

- frustration ..... 52, 673, 688  
 funding mechanisms ..... 223, 677, 687, 689  
 fungi ..... 155, 599, 929  
   acaropathogenic ..... 260  
   entomopathogenic ..... 41, 42, 240, 932  
   fungicide ..... 598  
   toxins ..... 343
- G**
- gametogenesis ..... 845  
 Gates Foundation ..... 805  
 gelatinisation ..... 99  
 gender ..... 94, 434, 445, 720, 737  
 gene ..... 60, 87, 148, 835, 848  
   expression ..... 647, 816, 850, 851, 933, 936  
   delivery ..... 646, 649  
   dispersal ..... 650  
   editing ..... 355, 471, 809, 811, 835, 843  
   functions ..... 155, 815, 826, 835  
   lateral transfer ..... 852  
   lethal ..... 471, 646, 816  
   mitochondrial ..... 282, 290, 308, 312, 883  
   pool ..... 237  
   selfish ..... 798  
   scissor ..... 796, 806  
   sex determination ..... 815-818, 826, 829, 846  
   targeting ..... 648  
 gene drives ..... 645-652, 795-806, 809-831, 849-852  
   anticipatable negative side effects ..... 806  
   applications ..... 809  
   competing repair mechanisms ..... 798  
   constructs ..... 238, 798, 799, 817, 824, 827  
   CRISPR-based ..... 795-806, 818, 849  
   daisy-chain drives ..... 803, 829  
   evolutionary instability ..... 798  
   interventions ..... 806  
   irreversibility ..... 795, 801, 803  
   mechanisms ..... 355, 647, 651  
   modification/manipulation drives ..... 796, 800  
   nuclease-based ..... 852  
   population replacement ..... 818, 824  
   proposals ..... 652  
   regulation ..... 831  
   research ..... 800, 803-806, 813, 818  
   resistance alleles ..... 798, 809, 818, 829, 848, 851  
   resistance mechanisms ..... 355  
   reversal drives ..... 803  
   risks ..... 799, 800, 851  
   selective pressures ..... 818  
   suppression drives ..... 796, 800, 817  
   systems ..... 650, 651, 817, 818, 825, 829, 849  
   technologies ..... 355, 651, 801, 805, 806, 811, 818  
   transgenic ..... 474  
   weapon-like effects ..... 801

- gene flow ..... 309, 861  
   genetic boundaries ..... 860  
   impediments ..... 860  
   interspecific ..... 800  
   pattern ..... 306  
   sex-biased ..... 311
- genetic
- adaptation ..... 469  
   alterations ..... 647, 648  
   background ..... 286, 374, 378, 385  
   changes ..... 237  
   control ..... 238, 471, 843-845  
   differentiation ..... 282, 307, 309, 862-864  
   distance ..... 310, 862, 863, 866  
   divergence ..... 311, 465  
   diversity ..... 309-312, 415, 799, 818, 860  
   engineering ..... 648-651, 791, 796, 798, 851  
   heterogeneity ..... 307  
   isolation ..... 282, 861  
   markers ..... 312, 555, 860  
   modifications ..... 237, 339, 372, 382, 443, 474, 639, 646-649, 817, 824, 830-834  
   monitoring ..... 357  
   relatedness ..... 469  
   resources ..... 655, 656, 663-665  
   selfish elements ..... 801, 813  
   sex ratio distorters ..... 844-852  
   sexing methods ..... 410  
   sexing strains ..... 129, 132, 176, 201, 210, 416, 734  
   traits ..... 813-817, 824, 833, 834, 844  
   variability ..... 306-311, 315, 799
- genetically modified
- cotton ..... 56, 60  
 crops ..... 819-822, 831  
 diamondback moth ..... 646, 833, 929  
 mosquitoes ..... 345, 352, 354-357, 406, 646, 651, 803, 833  
 stable flies ..... 238, 243
- genetically modified organisms (GMOs) ..... 238, 345, 356, 645, 646, 801, 819  
 non-transgenic ..... 819  
 regulation ..... 645-652, 819-822, 831-833  
 releases ..... 410, 651, 819, 822, 827, 832, 833  
 self-limiting ..... 650-652  
 technologies ..... 646
- genome editing ..... 645-649, 652, 806, 809-835, 843, 848  
 cisgenesis ..... 647  
 homing endonucleases ..... 471, 798, 806, 813, 848  
 intragenesis ..... 647  
 meganucleases ..... 648, 809, 812  
 side effects ..... 826, 833  
 site-directed nucleases ..... 645-649  
 transcription activator-like effector nucleases (TALEN) ..... 648, 798, 812, 813, 848

- zinc finger nucleases (ZFN)...648, 809, 812, 813, 848  
 genome rearrangements ..... 650, 936  
 genome reduction ..... 936  
 genome-edited organisms ... 820, 821, 831, 832  
 genomics..... 809, 920, 936  
 geographic ..... 55, 66, 320, 673, 674, 830, 895  
     barriers..... 308  
     boundaries ..... 471  
     distance ..... 309, 311, 862  
     distribution...17, 20, 21, 34, 166, 222, 280,  
         305, 311, 314, 315, 522, 861  
     expansion..... 189, 506, 515  
     information systems (GIS)...285, 310, 326,  
         413, 483, 484, 488, 546, 551, 582, 640,  
         765, 772, 859, 860, 898, 903, 910  
     isolation ..... 131, 139, 309, 312, 880  
     layers ..... 489  
     range ... 51, 87, 309, 340, 374, 505, 506, 515  
         scales ..... 114, 305, 306, 606, 861, 903  
     geometric tools..... 860  
     geometric morphometrics ..... 282  
 Germany ..... 822, 835  
     BASF ..... 821  
     Bayer Crop Science ..... 821  
     Federal Ministry of Education and Research  
         ..... 820  
 Fraunhofer Institute for Molecular Biology  
     and Applied Ecology ..... 809  
 German Life Sciences Association ..... 820  
 Heidelberg ..... 449  
 Justus-Liebig-University ..... 809  
 Mosquito Atlas ..... 731  
 Regensburg ..... 324  
 germline..... 377, 814, 818, 829, 849  
     cells..... 647  
     development ..... 815  
     infections ..... 375  
 Ghana ..... 859  
 giant peacock moth ..... 779  
 global agricultural production..... 162  
 Global Eradication and Response Database  
     (GERDA)..... 505-515, 870  
 global positioning system (GPS)....331, 413,  
     437-440, 606, 718, 860, 910  
     coordinates..... 588  
     flight recorders..... 69  
     handheld units..... 20, 559  
     locations..... 56  
     mapping ..... 51  
     navigation system ..... 440  
     technology ..... 606  
 globalisation ..... 505, 515, 730  
 goats ..... 564  
 grain..... 26, 75  
     management..... 722  
     production..... 234  
     storage practices ..... 722, 723  
 Grand Cayman Island ..... 356  
 grape berry moth ..... 594  
 grape tortrix ..... 594  
 grapes ..... 581-594, 597-612, 658, 779  
     bunch rot..... 583, 599  
     in must..... 589  
     industry...129, 582, 583, 593, 597, 598, 676  
         processing ..... 588, 589, 591  
         table...97, 108, 130, 131, 139, 181, 188, 602,  
             611  
     wine..... 124, 583, 589, 597, 598, 602, 611  
 grazing..... 433, 442  
     lands ..... 561, 562  
     overgrazing ..... 298  
     pressure ..... 282  
 greater wax moth ..... 240, 936  
 Greece ..... 810  
     University of Patras ..... 917  
 green fluorescent protein ..... 934  
 Green Revolution ..... 619  
 greenhouses ..... 6-12, 658  
     crops ..... 658  
     gases ..... 162, 488  
 ground ..... 144, 152, 545, 555, 861  
     adulticiding ..... 333, 334  
     applications..... 59, 529, 598, 605, 606, 907  
     bait sprays..... 199, 486, 529, 530, 912  
     fogging ..... 859  
     larviciding ..... 330, 331  
     releases...102, 103, 129, 132, 135, 139, 202,  
         203, 223, 290, 295, 450, 531-533, 913  
     shipment ..... 356  
     spray rigs ..... 76  
     spraying...277, 469, 484, 497, 531, 605-609,  
         768, 910  
     surveys ..... 771  
     teams ..... 770-775  
     transport ..... 914  
     truthing ..... 260, 413  
     water ..... 75, 78, 120  
 growers..... 669-689, 695-706  
     assessments ..... 55  
     associations ..... 19, 34, 225  
     buy-in ..... 118, 133  
     community ..... 63, 66, 138  
     groups ..... 674, 675, 686, 701, 892  
     key ..... 702  
     knowledge ..... 703  
     liaisons ..... 590-592  
     negligent ..... 678  
     organic ..... 119, 123, 611  
     part-time ..... 698, 699  
     statutory levy ..... 131  
     surveys ..... 695, 706  
     uncooperative ..... 675  
     union ..... 199, 210  
 growth rates...166, 489, 490, 598, 617, 886, 935  
 guabiroba ..... 219, 220

Guatemala...175-179, 183, 483-501, 531, 535  
 709-725  
 border with El Salvador and Honduras .178,  
 179  
 border with Mexico.....176, 198  
 coffee production areas...486, 491, 495, 499  
 Community Development Councils.....715-  
 717  
 containment barrier.....177-179  
 El Pino .....135, 176, 177, 522  
 Jutiapa.....711-724  
 land use map .....499  
 National Chagas Vector Control  
     Programme .....715, 716  
 northern .....166, 184  
 Petén .....177, 184  
 San Miguel Petapa .....176  
 soil maps.....599  
 south-eastern .....711  
 south-western.....490, 491, 501  
 Universidad de San Carlos.....718  
 Universidad del Valle .....709, 718  
 Guatemala-Mexico-USA Moscamed  
     Programme ...161, 175, 185, 188, 297, 483,  
 485, 519, 521, 522, 526  
 guava fruit fly .....167  
 guavas.....186, 491, 520  
     pineapple guavas.....219, 220  
 guide RNA...648, 799, 813, 814, 818, 829, 847,  
 848, 851  
 guided surveillance areas .....544, 546  
 Guillain-Barré syndrome .....340  
 Guinea .....859  
     forests .....276  
 Gulf of Mexico .....320, 565, 568  
 Guyana .....186, 188  
 gypsy moth...505, 510, 511, 515, 551-559, 779,  
 783, 788, 789  
 Slow the Spread Programme..510, 511, 551-  
 557, 788  
 tropical gypsy moth.. .....896

**H**

habitat...4, 73, 87, 121, 254, 310, 319, 670, 720,  
 789, 827, 920  
 aquatic .....322  
 cryptic.....350, 470  
 desert locust .....766-772  
 estuary .....320  
 fragmentation.....276, 862  
 larval.....349, 445, 450  
 manipulation.....618, 628  
 mosquito breeding...320, 329, 331, 336, 339,  
     346, 445, 641, 741, 748, 749, 758  
 natural.....289, 320, 562, 922  
 overwintering.....71  
 patches .....862, 863

residential .....323  
 rice bund .....621  
 rural .....899  
 salt marsh.....320, 323, 329, 332, 333  
 screwworm .....306, 310  
 suitability....261, 278, 280, 292-296, 300,  
     862, 864, 865  
 tsetse.....276-300, 862-866  
 urban.....285, 899  
 vector .....641  
 habituation .....603, 782, 791  
 haemocoel .....918, 931  
 haemocytes .....935  
 haemorrhagic fever.....341, 810  
 Haiti .....535  
 Hamilton, W. D. .....844  
 Hantaan virus.....810  
 hatching-in-installment .....436  
 heat.....154, 870  
     metabolic .....136, 239  
     shock .....816, 828, 936  
     treatment .....589  
     units.....484  
 hemizygous distorter males .....847  
 herbicides .....40, 907  
     tolerance .....646  
 herbivores .....18, 618, 656, 659  
     antiherbivore defence response.....933  
     invasive .....23  
     natural enemy interactions .....4, 29  
     plant interplay .....25, 933  
 herd immunity .....341, 748  
 heredity  
     functional units .....663  
     Mendelian rules .....796, 813, 814, 825  
 heterogametic .....845, 849  
     sex .....844  
     species .....843, 844, 846, 850  
 heterozygote to homozygote.....796, 814  
 heuristics .....622  
 high-rise  
     apartment blocks.....749, 750  
     urban environment.....747-749  
 high-throughput sequencing .....917  
 Holocene .....309, 311  
 homing .....814, 818, 829  
     endonucleases...471, 798, 806, 809, 813, 848  
     guide RNA...648, 799, 813, 814, 818, 829,  
         847, 848, 851  
 homogametic sex .....844  
 Honduras .....178, 179, 182, 183, 188, 711  
 honeydew .....4, 149  
 honeydew moth .....594  
 hopperburn .....618  
 horizontal.....100, 700  
     distance .....390  
     networks .....703  
     rotation .....390

- transgene transfer.....852  
 transmission.....386  
 horn flies.....234, 238, 242, 463-476  
   distribution.....465  
   Japan.....465  
   North America.....464, 466, 475  
   South America.....466  
   Taiwan.....465  
   Viet Nam.....465  
 horse nettle.....933  
 horses.....242, 277  
 horticultural.....130, 514, 694  
   commodities.....161, 163, 883  
   crops.....164, 514  
   exporting countries.....687  
   exports.....162, 171  
   industries....163, 164, 168, 170, 177-180,  
     184, 186, 694, 701  
   landscapes.....672  
   losses.....682  
   operations.....698  
   pests.....670, 674, 693  
   production..161-164, 167, 169-171, 184, 672  
   products...162, 163, 171-175, 189, 534, 535,  
     671  
   systems.....899  
 host...34, 40, 82, 146, 167, 242, 254, 257, 340,  
 371-376, 476, 491, 800, 918-923, 928-935  
   alternate ..135, 139, 197, 220, 224, 618, 620  
   areas.....34, 179, 534, 674, 675  
   associations.....252, 473, 476  
   availability...199, 219, 489, 492, 493, 495,  
     789  
   bovid.....259  
   cells.....473, 477, 919  
   defences.....918, 930  
   development ..918  
   diet.....920-923  
   exploitation.....917, 922  
   feeding.....23, 27  
   finding.....150, 151  
   fitness .....376, 934, 937  
   free periods.....65  
   fruit...149, 150, 155, 217, 220, 520, 529,  
     530, 676, 870  
   fruiting season.....150  
   human .....340, 354, 824  
   immune response ..474  
   invertebrate.....379  
   manipulating reproduction.....370, 471  
   metabolism ..919  
   mosquito ..376, 385,  
   native .....220, 378, 385, 466  
   neglected plants ..129  
   non-commercial.....786  
   phenology .....502  
   plant..4, 9, 137, 146, 151, 154, 514, 563,  
     567, 568, 571-574, 587, 681, 704, 777  
   plant cultivation.....5, 6  
   plant density ..42, 899  
   plant management.....135  
   plant responses ..907  
   primary .....94  
   preferences ..143, 150, 218, 933  
   public lands ..677  
   range.....146, 164, 368, 525, 582, 660, 671  
   removal.....512, 570  
   reproduction ..370, 471, 919  
   resistance ..256  
   resources.....468, 474  
   risk.....675  
   scarcity ..148  
   secondary.....588  
   speciation.....919  
   status.....173  
   suitable ..235, 534  
   surveys.....220  
   survival.....919  
   symbiont co-evolutionary patterns.....919  
   trees..41, 111, 114-116, 150, 529, 531, 552,  
     880, 926  
   unsuitable ..220  
   vertebrate.....252  
   wild.....111, 114, 219, 528, 530, 574  
 hot spots...107, 115, 243, 295, 529, 531, 677,  
 736, 737, 786, 898, 912  
 house fly .....234, 815  
 household moves ..553  
 housing improvement.....640, 711  
 Huanglongbing ..33-43, 914  
 human  
   activity.....243, 309, 311, 657, 825  
   behaviour.....346, 674, 683  
   capital.....139  
   capacity ..343, 638  
   cells ..811, 848  
   disease vectors.....736, 809  
   diseases.....260, 858  
   errors ..802, 898, 910  
   evolution.....797  
   factors.....102, 539  
   filariasis.....472  
   genome ..811  
   health...171, 319, 352, 407, 507, 514, 605,  
     651, 656, 660, 825, 831, 918  
   host.....340, 353, 824  
   immune system.....826  
   infections ..921  
   intrusion.....277  
   landing catches ..740  
   motivation.....683  
   movement.....165, 166, 640, 641  
   onchocerciasis ..635  
   pathogens.....260, 368, 919, 922, 930  
   population..252, 277, 340-343, 410, 634,  
     635, 639, 730, 823, 826, 827, 835

- population acceptance ..... 451
- population density ..... 276, 336, 733, 749
- population engagement ..... 344
- population growth ..... 161, 321
- population increase ..... 162, 163, 170
- resources...113, 118, 119, 130, 223, 296, 342, 521, 546, 548, 549, 577
- role ..... 805
- safety ..... 830
- settlement ..... 858
- suffering ..... 637
- human African trypanosomosis ..... 276, 857
- hybrid dysgenesis ..... 311
- hydrogen fuel cell ..... 905
- hydrological ..... 442
  - changes ..... 433, 442
  - strategy ..... 442
- hydrolysed ..... 312, 937
- proteins ..... 217, 218
  - yeast ..... 152, 202
- hyperparasitoids ..... 19, 22, 23, 25-27
- hypopygium ..... 436
- hypoxia ..... 154, 384

**I**

- Incompatible Insect Technique (IIT)...154, 352, 367-395, 405-428, 443, 472-476, 643, 732, 747, 803
  - application...368, 371, 374, 376, 380, 384, 387, 410, 411, 445, 453, 733
  - releases ..... 384, 385, 392, 393, 394
  - trial ..... 373, 391, 455
- IIT/SIT
  - combined approach....368, 383-386, 391, 394, 395, 747, 748
  - combined application....367, 382, 384, 385, 387, 392
  - releases ..... 384-386, 393-395
  - sequential ..... 384, 385
- immigration...356, 373, 394, 617, 670, 783, 789
- immune ..... 824, 931
  - function.....918
  - responses ..... 474, 935
- immune system ..... 99
  - eukaryotic ..... 812
  - human ..... 826
  - insects ..... 917, 930
  - mosquitoes.....931
- import
  - biocontrol agents.....124, 660
  - milk.....298
  - natural enemies ..... 659, 662
  - palm trees ..... 539-541
  - prohibition ..... 540, 541
  - regulations ..... 124, 660
  - restrictions ..... 822
  - inbreeding ..... 851

- incentives ..... 122, 626, 677, 698, 699
- incubation period ..... 474, 475
- incursions...165, 186, 189, 258, 468-470, 520, 531, 535, 570, 575, 577, 593, 673, 869-886
  - early ..... 562, 564, 894, 895
  - exotic ..... 891, 894, 895, 898, 900
  - frequencies ..... 514
  - invasive species ..... 172
  - responses ..... 505-507, 515
  - risk data ..... 886
  - timely detection ..... 575
- India...4, 60, 144, 198, 350, 372, 382, 408, 410, 766, 772
  - Indian Council of Medical Research....372, 408
  - Karnataka ..... 350
  - Sikkim ..... 146
  - West Bengal ..... 146
  - western ..... 770
- Indian Ocean ..... 34, 165, 373, 406
  - Grande Glorieuse ..... 373
  - La Réunion ..... 241, 353, 373, 408
  - Mauritius ..... 234, 353, 373, 408, 411
  - Mayotte ..... 373
- indicator species ..... 283, 284
- Indonesia ..... 19, 23, 28, 625
  - Bogor Agricultural University ..... 17, 19
  - eastern ..... 18
  - Java ..... 619
  - rice fields ..... 621
  - Yogyakarta ..... 354
- infographics ..... 752, 754
- information
  - campaigns ..... 739, 832
  - flow ..... 698, 702, 703, 706, 771
  - translation ..... 703, 755
- infrared ..... 97, 773
- inga fruit fly ..... 167
- innovation systems ..... 693, 697, 701, 703, 706
  - actors ..... 702
  - co-evolutionary process ..... 695
  - literature ..... 700
  - thinking ..... 695, 698
- insect
  - attractants ..... 514, 895
  - bacteria ..... 920
  - biodiversity ..... 29
  - biomass ..... 918
  - capture ..... 875, 898
  - cargo ..... 912, 913
  - cells ..... 918
  - commensals ..... 917, 922
  - competitiveness ..... 928
  - contamination in food ..... 822
  - detection ..... 889-900
  - development ..... 343, 492, 917, 922
  - digestive tracts ..... 918
  - dispersal ..... 541

- ecology ..... 29
- eradication ..... 552
- growth regulators ..... 42, 242, 343, 470, 597
- gut microbiota ..... 922, 934, 935
- guts ..... 917, 920
- hosts ..... 368, 929, 937
- invasions ..... 552, 870, 871
- mass ..... 827
- metabolism ..... 927
- microbiota ..... 920, 930
- migration ..... 830
- nitrogenous waste ..... 926
- production ..... 54, 88, 225
- remote monitoring ..... 889
- repellents ..... 738
- reproduction ..... 472
- susceptibility ..... 606
- symbionts ..... 918
- trap barcode ..... 892
  - vector ..... 33, 34, 37, 38, 339, 709-725
- insectary ..... 279, 285, 287, 297, 415, 420, 568, 913, 932
- insecticides
  - abamectin ..... 42, 151, 591, 619
  - adverse side effects ..... 827
  - aerial application ..... 59, 67, 606, 609, 785, 910
  - aluminium phosphide ..... 152
  - asynchronous delivery ..... 899
  - avermectin ..... 606
  - azadirachtin ..... 42
  - benzoylureas ..... 242
  - bifenthrin ..... 42
  - chlorantraniliprole ..... 591, 605
  - chlorpyrifos ..... 42, 64, 66, 68, 151, 545
  - cover sprays ..... 120, 151, 671, 910
  - cross-resistance ..... 112, 313
  - cyfluthrin ..... 42
  - cyhalothrin ..... 42, 241
  - cypermethrin ..... 42, 241, 313, 619
  - cyromazine ..... 242
  - DDT ..... 804
  - deltamethrin ..... 282, 348
  - dichlorvos ..... 151
  - dieldrin ..... 277, 816
  - dimethoate ..... 42, 694
  - emamectin benzoate ..... 606
  - fenthion ..... 218, 694
  - fipronil ..... 242
  - imidacloprid ..... 42, 545
  - imports ..... 625
  - indirect costs ..... 112
  - malathion ..... 71, 73, 77, 335, 343, 352
  - marketing ..... 626, 628
  - methoprene ..... 331, 333, 470
  - methoxyfenozide ..... 591, 606
  - misuses ..... 619
  - naled ..... 335, 352
  - organochlorine ..... 120
- organophosphate ..... 118, 120, 133, 218, 306, 312, 313, 343, 349
- permethrin ..... 241, 242, 258, 348
- phoxim ..... 151
- poisoning ..... 120
- pyrethrins ..... 61, 64-68, 151, 242, 306, 312-314, 343, 348, 859
- pyriproxyfen ..... 343, 349, 350, 354
- residues ..... 112, 120, 603
- resistance ..... 3, 4, 93, 94, 112-115, 121, 131, 218, 242, 305, 306, 314, 315, 327, 343, 348, 349, 353, 405, 406, 470, 474, 635, 641, 643, 658, 732, 784, 796, 804, 810, 816, 827
- resistance management ..... 243
- rotation ..... 242, 243
- shrinking choice ..... 218
- spinetoram ..... 606
- spinosad ..... 133, 331, 333, 484, 883
- spinosyns ..... 591
- susceptibility ..... 474, 567
- temephos ..... 331, 333, 343, 349, 350
- thiamethoxam ..... 42, 545
- topical application ..... 312
- tricarboxyls ..... 42
- vapor active ..... 640
- insecurity ..... 771, 775, 821
  - food ..... 162
- insemination
  - levels ..... 287
  - rates ..... 378
- inspection
  - early-season ..... 119
  - guided ..... 544
  - in-season ..... 116
  - levels ..... 523
  - manual ..... 890
  - packing houses ..... 684
  - post-treatment ..... 333
  - pre-harvest ..... 589
  - quarantine stations ..... 182, 531
  - sentinel animals ..... 890
  - trees ..... 540, 544, 547
  - type ..... 335
  - unmanned aerial systems ..... 336
  - visual ..... 116, 543, 544, 548
- institutional ..... 29, 686, 698, 699
  - adjustment ..... 693, 704
  - arrangements ..... 673, 678
  - aspects ..... 693, 694
  - assessment ..... 713
  - barriers ..... 674
  - capacity ..... 223, 687
  - change ..... 695, 703
  - ethical approval ..... 413
  - facilitators ..... 675
  - factors ..... 672, 674, 706, 724
  - influences ..... 346

- mechanisms ..... 670, 678  
 memory ..... 297  
 networks ..... 638  
 processes ..... 669, 670  
 requirements ..... 702  
 review board ..... 716  
 strategic alliance ..... 183  
 integrated mosquito management ..... 319, 328, 329, 336, 352  
 integrated pest management ..... 41, 82, 129, 216, 236, 251, 512, 519, 544, 557, 625, 661, 674, 787, 937  
 AW-IPM ..... 17-30, 93-108, 143-155, 163-188, 197-212, 221-223, 233, 275-300, 306, 369, 407, 484, 502, 562, 567, 577, 597, 669, 857, 859, 889-900  
 AW-IPM programmes ..... 108, 111-125, 130-140, 153, 175, 188, 211-223, 311, 315, 407, 443, 453, 522, 860, 896, 903, 913-915  
 International IPM Award of Excellence ..... 122  
 integrated vector management ..... 343, 428, 638, 709, 729-742  
 intellectual property rights ..... 646, 657  
 intensive surveillance areas ..... 544, 545  
 Interamerican Development Bank (IDB) ..... 187  
 Inter-American Institute for Cooperation on Agriculture (IICA) ..... 44, 185, 197, 199, 519, 522, 536  
 Intergovernmental Panel on Climate Change (IPCC) ..... 488, 500  
 International Atomic Energy Agency (IAEA) ..... 155, 161, 275, 277, 299, 353, 369, 519, 521, 567, 734  
 Collaborating Centres ..... 175  
 Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture ..... 94, 131, 161, 172-175, 225, 275, 277, 339, 443, 516, 561, 567, 730, 857, 903  
 technical cooperation projects ..... 174, 175, 177, 183, 277, 279, 285, 298, 300  
 International Center for Tropical Agriculture (CIAT) ..... 17, 18, 19, 30  
 International Fund for Agricultural Development (IFAD) ..... 30, 186  
 International Institute of Tropical Agriculture (IITA) ..... 17, 18, 19  
 International Organization for Biological Control (IOBC) ..... 655, 656, 660, 663-665  
 International Plant Protection Convention (IPPC) ..... 161, 163, 172-174, 507, 806  
 International Rice Research Institute (IRRI) ..... 617, 618, 629  
 international standards  
   aerial systems ..... 906  
   for phytosanitary measures (ISPMs) ..... 163, 172-174, 182, 189, 507, 520, 673, 699, 702, 870  
 internet ..... 547  
   based surveillance ..... 260  
   connectivity ..... 773  
 inter-specific  
   interbreeding ..... 374  
   introgression ..... 374  
 intestines ..... 104, 922  
   parasitic infections ..... 256  
 intra-specific  
   competition ..... 380  
   geographical variation ..... 374  
 introduction  
   Asian gypsy moth ..... 788  
   cactus moth ..... 562  
   invasive mosquitoes ..... 730  
   invasive pest ..... 165, 166  
   invasive species ..... 641, 656  
   natural enemies ..... 658-662  
   non-native biocontrol agents ..... 655, 656, 661  
   non-native fruit flies ..... 168  
   non-native species ..... 165, 189  
   technology ..... 652  
   parasitoids ..... 17, 19, 21  
 inundations ..... 437, 439  
 invaders ..... 17, 18, 164, 514  
 invasion ..... 17, 82, 166, 469, 552, 594, 870  
   buffalo flies ..... 465-468, 477  
   carambola fruit fly ..... 187  
   cotton bollworm ..... 658  
   desert locust ..... 767  
   dynamics ..... 510  
   European grapevine moth ..... 605  
   gypsy moth ..... 552  
   history ..... 28  
   Mediterranean fruit fly ..... 198, 485, 886  
   oriental fruit fly ..... 139  
   pathways ..... 20, 582, 587  
   Queensland fruit fly ..... 673  
   routes ..... 576  
   sources ..... 593  
   spread ..... 552, 558  
   threshold ..... 371, 380, 381  
 invasive  
   agricultural pests ..... 810  
   arthropods ..... 505, 510, 514, 570  
   Asian tiger mosquito ..... 729, 741  
   cactus moth ..... 561-564  
   false codling moth ..... 108  
   fish ..... 351  
   fruit flies ..... 133, 161, 186, 189, 535, 536, 869, 884  
   gene drives ..... 800  
   herbivores ..... 23  
   insects ..... 121, 165, 166, 506, 892, 896  
   light brown apple moth ..... 515  
   mealybugs ..... 25, 29  
   mosquitoes ..... 406, 730, 732, 741  
   prickly pear cacti ..... 561, 562

- red palm weevil ..... 539  
 sex ratio distorters ..... 844  
 species....18, 161, 168, 172, 189, 254, 406,  
     465, 505, 512, 515, 552, 641, 655, 656,  
     732, 802, 810, 850, 891  
 ticks ..... 251, 261  
 tools ..... 801  
 invasive pest....122, 520, 559, 562, 577, 587,  
     655, 658, 810  
 biodiversity ..... 515  
 dissemination by tropical storms.....166  
 incursions.....870  
 survival and climate change.....166  
 pathways.....165, 166  
 spread ..... 165  
 transboundary risks.....163  
 unintentional export ..... 664  
 investment....122, 124, 130, 133, 170, 179, 183,  
     189, 224, 256, 448, 514, 575, 597, 634, 635,  
     685, 689, 700, 705, 706, 801, 910  
 return on ..... 161, 167, 177, 180  
 stakeholder.....698  
 venture capital.....891  
 iPhone application ..... 333  
 Iran ..... 34, 769  
 irradiation....63, 153, 237, 286-288, 369, 378,  
     392, 396, 420, 427, 472, 748, 751, 822, 928  
 dose....94, 95, 102, 368, 369, 383-385, 388,  
     391, 411, 416, 417, 426, 613  
 procedures.....69, 222  
 pupal.....287, 388, 389, 391, 408  
 safeguarding ..... 69, 369, 385  
 irradiators  
     Gammabeam-650 ..... 225  
     GammaCell-220 ..... 225  
     gamma-ray.....223, 225, 283, 391, 447, 448  
     panoramic ..... 102, 225  
     RS 2000 ..... 391  
     RS 2400V ..... 225  
     Wolbaki ..... 391  
     X-ray....223, 225, 283, 336, 353, 389, 391,  
         395, 447, 448, 513, 531  
 irreversible.....801, 803, 805  
 consequences ..... 795, 801  
 irrigation ..... 52, 83, 85, 188, 324, 736, 907  
     centre pivot ..... 70, 73, 74  
     groundwater ..... 75, 78  
     pump ..... 75  
     surface ..... 73, 78  
 island ..... 308-311, 330  
     colonization ..... 309  
     ecological.....300  
     populations ..... 309, 736  
     residential ..... 392  
 isolation ....35, 66, 308, 407, 783, 786, 857-860  
     ecological.....412  
     genetic ..... 282, 861  
     geographic ..... 131, 309, 312, 412, 880  
     reproductive.....919  
     topographic ..... 139  
 Israel ..... 121, 177, 891  
 Italian locust ..... 765, 766  
 Italy....353, 444, 448, 449, 450, 582, 730, 731,  
     822  
     Campania ..... 729, 734, 741  
     Center for Technology Transfer.....581  
     Comitato di Gestione Isola di Vivara.....742  
     Edmund Mach Foundation ..... 729  
     Emilia Romagna ..... 730  
     ENEA ..... 734  
     Friuli-Venezia-Giulia ..... 730  
     Institute for Agricultural and Forest  
         Systems in the Mediterranean ..... 729  
     Lazio ..... 731, 736  
     Liguria ..... 730  
     Lombardia ..... 730  
     northern ..... 408  
     Phlegraean archipelago ..... 733, 734  
     Procida island ..... 729-741  
     Rome ..... 770, 772  
     Sicilia ..... 736  
     southern ..... 729, 733, 734  
     Toscana ..... 736  
     Trento ..... 581  
     University of Naples Federico II.....729-742  
     University of Perugia ..... 843  
     University of Pisa ..... 581  
     University of Rome La Sapienza ... 729, 739  
     University of Tuscia ..... 581, 595  
     Veneto ..... 730  
     Viterbo ..... 581  
     Vivara island ..... 733-735, 742  
     ZanzaMapp ..... 732, 739
- J**
- Jamaica ..... 34, 307, 308, 311  
 Japan ..... 4, 121, 131, 465, 565, 617, 619, 907  
     Civil Aviation Bureau ..... 909  
     Japanese International Cooperation Agency  
         (JICA) ..... 710, 718, 720  
     Nagoya ..... 655-665  
     rice fields ..... 907  
 Japanese beetle ..... 896  
 Japanese encephalitis ..... 635, 636  
 jewel wasp ..... 848  
 Jonas, Hans ..... 805  
 juvenile hormone ..... 349
- K**
- Kenya ..... 108  
 key stakeholders ..669, 687, 700, 702, 704, 709  
 Khapra beetle ..... 896  
 Knipling, E. F. ..... 113, 306, 470  
     model ..... 206

- Korea  
 Korean peninsula ..... 617, 619  
 South Korea ..... 617-619, 628
- L**
- label ..... 61, 67, 296, 327, 333, 545  
*Bt*-cotton ..... 61, 78, 87  
 compliance ..... 59  
 GMOs ..... 646  
 responsible choice ..... 123  
 restrictions ..... 60  
 labour-intensive ..... 286, 392, 437, 759, 772, 815, 889, 890, 894  
 lacewings ..... 28  
 lack  
   adaptive immune function ..... 918  
   adoption ..... 703  
   alternative insecticides ..... 343  
   area-wide approach ..... 348  
   awareness ..... 704, 705  
   buffer zones ..... 348  
   congruence ..... 311  
   cooperation ..... 689, 705  
   coordination among growers ..... 122  
   decisions ..... 697  
   diet sterilisation ..... 97  
   effective surveillance ..... 552  
   efficient organization ..... 549  
   females ..... 845  
   genetic differentiation ..... 308  
   harmonization of regulations ..... 661  
   isolation ..... 66  
   knowledge ..... 368, 682  
   legal authority ..... 673  
   market access ..... 682  
   micronutrients ..... 514  
   operational detection system ..... 520  
   opportunities ..... 165  
   rainfall ..... 768  
   replication ..... 786  
   research support ..... 641  
   road networks ..... 903  
   safe and nutritious food ..... 162  
   scientific evidence ..... 688  
   social cooperation ..... 899  
   species-specificity ..... 827  
   standardized classification ..... 565  
   sufficient manpower ..... 292  
   suitable habitat ..... 280  
   trained staff ..... 358  
   understanding ..... 682, 823, 835  
   undesired matings ..... 814  
   volatile pheromones ..... 237  
 lady beetles ..... 12, 28  
 land  
   cover maps ..... 294  
   degradation ..... 298
- use ..... 489, 554, 641  
 use changes ..... 258, 405  
 use map ..... 499  
 use patterns ..... 633  
 landing rate counts ..... 326, 335  
 landscape  
   complexity ..... 26  
   composition ..... 17, 30  
   diversity ..... 18, 26, 899  
   ecology ..... 23, 860  
   friction ..... 861  
   genetics ..... 857-866  
   heterogeneity ..... 113, 899  
   resistance models ..... 860  
   rural ..... 236, 618, 624, 913  
   structure ..... 26  
   suitability ..... 861  
   urban ..... 236, 899  
 Lao PDR ..... 18-20, 22, 28  
 larval-pupal glass separators ..... 416, 418, 426  
 larvicing ..... 319, 333, 337, 350, 355, 435, 437, 443, 454, 737, 738, 936  
 aerial ..... 331, 332, 335, 352, 440, 452, 912  
 ground ..... 330, 331  
   via auto-dissemination ..... 639  
 laser-scanning ..... 437  
 last glacial maximum ..... 309  
 late-modern technology ..... 801  
 Latin America ..... 161-189, 222, 341, 345, 347, 710, 711  
 Latin America and Caribbean region ..... 161-189  
 latin hypercube sampling ..... 878  
 leadership ..... 55, 88, 185, 223, 675, 699, 759  
 leaf beetles ..... 510  
 leafroller weevil ..... 935  
 leafrollers ..... 119, 121, 216, 896  
 legal  
   age ..... 909  
   authority of programmes ..... 116, 123, 673  
   bases for action ..... 38  
   conditions ..... 820  
   constraints ..... 903  
   experience ..... 542  
   framework ..... 655, 663, 908, 910  
   illegal dumps ..... 346  
   instruments ..... 540, 705  
   regulations ..... 909, 910, 915  
   structures ..... 663  
 legislation ..... 114, 189, 319, 320, 469, 543, 568, 675, 687, 706, 748  
   aviation ..... 103, 908, 909  
   genetic resources ..... 665  
   GMO ..... 652  
   sanitary ..... 345  
 legislative ..... 54, 88, 469  
   framework ..... 477  
   measures ..... 540, 549  
   power ..... 704

- leishmaniasis ..... 636  
 lek mating system ..... 149  
 lethality ..... 852  
     dominant ..... 406, 443, 471, 646, 803, 814, 845, 850  
     embryonic ..... 732  
     female ..... 815  
     post-zygotic ..... 844  
     seasonal ..... 474  
     trait ..... 828  
 levies ..... 679, 689  
     compulsory ..... 677  
     statutory ..... 129  
 lidars ..... 907  
 life ... 86, 147, 162, 234, 449, 598, 802-805, 823, 835, 892  
     cycles ... 5, 69, 143, 146, 252, 369, 378, 484, 492-494, 499, 526, 535, 575, 587, 603, 608  
     eukaryotic ..... 917  
     expectancy ..... 171, 929  
     form ..... 86  
     half-life ..... 847  
     histories ..... 233, 252, 509  
     productive ..... 40  
     quality ..... 341  
     shortening effect ..... 427, 475  
     span ... 103, 298, 415, 418, 427, 473, 474, 817, 826, 928, 935  
     stages ... 145, 332, 337, 434, 444, 552, 554, 589, 878, 880, 882, 899  
     styles ..... 684  
     time ..... 147, 217, 451, 563  
     years ..... 710  
 light brown apple moth ..... 515, 789  
 Lintner, Joseph Albert ..... 779  
 liver ..... 415, 446, 796  
 livestock...233, 252, 276, 305, 312, 477, 563, 858, 904  
     diseases ..... 469  
     fodder ..... 564, 565  
     industry ..... 258  
     pests ..... 407, 471, 816  
     pour-on ..... 242, 276, 284, 294, 861  
     producers ..... 235, 238, 239, 243  
     production systems ..... 234, 244, 256  
     ticks ..... 251-262  
     vaccination ..... 252-259  
     wastes ..... 236  
 livestock-wildlife interface ..... 253, 258, 259  
 living modified organisms ..... 645  
 logistic probability ..... 500, 501  
 longhorn beetles ..... 510  
 losses ..... 35, 44, 46, 151, 464, 617  
     aversion ..... 622  
     crop ..... 97, 104, 130, 131, 145, 810, 823  
     direct ..... 164, 168, 583  
     economic ..... 18, 66, 145, 168, 305, 858, 870, 889  
     estimated ..... 44, 163  
     exports ..... 164  
     financial ..... 14, 258, 682  
     food ..... 171  
     horticultural ..... 682  
     indirect ..... 168  
     livestock ..... 305, 407  
     natural enemies ..... 112  
     nutrient ..... 162  
     pollinators ..... 112  
     post-harvest ..... 131, 162  
     production ..... 100, 101, 131, 238, 463, 671  
     social ..... 535  
     yield ... 4, 18, 82, 145, 215, 217, 601, 618, 627  
 low pest prevalence  
     areas ... 113, 121, 130, 133, 139, 172, 174, 198, 484  
     conditions ..... 685  
     levels ..... 189  
     status ..... 131  
 lures ..... 895, 896  
     BG ..... 325  
     BioAnastrepha ..... 218  
     Biolure ..... 133, 201, 523-525  
     Ceratrap ..... 218, 523, 531, 534  
     cue-lure ..... 149, 152, 671  
     disparlure ..... 553, 788  
     food-based ..... 499, 523  
     GF-120 ..... 133-135, 152, 530, 531, 880  
     gossyplure ..... 57, 58, 61  
     hexalure ..... 57  
     hydrolysed proteins ..... 152, 202, 217, 218  
     kairomones ..... 545, 593, 790  
     methyl eugenol ..... 133, 149, 152  
     octenol ..... 325  
     protein-based ..... 218  
     sugarcane molasses ..... 218  
     torula yeast ..... 523, 533, 534  
     trimedlure ..... 499, 523, 524, 534, 880  
     vinegar ..... 152, 154  
 Lyme disease ..... 252  
 lymphatic filariasis ..... 444, 635, 636, 639

**M**

- machine learning ..... 499, 896  
 maize ..... 99, 658  
 malaria...319, 342, 636, 643, 795-806, 810, 931  
     anti-malarial drugs ..... 804, 825  
     artemisinin-based combination therapy ..... 635, 804  
     burden ..... 797, 805  
     control strategies ..... 795  
     elimination ..... 804, 805  
 Global Malaria Programme...634, 642, 644, 804

- incidence ..... 804  
interference in transmission ..... 937  
new vector control approaches ..... 642  
parasite cycle ..... 796, 804  
parasites ..... 355, 380, 795, 799, 804, 919  
transmitting mosquitoes ..... 795, 796, 799, 800, 802, 805, 847  
vectors ..... 350, 374, 375, 443, 639, 641, 800  
WHO Malaria Policy Advisory Committee ..... 643  
Malawi ..... 24, 859  
Malaysia ..... 18, 927  
male  
abundance ..... 452  
age ..... 378  
aggression ..... 149  
behavioural traits ..... 782  
competitiveness ..... 369, 387, 408  
courtship behaviour ..... 149  
determining genes ..... 815, 843, 852  
eggs ..... 25  
fertility ..... 845  
fitness ..... 379  
germline ..... 829, 849  
gonads ..... 447, 815  
heterogametic species ..... 843, 845, 846  
incompatibility ..... 376, 378, 379  
longevity ..... 379  
lures ..... 152, 523, 671  
meiosis ..... 846, 847  
offspring ..... 817, 850  
orientation ..... 790  
polygamy ..... 845  
quality ..... 288, 369, 370, 379, 383, 385, 450  
sampling methods ..... 452  
sensitivity ..... 792  
sexual performance ..... 929  
sterility ..... 369, 651, 847  
survival ..... 379, 387, 451  
male annihilation technique ..... 139, 186, 671, 701  
Mali ..... 774  
Bamako ..... 768  
malnutrition ..... 170  
Maltese islands ..... 736  
mammalian  
cells ..... 811, 851  
species ..... 826, 918, 921  
mango ..... 164, 179, 520  
Ataulfo cultivar ..... 209  
exports ..... 210, 212, 520  
fruit flies ..... 168, 186, 197-212  
growers' union ..... 199, 210  
industry ..... 180  
orchards ..... 197, 199, 207, 224  
packing houses ..... 197, 209-212  
production areas ..... 198, 199  
season ..... 197, 199, 210  
mangrove habitat ..... 320, 332  
manual ..... 392, 415, 772  
checking ..... 389, 392  
control methods ..... 330  
data entry ..... 892, 894  
good practices ..... 543  
mode ..... 904  
monitoring ..... 898  
operation ..... 390, 391  
trap inspection ..... 890  
trapping ..... 896, 898  
manure ..... 234, 858  
management ..... 239  
mapping ..... 51, 54-56, 85, 326, 413, 437, 588, 766, 772, 893  
distribution ..... 20, 677, 787  
DNA sequences ..... 847, 849  
households ..... 713  
landscape ..... 861  
procedures ..... 61, 437  
risk ..... 533  
software ..... 597  
stakeholders ..... 718, 719  
yield ..... 907  
market ..... 161, 167, 173, 464, 655, 660, 821, 891, 913  
access ..... 131, 133, 175, 682, 685, 694, 695, 700, 706, 891  
access protocols ..... 675, 677, 687, 701  
access requirements ..... 671, 698, 702, 706  
closed ..... 181  
economies ..... 165  
incentives ..... 122  
international ..... 171, 173, 198, 218, 671  
opportunities ..... 123, 652  
restricted ..... 121, 122  
returns ..... 124  
marketing ..... 123, 198, 344, 684  
advantages ..... 112  
genome-edited products ..... 821, 822, 831  
strategies ..... 626  
tactics ..... 628  
Markl, Hubert ..... 802  
mark-release-recapture ..... 288, 451, 737, 740  
Martinique ..... 34  
masculinized females ..... 815  
mass  
administration ..... 635  
displacement ..... 166  
media ..... 618, 622-624, 628  
releases ..... 12, 14, 19, 395, 817, 824, 828  
trapping ..... 135, 155, 347-349, 510-512, 544, 545, 571  
mass-production ..... 132, 148, 237, 367, 376, 388, 392, 395, 445, 447, 471, 658, 814  
cages ..... 390, 391  
facility ..... 136, 202, 522  
parasitoid ..... 41  
process ..... 41, 447

- mass-rearing...41, 153, 154, 199, 225, 283, 336, 373, 391, 407, 567, 612, 732, 733, 791, 816, 830, 850, 851  
cost ..... 12  
environment ..... 415  
facility...3, 52, 58, 63, 64, 95, 105, 111, 117, 117, 120, 121, 129, 133, 134, 137, 177, 179, 181, 224, 285, 288, 356, 395, 434  
genomic adaptation ..... 415  
procedures ..... 136, 356, 369  
process ..... 132, 135, 817  
scales ..... 5, 388, 410, 824, 829  
systems ..... 5, 828  
mate finding ..... 779, 780  
mathematical  
background ..... 871  
model ..... 280, 347  
modelling ..... 381, 382, 798  
mating ..... 146, 287, 424  
barriers ..... 286  
behaviour ..... 149, 150, 446, 567, 851  
compatibility ..... 94, 222, 286, 374  
competitiveness...94, 284, 286, 289, 369, 372, 374, 376, 379, 385, 387, 388, 395, 408, 411, 417, 420, 450, 472, 928, 929  
contamination ..... 349  
disruptant ..... 61, 779-792  
disruption...51-87, 94, 113-125, 237, 510-512, 551-559, 582-594, 597-613, 779-792, 891, 897  
incompatibility ..... 311, 382, 448  
larval breeding areas ..... 434, 445  
on host plants ..... 154  
multiple ..... 378  
performance ..... 286, 826  
period ..... 149  
prevention ..... 101  
prior feeding ..... 234, 235  
probability ..... 353, 418, 782  
ratio ..... 686  
rhythms ..... 782, 783  
sentinel females ..... 788  
system ..... 149, 150  
types ..... 374  
under mass-rearing ..... 446, 447  
Mauritania ..... 768  
Mauritius ..... 234, 353, 373, 408, 411  
Maxent model...276, 278, 292, 296, 310, 499-501, 862-865, 886  
maximum take-off mass (MTOM).....908-912  
Mayaro virus ..... 380  
mayfly exuvia ..... 236  
mealybugs ..... 17-30, 33, 919  
mechanical ..... 244  
control ..... 82, 319, 346, 497, 529, 571, 605  
damage ..... 914  
elimination ..... 339  
removal ..... 342, 346, 568, 572  
sex separation ..... 382, 392, 416, 427, 447  
transmission ..... 282, 296  
traps ..... 723  
MED-FOES ..... 869-886  
medfly ..... see Mediterranean fruit fly  
media ..... 345, 418, 419, 434, 437, 521, 676  
advertising ..... 116  
campaigns ..... 592, 622, 624, 628  
coverage ..... 733, 739  
digital ..... 757, 759  
mainstream ..... 754, 759  
social ..... 419, 592, 640, 754, 757, 759  
strategies ..... 622, 623  
medical ..... 336, 443, 448, 899  
assistance ..... 736  
biomedical research ..... 759  
condition certified ..... 909  
community ..... 747, 749  
costs ..... 341, 634  
data collection apps ..... 899  
sector ..... 261  
treatment ..... 804  
Mediterranean  
islands ..... 729, 733, 736  
region ..... 582, 731  
Sea ..... 767  
Mediterranean fruit fly...58, 113, 121, 129-140, 164-188, 198, 202, 217, 297, 373, 390, 443, 483-502, 734, 814-817, 822, 826, 828, 896, 910, 926  
eradication...175, 181, 185, 188, 519-535, 869-886  
free areas..166, 177, 181, 184, 523, 526, 531, 534, 535  
hosts ..... 520  
hotspots ..... 135  
programme ..... 33, 34, 175-179, 483-502  
releases ..... 133  
meiotic  
drive ..... 843-846  
sex chromosome inactivation ..... 850  
stages ..... 850  
Mekong  
Delta ..... 622  
subregion ..... 21  
Mekong University ..... 617  
melon fly ..... 113, 153, 165, 925  
melons ..... 182, 183  
Mendelian  
fashion ..... 844  
heredity rules ..... 796  
inheritance ..... 814, 825  
inheritance rate ..... 813  
meta  
genomics ..... 920  
populations ..... 860, 890  
proteomics ..... 920  
transcriptomics ..... 920

- metabolism ..... 148, 919, 927, 928, 931  
 metamorphosis ..... 148, 238  
 meteorological  
     data ..... 776  
     elements ..... 484, 488  
 methyl bromide fumigation ..... 671  
 Mexican fruit fly ..... 113, 153, 167, 179, 814, 816  
     preventive release programme ..... 188  
 Mexico ..... 238, 257, 258, 291, 307, 346, 350,  
     354, 373, 535, 536, 577, 711, 870, 914, 932  
     Baja California ..... 36, 37, 51, 53, 55, 82-86,  
         88, 177, 179, 188  
     Baja California Sur ..... 36, 37, 179  
     Campeche ..... 34, 36, 37, 40, 41, 561, 565, 574  
     Chiapas ..... 34, 36, 37, 41, 166, 174, 176, 200,  
         209, 210, 485-487  
     Chiapas, Metapa ..... 176, 177, 179, 197, 201,  
         202  
     Chiapas, Programa Moscafrut ..... 197, 201,  
         205, 221, 913  
     Chiapas, Soconusco ..... 197-200, 212  
     Chihuahua ..... 51-86, 179  
     Coahuila ..... 36, 37, 52, 71, 72, 87  
     Colima ..... 36, 37, 39-42  
     Colima, Manzanillo ..... 177  
     Colima, National Reference Center for  
         Biological Control ..... 41  
     Dirección General de Aeronáutica Civil ..... 909  
     Dirección General de Sanidad Vegetal  
         (DGSV) ..... 33, 38, 39, 41, 42, 87, 561  
     Durango ..... 71, 72, 87  
     El Colegio de la Frontera Sur ..... 197, 210  
     Guerrero ..... 34, 36, 37, 41  
     Hidalgo ..... 34, 36, 37, 41, 42  
     Jalisco ..... 36, 37, 40, 42  
     Mexico state, Tecámac ..... 39  
     Michoacán ..... 36, 37, 40  
     Morelos ..... 36, 37  
     National Forestry Commission ..... 567, 568,  
         571  
     National Park Service ..... 567  
     National Phytosanitary Reference Centre...  
         ..... 575  
     Nayarit ..... 36, 37, 40, 42  
     northern ..... 51, 52, 165, 576, 591, 777, 785, 790  
     Nuevo León ..... 36, 37  
     Oaxaca ..... 34, 36, 37, 41  
     Phytosanitary Epidemiological  
         Surveillance Programme ..... 33, 575-577  
     Puebla ..... 36, 37  
     Querétaro ..... 36, 37, 39  
     Quintana Roo ..... 34, 36, 37, 40, 41, 561-577  
     Quintana Roo, Isla Contoy ..... 562-575  
     Quintana Roo, Isla Mujeres ..... 562-575  
     San Luis Potosí ..... 36, 37, 42  
     Servicio Nacional de Sanidad, Inocuidad y  
         Calidad Agroalimentaria (SENASICA) .....
- 33, 41, 44, 55, 87, 176, 179, 199, 212,  
     561, 567, 568, 570, 914  
 Sinaloa ..... 36, 37, 40  
 Sonora ..... 36, 37, 51, 55, 82-88, 179  
 Sonora, fruit fly free area ..... 171  
 State Plant Health Committees ..... 38, 41, 43,  
     210, 212  
 Tabasco ..... 34, 36, 37, 41  
 Tamaulipas ..... 36, 37, 87  
 Veracruz ..... 36, 37, 42  
 Yucatán ..... 33-41, 562, 565, 574  
 Yucatán Peninsula ..... 564, 565, 574, 576  
 Zacatecas ..... 36, 37  
 Mexico-USA Bi-National Cactus Moth  
     Programme ..... 564, 574  
 Mexico-USA border ..... 188  
 Mexico-USA New World Screwworm  
     Commission ..... 296  
 mice ..... 709, 806, 811, 848  
 microbial ..... 921, 929  
     community ..... 236, 920  
     control agents ..... 658  
     diversity ..... 917  
     mutualisms ..... 918  
     pesticides ..... 647  
     strains ..... 658  
     succession ..... 236  
     symbioses ..... 917, 918  
     symbiotic associations ..... 920  
 microinjection ..... 411, 646  
     adult ..... 375, 476, 477  
     embryonic ..... 375, 386, 387, 476  
 micronutrients ..... 514  
     deficiencies ..... 170  
 microsatellites ..... 282, 305, 307  
     differences ..... 308  
     loci ..... 309  
     markers ..... 308, 312  
     nuclear ..... 308  
 microwave ..... 97, 98  
 Middle East ..... 766  
 migration  
     behaviour ..... 830  
     biology ..... 789  
     desert locust ..... 767-770  
     human ..... 165, 641  
     mosquitoes ..... 348  
     moths ..... 72, 604, 782-789  
     passive ..... 308  
     patterns ..... 305, 315, 651, 767  
     routes ..... 770  
     weather-driven ..... 72  
 migratory ..... 220, 777, 782, 785  
     capability ..... 787, 789  
     patterns ..... 766  
     pests ..... 619, 765, 766  
     swarms ..... 766  
     tendency ..... 783

- migratory locust..... 765, 766  
 misinformation ..... 752  
 mites ..... 35, 216, 240  
 mitochondrial..... 309  
     DNA ..... 282, 307-312, 465  
     genes ..... 290, 308  
     genotyping ..... 883  
     marker ..... 555  
 mobile..... 757, 772, 777  
     applications ..... 546, 547, 739, 897  
     ground release ..... 223  
     in-field devices ..... 900  
     moths ..... 562  
     pests...469, 622, 669-671, 674, 675, 889, 892  
     phytosanitary diagnostic unit ..... 39  
     scouting apps ..... 892, 893  
     splicing factor ..... 852  
     take-off station ..... 914  
 modern biotechnology ..... 237, 645  
 MODIS ..... 773  
     satellite data ..... 284  
     satellite images ..... 292  
 modular  
     design ..... 176  
     system ..... 224  
 molecular....130, 313, 410, 465, 809, 814, 823  
     analysis ..... 555, 563  
     biology ..... 306, 809, 843, 848  
     containment strategies..... 852  
     fingerprinting ..... 917  
     markers ..... 305, 306, 311, 312, 861  
     mechanisms ..... 155, 833, 834  
     recombination ..... 646  
     scissors..... 811  
     signal ..... 933  
     techniques ... 39, 40, 290, 471-474, 645, 918  
 monitoring ..... 331, 414, 451, 582, 770  
     arbovirus transmission ..... 325  
     automated ..... 897, 898, 900  
     by citizens ..... 739, 740  
     crop ..... 670  
     desert locust ..... 770-777  
     endemic populations ..... 891, 895  
     environmental ..... 283, 298  
     genetic ..... 357  
     global ..... 765  
     grids ..... 680, 687, 689  
     manual ..... 898  
     mosquito ..... 729, 731, 733, 738-740, 742  
     mutations in populations..... 305, 306, 314  
     networks ..... 519, 521, 674, 678, 732, 740  
     population... 78, 81, 154, 217, 545, 790, 792  
     programme...39, 78, 132, 133, 584, 590, 601,  
     607, 729, 731, 739  
     real-time..... 889-900  
     remote ..... 889  
     resistance ..... 59, 78, 314  
     staff..... 134  
     systems ..... 96, 353, 356, 444, 634  
     tidal activity ..... 324, 332  
 monkeys ..... 848  
 monophagous ..... 618, 622, 627  
 morbidity ..... 251, 252, 405, 633  
 Moroccan locust ..... 765, 766  
 Morocco ..... 770  
 morphotypes ..... 217, 222  
 Moscamed Brasil ..... 223  
 Moscamed Programme (Guatemala-Mexico-  
     USA) ..... 161, 188, 297, 483-502, 519, 521,  
     522, 526  
     El Pino facility ..... 135, 176, 177, 522  
     Metapa facility.176, 177, 179, 197, 201, 202  
 Moscamed Programme-RD ..... 185, 519-536  
 mosquitoes...223, 251, 252, 337, 359, 474, 505,  
     633, 641, 795, 806, 809, 833, 903, 910, 912,  
     915, 932  
     abatement ..... 319, 320, 321, 336  
     Asian tiger mosquito....324-327, 342, 346-  
     350, 367-395, 405, 408-411, 443-450,  
     472, 729-741, 748, 822  
     beneficial ..... 328  
     black salt marsh mosquito ..... 322  
     ditches ..... 328-330  
     fish..... 327-329, 350  
     floodwater ..... 324, 433-455  
     monitoring ..... 729, 731, 733, 738-740, 742  
     production facility .. 387-390, 415, 752, 754  
     southern house mosquito ..... 323  
     vectors...339, 340, 343, 368, 395, 405, 406,  
     409-412, 427, 428, 443, 444, 748, 796,  
     810, 931  
     yellow fever mosquito...324-327, 336, 339-  
     358, 373-375, 405-428, 443-447, 473,  
     747-759, 813, 815, 844, 846, 852  
 moths.....221, 354, 777, 780, 793  
     almond moth..... 373  
     apple clearwing moth..... 121  
     Asian gypsy moth ..... 555, 788  
     Brazilian apple leafroller ..... 216  
     brown-tail moth ..... 935, 936  
     cactus moth..... 113, 561-577  
     codling moth...111-125, 216, 443, 706, 779,  
     782, 785, 786, 790, 791, 896  
     corn earworm..... 896, 930  
     cotton leafworm..... 935, 936  
     diamondback moth . 646, 833, 924-930, 933  
     European grape berry moth..... 594  
     European grapevine moth.....581-594, 597-  
     613, 779, 787  
     fall armyworm ..... 765, 766, 777, 896, 907  
     false codling moth...93-108, 113, 121, 291,  
     443  
     giant peacock moth ..... 779  
     grape berry moth..... 594  
     grape tortrix ..... 594  
     greater wax moth ..... 240, 936

- gypsy moth...505, 510, 511, 515, 551-559  
     779, 783, 788, 789  
 heliothis moths ..... 779, 783  
 honeydew moth..... 594  
 leafrollers..... 119, 121, 216, 896  
 light brown apple moth..... 515, 789  
 mulberry pyralid ..... 930, 934  
 navel orangeworm ..... 779, 783, 787, 789  
 noctuids ..... 783, 896  
 oblique-banded leafroller..... 896  
 oriental fruit moth...216, 779, 782, 783, 786,  
     896  
 pink bollworm....51-88, 113, 443, 591, 777,  
     779-785, 790, 791  
 striped rice stemborer..... 621  
 tobacco cutworm..... 935  
 tortricid moths...93-108, 111-125, 506, 581-  
     594, 597-613, 779, 785-787  
 tropical gypsy moth ..... 896  
 tussock moths ..... 510, 514  
 movement....61, 68, 77, 82, 87, 166, 199, 412,  
     489, 556, 783, 861  
 accidental..... 552  
 air..... 57  
 authorization..... 544  
 controls ..... 469, 477, 589  
 diffusion..... 556, 876  
 fruit..... 484, 582, 589, 602, 871  
 human ..... 165, 166, 633, 635, 640, 641  
 infested animals ..... 308  
 livestock..... 311, 463, 476, 477  
 mated females ..... 788  
 migratory ..... 220  
 model for dispersion ..... 875  
 pest ..... 165, 166, 172, 531  
 plant material ... 39, 541-546, 549, 586, 787  
 restrictions ..... 121, 469, 589  
 seed-borne..... 52  
 storm front ..... 69  
 transboundary ..... 124, 161, 165, 172  
 wastes ..... 608  
 wind-borne..... 63, 69, 556, 788  
 mowing..... 433, 442  
 Mozambique ..... 859  
 mulberry pyralid ..... 930, 934  
 multi  
     actor network ..... 704  
     agent simulations ..... 869  
     billion dollar ..... 18, 29, 177  
     cellular organisms..... 917  
     country ..... 17, 22, 618, 621, 710  
     cultural landscape ..... 754  
     dimensional..... 669, 670  
     directional information flow ..... 698  
     disciplinary ..... 542, 712, 713, 715, 724  
     disease ..... 638  
     functional..... 813  
     gene resistant ..... 87
- institutional ..... 29, 183  
 lingual ..... 28  
 media campaigns ..... 622, 628  
 organizational ..... 139  
 organismal ..... 918  
 rotors ..... 905, 906  
 sectoral ..... 638, 711  
 species ..... 179  
 spectral camera ..... 907  
 spectral image analysis ..... 773  
 stakeholder ..... 623, 704  
 tactic ..... 51, 54, 590  
 voltine ..... 437, 598, 608  
 year ..... 618, 784
- muscoid flies ..... 237, 238, 244  
 mushroom ..... 820  
 mutagenesis ..... 647, 812, 820, 829  
     chemical ..... 819  
     classical... 816-819, 823-825, 828, 830, 833  
     insertional ..... 816  
     oligo-directed..... 647  
     radiation ..... 819  
     random ..... 812  
     site-directed ..... 816, 847
- mutagenic chain reaction....795, 796, 798, 799,  
     801, 802, 805
- mutations ..... 802, 816, 817, 819, 936  
     frequencies ..... 306, 314, 829  
     gene drives ..... 796, 818  
     genome editing ..... 819, 825, 828, 829  
     inactivating ..... 825, 829, 830  
     monitoring in populations .... 305, 306, 314  
     natural rate ..... 829  
     off-target ..... 834  
     point ..... 313, 817, 829, 833  
     random ..... 237, 649, 824, 830  
     resistance ..... 315  
     revertant ..... 824, 829  
     spontaneous ..... 649  
     structural ..... 312  
     temperature sensitive lethal...132, 176, 816,  
         817, 826, 828  
     Y chromosome ..... 844
- mutualists ..... 378, 919, 922  
 Myanmar ..... 372, 472  
     Ayeyawaddy delta ..... 20, 22

**N**

- nagana ..... 276, 857  
 Nagoya Protocol ..... 655-665  
 Namibia, Caprivi Strip..... 859  
 Natal fruit fly ..... 130  
 natural....220, 235, 240, 286, 319, 334, 337,  
     371, 453, 752, 800, 801, 846, 860, 872, 886  
     abortion rates ..... 284, 289  
     barriers..... 300, 769  
     biological control..... 26, 657

- control..... 41, 152, 330, 618, 619  
 DNA repair mechanisms..... 648  
 dispersal..... 8, 306, 563, 787  
 distribution range..... 163-165  
 habitat..... 289, 320, 562, 922  
 hosts..... 219  
 light..... 446, 447  
 mutation rate..... 829  
 pheromone..... 780, 782, 792  
 populations....106, 205, 237, 305, 306, 314,  
     315, 407, 409-411, 414-417, 420-424,  
     650, 788, 844, 846  
 reserve..... 572, 733  
 resource management .... 695, 700, 705, 706  
 selection..... 378, 791, 851  
 spread..... 180, 541, 788  
 sterility..... 415  
 suppression..... 224, 328  
 vegetation..... 95, 197, 221  
 wetlands..... 435, 438, 440, 450  
 natural enemies...17, 23, 29, 119, 153-155, 244,  
     621, 626, 627, 658, 661, 662, 899  
     abundance..... 26  
     attraction..... 624  
     conservation..... 618, 620, 657  
     destruction ..... 4, 619  
     diversity..... 26, 628  
     export..... 655, 663  
     exploration programmes..... 656  
     flower buds..... 624, 628  
     herbivore interactions ....., 4, 29  
     importation ....., 562, 659  
     invertebrate ....., 658, 660  
     knowledge ....., 28, 153, 626  
     loss..... 112  
     marketing..... 659, 662  
     native ....., 659, 665  
     non-native ....., 562, 655-657, 659, 664  
     of weeds..... 563  
     prospecting for new ....., 665  
     rearing..... 7, 657  
     regulation..... 659  
     risk analyses..... 660  
 navel orangeworm ....., 779, 783, 787, 789  
 nectar.....23, 149, 618, 620, 624, 628  
     extra-floral ....., 27  
     feeders ....., 783  
 nectarines..... 786  
 nematodes..... 409  
     acaropathogenic..... 260  
     entomopathogenic..... 240, 932  
     filarial ....., 464, 474, 475, 731  
 Neotropical region ....., 167, 305  
 Nepal ....., 146  
 net  
     cages ....., 8  
     benefit..... 112, 620  
     exporter..... 130, 169  
     losses ....., 620  
     movement ....., 876  
     photosynthesis ....., 863  
     returns ....., 168  
     revenue ....., 180  
 Netherlands ....., 121, 186, 655, 893  
     Mosquito Radar ....., 732  
 networks ....., 703, 717, 741, 777  
     communication ....., 680, 699  
     detection ....., 515, 585, 593  
     horizontal ....., 703  
     institutional ....., 638, 639  
     monitoring ....., 519, 521, 674, 678, 732, 740  
     mosquito ditches..... 328, 329  
     quarantine stations ....., 531  
     trapping....180, 486, 489, 522-528, 533, 535,  
     540, 545, 546, 551, 554, 562, 574, 575,  
     582-585, 686, 787, 788, 877, 880, 883  
     surveillance.....182, 534, 562, 564, 880  
     vertical ....., 703  
 New World screwworm.....113, 296, 305-315,  
     443, 470, 732, 814  
 New Zealand..122, 124, 514, 665, 870, 891, 895  
     AgResearch ....., 505  
     Better Border Biosecurity ....., 505, 516  
     Institute for Plant and Food Research ... 121,  
     505  
     University of Auckland ....., 505  
 Nicaragua ....., 183, 711  
 niche ....., 465, 683, 799, 827, 917  
     modelling ....., 18, 310  
     replacement ....., 757  
     vacant ....., 371, 380  
 Nigeria..... 18, 19, 859  
 night vision..... 334  
 nilgai ....., 259  
 nitrogen ....., 925-928  
     fertilizer ....., 24, 624  
     fixation ....., 923, 925, 926, 937  
 noctuids ....., 783, 896  
 non-communicable diseases.....161, 162, 170,  
     171, 189  
 non-diapausing strains ....., 153  
 non-governmental organizations.....709, 717,  
     721, 832  
 non-Mendelian inheritance ....., 650  
 non-native  
     biocontrol agents ....655, 656, 661, 662, 665  
     fruit flies ....., 133, 166, 170, 180  
     incursions ....., 514  
     invertebrates ....., 660  
     natural enemies..... 562, 655-657, 659, 664  
     pests..... 33, 562, 656  
     plants ....., 561, 802  
     species ....., 20, 165, 189, 655, 661, 802  
     weeds ....., 562  
 non-target ....., 477, 660, 800  
     fauna..... 283, 298

- impact ..... 428, 513, 555, 662  
 indicator species ..... 284  
 organisms ..... 151, 152, 427, 437, 827  
 species ..... 327, 374, 827, 852  
 Nordic Arctic ..... 800  
 North Africa ..... 165, 166, 552, 582, 766, 787  
 North America ..... 87, 131, 186, 234, 240, 261,  
     306, 308, 466, 470, 475, 551, 552, 555, 559,  
     587, 593, 731, 789  
 North American ..... 582, 583, 594  
     cattle industry ..... 464  
     colonization ..... 309  
     origin ..... 308  
     gypsy moth ..... 783, 788  
     range ..... 82  
 North American Plant Protection Organization  
     (NAPPO) ..... 561, 567  
 Norway ..... 834  
     Oslo Metropolitan University ..... 645  
 nucleases ..... 648  
     engineered nucleases ..... 649, 809, 811, 849  
     homing endonucleases ..... 471, 798, 806, 809,  
         813, 848  
     meganucleases ..... 648, 809, 812  
 RNA-guided endonucleases ..... 848, 850  
 site-directed nucleases ..... 645-649  
 transcription activator-like effector  
     nucleases (TALEN) ..... 648, 798, 812, 813,  
         848  
 zinc finger nucleases (ZFN) ..... 648, 809, 812,  
         813, 848  
 nuisance ..... 277, 322, 324, 372, 434, 435, 437,  
     442, 447, 452, 454, 731, 733  
 nurseries ..... 33, 40, 46, 541-543, 546, 547, 550,  
     563, 586
- O**
- oases ..... 597-612, 774  
 oats ..... 234  
 obesity ..... 170  
 oblique-banded leafroller ..... 896  
 Oceania ..... 164, 165, 406  
 oceans ..... 917  
 off-target ..... 333, 648  
     DNA cleavage ..... 650, 798, 811, 813  
     effects ..... 798-800, 803, 825  
     mutations ..... 834  
 off-the-shelf  
     pheromones ..... 896  
     remotely piloted aircraft systems ..... 907, 910  
 okra ..... 82, 83  
 Old World screwworm ..... 464  
 oligophagous ..... 143, 149, 154, 618, 627  
 olive ..... 582, 588, 928  
     olive fruit fly ..... 165, 168, 373, 919, 925, 928  
 Oman ..... 770  
     Jebel Akhdar Mountains ..... 769  
 onchocerciasis ..... 634, 635, 639  
 One Health ..... 251-255, 261  
 onion fly ..... 121, 930, 932  
 online survey ..... 759  
 Open Data Kit ..... 893  
 orchard sanitation ..... 93, 94, 103, 139, 154, 179,  
     671, 677, 679, 704  
 orchard-by-orchard management ..... 786  
 organic  
     certified ..... 75, 123, 607, 611  
     cotton ..... 66  
     farming ..... 69, 119, 832  
     food ..... 832  
     fruit industry ..... 123  
     insecticides ..... 42, 133, 484  
     material ..... 234, 236, 323  
     matter ..... 24, 323  
     orchards ..... 41, 118, 119, 603, 790  
     persistent pollutants ..... 122  
     production ..... 118, 512, 591, 611  
     vineyards ..... 591, 607, 611  
 Organismo Internacional Regional de Sanidad  
     Agropecuaria (OIRSA) ..... 172, 185, 519, 522,  
         536, 561  
 organogram ..... 540  
 oriental fruit fly ..... 150, 164, 172, 514, 896  
 oriental fruit moth ..... 216, 779, 782, 783, 786, 896  
 ornamental ..... 520, 539, 540, 563, 564, 571, 733  
 outbreaks ..... 69, 77, 108, 116, 139, 145, 166, 180,  
     185, 234, 258, 352, 406, 545, 589, 604, 673,  
     685, 731, 768, 894, 895, 898  
     area ..... 40, 532, 553, 566, 567  
     cactus moth ..... 561-577  
     dengue ..... 346, 747, 748  
     desert locust ..... 768, 771, 776, 777  
     diseases ..... 38, 253, 337, 406, 633, 635, 637-  
         639, 641, 731  
     dynamics ..... 886  
     gypsy moth ..... 551-553  
     Mediterranean fruit fly ..... 166, 180, 185, 484,  
         491, 519-534, 869-886  
     populations ..... 258, 491, 552, 570  
     planthopper ..... 618-620, 624-627  
     proportions ..... 237, 619  
     response ..... 638, 685  
     simulation ..... 869-886  
     years ..... 484, 497, 499  
 outreach ..... 43, 116, 238, 244, 583, 586, 590-594,  
     747-759  
     activities ..... 562, 751, 757, 759  
     materials ..... 568, 752  
     programme ..... 582, 591  
     public ..... 321, 545, 568  
     strategy ..... 749, 759  
 oven ..... 97, 99  
 overflooding ratios ..... 95, 103, 113, 137, 197,  
     220, 222, 223, 353, 391, 394, 407, 571, 789,  
     790, 847

overwintering.....583, 790  
 adult.....220, 476  
 capacity.....469  
 diapause.....146, 147  
 dormancy.....475  
 foci.....463, 468, 472, 475, 476  
 habitat.....71  
 populations.....60, 472, 473  
 potential.....63  
 pupal.....147, 582  
 response.....475  
 sites.....476  
 strategy.....463  
 tolerance.....934  
 oviposition.....154, 348, 495  
 autocidal gravid ovitrap.....347-349  
 behaviour.....150, 350  
 cages.....135, 136, 612  
 cues.....151  
 cycle.....294  
 marking pheromone.....151  
 period.....149, 217  
 preference.....150, 151  
 pre-oviposition period.....217  
 sites.....147, 150, 220, 244  
 traps.....347, 348, 415  
 wound.....147  
 ovulation sequence.....294

**P**

Pacific islands.....340, 514, 748  
 Pacific Ocean.....165, 880  
 packing houses.....197, 209-212, 669, 676, 684, 696, 699  
 painful bites.....233, 236, 237  
 painted apple moth.....113  
 Pakistan.....60, 347  
 Pan American Health Organization (PAHO).....342, 718  
 Panama.....34, 183, 311  
 papaya.....184  
 papaya fruit fly.....167  
 papaya mealybug.....20  
 paradigm.....243, 347, 785, 801, 819, 852, 904  
 Paraguay.....18, 29, 34, 307, 314, 340  
 parasites.....256, 300, 710, 795, 918, 930  
   blocking transmission.....356  
   ectoparasites.....251, 252, 254  
   endosymbiotic reproductive.....371, 374, 378, 379  
   human.....844  
   integrated parasite management.....257  
   obligate.....234, 463  
   semi-permanent.....234  
   temporary.....234  
   toxins.....343  
   treatments.....468

parasitoids.....153, 124, 198, 211, 212, 215, 218, 226, 242, 256, 409, 473, 656, 937  
 aerial release.....903, 913, 914  
 attraction to flowers.....624, 625, 628  
 community.....21, 23  
 egg parasitoids.....612, 628  
 endoparasitoids.....3  
 establishment.....21, 25, 29  
 habitat manipulation.....153, 628  
 hyperparasitoids.....19, 22, 23, 25-27  
 introduction.....17-29  
 mass-production.....5, 19, 34, 41, 225, 913  
 mass-rearing facilities.....3, 9, 201, 224  
 native.....208  
 parasitisation rate.....208  
 planthoppers.....618-620, 624, 625, 628  
 pteromalid.....240, 243  
 pupal.....240  
 releases.....3-14, 34, 41, 42, 197-202, 208-212, 215, 220, 226, 240, 903, 913  
 synchronised diapause.....155  
 paratransgenesis.....647, 934  
 parthenogenesis.....919  
 participatory action research.....709, 710, 721, 724  
 participatory activities.....710, 714, 715, 717, 723  
 particle gun.....646  
 passive chilling systems.....914  
 patents.....61, 292, 657, 664  
 pathogens.....240, 339, 409, 656, 795, 799, 812, 826, 917  
   animal.....930  
   blocking.....474  
   domestic animals.....261  
   entomopathogens.....19, 41, 42, 240, 658, 932, 935  
   evolving strains.....635  
   free propagative material.....35  
   host contact.....353  
   human.....260, 261, 368, 919, 922, 930  
   invasive.....641  
   livestock.....257  
   opportunistc.....922  
   pathogenic bacteria.....918  
   plant pathogens.....17, 25, 921  
   refractoriness.....818, 824, 827, 828  
   resistant strains.....427, 825  
   secondary.....471  
   tick-borne.....251-253, 257  
   toxins.....343  
   transmission.....261, 353, 370, 372, 379, 633, 635, 639, 641, 824, 919  
   vector-borne.....368, 372, 379, 635, 639  
   wildlife.....261  
   viral.....379, 919  
 Peaceful Uses Initiative (PUI)....275, 279, 298  
 peach fruit fly.....165  
 peaches.....179, 226, 491, 786  
 peanuts.....234

- pears ..... 181, 491, 786  
 pecans ..... 75  
 penalties ..... 12, 677  
 perceptions ..... 29, 669, 676, 679, 680-683, 687-689, 721, 733, 736, 759, 823  
 peridomestic  
     animals ..... 720  
     areas ..... 342, 346  
     environments ..... 710, 725  
 periphery ..... 39, 215, 218, 220, 225, 242, 789, 792  
 peri-urban ..... 704  
     areas ..... 277, 607  
     fringes ..... 674  
     scenario ..... 912  
 Peru ..... 131, 180, 188, 307, 310, 312, 315, 466, 535  
 pest  
     control advisers ..... 590, 592, 594, 626, 892  
     control strategies ..... 3, 709, 834  
     diagnostics ..... 618, 626-628  
     establishment ..... 62, 82, 161, 165, 166, 168, 172, 175, 180, 185, 468, 505, 541, 562, 575, 583, 598, 870, 871, 885  
     exports ..... 664  
     free areas ..... 133, 162, 171, 173, 179-189, 198, 484, 486, 871  
     free production sites ..... 182  
     free status ..... 670, 671, 673  
     incursions ..... 515, 535, 562, 570, 891, 895, 898, 900  
     pressure ..... 20, 21, 26, 115, 505, 604, 626, 671, 893  
     reservoir ..... 225, 258, 827  
     resistance ..... 131, 658  
     risk mitigation ..... 182  
     secondary ..... 82, 85, 603, 625  
     suppression ..... 522, 628, 674, 675, 891, 892  
     surveillance ..... 29, 305, 891, 895  
 pesticides ..... 14, 111, 119, 143, 151, 154, 251, 329, 656, 658, 660, 661, 664, 665, 775, 907  
     management ..... 43, 618, 626, 628  
     marketing ..... 626-628  
     microbial ..... 647  
     resistance ..... 23, 112, 256  
     restrictions ..... 112  
     residues ..... 3, 4, 136, 810  
 pharmaceuticals ..... 657, 804  
 phased conditional approach ..... 275-300, 859  
 phenotypic sorting ..... 410  
 pheromone ..... 780, 793  
     aerial application ..... 61, 66-68, 76, 78, 79, 81, 604, 605, 609, 788  
 aerosol puffers ..... 780, 786  
 atomizer puffers ..... 781  
 attracticide ..... 781  
 baited traps ..... 115, 553, 572, 573, 582, 788, 790, 792  
 blends ..... 588, 594, 603, 781, 788  
 dispensers ..... 582  
 dispensers, aerosol ..... 787, 792  
 dispensers, automated ..... 891  
 dispensers, hollow fibres ..... 61, 780, 781, 784  
 dispensers, hollow-tube ..... 590  
 dispensers, Lorelei ..... 95  
 dispensers, polymer ..... 603-605, 609, 611  
 dispensers, rope ..... 61, 62, 65-85, 785  
 disruptant formulations ..... 781  
 drops ..... 604  
 emission ..... 76, 590, 783, 790  
 flowable formulation ..... 604, 605  
 identification ..... 567  
 laminate flakes ..... 780, 781  
 mate recognition ..... 237  
 mating disruption ..... 51-87, 94, 113-125, 237, 510-512, 551-559, 582-594, 597-613, 779-792, 891, 897  
 microcapsules ..... 780, 781  
 oviposition marking ..... 151  
 plume ..... 603, 779, 782  
 production ..... 937  
 release rate ..... 790, 792  
 sprayable ..... 65, 71, 76, 79, 82, 84  
 synthetic ..... 95, 780  
 traps ..... 51, 117, 551, 556, 559, 582-585, 599, 671, 785, 787-790  
 waxy dollops ..... 781  
 Philippines ..... 18, 618, 620  
     International Rice Research Institute (IRRI) ..... 617, 618, 629  
     Visayas State University ..... 617  
 photo  
     period ..... 415, 598  
     sensors ..... 897  
     synthesis ..... 863  
     taxis ..... 8, 100  
 phylogenetic  
     distant taxa ..... 375  
     information ..... 937  
     related hosts ..... 376  
     relationship ..... 308  
 phylogeography ..... 305-312  
 physical removal ..... 511, 512  
 phytosanitary  
     accreditation ..... 544  
     actions ..... 33, 37, 39, 46  
     committees ..... 87  
     constraints ..... 20  
     emergency ..... 568  
     measures ..... 39, 40, 43, 540, 541, 698, 700  
     regulation ..... 39, 107, 171, 542  
     risk ..... 94, 172  
     strategies ..... 39, 169, 189  
     surveillance ..... 38  
     treatment ..... 671, 832  
 pineapple ..... 234, 238-241

- pink bollworm.....51-87, 113, 443, 591, 777,  
     779-785, 790, 791  
 Pink Bollworm Eradication Programme ..52-86  
 Pink Hibiscus Mealybug Programme.....33  
 pistachios.....787, 788  
 plagues.....768-777  
 plant  
     breeding .....5, 835  
     defences .....933  
     diseases .....20, 26, 30  
     health .....23, 174  
     health committees.....38-43, 55, 200, 202,  
         209-212  
     host.....4-9, 25, 42, 129, 135, 137, 139, 146,  
         151, 154, 514, 563, 567-574, 587, 704,  
         777, 886, 899, 907  
     insect-microbe interactions .....25, 30  
     leachates .....149  
     material.....22, 37, 39, 541, 543, 546, 549,  
         571, 586, 926  
     paradigm .....819  
     pathogens.....23, 25, 921  
     protection organizations....33, 40, 167, 172,  
         198, 544, 567  
     protection programmes .....33  
     sentinel.....575  
 plasma-atomic emission spectrometer .....58  
 plasmids.....812, 934  
 plasticity  
     ecological.....27  
     in overwintering response.....475  
 Pleistocene.....309, 311  
 plums.....582, 786  
 plumes .....603, 779, 782  
 political.....297, 568, 640, 776  
     barriers.....712  
     benefits .....507  
     buy-in .....638  
     circumstances .....539  
     commitment .....634, 635  
     conditions .....712  
     constraints.....55  
     context .....699  
     decisions .....455  
     demand .....433  
     dynamics.....717  
     factors .....797, 804  
     freedom.....296  
     initiative.....279  
     leaders.....344  
     partners .....122  
     perspective.....244  
     pressure.....435  
     resources.....577  
     support .....342  
     turmoil .....225  
     uncertainty .....652  
     will.....116, 131, 189, 276
- pollinators.....112, 605, 800, 827  
 polygons .....333, 437, 439, 440, 531, 546, 864  
     release.....199-201, 205, 207-211, 865  
 polygyny .....149  
 polymerase chain reaction (PCR)..39, 325, 377,  
     388, 394, 424, 448, 724  
     PCR-RFLP .....307-309  
 polymorphisms .....308, 311, 799, 851  
     SNPs .....312  
 polyphagous.4, 93, 108, 149, 164, 822, 870, 899  
     predation .....659  
 pomace .....589  
 pome fruit.....111-125, 779, 785  
     industry .....111, 116, 123  
     pests .....896  
 population  
     collapse...21, 65, 349, 473, 563, 782, 817,  
         824, 844, 845, 852  
     density threshold.....824, 830  
     differentiation .....308  
     dynamics..4, 13, 21, 26, 43, 173, 197, 198,  
         205, 219, 223, 233, 244, 251, 254, 284,  
         428, 473, 488, 497, 607, 612, 741, 771,  
         900  
     ecology .....484, 502, 567, 830  
     elimination...371, 373, 381, 391, 394, 395,  
         443, 470, 471, 830, 859  
     expansion .....309, 312  
     genetic analyses .....312  
     genetics....276, 306-313, 818, 859, 860, 861  
     growth models .....598  
     growth rates .....166, 598  
     isolated...315, 453, 470, 551, 556-558, 585,  
         861, 863  
     non-immune .....641  
     replacement...353-355, 367-395, 410, 411,  
         471, 748, 817, 818, 824-827, 851  
     size estimates .....455, 880  
     structure .....305-315  
     suppression...66, 94, 118, 139, 315, 339-359,  
         367-395, 408-411, 433-455, 471, 484,  
         732-734, 748, 790, 799, 817-827, 859  
     surveillance.....29, 324, 408, 759  
 Portugal  
     MosquitoWEB .....732  
 posters .....43, 574, 623  
 post-harvest  
     burying residues .....239  
     cold treatment .....94  
     control .....608, 671  
     crop destruction .....65  
     losses .....131, 162  
     measures .....832  
     pest absence .....104  
     treatments .....167, 171, 174, 179, 513, 699  
     poverty .....4, 162, 276, 639, 712, 858  
     traps .....24  
 precautionary principle.....801, 803, 805

- PRECEDE-PROCEED model ..... 713  
precision agriculture ..... 260, 891, 907  
predation ..... 28, 152, 375, 492, 619, 659  
predators ..... 155, 256, 342, 409, 427, 618, 619, 656, 767, 918, 937  
ants ..... 290  
aquatic invertebrates ..... 330, 343  
build-up ..... 628  
fish ..... 327, 328, 330, 343  
generalists ..... 621  
hemipterans ..... 658  
hoverflies ..... 12  
laboratory-reared ..... 19  
lacewings ..... 12  
lady beetles ..... 12, 28  
mass-releases ..... 19  
mites ..... 240, 658  
of pest eggs ..... 621  
predatory mosquitoes ..... 327, 328  
spiders ..... 12, 28, 621, 624, 625  
staphilinid beetles ..... 240  
predictive  
analyses ..... 682  
environmental parameters ..... 862  
model ..... 502  
tools ..... 483, 485, 640  
pre-emptive  
programmes ..... 642  
response ..... 638  
prevention ..... 66, 174, 262, 486, 712, 797  
chemoprophylactic treatment ..... 804  
damage ..... 101  
dengue ..... 342, 344, 757  
diseases ..... 345, 406, 643, 720  
economic loss ..... 66  
malaria ..... 797  
practices ..... 43  
programmes ..... 188, 341, 640  
reproduction in the field ..... 383  
resistance ..... 62, 82  
tick-borne diseases ..... 252, 261  
transboundary movement ..... 172  
preventive ..... 28, 236, 564, 575-577, 797, 804  
control ..... 14, 608  
control strategy ..... 770  
release programmes ..... 177, 188, 564, 883  
price ..... 18, 123, 171, 389, 906  
consumer ..... 133  
differential ..... 179  
international ..... 183  
property ..... 437  
prickly pear ..... 562-575  
principle of responsibility ..... 805  
probiotics ..... 925, 928, 929  
Probit 9 ..... 671, 702  
progeny ..... 94, 237, 411, 796, 843, 848, 852, 929  
  female-biased ..... 844, 845  
  male-biased ..... 847  
progressive control pathway ..... 862  
prohibition ..... 541  
prokaryotic ..... 368, 812  
proof of concept ..... 339, 353, 358, 385, 387, 428, 709  
proof-of-principle ..... 372, 644, 817, 849  
prophylactic  
  applications ..... 618-620, 627  
  dips ..... 28  
  treatment ..... 804  
prospective technology assessment ..... 795-806  
protection ..... 702  
  anti-aphid mesh ..... 40  
  crop ..... 17, 135, 603, 787, 789, 791, 891  
  degradation ..... 780  
  environmental ..... 322  
  environmental stressors ..... 930  
  erosion ..... 169  
  parasite infection ..... 931  
  parasitoids ..... 937  
  pathogens ..... 917, 922, 930  
  physical ..... 242  
  population replacement ..... 381, 394  
  predators ..... 767  
  propagative material ..... 33, 46  
  radiation ..... 448  
protists ..... 921  
protozoa ..... 252, 929  
proxy ..... 288, 452, 714  
pruning ..... 40, 529, 530  
  scars ..... 544  
  wastes ..... 608  
psychological ..... 681  
  assessments ..... 713  
  barriers ..... 678  
  drivers ..... 678, 683  
  literature ..... 682  
  perspective ..... 681  
  research ..... 679, 683  
  satisfaction ..... 241  
  science literature ..... 682, 683  
psychology ..... 713  
  social ..... 622  
psychometric model ..... 622  
psychosocial  
  barriers ..... 678, 899  
  factors ..... 674, 677, 678  
psyllids ..... 33-46, 919  
public  
  acceptance ..... 237, 238, 243, 260, 372, 410, 474, 680, 681, 688  
  awareness ..... 27, 111, 223, 345, 356, 568, 687, 725, 729, 741, 759, 833  
  disapproval ..... 833  
  good ..... 664  
  housing apartments ..... 747, 749  
  lands ..... 677, 704  
  resistance ..... 123