

(Lai et al., 1991)

(Rodrigues et al., 2008) *Describes use of mutated (enzymatically inactive) version of bee venom PLA₂ to confer refractoriness to Plasmodium berghei in Aedes fluviatilis. No fitness cost was observed, in contrast to previous study with unmodified PLA₂ (Moreira et al JBC 2002 and Moreira et al Genetics 2004).*

(Moreira et al., 2004) *Examines fitness of two sets of transgenic mosquitoes engineered for refractoriness to malaria (Plasmodium berghei). Shows that transgenics expressing SM1 have no significant fitness reduction whereas PLA₂ imposes a cost. Later (Rodrigues et al IMB 2008) showed that mutating PLA₂ to remove enzyme activity removes this fitness cost while retaining anti-plasmodium activity.*

(Howell and Benedict, 2009) *Observed no effect of a transgene on fitness of Anopheles arabiensis.*

(Huho et al., 2007) *Comparison of fitness of wild and lab-reared (non-transgenic) Anopheles mosquitoes.*

(Santos et al., 2010) *Fitness studies on mPLA₂ transgenic mosquitoes (Aedes fluviatilis). Found slightly increased body size, no change in insecticide resistance.*

(Morrison et al., 2009) *Mating competitiveness of a RIDL strain of Medfly (Ceratitis capitata) in field cage.*

1.5.2 Cost-effectiveness

Reviews:

Primary literature:

(Atkinson et al., 2007) *Analyses the effectiveness and cost-effectiveness of RIDL/SIT for the control of dengue; concludes that it is an attractive strategy.*

(Rafikov et al., 2009)

(Thomé et al., 2010)

(Esteva and Mo Yang, 2005)

2 Other transgenic insects

2.1 Transformation

Reviews:

(Handler and James, 2000)

(O'Brochta and Handler, 2008)

Primary literature:

(Loukeris et al., 1995) *First transformation of a non-Drosophila insect (Medfly, Ceratitis capitata). Used Minos*

(Sarkar et al., 2006)

(Allen et al., 2004) *First transformation of the New World screwworm, Cochliomyia hominivorax. Used piggyBac.*

(Berghammer et al., 1999) *First transformation of a coleopteran (Tribolium castaneum). Used piggyBac and an eye-specific marker (3xP3).*

(Condon et al., 2007) *First transformation of the Mexican fruit fly Anastrepha ludens. Used piggyBac.*

(Gong and Golic, 2003) *Homologous recombination/integration system in Drosophila melanogaster.*

(Handler and Harrell, 2001) *DsRed better than EGFP*

(Handler and Harrell, 2001) *First transformation of Anastrepha suspensa, used piggyBac.*

(Handler and McCombs, 2000) *Transformation of the Oriental fruit fly Bactrocera dorsalis. Used piggyBac; insertions appeared stable despite presence of endogenous elements.*

(Handler et al., 1998) *Transformation of Medfly (Ceratitis capitata) with piggyBac.*

(Hediger et al., 2001) *First transformation of the house fly Musca domestica; used piggyBac.*

(Horn et al., 2003) *piggyBac-based constructs for transposon mutagenesis, esp enhancer trap. Tested in Drosophila melanogaster but may be suitable for other species.*

(Horn et al., 2002) *Transformation markers: fluorescent proteins expressed under control of eye-specific 3xP3 enhancer.*

(Koukidou et al., 2006) *First transformation of the olive fly Bactrocera oleae. Used Minos.*

(Li et al., 2005) *Minimum cis-acting piggyBac sequences needed for efficient germline transformation.*

(Lorenzen et al., 2003) *piggyBac-based enhancer-trap and remobilisation in Tribolium. Shorter piggyBacs showed higher transformation efficiency than long ones (Table 1)*

(Lorenzen et al., 2007) *Tools for transposon-based mutagenesis in Tribolium castaneum*

(Peloquin et al., 2000) *First transformation of a lepidopteran (pink bollworm, Pectinophora gossypiella). Used piggyBac.*

(Schetelig et al., 2009) *Site-specific recombination in Medfly (Ceratitis capitata) using phage C31 integrase system (see Nimmo et al IMB 2006 and Groth et al Genetics 2004).*

(Scolari et al., 2008) *Fluorescent-labelled sperm in Medfly (Ceratitis capitata)*

(Sumitani et al., 2003) *First transformation of a Hymenopteran (sawfly, Athalia rosae). Used piggyBac.*

(Tamura et al., 2000) *First transformation of the silkworm Bombyx mori. Used piggyBac.*

2.2 SIT/RIDL

Reviews:

(Simmons et al., 2007) *Prospects and progress for use of engineered pink bollworm for area-wide control*

(Alphey, 2007) *Review of the potential application of transgenic methods to SIT. RIDL. Focuses primarily on agricultural insects.*

Primary literature:

(Thomas et al., 2000) *First description of RIDL (Release of Insects carrying a Dominant Lethal genetic system). Theory and proof-of-principle strain construction in Drosophila melanogaster.*

(Gong et al., 2005) *Bisexual-lethal RIDL system and strains for Medfly (Ceratitis capitata), based on tetracycline-repressible positive feedback system.*

(Horn and Wimmer, 2003) *Embryo-specific-lethal tetracycline-based lethal system in Drosophila melanogaster.*

(Schetelig et al., 2009) *Attempt to develop embryo-specific-lethal strains of Medfly (Ceratitis capitata) similar to those of Horn and Wimmer (Nat Biotech 2003). Achieved embryonic lethality, but not strictly embryo-specific. Strain appeared competitive in cage studies.*

(Fu et al., 2007) *Use of alternative splicing for combinatorial control of gene expression. Developed a female-specific RIDL system in Medfly (Ceratitis capitata)*

2.2.1 Genetic sexing

Reviews:

(Marec et al., 2005) *Proposes various methods for genetic sexing in Lepidoptera using classical and/or transgenic methods*

(Saccone et al., 2007) *Discusses genetic sexing in Medfly (Ceratitis capitata) by female-to-male transformation using conditional knockdown of Cctra.*

Primary literature:

(Christophides et al., 2001) *Unsuccessful attempt to engineer sex-specific differential ethanol resistance in Medfly (Ceratitis capitata).*

(Condon et al., 2007) *Genetic sexing through the use of Y-linked transgenes (Medfly, Ceratitis capitata)*

(Heinrich and Scott, 2000) *Tetracycline-repressible female-specific lethal genetic system in Drosophila melanogaster as model for genetic sexing system for SIT.*

2.3 Other

2.3.1 Molecular

2.3.1.1 Stability

Reviews:

Primary literature:

(Dafa'alla et al., 2006) *A method for post-integration removal of transposon sequences to generate transposon-free chromosomal insertions. Demonstrated in Medfly (Ceratitis capitata)*

(Handler et al., 2004)

(Lozovsky et al., 2002) *Engineered mariner elements are extremely stable in Drosophila, much more so than native elements, even when exposed to transposase.*

(O'Brochta et al., 2003)

(Sethuraman et al., 2007)

2.3.1.2 Fitness

Reviews:

Primary literature:

(Allen et al., 2004) *Transgenic screwworm (Cochliomyia hominivorax) have no apparent reduction in larval fitness relative to wild type (8 strains).*

2.3.2 Use and Cost-effectiveness

Reviews:

(Miller, 2007) *Transgenesis and paratransgenesis - economic, political and regulatory difficulties of introducing a new beneficial technology*

Primary literature:

(Alphey et al., 2007) *Describes the potential use of released engineered insects, e.g. female-specific RIDL, to manage potential or actual resistance against other interventions, e.g. Bt crops.*

(Alphey et al., 2008)

(Alphey et al., 2009) *Follows Alphey et al JEE (2007); describes potential use of release of engineered insects, e.g. RIDL, to manage actual or potential resistance to other interventions. Explores a wider range of scenarios, primarily in the context of Bt crops.*

(Schliekelman and Gould, 2000) *Models use of female-killing transgenes for pest control.*

(Schliekelman and Gould, 2000) *Models use of conditional lethal (e.g. temperature-sensitive) transgenes for pest control.*

(Schliekelman et al., 2005) *Models use of sex-ratio distorting transgenes for pest control.*

(Tomita et al., 2003) *Use of transgenic silkworm as protein factories.*

3 Mosquito biology

Relevant to risk assessment

(ECDC, 2009) *Development of Aedes albopictus risk maps for Europe*

(Hemingway et al., 2002) *Overview of insecticide resistance*

3.1 Ecology

Reviews:

(Pates and Curtis, 2005)

3.1.1 Dispersal

Reviews:

(Service, 1997)

(Reiter, 2007) *"Skip oviposition" and implications for control*

Primary literature:

(Reiter, 1998) *Suggests that Aedes albopictus may have spread via trade in used tyres.*

3.1.2 Mating biology

Reviews:

(Howell and Knols, 2009)

(Takken et al., 2006)

Primary literature:

(Ng'habi et al., 2008)

(Okanda et al., 2002)

(Tripet et al., 2003)

3.1.2.1 Mating songs

Primary literature:

(Pennetier et al., 2009) *'Mating songs' based on wing-beat frequency may allow mate recognition and potentially assortative mating in Anopheles gambiae.*

(Warren et al., 2009) *Sexual recognition through matching of flight-tone harmonics in Culex mosquitoes*

(Gibson and Russell, 2006) *Toxorhynchites brevialpis mosquitoes match wing-beat frequency during courtship.*

(Cator et al., 2009) *Male and female Aedes aegypti detect potential partner's wingbeat frequency and adjust as part of courtship.*

(Tripet et al., 2004)

3.1.3 Inter- and intra-species interactions

Reviews:

(Juliano, 2007) *Reviews mosquito population dynamics and implications for control, especially biological control*

(Juliano, 2009) *Reviews ecological interactions between mosquito species*

Primary literature:

(Zhong et al., 2006)

(Dye, 1984) *Models density-dependence in Aedes aegypti, largely based on data from Southwood (1972) Thailand studies.*

(Legros et al., 2009) *Revisits Dye's 1984 model of density-dependence in Aedes aegypti; suggests reduced importance of density dependence.*

(Southwood et al., 1972) *Classic study of Aedes aegypti ecology. Used by many later analyses and models (e.g.) of larval density-dependence (e.g. Dye, 1984; Legros et al 2009)*

(Menge et al., 2005)

3.1.4 Predators and prey

(Blum et al., 1997)

3.1.5 Toxicity of Green Fluorescent Protein

(Richards et al., 2003)

3.2 Monitoring

Reviews:

(Service, 1993)

(Focks and Alexander, 2006)

(Focks, 2003)

(Hagler and Jackson, 2001)

(Silver, 2008)

4 Existing guidance

4.1 Review / commentary

(Angulo and Gilna, 2008a) *Suggests that regulation of GM insects with self-sustaining ("self-spreading") genetics, i.e. gene drive would be extremely difficult, in contrast to self-limiting (e.g. genetically sterile) strains.*

(Angulo and Gilna, 2008b) *Suggests that regulation of GM insects with self-sustaining ("self-spreading") genetics, i.e. gene drive would be extremely difficult, in contrast to self-limiting (e.g. genetically sterile) strains.*

(Benedict et al., 2008) *Guidance for contained field trials of GM mosquitoes with a gene drive system*

(Curtis, 2002)

(Malcolm et al., 2009) *Field site selection for Anopheles arabiensis control by radiation-based SIT. Sudan vs La Réunion.*

(Beech et al., 2009) *Large UNDP-sponsored group with extensive DEC representation examined three hypothetical release strains/strategies.*

(Beech et al., 2009) *Review of current (2009/10) initiatives relating to biosafety, risk assessment/management and ESC aspects of potential use of transgenic mosquitoes for disease control.*

(Pew Initiative on Food and Biotechnology, 2004) *Highlighted some policy issues including potential gaps or uncertainties in US regulatory framework. Led to 2004 Pew conference "Biotech Bugs".*

(Pew Initiative on Food and Biotechnology, 2004) *Proceedings of the conference following the Pew Initiative's 2004 "Bugs in the system?" report on GM insects*

(Mumford et al., 2009) *Introduction to Mosqguide, a WHO-TDR sponsored initiative to develop guidance on the potential deployment of genetically modified (GM) mosquitoes to control vector borne diseases*

(Wozniak, 2007)

(IAEA, 2006) *Proceedings of a meeting in Rome (April 2002). Early, but now somewhat outdated discussion of uses and risk assessment of GM arthropods.*

4.2 Primary text

(NAPPO, 2007) *North American Plant Protection Organization (NAPPO) standard for importation and confined release of GM arthropods*

(American Committee of Medical Entomology, 2003) *Arthropod containment Guidelines (USA)*

(USDA, 2001) *2001 Environmental Assessment (EA) of transgenic pink bollworm*

(USDA, 2006) *2006 Environmental Assessment (EA) of transgenic pink bollworm*

(USDA, 2008) *Final Environmental Impact Statement (EIS) on use of genetically engineered fruit fly and pink bollworm*

(USDA, 2009) *Record of Decision regarding the Final Environmental Impact Statement (FEIS) on the use of genetically engineered fruit fly and pink bollworm. "After a thorough evaluation of the potential impacts of the alternatives considered in the FEIS, APHIS has decided to integrate the use of genetically engineered insects into the sterile insect technique used in agency plant pest control programs."*

5 Citations

Abraham, E.G., Donnelly-Doman, M., Fujioka, H., Ghosh, A., Moreira, L., and Jacobs-Lorena, M. (2005). Driving midgut-specific expression and secretion of a foreign protein in transgenic mosquitoes with AgAper1 regulatory elements. *Insect Molecular Biology* 14, 271-279. [**Describes use of promoter fragment from *Anopheles gambiae* adult peritrophic matrix protein 1 (AgAper1) to drive expression in**

midgut of transgenic mosquitoes. With PLA2, gave ~80% reduction in (refractoriness to) *P. berghei* oocyst formation.]

- Adelman, Z.N., Jasinskiene, N., Onal, S., Juhn, J., Ashikyan, A., Salampessy, M., MacCauley, T., and James, A.A. (2007). *nanos* gene control DNA mediates developmentally regulated transposition in the yellow fever mosquito *Aedes aegypti*. *Proc Natl Acad Sci U S A* 104, 9970-9975. **[A mariner/Mos1 transposon expressing Mos1 transposase under control of a nanos-derived promoter fragment in *Aedes aegypti* can mobilise injected Mos1 transgenes but not itself.]**
- Adelman, Z.N., Jasinskiene, N., Vally, K.J.M., Peek, C., Travanty, E.A., Olson, K.E., Brown, S.E., Stephens, J.L., Knudson, D.L., Coates, C.J., *et al.* (2004). Formation and loss of large, unstable tandem arrays of the *piggyBac* transposable element in the yellow fever mosquito, *Aedes aegypti*. *Transgenic Research* 13, 411-425. **[Describes a single non-canonical insertion event of a piggyBac-based construct in *Aedes aegypti*. Multi-copy array including transposase helper. Array is unstable; possibly due to recombination events.]**
- Allen, M., Berkebile, D., and Skoda, S. (2004). Postlarval fitness of transgenic strains of *Cochliomyia hominivorax* (Diptera: Calliphoridae). *J Econ Entomol* 97, 1181-1185. **[Transgenic screwworm (*Cochliomyia hominivorax*) have no apparent reduction in larval fitness relative to wild type (8 strains).]**
- Allen, M., Handler, A., Berkebile, D., and Skoda, S. (2004). *piggyBac* transformation of the New World screwworm, *Cochliomyia hominivorax*, produces multiple distinct mutant strains. *Med Vet Entomol* 18, 1-9. **[First transformation of the New World screwworm, *Cochliomyia hominivorax*. Used piggyBac.]**
- Allen, M., O'Brochta, D., Atkinson, P., and Levesque, C. (2001). Stable, germ-line transformation of *Culex quinquefasciatus* (Diptera: Culicidae). *J Med Entomol* 38, 701-710. **[First transformation of a *Culex* mosquito.]**
- Alphey, L. (2000). Is RIDL the answer? In *ISB News Report*, pp. 8-10. **[Early, accessible, review of RIDL]**
- Alphey, L. (2002). Re-engineering the Sterile Insect Technique. *Insect Biochem Mol Biol* 32, 1243-1247.
- Alphey, L. (2007). Engineering insects for the Sterile Insect Technique. In *Area-wide control of insect pests: from research to field implementation*, M. Vreysen, A. Robinson, and J. Hendrichs, eds. (Dordrecht, The Netherlands, Springer), pp. 51-60. http://dx.doi.org/10.1007/978-1-4020-6059-5_3 **[Review of the potential application of transgenic methods to SIT. RIDL. Focuses primarily on agricultural insects.]**
- Alphey, L. (2009). Natural and engineered mosquito immunity. *Journal of Biology* 8, 40. <http://jbiol.com/content/8/4/40> **[Short review outlining several approaches to use of mosquito genetic engineering for disease control, including population suppression/population replacement and self-limiting/self-sustaining methods.]**
- Alphey, L., and Andreasen, M.H. (2002). Dominant lethality and insect population control. *Mol Biochem Parasitol* 121, 173-178. **[Review of SIT-RIDL for mosquitoes. Now partially superseded by Alphey, Nimmo, O'Connell and Alphey (2008) [Chapter in Aksoy book] and Alphey, Benedict et al (2010) Vector-Borne and Zoonotic Disease]**
- Alphey, L., Beard, B., Billingsley, P., Coetzee, M., Crisanti, A., Curtis, C.F., Eggleston, P., Godfray, C., Hemingway, J., Jacobs-Lorena, M., *et al.* (2002). Malaria control with genetically modified vectors. *Science* 298, 119-121.
- Alphey, L., Benedict, M.Q., Bellini, R., Clark, G.G., Dame, D., Service, M., and Dobson, S. (2010). Sterile-insect methods for control of mosquito-borne diseases – an analysis. *Vector Borne and Zoonotic Diseases in press*. <http://www.liebertonline.com/doi/abs/10.1089/vbz.2009.0014> **[Comprehensive review of sterile-insect methods for mosquito control. Includes use of *Wolbachia*, genetic engineering (including RIDL) and other advance. Poses and addresses a series of specific questions about sterile-insect methods.]**

- Alphey, L., Nimmo, D., O'Connell, S., and Alphey, N. (2008). Insect population suppression using engineered insects. In *Transgenesis and the management of vector-borne disease*, S. Aksoy, ed. (Austin, Texas, Landes Bioscience), pp. 93-103. <http://www.eurekah.com/chapter/3233> [**Open access review on sterile-insect methods, esp RIDL, for vector (mosquito) control**]
- Alphey, N., Bonsall, M., and Alphey, L. (2009). Combining pest control and resistance management: synergy of engineered insects with Bt crops. *Journal of Economic Entomology* 102, 717-732. [**Follows Alphey et al JEE (2007); describes potential use of release of engineered insects, e.g. RIDL, to manage actual or potential resistance to other interventions. Explores a wider range of scenarios, primarily in the context of Bt crops.**]
- Alphey, N., Coleman, P.G., Bonsall, M., and Alphey, L. (2008). Proportions of different habitat types are critical to the fate of a resistance allele. *Theoretical Ecology* 1, 103-115.
- Alphey, N., Coleman, P.G., Donnelly, C.A., and Alphey, L. (2007). Managing insecticide resistance by mass release of engineered insects. *Journal of Economic Entomology* 100, 1642-1649. [**Describes the potential use of released engineered insects, e.g. female-specific RIDL, to manage potential or actual resistance against other interventions, e.g. Bt crops.**]
- American Committee of Medical Entomology (2003). Arthropod containment guidelines (version 3.1). *Vector Borne Zoonotic Dis* 3, 57 - 98. [**Arthropod containment Guidelines (USA)**]
- Angulo, E., and Gilna, B. (2008a). International law should govern release of GM mosquitoes. *Nature* 454, 158. [**Suggests that regulation of GM insects with self-sustaining ("self-spreading") genetics, i.e. gene drive would be extremely difficult, in contrast to self-limiting (e.g. genetically sterile) strains.**]
- Angulo, E., and Gilna, B. (2008b). When biotech crosses borders. *Nature Biotechnology* 26, 277-282. [**Suggests that regulation of GM insects with self-sustaining ("self-spreading") genetics, i.e. gene drive would be extremely difficult, in contrast to self-limiting (e.g. genetically sterile) strains.**]
- Atkinson, M.P., Su, Z., Alphey, N., Alphey, L.S., Coleman, P.G., and Wein, L.M. (2007). Analyzing the control of mosquito-borne diseases by a dominant lethal genetic system. *Proc Natl Acad Sci U S A* 104, 9540-9545. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=17519336 [**Analyses the effectiveness and cost-effectiveness of RIDL/SIT for the control of dengue; concludes that it is an attractive strategy.**]
- Atkinson, P., Pinkerton, A., and O'Brochta, D. (2001). Genetic transformation systems in insects. *Annu Rev Entomol* 46.
- Beech, C.J., Nagaraju, J., Vasan, S.S., Rose, R.I., Othman, R.Y., Pillai, V., and Saraswathy, T.S. (2009). Risk analysis of a hypothetical open field release of a self-limiting transgenic *Aedes aegypti* mosquito strain to combat dengue *Asian Pacific Journal of Molecular Biology and Biotechnology* 17, 99-111. <http://www.msmbb.org.my/apjmabb/html173/173cont.htm> [**Large UNDP-sponsored group with extensive DEC representation examined three hypothetical release strains/strategies.**]
- Beech, C.J., Vasan, S.S., Quinlan, M.M., Capurro, M.L., Alphey, L.S., Bayard, V., Bouaré, M., McLeod, M.C., Kittayapong, P., Lavery, J.V., *et al.* (2009). Deployment of innovative genetic vector control strategies: Progress on regulatory and biosafety aspects, capacity building and development of best-practice guidance *Asian Pacific Journal of Molecular Biology and Biotechnology* 17, 75-85. <http://www.msmbb.org.my/apjmabb/html173/173cont.htm> [**Review of current (2009/10) initiatives relating to biosafety, risk assessment/management and ESC aspects of potential use of transgenic mosquitoes for disease control.**]
- Benedict, M., and Robinson, A. (2003). The first releases of transgenic mosquitoes: an argument for the sterile insect technique. *Trends Parasitol* 19, 349 - 355.

- Benedict, M.Q., D'Abbs, P., Dobson, S., Gottlieb, M., Harrington, L.C., Higgs, S., James, A.A., James, S., Knols, B.G.J., Lavery, J.V., *et al.* (2008). Guidance for contained field trials of vector mosquitoes engineered to contain a gene drive system: recommendations of a scientific working group. *Vector-Borne and Zoonotic Diseases* 8, 127-166. [**Guidance for contained field trials of GM mosquitoes with a gene drive system**]
- Berghammer, A.J., Klingler, M., and Wimmer, E.A. (1999). A universal marker for transgenic insects. *Nature* 402, 370-371. [**First transformation of a coleopteran (*Tribolium castaneum*). Used *piggyBac* and an eye-specific marker (3xP3).**]
- Blum, S., Basedow, T., and Becker, N. (1997). Culicidae (Diptera) in the diet of predatory stages of anurans (Amphibia) in humid biotopes of the Rhine Valley in Germany. *Journal of Vector Ecology* 22, 23-29.
- Boëte, C., and Koella, J. (2002). A theoretical approach to predicting the success of genetic manipulation of malaria mosquitoes in malaria control. *Malaria J* 1, 3.
- Braig, H., and Yan, G. (2001). The spread of genetic constructs in natural insect populations. In *Genetically Engineered Organisms: Assessing Environmental and Human Health Effects* (Boca Raton, CRC Press).
- Burt, A. (2003). Site-specific selfish genes as tools for the control and genetic engineering of natural populations. *Proc R Soc Lond B Biol Sci* 270, 921-928. [**Potential uses of engineered strains carrying homing endonucleases for manipulating wild populations.**]
- Capurro, M., Coleman, J., Beerntsen, B., Myles, K., Olson, K., Rocha, E., Krettli, A., and James, A. (2000). Virus-expressed, recombinant single-chain antibody blocks sporozoite infection of salivary glands in *Plasmodium gallinaceum*-infected *Aedes aegypti*. *Am J Trop Med Hyg* 62.
- Cator, L.J., Arthur, B.J., Harrington, L.C., and Hoy, R.R. (2009). Harmonic Convergence in the Love Songs of the Dengue Vector Mosquito. *Science* 323, 1077-1079. <http://www.sciencemag.org/cgi/content/abstract/323/5917/1077> [**Male and female *Aedes aegypti* detect potential partner's wingbeat frequency and adjust as part of courtship.**]
- Catteruccia, F. (2007). Malaria vector control in the third millennium: progress and perspectives of molecular approaches. *Pest Manag Sci* 63, 634 - 640. [**Review of molecular genetic research in *Anopheles* mosquitoes, including transgenic mosquitoes.**]
- Catteruccia, F., Benton, J., and Crisanti, A. (2005). An *Anopheles* transgenic sexing strain for vector control. *Nature Biotechnology* 23, 1414-1417. [**Describes transgenic *Anopheles stephensi* mosquitoes expressing fluorescent protein in their gonads and sperm. Allows sex-separation based on gonadal fluorescence from late larval stage.**]
- Catteruccia, F., Crisanti, A., and Wimmer, E. (2009). Transgenic technologies to induce sterility. *Malaria Journal* 8, S7. <http://www.malariajournal.com/content/8/S2/S7> [**Review of potential use of transgenic methods for inducing 'genetic sterility' in mosquitoes for sterile-insect methods (replacing radiation). Negative impact of radiation is noted. Focuses on the authors' research interests: genetic sexing by sex-limited expression of a fluorescent protein; embryo-specific RIDL and dominant male sterility (I-Ppol)**]
- Catteruccia, F., Godfray, H., and Crisanti, A. (2003). Impact of genetic manipulation on the fitness of *Anopheles stephensi* mosquitoes. *Science* 299, 1225-1227. [**Examined some aspects of fitness of four lines of transgenic mosquitoes. Concluded fitness was poor. This study has been taken to mean that all transgenic mosquitoes will have poor fitness/performance, but this conclusion would be inappropriate due to (i) low number of lines studied and (ii) confounding effects of inbreeding. Irvin et al (PNAS 2004) is a similar study with similar limitations. Several papers from Marcelo-Lorena lab and others demonstrate opposite. Marrelli et al (TiPS 2006) discuss.]**]

- Catteruccia, F., Nolan, T., Loukeris, T., Blass, C., Savakis, C., Kafatos, F., and Crisanti, A. (2000). Stable germline transformation of the malaria mosquito *Anopheles stephensi*. *Nature* 405, 959-962. [**First transformation of *Anopheles stephensi*. Used Minos.**]
- Chen, C.-H., Huang, H., Ward, C., Su, J., Schaeffer, L., Guo, M., and Hay, B. (2007). A synthetic maternal-effect selfish genetic element drives population replacement in *Drosophila*. *Science* 316, 597-600. [**Synthetic MEDEA-like gene drive system in *Drosophila melanogaster*.**]
- Christophides, G., Savakis, C., Mintzas, A., and Komitopoulou, K. (2001). Expression and function of the *Drosophila melanogaster* ADH in male *Ceratitis capitata* adults: a potential strategy for medfly sexing based on gene-transfer technology. *Insect Molecular Biology* 10, 249-254. [**Unsuccessful attempt to engineer sex-specific differential ethanol resistance in Medfly (*Ceratitis capitata*).**]
- Coates, C., Jasinskiene, N., Miyashiro, L., and James, A. (1998). Mariner transposition and transformation of the yellow fever mosquito, *Aedes aegypti*. *Proc Natl Acad Sci USA* 95, 3748-3751. [**One of a pair of papers describing the first transformation of a mosquito (*Aedes aegypti*). This paper uses mariner; Jasinskiene et al 1998 PNAS used Hermes.**]
- Condon, K., Condon, G., Dafa'alla, T., Fu, G., Phillips, C., Jin, L., Gong, P., and Alphey, L. (2007). Genetic sexing through the use of Y-linked transgenes. *Insect Biochemistry and Molecular Biology* 37, 1168-1176. [**Genetic sexing through the use of Y-linked transgenes (Medfly, *Ceratitis capitata*)**]
- Condon, K.C., Condon, G.C., Dafa'alla, T.H., Forrester, O.T., Phillips, C.E., Scaife, S., and Alphey, L. (2007). Germ-line transformation of the Mexican fruit fly. *Insect Molecular Biology* 16, 573-580. [**First transformation of the Mexican fruit fly *Anastrepha ludens*. Used piggyBac.**]
- Curtis, C. (1994). The case for malaria control by genetic manipulation of its vectors. *Parasitol Today* 10, 371 - 374.
- Curtis, C., Coleman, P., Kelly, D., and Campbell-Lendrum, D. (2006). Advantages and limitations of transgenic vector control: sterile males vs gene drivers. In *Genetically modified mosquitoes for malaria control*, C. Boëte, ed. (Austin, Texas, Landes Bioscience).
- Curtis, C.F. (1968). Possible use of translocations to fix desirable genes in insect pest populations. *Nature* 218, 368-369.
- Curtis, C.F. (2002). Possible ways of using transgenic mosquitoes for malaria and dengue control and risk assessment. 7th International Symposium on Biosafety of Genetically Modified Organisms, 165 - 175.
- Dafa'alla, T.H., Condon, G.C., Condon, K.C., Phillips, C.E., Morrison, N.I., Jin, L., Epton, M.J., Fu, G., and Alphey, L. (2006). Transposon-free insertions for insect genetic engineering. *Nature Biotechnology* 24, 820-821. [**A method for post-integration removal of transposon sequences to generate transposon-free chromosomal insertions. Demonstrated in Medfly (*Ceratitis capitata*)**]
- Davis, S., Bax, N., and Grewe, P. (2001). Engineered underdominance allows efficient and economic introgression of traits into pest populations. *J theor Biol* 212, 83-98.
- Dimopoulos, G. (2007). Building a better mosquito: identifying the genes enabling malaria and dengue fever resistance in *A. gambiae* and *A. aegypti* mosquitoes. *Journal of Visualized Experiments* 5, 233.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2557083/> [**Video interview with George Dimopoulos. Discusses refractory genes and transgenic mosquitoes.**]
- Dye, C. (1984). Models for the population dynamics of the yellow fever mosquito, *Aedes aegypti*. *Journal of Animal Ecology* 53, 247-268. [**Models density-dependence in *Aedes aegypti*, largely based on data from Southwood (1972) Thailand studies.**]
- ECDC (2009). Development of *Aedes albopictus* risk maps (Stockholm, Sweden, ECDC), pp. 52.
http://ecdc.europa.eu/en/files/pdf/Publications/0905_TER_Development_of_Aedes_albopictus_risk_maps.pdf [**Development of *Aedes albopictus* risk maps for Europe**]

- Esteva, L., and Mo Yang, H. (2005). Mathematical model to assess the control of *Aedes aegypti* mosquitoes by the sterile insect technique. *Mathematical Biosciences* 198, 132-147.
- Focks, D. (2003). A Review of Entomological Sampling Methods and Indicators for Dengue Vectors. , W.S.P.f.R.a.T.i.T.D. (TDR), ed. http://www.who.int/tdr/publications/publications/pdf/dengue_vectors.pdf
- Focks, D.A., and Alexander, N. (2006). Multicountry study of *Aedes aegypti* pupal productivity survey methodology: findings and recommendations (Geneva, Switzerland, WHO-TDR), pp. 48.
- Franz, A., Sanchez-Vargas, I., Adelman, Z., Blair, C., Beaty, B., James, A., and Olson, K. (2006). Engineering RNA interference-based resistance to dengue virus type 2 in genetically modified *Aedes aegypti*. *Proc Nat'l Acad Sci USA* 103, 4198-4203. **[Expression of a hairpin RNA from dengue-2 confers good refractoriness (resistance) to dengue-2 virus in transgenic *Aedes aegypti*.]**
- Franz, A.W.E., Sanchez-Vargas, I., Piper, J., Smith, M.R., Khoo, C.C.H., James, A.A., and Olson, K.E. (2009). Stability and loss of a virus resistance phenotype over time in transgenic mosquitoes harbouring an antiviral effector gene. *Insect Molecular Biology* 18, 661-672. <http://dx.doi.org/10.1111/j.1365-2583.2009.00908.x> **[Describes loss of refractoriness over time in a transgenic line of *Aedes aegypti* expressing a hairpin RNA derived from dengue-2. Transgenic line originally described by Franz et al PNAS (2006).]**
- Fryxell, K., and Miller, T. (1995). Autocidal biological control: a general strategy for insect control based on genetic transformation with a highly conserved gene. *Journal of Economic Entomology* 88, 1221-1232. **[Early proposal to use conditional lethals for insect population control. Focused on a cold-sensitive allele of *Notch*.]**
- Fu, G., Condon, K.C., Epton, M.J., Gong, P., Jin, L., Condon, G.C., Morrison, N.I., Dafa'alla, T.H., and Alphey, L. (2007). Female-specific insect lethality engineered using alternative splicing. *Nature Biotechnology* 25, 353-357. **[Use of alternative splicing for combinatorial control of gene expression. Developed a female-specific RIDL system in Medfly (*Ceratitis capitata*)]**
- Fu, G., Lees, R., Nimmo, D., Aw, D., Jin, L., Gray, P., Berendonk, T., White-Cooper, H., Scaife, S., Phuc, H.K., *et al.* (2010). Female-specific flightless phenotype for mosquito control. *Proc Natl Acad Sci U S A in press*. **[Develop a conditional female-specific flightless strain for sterile-male (RIDL/SIT) control of *Aedes aegypti*.]**
- Gibson, G., and Russell, I. (2006). Flying in tune: sexual recognition in mosquitoes. *Curr Biol* 16, 1311 - 1316. **[*Toxorhynchites brevipalpis* mosquitoes match wing-beat frequency during courtship.]**
- Gong, P., Epton, M.J., Fu, G., Scaife, S., Hiscox, A., Condon, K.C., Condon, G.C., Morrison, N.I., Kelly, D.W., Dafa'alla, T., *et al.* (2005). A dominant lethal genetic system for autocidal control of the Mediterranean fruitfly. *Nat Biotech* 23, 453-456. **[Bisex-lethal RIDL system and strains for Medfly (*Ceratitis capitata*), based on tetracycline-repressible positive feedback system.]**
- Gong, W.J., and Golic, K.G. (2003). Ends-out, or replacement, gene targeting in *Drosophila*. *Proc Natl Acad Sci U S A* 100, 2556-2561. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12589026 **[Homologous recombination/integration system in *Drosophila melanogaster*.]**
- Gould, F., and Schliekelman, P. (2004). Population genetics of autocidal control and strain replacement. *Annu Rev Entomol* 49, 193-217.
- Grossman, G., Rafferty, C., Clayton, J., Stevens, T., Mukabayire, O., and Benedict, M. (2001). Germline transformation of the malaria vector, *Anopheles gambiae*, with the *piggyBac* transposable element. *Insect Molecular Biology* 10, 597-604. **[First transposon-mediated transformation of *Anopheles gambiae*.]**
- Hagler, J.R., and Jackson, C.G. (2001). Methods of marking insects: Current techniques and future prospects. *Annu Rev Entomol* 46, 511 - 543.

- Handler, A. (2002). Use of the *piggyBac* transposon for germ-line transformation of insects. *Insect Biochem Mol Biol* 32, 1211-1220.
- Handler, A., and Harrell, R. (2001). Polyubiquitin-regulated DsRed marker for transgenic insects. *BioTechniques* 31, 820-828. [**DsRed better than EGFP**]
- Handler, A., and James, A. (2000). *Insect transgenesis: methods and applications* (Boca Raton, CRC Press).
- Handler, A., and McCombs, S. (2000). The *piggyBac* transposon mediates germ-line transformation in the Oriental fruit fly and closely related elements exist in its genome. *Insect Molecular Biology* 9, 605-612. [**Transformation of the Oriental fruit fly *Bactrocera dorsalis*. Used *piggyBac*; insertions appeared stable despite presence of endogenous elements.**]
- Handler, A., Zimowska, G., and Horn, C. (2004). Post-integration stabilization of a transposon vector by terminal sequence deletion in *Drosophila melanogaster*. *Nat Biotech* 22, 1150-1154.
- Handler, A.M., and Harrell, R.A.I. (2001). Transformation of the Caribbean fruit fly, *Anastrepha suspensa*, with a *piggyBac* vector marked with polyubiquitin-regulated GFP. *Insect Biochem Mol Biol* 31, 199-205. [**First transformation of *Anastrepha suspensa*, used *piggyBac*.**]
- Handler, A.M., McCombs, S.D., Fraser, M.J., and Saul, S.H. (1998). The lepidopteran transposon vector, *piggyBac*, mediates germ-line transformation in the Mediterranean fruit fly. *Proc Natl Acad Sci U S A* 95, 7520-7525. [**Transformation of Medfly (*Ceratitis capitata*) with *piggyBac*.**]
- Hediger, M., Niessen, M., Wimmer, E.A., Dubendorfer, A., and Bopp, D. (2001). Genetic transformation of the housefly *Musca domestica* with the lepidopteran derived transposon *piggyBac*. *Insect Molecular Biology* 10, 113-119. [**First transformation of the house fly *Musca domestica*; used *piggyBac*.**]
- Heinrich, J.C., and Scott, M.J. (2000). A repressible female-specific lethal genetic system for making transgenic insect strains suitable for a sterile-release program. *Proc Natl Acad Sci USA* 97, 8229-8232. www.pnas.org/cgi/doi/10.1073/pnas.140142697 [**Tetracycline-repressible female-specific lethal genetic system in *Drosophila melanogaster* as model for genetic sexing system for SIT.**]
- Hemingway, J., Field, L., and Vontas, J.G. (2002). An overview of insecticide resistance. *Science* 298, 96-97. [**Overview of insecticide resistance**]
- Horn, C., Offen, N., Nystedt, D., Hacker, U., and Wimmer, E.A. (2003). *piggyBac*-based insertional mutagenesis and enhancer detection as a tool for functional insect genomics. *Genetics* 162, 647-661. [***piggyBac*-based constructs for transposon mutagenesis, esp enhancer trap. Tested in *Drosophila melanogaster* but may be suitable for other species.**]
- Horn, C., Schmid, B.G.M., Pogoda, F.S., and Wimmer, E.A. (2002). Fluorescent transformation markers for insect transgenesis. *Insect Biochem Mol Biol* 32, 1221-1235. [**Transformation markers: fluorescent proteins expressed under control of eye-specific 3xP3 enhancer.**]
- Horn, C., and Wimmer, E.A. (2003). A transgene-based, embryo-specific lethality system for insect pest management. *Nat Biotech* 21, 64-70. [**Embryo-specific-lethal tetracycline-based lethal system in *Drosophila melanogaster*.**]
- Howell, P., and Knols, B.G.J. (2009). Male mating biology. *Malar J* 8, S8.
- Howell, P.I., and Benedict, M.Q. (2009). Mating competitiveness of *Anopheles arabiensis* males as a function of transgenic state and genetic similarity to females. *J Insect Behav.* <http://www.springerlink.com/content/t367125385582216/fulltext.pdf> [**Observed no effect of a transgene on fitness of *Anopheles arabiensis*.**]
- Huho, B.J., Ng'habi, K.R., Killeen, G.F., Nkwengulila, G., Knols, B.G.J., and Ferguson, H.M. (2007). Nature beats nurture: a case study of the physiological fitness of free-living and laboratory-reared male *Anopheles gambiae* s.l. *J Exp Biol* 210, 2939 - 2947. [**Comparison of fitness of wild and lab-reared (non-transgenic) *Anopheles* mosquitoes.**]

- IAEA (2006). Status and risk assessment of the use of transgenic arthropods in plant protection (Vienna, Austria, IAEA), pp. 155. [**Proceedings of a meeting in Rome (April 2002). Early, but now somewhat outdated discussion of uses and risk assessment of GM arthropods.**]
- Ito, J., Ghosh, A., Moreira, L.A., Wimmer, E.A., and Jacobs-Lorena, M. (2002). Transgenic anopheline mosquitoes impaired in transmission of a malaria parasite. *Nature* 417, 452-455.
- James, A. (2002). Engineering mosquito resistance to malaria parasites: the avian malaria model. *Insect Biochem Mol Biol* 32, 1317-1323.
- James, A. (2005). Gene drive systems in mosquitoes: rules of the road. *Trends Parasitol* 21, 64-67.
- James, A.A. (2007). Preventing the spread of malaria and dengue fever using genetically modified mosquitoes. *Journal of Visualized Experiments* 5, 231.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2557084> [**Video interview with Tony James. Discusses various aspect of potential use of transgenic mosquitoes.**]
- Jasinskiene, N., Coates, C., Ashikyan, A., and James, A. (2003). High efficiency, site-specific excision of a marker gene by the phage P1 *cre-loxP* system in the yellow fever mosquito, *Aedes aegypti*. *Nucl Acids Res* 31, e147. [**Shows cre-loxP recombination system works in *Aedes aegypti* for site-specific excision of chromosomal insertion. Did not detect excision with FLP/FRT in similar experiments.**]
- Jasinskiene, N., Coates, C., Benedict, M., Cornel, A., Rafferty, C., James, A., and Collins, F. (1998). Stable transformation of the yellow fever mosquito, *Aedes aegypti*, with the Hermes element from the housefly. *Proc Natl Acad Sci USA* 95, 3743-3747. [**One of a pair of papers describing the first transformation of a mosquito (*Aedes aegypti*). This paper uses Hermes; Coates et al 1998 PNAS used *mariner*.**]
- Juliano, S.A. (2007). Population dynamics. *J Am Mosq Control Assoc* 23 (Suppl 2), 265-275.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2442569/> [**Reviews mosquito population dynamics and implications for control, especially biological control**]
- Juliano, S.A. (2009). Species interactions among larval mosquitoes: context dependence across habitat gradients. *Annu Rev Entomol* 54, 37-56. [**Reviews ecological interactions between mosquito species**]
- Kim, W., Koo, H., Richman, A.M., Seeley, D.C., Vizioli, J., Klocko, A.D., and O'Brochta, D.A. (2004). Ectopic expression of a cecropin transgene in the human malaria vector mosquito *Anopheles gambiae* (Diptera: Culicidae): Effects on susceptibility to *Plasmodium*. *J Med Entomol* 41, 447 - 455.
- Knols, B., Bossin, H., Mukabana, W., and Robinson, A. (2007). Transgenic mosquitoes and the fight against malaria: managing technology push in a turbulent GMO world. *Am J Trop Med Hyg* 77, 232 - 242. [**Opinion piece. Argues for international coordination of introduction and use of GM mosquitoes for disease control.**]
- Knols, B.G.J., and Louis, C., eds. (2006). Bridging laboratory and field research for genetic control of disease vectors : [proceedings of the joint WHO/TDR, NIAD, IAEA and Frontis workshop on bridging laboratory and field research for genetic control of disease vectors, Nairobi, Kenya 14-16 July 2004] (Dordrecht, Springer).
<http://library.wur.nl/ojs/index.php/frontis/issue/view/230/showToc> [**Proceedings of the joint WHO/TDR, NIAD, IAEA and Frontis workshop on bridging laboratory and field research for genetic control of disease vectors, Nairobi, Kenya 14-16 July 2004**]
- Kokoza, V., Ahmed, A., Wimmer, E.A., and Raikhel, A.S. (2001). Efficient transformation of the yellow fever mosquito *Aedes aegypti* using the *piggyBac* transposable element vector pBac[3xP3-EGFP afm]. *Insect Biochem Mol Biol* 31, 1137-1143.
[**Transformation of *Aedes aegypti* using *piggyBac*.**]
- Koukidou, M., Klinakis, A., Reboulakis, C., Zagoraiou, L., Tavernarakis, N., Livadaras, I., Economopoulos, A., and Savakis, C. (2006). Germ line transformation of the olive fly

- Bactrocera oleae* using a versatile transgenesis marker. *Insect Molecular Biology* 15, 95-103. [**First transformation of the olive fly *Bactrocera oleae*. Used *Minos*.**]
- Lai, C.J., Zhao, B.T., Hori, H., and Bray, M. (1991). Infectious RNA transcribed from stably cloned full-length cDNA of dengue type 4 virus. *Proc Natl Acad Sci U S A* 88, 5139-5143.
- Lambrechts, L., Koella, J.C., and Boëte, C. (2008). Can transgenic mosquitoes afford the fitness cost? *Trends in Parasitology* 24, 4-7.
<http://www.sciencedirect.com/science/article/B6W7G-4RfKkM4-1/2/732786a4a8e9fa4969edaaa48df01df6> [**Commentary, with additional modelling, on Marelli et al (Jacobs-Lorena) PNAS paper indicating that malaria refractoriness can provide an overall fitness advantage. Conclude that gene driver will still be required.**]
- Legros, M., Lloyd, A.L., Huang, Y., and Gould, F. (2009). Density-Dependent Intraspecific Competition in the Larval Stage of *Aedes aegypti* (Diptera: Culicidae): Revisiting the Current Paradigm. *Journal of Medical Entomology* 46, 409-419.
<http://dx.doi.org/10.1603/033.046.0301> [**Revisits Dye's 1984 model of density-dependence in *Aedes aegypti*; suggests reduced importance of density dependence.**]
- Li, J. (2004). Simple mathematical models for interacting wild and transgenic mosquito populations. *Mathematical Biosciences* 189, 39-59.
- Li, X., Harrell, R.A., Handler, A.M., Beam, T., Hennessy, K., and Fraser, M.J. (2005). *piggyBac* internal sequences are necessary for efficient transformation of target genomes. *Insect Molecular Biology* 14, 17-30. [**Minimum *cis*-acting *piggyBac* sequences needed for efficient germline transformation.**]
- Lobo, N., Hua-Van, A., Li, X., Nolen, B., and Fraser, M. (2002). Germ line transformation of the yellow fever mosquito, *Aedes aegypti*, mediated by transpositional insertion of a *piggyBac* vector. *Insect Molecular Biology* 11, 133-139. [**Transformation of *Aedes aegypti* using *piggyBac***]
- Lobo, N.F., Clayton, J.R., Fraser, M.J., Kafatos, F.C., and Collins, F.H. (2006). High efficiency germ-line transformation of mosquitoes. *Nature Protocols* 1, 1312-1317. [**Optimised protocols for mosquito transformation**]
- Lorenzen, M.D., Berghammer, A.J., Brown, S.J., Denell, R.E., Klingler, M., and Beeman, R.W. (2003). *piggyBac*-mediated germline transformation in the beetle *Tribolium castaneum*. *Insect Molecular Biology* 12, 433-440. [***piggyBac*-based enhancer-trap and remobilisation in *Tribolium*. Shorter *piggyBacs* showed higher transformation efficiency than long ones (Table 1)**]
- Lorenzen, M.D., Kimzey, T., Shippy, T.D., Brown, S.J., Denell, R.E., and Beeman, R.W. (2007). *piggyBac*-based insertional mutagenesis in *Tribolium castaneum* using donor/helper hybrids. *Insect Molecular Biology* 16, 265-275. [**Tools for transposon-based mutagenesis in *Tribolium castaneum***]
- Loukeris, T.G., Livadaras, I., Arca, B., Zabalou, S., and Savakis, C. (1995). Gene transfer into the medfly, *Ceratitidis capitata*, with a *Drosophila hydei* transposable element. *Science* 270, 2002-2005. [**First transformation of a non-*Drosophila* insect (Medfly, *Ceratitidis capitata*). Used *Minos***]
- Lozovsky, E.R., Nurminsky, D., Wimmer, E.A., and Hartl, D.L. (2002). Unexpected stability of *mariner* transgenes in *Drosophila*. *Genetics* 160, 527-535. [**Engineered *mariner* elements are extremely stable in *Drosophila*, much more so than native elements, even when exposed to transposase.**]
- Lycett, G.J., Kafatos, F.C., and Loukeris, T.G. (2004). Conditional expression in the malaria mosquito *Anopheles stephensi* with Tet-on and Tet-off systems. *Genetics* 167, 1781-1790. [**Conditional expression in *Anopheles stephensi* with Tet-on and Tet-off**]
- Malcolm, C., El Sayed, B., Babiker, A., Girod, R., Fontenille, D., Knols, B., Nugud, A., and Benedict, M. (2009). Field site selection: getting it right first time around. *Malaria Journal* 8, S9. <http://www.malariajournal.com/content/8/S2/S9> [**Field site selection for *Anopheles arabiensis* control by radiation-based SIT. Sudan vs La Réunion.**]

- Marec, F., Neven, L.G., Robinson, A.S., Vreysen, M.J.B., Goldsmith, M.R., Nagaraju, J., and Franz, G. (2005). Development of genetic sexing strains in Lepidoptera: from traditional to transgenic approaches. *J Econ Entomol* 98, 248-259. [**Proposes various methods for genetic sexing in Lepidoptera using classical and/or transgenic methods**]
- Marrelli, M.T., Li, C., Rasgon, J.L., and Jacobs-Lorena, M. (2007). Transgenic malaria-resistant mosquitoes have a fitness advantage when feeding on *Plasmodium*-infected blood. *Proc Natl Acad Sci U S A* 104, 5580-5583. [**Transgenic refractoriness to *Plasmodium* can confer a net fitness advantage. Effect considered by others to be restricted to specific lab circumstances only (e.g. Lambrechts et al 2008) and not to remove need for gene driver.**]
- Marrelli, M.T., Moreira, C.K., Kelly, D., Alphey, L., and Jacobs-Lorena, M. (2006). Mosquito transgenesis: what is the fitness cost? *TRENDS in Parasitology* 22, 197-202. [**Reviews literature on laboratory studies of fitness costs for transgenic insects. Concludes that strains with low fitness costs can be constructed; fitness cost is not an unsurmountable obstacle to beneficial field use of transgenic insects.**]
- Marshall, J. (2008). A branching process for the early spread of a transposable element in a diploid population. *Journal of Mathematical Biology* 57, 811-840. <http://dx.doi.org/10.1007/s00285-008-0190-2> [**Models spread of a transposon-based gene drive system**]
- Marshall, J.M. (2009). The effect of gene drive on containment of transgenic mosquitoes. *Journal of Theoretical Biology* 258, 250-265. <http://www.sciencedirect.com/science/article/B6WMD-4VJM322-5/2/fe076739ef323788ef7793be463bfccb>
- Marshall, J.M., and Taylor, C.E. (2009). Malaria Control with Transgenic Mosquitoes. *PLoS Med* 6, e1000020. <http://dx.doi.org/10.1371/journal.pmed.1000020> [**John Marshall and Charles Taylor review recent advances in the development of transgenic mosquitoes for malaria control.**]
- Medlock, J., Luz, Paula M., Struchiner, Claudio J., and Galvani, Alison P. (2009). The Impact of Transgenic Mosquitoes on Dengue Virulence to Humans and Mosquitoes. *The American Naturalist* 174, 565-577. <http://www.journals.uchicago.edu/doi/abs/10.1086/605403>
- Menge, D., Guda, T., Zhong, D., Pai, A., Zhou, G., Beier, J., Gouagna, L., and Yan, G. (2005). Fitness consequences of *Anopheles gambiae* population hybridization. *Malar J* 4.
- Miller, L., Sakai, R., Romans, P., Gwadz, R., Kantoff, P., and Coon, H. (1987). Stable integration and expression of a bacterial gene in the mosquito *Anopheles gambiae*. *Science* 237, 779-781. <http://www.sciencemag.org/cgi/content/abstract/237/4816/779> [**First genetic transformation of *Anopheles gambiae*. Used a *P* element vector but insertion appears not to have been transposon-mediated and does not form a reliable or reproducible method.**]
- Miller, T.A. (2007). Applying insect transgenic technology: Scientific and regulatory experiences. *Entomological Research* 37, 65-75. [**Transgenesis and paratransgenesis - economic, political and regulatory difficulties of introducing a new beneficial technology**]
- Moreira, L., Ito, J., Ghosh, A., Devenport, M., Zieler, H., Abraham, E., Crisanti, A., Nolan, T., Catteruccia, F., and Jacobs-Lorena, M. (2002). Bee venom phospholipase inhibits malaria parasite development in transgenic mosquitoes. *Journal of Biological Chemistry* 277, 40839-40843. [**Describes construction of transgenic *Anopheles stephensi* mosquitoes refractory to transmission of a rodent malaria due to expression of a bee venom phospholipase. Later shown to impose significant fitness penalty (Moreira et al Genetics 2004); may be possible to overcome this by modifying the phospholipase.**]
- Moreira, L., Wang, J., Collins, F., and Jacobs-Lorena, M. (2004). Fitness of anopheline mosquitoes expressing transgenes that inhibit *Plasmodium* development. *Genetics*

- 166, 1337-1341. [Examines fitness of two sets of transgenic mosquitoes engineered for refractoriness to malaria (*Plasmodium berghei*). Shows that transgenics expressing SM1 have no significant fitness reduction whereas PLA2 imposes a cost. Later (Rodrigues et al IMB 2008) showed that mutating PLA2 to remove enzyme activity removes this fitness cost while retaining anti-plasmodium activity.]
- Moreira, L.A., Edwards, M.J., Adhami, F., Jasinskiene, N., James, A.A., and Jacobs-Lorena, M. (2000). Robust gut-specific gene expression in transgenic *Aedes aegypti* mosquitoes. Proceedings of the National Academy of Sciences of the United States of America 97, 10895-10898. [Describes use of promoter fragments from *Aedes aegypti* and *Anopheles gambiae* carboxypeptidase genes to drive blood meal-inducible midgut expression in transgenic *Aedes aegypti*.]
- Morris, A.C., Eggleston, P., and Crampton, J.M. (1989). Genetic transformation of the mosquito *Aedes aegypti* by micro-injection of DNA. Med Vet Entomol 3, 1-7. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=2519641 [Transformation of *Aedes aegypti* with P element plasmids. Integration not easily reproducible; probably not transposon-mediated.]
- Morrison, N.I., Segura, D.F., Stainton, K.C., Fu, G., Donnelly, C.A., and Alphey, L.S. (2009). Sexual competitiveness of a transgenic sexing strain of the Mediterranean fruit fly, *Ceratitis capitata*. Entomologia Experimentalis et Applicata 133, 146-153. [Mating competitiveness of a RIDL strain of Medfly (*Ceratitis capitata*) in field cage.]
- Mumford, J., Quinlan, M.M., Beech, C.J., Alphey, L., Bayard, V., Capurro, M.L., Kittayapong, P., Knight, J.D., Marrelli, M.T., Ombongi, K., et al. (2009). MosqGuide: A project to develop best practice guidance for the deployment of innovative genetic vector control strategies for malaria and dengue Asian Pacific Journal of Molecular Biology and Biotechnology 17, 93-95. <http://www.msmbb.org.my/apjmbb/html173/173cont.htm> [Introduction to Mosqguide, a WHO-TDR sponsored initiative to develop guidance on the potential deployment of genetically modified (GM) mosquitoes to control vector borne diseases]
- NAPPO (2007). RSPM27 "Guidelines for Importation and Confined Field Release of Transgenic Arthropods in NAPPO Member Countries" (NAPPO, Ottawa, Canada). <http://www.nappo.org/Standards/Authors/RSPMNo.27-authors-e.html> [North American Plant Protection Organization (NAPPO) standard for importation and confined release of GM arthropods]
- Ng'habi, K.R., Huho, B.J., Nkwengulila, G., Killeen, G.F., Knols, B.G.J., and Ferguson, H.M. (2008). Sexual selection in mosquito swarms: may the best man lose? Anim Behav 76, 105 - 112.
- Nimmo, D., Alphey, L., Meredith, J., and Eggleston, P. (2006). High efficiency site-specific genetic engineering of the mosquito genome. Insect Molecular Biology 15, 129-136. [First description of a site-specific integration system in a non-Drosophila insect. Phage C31 integrase system in the mosquito *Aedes aegypti*.]
- Nolan, T., Bower, T., Brown, A., Crisanti, A., and Catteruccia, F. (2002). piggyBac-mediated germline transformation of the malaria mosquito *Anopheles stephensi* using the red fluorescent protein dsRED as a selectable marker. J Biol Chem 277, 8759-8762. [piggyBac-mediated transformation of *Anopheles stephensi*]
- O'Brochta, D., and Handler, A. (2008). Perspectives on the state of insect transgenics. Adv Exp Med Biol 627, 1-18.
- O'Brochta, D.A., Sethuraman, N., Wilson, R., Hice, R.H., Pinkerton, A.C., Levesque, C.S., Bideshi, D.K., Jasinskiene, N., Coates, C.J., James, A.A., et al. (2003). Gene vector and transposable element behavior in mosquitoes. J Exp Biol 206, 3823-3834. <http://jeb.biologists.org/cgi/content/abstract/206/21/3823>
- Okanda, F.M., Dao, A., Njiru, B.N., Arija, J., Akelo, H.A., Toure, Y., Odulaja, A., Beier, J.C., Githure, J.I., and Yan, G. (2002). Behavioural determinants of gene flow in malaria vector populations: *Anopheles gambiae* males select large females as mates. Malar J 1, 10.

- Olson, K.E., Alphey, L., Carlson, J., and James, A.A. (2006). Genetic approaches in *Aedes aegypti* for control of dengue: an overview. In Bridging Laboratory and Field Research for Genetic Control of Disease Vectors, B.G.J. Knols, and C. Louis, eds. (Heidelberg, Springer), p. 210.
- Papathanos, P., Bossin, H., Benedict, M., Catteruccia, F., Malcolm, C., Alphey, L., and Crisanti, A. (2009). Sex separation strategies: past experience and new approaches. *Malaria Journal* 8, S5. <http://www.malariajournal.com/content/8/S2/S5>
- Pates, H., and Curtis, C.F. (2005). Mosquito behaviour and vector control. *Annual Review of Entomology* 50, 53-70.
- Peloquin, J.J., Thibault, S.T., Staten, R., and Miller, T.A. (2000). Germ-line transformation of pink bollworm (Lepidoptera: Gelechiidae) mediated by the *piggyBac* transposable element. *Insect Mol Biol* 9, 323-333. [**First transformation of a lepidopteran (pink bollworm, *Pectinophora gossypiella*). Used *piggyBac*.**]
- Pennetier, C., Warren, B., Dabiré, K.R., Russell, I.J., and Gibson, G. (2009). "Singing on the Wing" as a Mechanism for Species Recognition in the Malarial Mosquito *Anopheles gambiae*. *Curr Biol* 20, 131-136. [http://www.cell.com/current-biology/abstract/S0960-9822\(09\)02055-7](http://www.cell.com/current-biology/abstract/S0960-9822(09)02055-7) [**'Mating songs' based on wing-beat frequency may allow mate recognition and potentially assortative mating in *Anopheles gambiae*.**]
- Perera, O., Harrell, R., and Handler, A. (2002). Germ-line transformation of the South American malaria vector, *Anopheles albimanus*, with a piggyBac-EGFP transposon vector is routine and highly efficient. *Insect Molecular Biology* 11, 291-297. [**First transformation of *Anopheles albimanus*.**]
- Pew Initiative on Food and Biotechnology (2004). Biotech bugs: a look at the science and public policy surrounding the release of genetically modified insects (Washington, DC, Pew Initiative on Food and Biotechnology). http://www.pewtrusts.org/news_room_detail.aspx?id=36776 also conference audio file at http://www.pewtrusts.org/news_room_detail.aspx?id=36996 and http://www.pewtrusts.org/news_room_detail.aspx?id=36998 [**Proceedings of the conference following the Pew Initiative's 2004 "Bugs in the system?" report on GM insects]**
- Pew Initiative on Food and Biotechnology (2004). Bugs in the System? Issues in the science and regulation of genetically modified insects (Washington, DC, Pew Initiative on Food and Biotechnology), pp. 109. http://www.pewtrusts.org/our_work_report_detail.aspx?id=17984 [**Highlighted some policy issues including potential gaps or uncertainties in US regulatory framework. Led to 2004 Pew conference "Biotech Bugs".**]
- Phuc, H.K., Andreasen, M.H., Burton, R.S., Vass, C., Epton, M.J., Pape, G., Fu, G., Condon, K.C., Scaife, S., Donnelly, C.A., *et al.* (2007). Late-acting dominant lethal genetic systems and mosquito control. *BMC Biology* 5, 11. <http://www.biomedcentral.com/1741-7007/5/11> [**Show by mathematical modelling that late-acting lethality would be advantageous in sterile male (RIDL/SIT) control of mosquitoes. Construct a transgenic strain of *Aedes aegypti* with the necessary repressible, late-acting dominant lethality.**]
- Pinkerton, A.C., Michel, K., O'Brochta, D.A., and Atkinson, P.W. (2000). Green fluorescent protein as a genetic marker in transgenic *Aedes aegypti*. *Insect Molecular Biology* 9, 1-10. [**EGFP as transformation marker in *Aedes aegypti***]
- Rafikov, M., Bevilacqua, L., and Wyse, A.P.P. (2009). Optimal control strategy of malaria vector using genetically modified mosquitoes. *Journal of Theoretical Biology* 258, 418-425. <http://www.sciencedirect.com/science/article/B6WMD-4T6M88N-3/2/95298903bc71251665a9274aa5ce33fd>
- Rasgon, J.L. (2009). Multi-Locus Assortment (MLA) for Transgene Dispersal and Elimination in Mosquito Populations. *PLoS ONE* 4, e5833. <http://dx.doi.org/10.1371/journal.pone.0005833>

- Reiter, P. (1998). *Aedes albopictus* and the world trade in used tires, 1988-1995: the shape of things to come? *J Am Mosq Control Assoc* 14, 83-94. [**Suggests that *Aedes albopictus* may have spread via trade in used tyres.**]
- Reiter, P. (2007). Oviposition, Dispersal, and Survival in *Aedes aegypti*: Implications for the Efficacy of Control Strategies. *Vector-Borne and Zoonotic Diseases* 7, 261-274. <http://www.liebertonline.com/doi/abs/10.1089/vbz.2006.0630> [**"Skip oviposition" and implications for control**]
- Richards, H.A., Han, C.-T., Hopkins, R.G., Failla, M.L., Ward, W.W., and Stewart, C.N.J. (2003). Safety Assessment of Recombinant Green Fluorescent Protein Orally Administered to Weaned Rats. *The Journal of Nutrition* 133, 1909-1912.
- Rodrigues, F.G., Oliveira, S.B., Rocha, B.C., and Moreira, L.A. (2006). Germline transformation of *Aedes fluviatilis* (Diptera:Culicidae) with the *piggyBac* transposable element. *Mem Inst Oswaldo Cruz* 101, 755-757. [**First transformation of *Aedes fluviatilis*. Used *piggyBac*.**]
- Rodrigues, F.G., Santos, M.N., De Carvalho, T.X.T., Rocha, B.C., Riehle, M.A., Pimenta, P.F.P., Abraham, E.G., Jacobs-Lorena, M., Alves De Brito, C.F., and Moreira, L.A. (2008). Expression of a mutated phospholipase A₂ in transgenic *Aedes fluviatilis* mosquitoes impacts *Plasmodium gallinaceum* development. *Insect Molecular Biology* 17, 175-183. [**Describes use of mutated (enzymatically inactive) version of bee venom PLA₂ to confer refractoriness to *Plasmodium berghei* in *Aedes fluviatilis*. No fitness cost was observed, in contrast to previous study with unmodified PLA₂ (Moreira et al JBC 2002 and Moreira et al Genetics 2004).**]
- Saccone, G., Pane, A., de Simone, A., Salvemini, M., Milano, A., Annunziata, L., Mauro, U., and Polito, L.C. (2007). New sexing strains for Mediterranean fruit fly *Ceratitis capitata*: transforming females into males. In *Area-wide control of insect pests: from research to field implementation*, M.J.B. Vreysen, A.S. Robinson, and J. Hendrichs, eds. (Dordrecht, The Netherlands, Springer), pp. 95-102. [**Discusses genetic sexing in Medfly (*Ceratitis capitata*) by female-to-male transformation using conditional knockdown of *Cctra*.**]
- Santos, M.N., Nogueira, P.M., Dias, F.B.S., Valle, D., and Moreira, L.A. (2010). Fitness aspects of transgenic *Aedes fluviatilis* mosquitoes expressing a *Plasmodium*-blocking molecule. *Transgenic Research in press*. [**Fitness studies on mPLA₂ transgenic mosquitoes (*Aedes fluviatilis*). Found slightly increased body size, no change in insecticide resistance.**]
- Sarkar, A., Atapattu, A., Belikoff, E., Heinrich, J., Li, X., Horn, C., Wimmer, E., and Scott, M. (2006). Insulated *piggyBac* vectors for insect transgenesis. *BMC Biotechnology* 6, 27.
- Schetelig, M.F., Caceres, C., Zacharopoulou, A., Franz, G., and Wimmer, E.A. (2009). Conditional embryonic lethality to improve the sterile insect technique in *Ceratitis capitata* (Diptera: Tephritidae). *BMC Biology* 7, 4. [**Attempt to develop embryo-specific-lethal strains of Medfly (*Ceratitis capitata*) similar to those of Horn and Wimmer (Nat Biotech 2003). Achieved embryonic lethality, but not strictly embryo-specific. Strain appeared competitive in cage studies.**]
- Schetelig, M.F., Scolari, F., Handler, A.M., Kittelmann, S., Gasperi, G., and Wimmer, E.A. (2009). Site-specific recombination for the modification of transgenic strains of the Mediterranean fruit fly *Ceratitis capitata*. *Proc Natl Acad Sci U S A* 106, 18171-18176. [**Site-specific recombination in Medfly (*Ceratitis capitata*) using phage C31 integrase system (see Nimmo et al IMB 2006 and Groth et al Genetics 2004).**]
- Schliekelman, P., Ellner, S., and Gould, F. (2005). Pest control by genetic manipulation of sex ratio. *J Econ Entomol* 98, 18-34. [**Models use of sex-ratio distorting transgenes for pest control.**]
- Schliekelman, P., and Gould, F. (2000). Pest Control by the Introduction of a Conditional Lethal Trait on Multiple Loci: Potential, Limitations, and Optimal Strategies. *Journal of Economic Entomology* 93, 1543-1565. [**Models use of conditional lethal (e.g. temperature-sensitive) transgenes for pest control.**]

- Schliekelman, P., and Gould, F. (2000). Pest control by the release of insects carrying a female-killing allele on multiple loci. *J Econ Entomol* 93, 1566 - 1579. **[Models use of female-killing transgenes for pest control.]**
- Scolari, F., Schetelig, M.F., Bertin, S., Malacrida, A.R., Gasperi, G., and Wimmer, E.A. (2008). Fluorescent sperm marking to improve the fight against the pest insect *Ceratitis capitata* (Wiedemann; Diptera: Tephritidae). *New Biotechnol* 25, 76 - 84. **[Fluorescent-labelled sperm in Medfly (*Ceratitis capitata*)]**
- Scott, T., Takken, W., Knols, B., and Boëte, C. (2002). The ecology of genetically modified mosquitoes. *Science* 298, 117-119.
- Scott, T.W., Harrington, L.C., Knols, B.G.J., and Takken, W. (2008). Applications of mosquito ecology for successful transgenic based disease prevention programs. In *Transgenesis and the management of vector-borne disease*, S. Aksoy, ed. (Austin, Texas, Landes Bioscience), pp. 151-168.
- Service, M. (1993). *Mosquito Ecology. Field Sampling Methods*, 2nd edn (London, Chapman and Hall).
- Service, M. (1997). Mosquito (Diptera: Culicidae) dispersal--the long and short of it. *Journal of Medical Entomology* 34, 579-588.
- Sethuraman, N., Fraser, M.J., Eggleston, P., and O'Brochta, D. (2007). Post-integration stability of *piggyBac* in *Aedes aegypti*. *Insect Biochem Mol Biol* 37, 941-951.
- Silver, J. (2008). *Mosquito Ecology: Field sampling methods*, 3rd edn (The Netherlands, Springer).
- Simmons, G.S., Alphey, L.S., Vasquez, T., Morrison, N.I., Epton, M.J., Miller, E., Miller, T.A., and Staten, R.T. (2007). Potential use of a conditional lethal transgenic pink bollworm *Pectinophora gossypiella* in area-wide eradication or suppression programmes. In *Area-wide control of insect pests*, M.B. Vreysen, A.S. Robinson, and J. Hendrichs, eds. (Dordrecht, Springer Netherlands), pp. 119-123. **[Prospects and progress for use of engineered pink bollworm for area-wide control]**
- Sinkins, S., and Gould, F. (2006). Gene drive systems for insect disease vectors. *Nature Reviews Genetics* 7, 427-435.
- Smith, R.C., Walter, M.F., Hice, R.H., O'Brochta, D.A., and Atkinson, P.W. (2007). Testis-specific expression of the beta2 tubulin promoter of *Aedes aegypti* and its application as a genetic sex-separation marker. *Insect Molecular Biology* 16, 61-71. **[Fluorescent-labelled sperm in *Aedes aegypti*.]**
- Southwood, T., Murdie, G., Yasuno, M., Tonn, R., and Reader, P. (1972). Studies on the life budget of *Aedes aegypti* in Wat Samphaya, Bangkok, Thailand. *Bull World Health Organ* 46, 211-226. **[Classic study of *Aedes aegypti* ecology. Used by many later analyses and models (e.g.) of larval density-dependence (e.g. Dye, 1984; Legros et al 2009)]**
- Struchiner, C.J., Kidwell, M.G., and Ribeiro, J.M.C. (2005). Population dynamics of transposable elements: copy number regulation and species invasion requirements. *Journal of Biological Systems* 13, 455-475. **[Models invasion and spread of autonomous transposons.]**
- Sumitani, M., Yamamoto, D.S., Oishi, K., Lee, J.M., and Hatakeyama, M. (2003). Germline transformation of the sawfly, *Athalia rosae* (Hymenoptera: Symphyta), mediated by a *piggyBac*-derived vector. *Insect Biochem Mol Biol* 33, 449-458. **[First transformation of a Hymenopteran (sawfly, *Athalia rosae*). Used *piggyBac*.]**
- Takken, W., Constantini, C., Dolo, G., Hassanali, A., Sagnon, N., and Osir, E. (2006). Mosquito mating behavior. *Bridging Laboratory and Field Research for Genetic Control of Disease Vectors*, 183 - 188.
- Tamura, T., Thibert, C., Royer, C., Kanda, T., Eappen, A., Kamba, M., Komoto, N., Thomas, J.-L., Mauchamp, B., Chavancy, G., et al. (2000). Germline transformation of the silkworm *Bombyx mori* L. using a *piggyBac* transposon-derived vector. *Nat Biotech* 18, 81-84. **[First transformation of the silkworm *Bombyx mori*. Used *piggyBac*.]**
- Thomas, D.D., Donnelly, C.A., Wood, R.J., and Alphey, L.S. (2000). Insect population control using a dominant, repressible, lethal genetic system. *Science* 287, 2474-2476.

[First description of RIDL (Release of Insects carrying a Dominant Lethal genetic system). Theory and proof-of-principle strain construction in *Drosophila melanogaster*.]

- Thomé, R.C.A., Yang, H.M., and Esteva, L. (2010). Optimal control of *Aedes aegypti* mosquitoes by the sterile insect technique and insecticide. *Mathematical Biosciences* 223, 12-23.
- Tomita, M., Munetsuna, H., Sato, T., Adachi, T., Hino, R., Hayashi, M., Shimizu, K., Nakamura, N., Tamura, T., and Yoshizato, K. (2003). Transgenic silkworms produce recombinant human type III procollagen in cocoons. *Nature Biotechnology* 21, 52-56. **[Use of transgenic silkworm as protein factories.]**
- Tripet, F., Dolo, G., Traore, S., and Lanzaro, G.C. (2004). The "wingbeat hypothesis" of reproductive isolation between members of the *Anopheles gambiae* complex (Diptera: Culicidae) does not fly. *J Med Entomol* 41, 375 - 384.
- Tripet, F., Toure, Y.T., Dolo, G., and Lanzaro, G.C. (2003). Frequency of multiple inseminations in field collected *Anopheles gambiae* females revealed by DNA analysis of transferred sperm. *Am J Trop Med Hyg* 68, 1 - 5.
- USDA (2001). Availability of Environmental Assessment and Finding of No Significant Impact for a Confined Field Test of Genetically Engineered Pink Bollworm M.a.R.P. United States Department of Agriculture, Animal and Plant Health Inspection Service, ed. **[2001 Environmental Assessment (EA) of transgenic pink bollworm]**
- USDA (2006). Availability of an Addendum to an Environmental Assessment for Field Release of Genetically Engineered Pink Bollworm M.a.R.P. United States Department of Agriculture, Animal and Plant Health Inspection Service, ed. (Federal Register). **[2006 Environmental Assessment (EA) of transgenic pink bollworm]**
- USDA (2008). Final Environmental Impact Statement Use of Genetically Engineered Fruit Fly and Pink Bollworm in APHIS PLant Pest Control Programs, M.a.R.P. United States Department of Agriculture, Animal and PLant Health Inspection Service, ed. (Riverdale MD 20737, USDA). http://www.aphis.usda.gov/plant_health/ea/geneng.shtml **[Final Environmental Impact Statement (EIS) on use of genetically engineered fruit fly and pink bollworm]**
- USDA (2009). Use of Genetically Engineered Fruit Fly and Pink Bollworm in APHIS Plant Pest Control Programs: Record of Decision, U.S.D.o. Agriculture, ed. (Federal Register, Federal Register), pp. 21314 -21316. http://www.aphis.usda.gov/plant_health/ea/geneng.shtml **[Record of Decision regarding the Final Environmental Impact Statement (FEIS) on the use of genetically engineered fruit fly and pink bollworm. "After a thorough evaluation of the potential impacts of the alternatives considered in the FEIS, APHIS has decided to integrate the use of genetically engineered insects into the sterile insect technique used in agency plant pest control programs."]**
- Warren, B., Gibson, G., and Russell, I.J. (2009). Sex Recognition through Midflight Mating Duets in *Culex* Mosquitoes Is Mediated by Acoustic Distortion. *Current Biology* 19, 485-491. <http://www.sciencedirect.com/science/article/B6VRT-4VTMHBD-1/2/698cd273cbe0bca55073321be5e1c678> **[Sexual recognition through matching of flight-tone harmonics in *Culex* mosquitoes]**
- Wilke, A.B.B., Gomes, A.d.C., Natal, D., and Marrelli, M.T. (2009). Controle de vetores utilizando mosquitos geneticamente modificados / Control of vector populations using genetically modified mosquitoes. *Rev Saude Publica* 43, 869-874. http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S0034-89102009000500017&nrm=iso **[Evaluates classical and transgenic SIT (RIDL) for *Aedes aegypti* control. Concludes that RIDL would be a valuable component of an integrated control program.]**
- Wimmer, E. (2003). Applications of insect transgenesis. *Nat Rev Genet* 4, 225-232.
- Windbichler, N., Papathanos, P.A., and Crisanti, A. (2008). Targeting the X chromosome during spermatogenesis induces Y chromosome transmission ratio distortion and early dominant embryo lethality in *Anopheles gambiae*. *PLoS Genet* 4, e1000291.

<http://www.plosgenetics.org/article/info%3Adoi%2F10.1371%2Fjournal.pgen.1000291>

[Expressed the homing endonuclease I-Ppol in male germline of *Anopheles gambiae*. Intended to get X-shredding and male bias in progeny. Observed complete dominant male sterility. Molecular data indicate some preferential cutting of X chromosome. Lack of male progeny may be due to carry-over of enzyme to embryos.]

Wozniak, C.A. (2007). Regulatory impact on insect biotechnology and pest management. *Entomological Research* 37, 221-230.

Zhong, D., Temu, E.A., Guda, T., Gouagna, L., Menge, D., Pai, A., Githure, J., Beier, J.C., and Yan, G. (2006). Dynamics of Gene Introgression in the African Malaria Vector *Anopheles gambiae*. *Genetics* 172, 2359-2365.

<http://www.genetics.org/cgi/content/abstract/172/4/2359>