

APPENDIX

Table S1: Subspecies identifications, references, years and countries of collect of *C. pipiens* strains samplings. For *C. pipiens* subspecies determination, see reference ².

| Mosquito strains | <i>C. pipiens</i> subspecies | Years and countries of collect | References |
|------------------|------------------------------|--------------------------------|------------|
| Slab | <i>quinquefasciatus</i> | 1950, California | 1 |
| La Var | <i>pipiens</i> | 2003, France | 2 |
| Bifa | <i>pipiens</i> | 2002, France | 2 |
| MaClo | <i>quinquefasciatus</i> | 1984, California | 3 |
| Istambul | <i>pipiens</i> | 2003, Turkey | 2 |
| Tunis | <i>molestus</i> | 1992, Tunisia | 4 |
| Bismuth | <i>pipiens</i> | 2003, Tunisia | 2 |
| Kol | <i>pipiens</i> | 2001, Crete | 5 |
| Ducos | <i>quinquefasciatus</i> | 2003, Martinique | 2 |
| Keo | <i>pipiens</i> | 2003, Cyprus | 2 |
| Kara | <i>quinquefasciatus</i> | 2003, China | 2 |
| BJBJT | <i>quinquefasciatus</i> | 2003, China | 2 |

References (TableS1)

1. Georghiou, G. P., Metcalf, R. L., Gidden, F. E. 1966 Carbamate-resistance in mosquitoes: selection of *Culex pipiens fatigans* Wied (= *Culex quinquefasciatus*) for resistance to Baygon. *Bulletin of the World Health Organization* **35**, 691-708.
2. Duron, O., Lagnel, J., Raymond, M., Bourtzis, K., Fort, P. & Weill, M. 2005 Transposable element polymorphism of *Wolbachia* in the mosquito *Culex pipiens*: evidence of genetic diversity, super-infection and recombination. *Molecular Ecology* **14**, 1561-1573.
3. derived from Selax strain, see : Raymond, M., Pasteur, N., Georghiou, G. P., Mellon, R. B., Wirth, M. C. & Hawley, M. K. 1987 Detoxification esterases new to California, USA, in organophosphate-resistant *Culex quinquefasciatus* (Diptera: Culicidae). *Journal of Medical Entomology* **24**, 24-27.

4. Ben Cheikh, H., Ben Ali-Haouas, Z., Marquine, M. & Pasteur, N. 1998 Resistance to organophosphorus and pyrethroid insecticides in *Culex pipiens* (Diptera: Culicidae) from Tunisia. *Journal of Medical Entomology* **35**, 251-260.

5. Unpublished data.

Table S2: Population numeration, references, years and countries of collect of *C. pipiens* field population samplings.

| N° | Name | Years and countries of collect | References |
|----|-----------|--------------------------------|------------|
| 1 | Ferreira | 1993, Portugal | 1 |
| 2 | Praias | 1993, Portugal | 2 |
| 3 | Menthe | 1996, Spain | 3 |
| 4 | Lotto | 1996, Spain | 3 |
| 5 | Ganges | 2002, France | 4 |
| 6 | Maurin | 2001, France | 4 |
| 7 | SB90 | 1990, France | 4 |
| 8 | SB01 | 2001, France | 4 |
| 9 | Martigues | 1997, France | 5 |
| 10 | Padova | 1994, Italia | 1 |
| 11 | G5 | 1997, Algeria | 4 |
| 12 | Bled | 1996, Tunisia | 4 |
| 13 | Douze | 2003, Tunisia | 4 |
| 14 | Tunis | 1992, Tunisia | 6 |
| 15 | Bismuth | 2003, Tunisia | 4 |
| 16 | Menzel | 1996, Tunisia | 4 |
| 17 | Gourbi | 1996, Tunisia | 4 |
| 18 | Kunupia | 2002, Crete | 4 |
| 19 | Plage | 2002, Crete | 4 |

References (Table S2)

1. Duron, O., Lagnel, J., Raymond, M., Bourtzis, K., Fort, P. & Weill, M. 2005 Transposable element polymorphism of *Wolbachia* in the mosquito *Culex pipiens*: evidence of genetic diversity, super-infection and recombination. *Molecular Ecology* **14**, 1561-1573.
2. Bourguet, D., Capela, R. & Raymond, M. 1996 An insensitive acetylcholinesterase in *Culex pipiens* L. mosquitoes from Portugal. *Journal of Economic Entomology* **89**, 1060-1066.
3. Eritja, R. & Aranda, C. 1995 Preliminary observations on sex-related variation in a morphological character of *Culex pipiens* (Diptera: Culicidae) larvae in northeastern Spain. *Mosquito Systematics* **27**, 73-77.
4. Unpublished data.
5. Bourguet, D., Lenormand, T., Guillemaud, T., Marcel, V., Fournier, D., Raymond, M. 1997 Variation of dominance of newly arisen adaptive genes. *Genetics* **147**, 1225-1234.
6. Ben Cheikh, H., Ben Ali-Haouas, Z., Marquine, M. & Pasteur, N. 1998 Resistance to organophosphorus and pyrethroid insecticides in *Culex pipiens* (Diptera: Culicidae) from Tunisia. *Journal of Medical Entomology* **35**, 251-260.

Table S3: Amplimers used for the analysis. List of the amplimers used to specifically amplify WO prophage open reading frames (ORFs). For each ORF are indicated clusters from which PCR originated, forward and reverse primers and sizes of the resulting PCR products.

| ORF | Cluster | Forward primer | Reverse primer | Size (bp) |
|-------|--------------|------------------------------|-----------------------------|-----------|
| Gp1b | C | 5'- AAGTGGCTGGAAAATGTATAAC | 5'- TGAGTTTGCTATTTACTGCTAG | 307 |
| Gp2a | A | 5'- GCAAATATTTTAGGTGAGGCGC | 5'- ACGGAGTTCTCCACAAAGTACT | 363 |
| Gp2b | B | 5'- CGTAGTGGCATTGAATTTAACC | 5'- ACGGAGTTCTCCACAAAGTACT | 642 |
| Gp2d | D | 5'- AGAACACCCTGGTGAAAATACC | 5'- ACGGAGTTCTCCACAAAGTACT | 586 |
| Gp2e | G | 5'- TTCTACAACAGATGATCAAACG | 5'- CATCATCGGCCTACATAGCCA | 306 |
| Gp3a | A | 5'- AAGTGGGTTTGATGAAAAATGT | 5'- TACATCATCATGCGGAATGTGC | 1339 |
| Gp3b | B | 5'- CAGAGGTCTTTCAATTGAAAAG | 5'- GCGGTTATAAAAATTTAAATGCA | 428 |
| Gp3c | <i>orf7c</i> | 5'- CAGAGGTCTTTCAATTGAAAAG | 5'- AAGAACTTCAGTACGATACTTG | 196 |
| Gp3d | D | 5'- AAGTGGGTTTGATGAAAAATGT | 5'- AAGAACTTCAGTACGATACTTG | 361 |
| Gp7d | I | 5'- AAAAGGTTCTACAAGATTTTTGAA | 5'- CCTTTATAACCTCTTGGCATTGT | 423 |
| Gp9a | A | 5'- TTTTGCCATTGCAGAGTTACAG | 5'- TGATAACTCTCCCAATGGT | 220 |
| Gp9b | B | 5'- GATTTTCAGAGCTGAATAGGAAG | 5'- GCTTCTCTTTATCATATAACAGT | 332 |
| Gp15a | C-Q-D | 5' TGTGACTACTAATGCTTCAGGA | 5' CTCCTCACAGTATTCGAGTTT | 296 |
| Gp15b | R | 5' GTAGAAGCAAAGAGTTTGTTG | 5' CTCCTCACAGTATTCGAGTTT | 484 |
| Gp24a | C | 5' AGGTAAGTATGGTAAGCTTGGG | 5' AGAGCAAATGGGAATAACTGCA | 706 |
| Gp24b | V | 5' ATAAGCTACTTGGATTTACCAC | 5' GGAATCCATAGGCATAACTGCA | 398 |

Table S4: wPip variants. 66 *Wolbachia* variants were identified among *C. pipiens* strains and field populations using the presence/absence PCR patterns of 10 WO phage and *Tr1* markers. *Wolbachia* variants in the Pel strain remain to be determined. Variants are defined by 10 digit-letter-digit codes, which describe respectively the ORF number, the cluster (see Table 1) and the PCR status (presence (1) or absence (0)). For each variant the number of occurrence (n) in populations is indicated. Laboratory strains are considered as single field individuals but at least 4 mosquitoes were analysed for each strain. * indicate laboratory strains.

| N° | Wolbachia WO variants | Tr1 | n | mosquitoes (strains and field populations) |
|----|---|---------|----|--|
| 1 | 1b1-2a1-2b0-2e1-3a1-3b0-3c1-3d0-15a0-15b1 | wPip1+4 | 1 | Slab* |
| 2 | 1b1-2a1-2b0-2e1-3a1-3b0-3c1-3d0-15a0-15b1 | wPip3 | 3 | pop 5 |
| 3 | 1b1-2a1-2b0-2e1-3a1-3b0-3c1-3d0-15a0-15b0 | wPip1 | 1 | pop 3 |
| 4 | 1b1-2a1-2b0-2e1-3a0-3b0-3c1-3d0-15a0-15b1 | wPip1 | 2 | pop 6 |
| 5 | 1b1-2a1-2b0-2e1-3a0-3b0-3c1-3d0-15a0-15b1 | wPip3 | 8 | LaVar*; pop 4 and 5 |
| 6 | 1b1-2a1-2b0-2e1-3a0-3b0-3c1-3d0-15a0-15b0 | wPip3 | 3 | pop 1, 5 and 7 |
| 7 | 1b0-2a1-2b0-2e1-3a0-3b0-3c1-3d0-15a0-15b1 | wPip1 | 4 | pop 3, 6 and 7 |
| 8 | 1b0-2a1-2b0-2e1-3a0-3b0-3c1-3d0-15a0-15b1 | wPip3 | 15 | pop 1, 3, 4, 5, 6 and 7 |
| 9 | 1b1-2a1-2b0-2e0-3a1-3b1-3c1-3d0-15a0-15b1 | wPip1 | 1 | pop 1 |
| 10 | 1b1-2a1-2b0-2e0-3a1-3b1-3c1-3d0-15a0-15b1 | wPip4 | 1 | MaClo* |
| 11 | 1b0-2a1-2b1-2e1-3a1-3b1-3c0-3d1-15a1-15b0 | wPip3 | 76 | Tunis*; Kol*; Bismuth*; pop 12, 13, 14, 15, 16, 17,18 and 19 |
| 12 | 1b0-2a1-2b1-2e1-3a1-3b1-3c0-3d1-15a1-15b0 | wPip1 | 1 | Bifa-A* |
| 13 | 1b1-2a0-2b0-2e1-3a1-3b0-3c1-3d0-15a0-15b1 | wPip3 | 1 | Ducos* |
| 14 | 1b0-2a0-2b1-2e1-3a1-3b0-3c1-3d0-15a0-15b1 | wPip2-B | 4 | Keo-A* |
| 15 | 1b0-2a0-2b1-2e1-3a0-3b0-3c1-3d0-15a0-15b1 | wPip2-B | 9 | Keo-B* |
| 16 | 1b1-2a0-2b0-2e0-3a1-3b0-3c0-3d1-15a1-15b0 | wPip3 | 1 | Kara-A* |
| 17 | 1b0-2a0-2b0-2e0-3a1-3b0-3c0-3d1-15a1-15b0 | wPip3 | 1 | Kara-B* |
| 18 | 1b0-2a0-2b0-2e0-3a0-3b0-3c0-3d1-15a1-15b0 | wPip3 | 1 | Kara-C* |
| 19 | 1b1-2a0-2b0-2e1-3a1-3b1-3c0-3d0-15a1-15b0 | wPip3 | 2 | BJBJT-A*; Sphae-B* |
| 20 | 1b1-2a0-2b0-2e1-3a1-3b0-3c0-3d1-15a1-15b0 | wPip3 | 1 | BJBJT-B* |
| 21 | 1b1-2a0-2b0-2e0-3a1-3b1-3c0-3d0-15a1-15b0 | wPip3 | 1 | BJBJT-C* |
| 22 | 1b0-2a1-2b0-2e0-3a0-3b0-3c0-3d0-15a1-15b0 | wPip3 | 1 | Barriol* |
| 23 | 1b0-2a1-2b0-2e0-3a0-3b0-3c0-3d0-15a0-15b0 | wPip3 | 4 | pop 1 and 6 |
| 24 | 1b0-2a1-2b0-2e0-3a0-3b0-3c0-3d0-15a0-15b1 | wPip3 | 1 | pop 1 |
| 25 | 1b1-2a1-2b0-2e0-3a0-3b0-3c1-3d0-15a0-15b1 | wPip4 | 1 | Selax* |
| 26 | 1b1-2a0-2b0-2e1-3a1-3b1-3c1-3d1-15a0-15b0 | wPip1 | 1 | Sphae-A* |
| 27 | 1b1-2a0-2b1-2e0-3a1-3b1-3c1-3d1-15a0-15b0 | wPip3 | 1 | Sphae-C* |
| 28 | 1b0-2a1-2b1-2e0-3a0-3b1-3c0-3d1-15a1-15b0 | wPip3 | 1 | Espro-A* |
| 29 | 1b0-2a1-2b1-2e0-3a0-3b1-3c0-3d0-15a1-15b0 | wPip3 | 2 | Espro-B*; pop 16 |
| 30 | 1b0-2a1-2b1-2e1-3a1-3b0-3c0-3d1-15a1-15b0 | wPip3 | 1 | Mart* |
| 31 | 1b1-2a0-2b1-2e1-3a1-3b1-3c1-3d1-15a0-15b0 | wPip3 | 14 | Istambul*; pop 11 |
| 32 | 1b1-2a1-2b1-2e1-3a0-3b1-3c0-3d1-15a1-15b0 | wPip3 | 1 | pop 2 and 3 |
| 33 | 1b1-2a0-2b1-2e1-3a1-3b1-3c0-3d1-15a1-15b0 | wPip3 | 1 | pop 2 |
| 34 | 1b1-2a0-2b1-2e1-3a1-3b1-3c0-3d0-15a1-15b0 | wPip3 | 1 | pop 2 |
| 35 | 1b1-2a0-2b1-2e1-3a0-3b1-3c0-3d1-15a1-15b0 | wPip3 | 2 | pop 2 |
| 36 | 1b0-2a1-2b0-2e1-3a1-3b0-3c1-3d0-15a0-15b1 | wPip1 | 1 | Bifa-B*; pop 3 |
| 37 | 1b0-2a1-2b0-2e1-3a0-3b0-3c0-3d0-15a0-15b1 | wPip1 | 1 | pop 5 |
| 38 | 1b0-2a1-2b0-2e1-3a0-3b0-3c0-3d0-15a0-15b1 | wPip3 | 2 | pop 3 |
| 39 | 1b1-2a0-2b0-2e1-3a0-3b0-3c1-3d0-15a0-15b1 | wPip3 | 4 | pop 4, 5 and 8 |
| 40 | 1b1-2a0-2b0-2e1-3a0-3b0-3c1-3d0-15a0-15b0 | wPip3 | 1 | pop 8 |
| 41 | 1b1-2a1-2b0-2e0-3a0-3b1-3c0-3d0-15a0-15b0 | wPip1 | 1 | pop 4 |
| 42 | 1b0-2a1-2b0-2e0-3a0-3b0-3c1-3d0-15a0-15b0 | wPip3 | 2 | pop 5 and 6 |
| 43 | 1b0-2a1-2b0-2e1-3a0-3b0-3c1-3d0-15a0-15b0 | wPip3 | 1 | pop 7 |
| 44 | 1b1-2a0-2b0-2e1-3a0-3b0-3c0-3d0-15a0-15b1 | wPip3 | 1 | pop 6 |
| 45 | 1b1-2a0-2b0-2e1-3a0-3b0-3c0-3d0-15a0-15b0 | wPip3 | 1 | pop 7 |
| 46 | 1b0-2a0-2b0-2e1-3a0-3b0-3c1-3d1-15a0-15b1 | wPip3 | 4 | pop 8 |
| 47 | 1b1-2a1-2b0-2e1-3a1-3b0-3c1-3d1-15a0-15b1 | wPip1 | 1 | pop 8 |
| 48 | 1b1-2a1-2b0-2e0-3a0-3b0-3c0-3d0-15a0-15b0 | wPip3 | 1 | pop 7 |
| 49 | 1b1-2a1-2b0-2e1-3a0-3b0-3c0-3d0-15a0-15b0 | wPip1 | 1 | pop 7 |
| 50 | 1b1-2a1-2b1-2e1-3a0-3b0-3c1-3d0-15a0-15b1 | wPip1 | 4 | pop 9 |
| 51 | 1b1-2a1-2b1-2e1-3a0-3b0-3c1-3d0-15a0-15b1 | wPip3 | 1 | pop 9 |
| 52 | 1b1-2a1-2b1-2e1-3a0-3b0-3c1-3d0-15a0-15b0 | wPip3 | 1 | pop 9 |
| 53 | 1b1-2a1-2b1-2e1-3a0-3b0-3c0-3d1-15a0-15b0 | wPip3 | 1 | pop 9 |
| 54 | 1b0-2a0-2b0-2e0-3a0-3b0-3c1-3d0-15a0-15b1 | wPip3 | 1 | pop 9 |
| 55 | 1b1-2a1-2b1-2e0-3a0-3b0-3c1-3d1-15a0-15b1 | wPip1 | 1 | pop 9 |
| 56 | 1b1-2a1-2b1-2e1-3a0-3b1-3c1-3d1-15a0-15b0 | wPip3 | 2 | pop 10 |
| 57 | 1b1-2a0-2b1-2e1-3a0-3b1-3c1-3d1-15a0-15b0 | wPip3 | 2 | pop 10 |
| 58 | 1b0-2a1-2b1-2e1-3a0-3b1-3c0-3d1-15a1-15b0 | wPip3 | 1 | pop 19 |
| 59 | 1b0-2a1-2b1-2e1-3a0-3b1-3c0-3d1-15a0-15b0 | wPip3 | 1 | pop 16 |
| 60 | 1b0-2a1-2b1-2e1-3a1-3b1-3c0-3d0-15a0-15b0 | wPip3 | 1 | pop 16 |
| 61 | 1b1-2a1-2b0-2e1-3a0-3b0-3c0-3d1-15a0-15b0 | wPip3 | 1 | pop 5 |
| 62 | 1b0-2a0-2b0-2e0-3a0-3b0-3c0-3d0-15a0-15b1 | wPip3 | 1 | pop 5 |
| 63 | 1b1-2a0-2b0-2e0-3a0-3b0-3c1-3d0-15a0-15b1 | wPip3 | 1 | pop 5 |
| 64 | 1b1-2a1-2b1-2e1-3a1-3b1-3c0-3d1-15a1-15b0 | wPip1 | 1 | pop 2 |
| 65 | 1b1-2a1-2b1-2e1-3a1-3b1-3c0-3d1-15a1-15b0 | wPip3 | 2 | pop 2 |
| 66 | 1b1-2a1-2b0-2e1-3a1-3b0-3c1-3d0-15a0-15b1 | wPip1 | 7 | pop 4, 7 and 8 |
| 67 | 1b1-2a1-2b1-2e1-3a1-3b1-3c0-3d1-15a1-15b1 | wPip1+3 | | Pel* |