

## Index

- acoustic signal, 178
- AFLP markers, 46, 254
- Africa, 258, 262
  - biological links to Seychelles, 246, 252
  - cichlids, 81
  - clade, 139
  - East, 261–2
  - elephants, 208
  - North, 217
  - separation from Madagascar, 245
  - sub-Saharan, 254, 259–61
  - succulent biome, 205
  - taxa, 135
  - transmarine dispersal, 265
  - transoceanic dispersal, 257
  - tropical mainland, 256
  - West, 261
- agamospecies, 103
- Agrodiaetus*, 176
- Ailuronyx*, 254
- Alaska, 221
- Aldabra, 246, 255, 260
- Aldabrachelys*, 260
- algae
  - microalgae, 99
  - nomenclature, 8, 103
  - species number, 79
- allogamy, 41
- allopolyploidy, 43, 55
- allozymes, 41, 43
- Alpinobombus*, 215–19, 221, 224, 233–4
- alveolates, 3
- amphipods, 147–9
- Anarthrophyllum*, 206
- anatomy, 16, 56, 284
- Angiosperm Phylogeny Group, 50, 131, 133
- angiosperms, 89, 102, 130, 132–4, 144
- animals
  - basal clades, 107
  - chemoreception, 178
  - clonal reproduction, 102
  - electroreception, 179
  - life cycles, 88
  - nomenclature, 103
  - pollination, 38
  - protected areas, 285
  - self-identification, 184
  - species number, 78
  - UV detection, 176
  - vibratory signals, 177
- anurans, 177, 247, 252
- apomixis, 101–2
- apomorphy, 97
- apoecilism, 176
- apple maggot fly, 182
- archaea, 99, 110, 112
  - species number, 79
- Archaius*, 256
- Argentina, 138
- Arquita*, 202, 205
- arthropods, 107, 282
- ascomycetes, 43
- asexual reproduction, 101–2, 198
- Asia, 43, 236, 242, 245–6, 257
- Asia Minor, 41, 44
- assortative mating, 173
- Asteraceae, 132
- Astragalus*, 49, 206
- Ateleia*, 206
- Atlantic rainforest, 289
- autogamy, 41, 48
- autonomisation, 104
- bacteria, 179
  - horizontal gene transfer, 101
  - individuality, 104
  - OTUs, 79
  - reproduction modes, 99
  - species number, 79, 103
  - subpopulations, 82
- Balkans, 285
- Baltimore classification, 103

- barcodes, 57–8, 62, 137, 139, 183, 198, 214, 217, 219, 221, 236, 284
- BEEBOL, 219
- BIN, 236
- BOLD, 183, 217, 236
- CCDB, 217
- CO1 184, 198, 214–18, 234, 236, 284
- diagnosability, 37
- bats, 177, 181
  - horseshoe, 175
  - sac-winged, 179
- Bayesian analysis, 4, 68, 217–18, 229, 233
- bdelloid rotifers, 98
- bee orchids, 45–6
- BEEBOL. *See* barcodes
- beech forest, 285, 288–9
- Belgium, 41, 44
- Berlin herbarium, 25
- BHL. *See* Biodiversity Heritage Library
- binomial name
  - STC, 20
- biodiversity, 9, 85, 110, 243
  - loss, 9, 186
  - undiscovered, 262
- Biodiversity Heritage Library (BHL), 22
- biogenetic law, 89, 91
- biological collections, 1, 4, 6
- biological universe, 9, 22
- biomes, 98, 138
- biometry
  - in taxonomy, 19
- biomonitoring, 183
- biosystematics, 17, 26, 66, 70
- Bipalium*, 289
- birds, 16, 89, 91, 177
- Boaedon*, 260
- Bolivia, 136, 138
- bombacoid tree, 204
- Bombus*, 6, 215, 217–18, 230, 235
- botanists, 103, 199
- bottlenecks
  - genetic, 150, 159
  - population, 151
- branchial arches, 87, 89
- Brassicaceae, 206
- Brazil, 25–6, 138, 201, 287, 289
- British Isles, 44
- brown phylogenies, 55
- Bulgaria, 285
- bumblebees, 3, 44, 214–15, 217, 220, 232, 235–6
- butterfly UV patterns, 176
- caatinga, 201–2, 206
- caecilians, 253–4, 265
- Caesalpinia* group, 205
- camouflage, 81
- Campylomormyrus*, 179
- Candolle, A.P. de, 17
- Candollean species, 14
- Carcinus*, 178
- Caribbean, 138
- carpel, 130, 132
- CAS-IoB. *See* barcodes
- Catalogue of Life, 23
- CATE, 24
- Cavernacmella*, 148–9
- Ceiba*, 198, 204
- Central Asia, 216
- Cerrado, 138, 202, 206
- character
  - apomorphic, 143
  - change, lack of, 144
  - conserved, 132
  - defining, 146
  - diagnostic, 96, 130, 132, 134–5, 140, 146, 235
  - displacement, 176–7, 180
  - epigenetic, 101
  - hidden, 182
  - homoplasious, 133
  - molecular, 81, 214
  - morphological, 24, 28, 37, 58–9, 83, 132–3, 232, 255, 284
  - ontogenetic, 96
  - paedomorphic, 96
  - phyloperiodic, 96
  - plesiomorphic, 133
  - qualitative, 139, 150
  - quantitative, 139, 150
  - radular, 85, 92
  - reproductive, 176
  - soft, 4, 139
  - typical, 20
- chemical signalling, 178, 182
- chemistry, 5, 91, 178
- China, 216
- Choanoflagellatea, 107
- chordates, 107
- Chromodorididae, 96
- Chrysoperla*, 177
- Cichlidae, 149, 173–5, 182
- Cichorieae Portal, 24
- classification, 7, 58, 130
  - of angiosperms, 131
  - biological, 98
  - chemical elements, 94
  - competing, 39
  - diagnosability, 133
  - formula-based, 112
  - horizontal gene transfer, 98
  - of life, 5
  - natural, 66
  - from molecular trees, 64
  - ontogenetic, 99, 115
  - ontogeny in, 84

**296 INDEX**

- classification (cont.)
  - organism-centred, 99, 111
  - phylogenetic, 104, 114
  - supraspecific, 38
  - virus, 8
- Cletocamptus*, 149
- climatic envelope, 180
- clonal, 98–9, 101–4, 113
- cnidarians, 99
- cod fish, 109
- cod icefish, 3
- cognition
  - concepts, 14–15, 18, 20
  - subjective processes, 17–18
- collaboration, 25, 57, 216, 242
- collective management
  - by systematists, 15
- Cologania*, 206
- colour patterns, 93, 96, 175, 259
  - local, 174
  - species delimitation, 94
  - on wings, 174
- common ancestor, 5, 147
- communication
  - bats, 181
  - by signals, 182
  - chemical, 178
  - combined modes, 179
  - diversity, 114, 116
  - electrical, 179
  - mate recognition, 175
  - premating, 179
  - science and society, 107
  - species, 107
  - species concepts, 98
  - taxon concepts, 19
  - vibrational, 177
  - vocal, 177
  - within species, 176
- comparative morphology, 87
- competition
  - interspecific, 172, 179, 181
  - intraspecific, 179
- conservation, 3, 70, 115, 144, 169, 184, 264, 281–3, 288
- nomenclatural, 113
- pollination, 235
- conservatism
  - morphological, 243
  - niche, 150, 157
  - ontogenetic, 89, 106
  - phylogenetic, 206
  - phylotypic periods, 89, 94, 107
- consilience, 28
- constraint
  - cause for stasis, 158
  - definition, 158
- convention
  - species taxa, 9, 14, 24, 29, 109
  - convergence, 7, 145, 147, 173, 289
  - lineage, 6, 54
  - phenotypic, 55, 174
- Convolvulaceae, 134, 198
- co-occurrence
  - cryptic species, 180
  - reproductive isolation, 175
  - species, 180
- copepods, 3, 178
- copulatory behaviour, 178
- Corambidae*, 84, 89
- corolla, 139–40
- correlation
  - barcodes and long branches, 220
  - character, 27
  - genotype and phenotype, 47
  - morphological, nuclear and plastid, 49
  - morphology and nuclear, 51
  - pH and abundance, 287
  - of plastid data and geography, 49
- Coursetia*, 201
- crabs, 178
- Crepis*, 27
- crown taxa, 97
- Crustacea, 85, 149, 178
- crypsis, 3, 5, 262–3, 265–6, 289
  - ecology, 243
  - lineage longevity, 243
- cryptic
  - clade, 16, 36, 47–8, 50–1, 54–5, 57–9, 63, 65–9, 71, 140
  - diversity, 78, 80, 151, 181, 281–2
  - ecological speciation, 183
  - edaphic fauna, 283
  - lineages, 5, 243, 256, 265
  - nodes, 130, 133, 140
  - phases in ontogeny, 85, 88, 92, 106
  - plant species, 197
  - speciation, 48, 197
  - species taxon concepts, 26
  - taxa, 1, 8, 135, 140, 243, 264
- cryptic species, 1, 3, 5–8, 14, 26–7, 36, 39–40, 48, 52, 54, 67, 79–80, 82–3, 85, 91, 96, 98–9, 107, 109, 116, 135, 143, 169, 174, 179, 197, 201, 213, 215, 220, 232, 234, 247, 258
- allopatry, 243
- anthropocentrism, 183
- apples and oranges, 146
- biodiversity estimates, 144
- causes, 243
- Cavernacmella*, 148
- chemical ecology, 178
- convergence, 174
- co-occurring, 172
- definition, 16, 39, 80, 145, 169, 243, 281
- evolution of stasis, 145

- feedback from E- to T-species, 17
- fig wasps, 181
- formal recognition a matter of convention, 29
- general properties, 146
- herpetofauna, 263, 266
- hyperstable niches, 158
- insufficient determination, 282
- lack of morphological differentiation, 173
- Melanobombus*, 235
- methodological error, 183
- micro and macroevolution, 151
- modes of origin, 55
- molecular diagnoses, 183
- morphological bias, 186
- morphological stasis, 149, 151
- multimodal signalling, 179
- natural phenomenon, 144, 146
- need to be verified for speciation rates
  - estimation, 54
  - new definition, 146
  - niche occupation, 157
  - phonic, 182
  - planarians, 285
  - problem, 80
  - relation to formal taxonomic species, 28
  - require molecular data, 68
  - research potential, 169
  - rooted in incongruence, 55
  - self-recognition, 175
  - similarity, 182
  - source of diverse data, 160
  - standard taxonomy, 26
  - stasis, 150
  - Stylocapitella*, 149
  - sympatric, 282
  - taxonomic species awaiting formalisation, 16
  - tests for trait change, 159
  - theoretical concept, 145
  - trait variability, 159
  - in UV reflecting families, 177
  - vibrational communication, 177
  - vocal communication, 177
  - weakness of morphology, 172
  - what are they?, 281
- Ctenophora, 107
- cues, 46, 175, *See* species identity
  - information about environment, 175
- Cyathostegia*, 202–3, 205
- Cyperus*, 54
- cytogenetics, 26–7
- Czech Republic, 285
- Dactylorhiza*, 43–4, 47–50, 55
- Daphnia*, 103
- Darwin, 3–4, 78, 88, 109
  - Tree of Life Project, 70
- data
  - missing, 216
- data sets
  - incongruence, 55
  - concatenation, 54–5, 69
  - congruence, 40, 79
  - consilience, 27
  - correlation, 219
  - incongruence, 5, 7, 49, 51, 61, 64, 68, 107, 111
  - integration, 27
  - multiple categories, 61
  - at multiple demographic scales, 61
  - publication, 27
  - re-analysis, 219
  - from same sample, 64, 72
- deep homology, 94
- delimitation vs. typicality, 20
- DELTA, 24
- demographic monography, 59, 61, 70
- demography, 179, 266
- Dendronotus*, 85, 92, 97, 108
- Denisovians, 109
- density dependence, 180
- diagnosability, 37, 130, 132–5, 138, 140
- diagnosis, 8, 19–21, 26, 81, 95
  - as best fit, 20
  - as delimitation, 20
  - discrete delimitation, 20
  - new species, 242
  - species, 14
- Dichrostachys*, 206
- diffusion patterns, 91
- diploblastic, 99
- Diporiphora*, 149
- Dipteryx*, 206
- discontinuities, 44, 59, 62, 64, 67–8
  - scale-dependence, 64
- dispersal, 157, 181, 199, 202, 205–6, 243, 246–7, 252, 256, 258–9, 261, 283
  - differential, 180
  - limited ecological setting, 202, 205
  - transmarine, 265
- disruptive selection, 170, 173
- distribution, 288
  - allele, 108
  - entire, 234
  - gamma-frequency, 218
  - geographic, 139, 145, 151, 158, 176, 184
  - global, 216, 235
  - modelling, 242
  - phylogenetic, 101–2
  - planarians, 285, 288
  - Seychelles, 246
- disturbance, 177, 182
- divergence, 247
  - by natural selection, 173
  - by UV reflectance, 177

**298 INDEX**

- divergence (cont.)
  - clade, 257
  - degree, 215
  - ephemeral, 158
  - estimates of, 5
  - genetic, 55, 82, 147, 174, 182, 219
  - geographical, 219
  - lack of phenotypic, 243
  - lineage, 4–8
  - local, 180
  - low genetic, 79
  - mitochondrial sequences, 252, 258
  - molecular, 48, 80–1, 96
  - morphological, 172
  - ontogenetic, 89
  - phenological, 47
  - phenotypic, 197
  - recent, 147
  - sequence, 51
  - signal, 182
  - species, 54
  - trait, 169
  - within-species, 219
- diversification rates, 68, 138
- diversity
  - interspecific, 288
  - intraspecific, 231, 288
- DNA, 1, 4–8, 27, 37, 40, 48, 51, 69, 79, 88, 110, 133, 135, 215, 235, 252, 254–61
- dorids, 85, 89, 97
- duration of residence, 262, 265
- Earth BioGenome Project (EBP), 70
- Eastern Europe, 41, 44
- echinoderms
  - ophiuroid, 85
- echolocation, 175, 181
  - bats, 182
- ecological niche
  - differentiation, 180–1
  - tracking, 150, 157
- ecological speciation, 47, 143, 150, 182–3
- ecology, 5, 15, 38, 61, 139, 151, 172, 173, 181–2, 184, 257, 265–6, 281
- ecosystem services, 9
- ecotypes, 41, 43, 63
- ecotypic variation, 200
- ectomycorrhizae, 43
- Ecuador, 202
- edDNA, 183
- effective population sizes, 198, 202, 204, 207
- Einstein, 109
- electric fields, 179, 183
- electric fish, 179
- electric organs, 179
- electrical, 5
- electrolocation
  - definition, 179
  - electroreception, 179
- Elfdaliana*, 95, 113
- embryology, 87
- Enallagma*, 148
- Enchenopa*, 182
- Encyclopedia of Life, 25
- endemic, 41, 43, 200, 204–5, 243, 246–7, 253–8, 260, 265–6
- endomycorrhizae, 43
- England, 285
- Engler
  - Das Pflanzenreich, 22
- environment, 25, 44, 55, 65, 88, 143–4, 149, 151, 157, 173, 175–6, 179, 181, 185, 202, 205, 243, 245–6, 265–6, 286
- arctic, 215, 234
- dry South American, 205
- high mountains, 215
- subarctic, 215, 234
- environmental fluctuations, 180
- EoL. *See* Encyclopedia of Life
- Epidendroideae, 40
- epigenetic, 55, 82–3, 85, 88, 97, 101–2, 104
  - properties, 44
- Epipactis*, 40–1, 43–4, 47–8, 53, 55
- epistasis, 159
- equivalence
  - ecological, 180–1
  - of species, 108
- Erimacus*, 178
- Eriocrania*, 178
- error rate
  - of accepted species, 224, 232
- Erythrina*, 206
- E-species, 14–18, 21, 26, 28–9
- essentialism, 22
- e-taxonomy, 24
  - large scale, 25
- Eudicots, 132
- eukaryotes, 70, 106, 110, 131, 133, 144
- Euphorbiaceae, 202
- Eurasia, 53, 215
- Europe, 41, 44, 48, 181, 217, 220, 235, 262, 281–5, 288
- Eurytemora*, 157
- evo-devo, 87, 91, 105
- evolution, 67, 84, 183, 205
  - autapomorphies, 52
  - Ceiba*, 205
  - of characters, 132–3
  - convergent, 6, 148
  - cryptic species, 148, 151
  - and development, 87–8
  - of diversity, 28
  - of dorids, 107

- and ecology, 38
- and epigenesis, 82
- gene-centric view, 107
- at individual level, 102
- independent, 148
- Ipomoea*, 138
- on islands, 243
- neutral, 143
- nuptial colour, 174
- ontogeny, 87
- original, 84
- parallel, 6, 91
- physiological tolerance, 157
- plant, 55
- polyploidy, 206
- random, 85
- rate of, 159
- reproductive barriers, 182
- reticulate to cladogenic, 184
- secondary, 84
- signals, 174
- similar morphology, 173
- and species, 104
- of taxonomy, 83
- tempo, 6
- evolutionary biologists, 8, 16, 20, 23, 26, 29, 65, 70, 87, 107
- evolutionary biology, 3, 7, 14–15, 23, 28–9, 44, 84, 88–9, 143, 145, 150–1, 184
- evolutionary cohesion, 67
- evolutionary experimentation, 54, 65
- evolutionary lineage, 80, 82, 137, 140, 285
- evolutionary process, 4, 6–7, 9, 14, 16, 29, 81, 83, 89, 101, 145–6, 151, 265
- continuous, 81
- ecological, 205
- multiple ecological, 205
- evolutionary radiation, 47, 54, 102
- definition, 54
- evolutionary species, 14, 21, 28, 67
- hypotheses of processes, 28
- process of diversification, 16
- evolvability, 149
- exemplars
- of concepts, 17–18
- exhaustivity, 134
- of classifications, 134, 140
- extinction, 9, 52–5, 69, 138, 245–6, 263
- enhancing phylogenetic signal, 52
- Fabaceae, 132
- Fagus*, 288
- feathers, 91
- ferns, 3
- fig wasps, 180
- fish, 87, 89, 91, 102, 109–10, 173, 179
- fitness, 41, 158, 172
- enhanced by mutation, 159
- flatworms, 3, 91, 282–3, 286, 289
- terrestrial, 281
- Flora do Brasil 2020 25
- flounder, 1
- foraging strategies, 181
- formal taxonomic recognition, 198
- foundation monograph, 57–8, 62, 66
- fragrance
- floral, 46
- France, 42, 285, 288
- Frégate, 254–8, 261
- frog, 252, 264–6
- funding, 26, 234–6
- fungi, 3, 8, 43, 64, 79, 99, 103, 144
- fuzzy
- boundaries, 15, 20
- Galearis*, 45
- gas chromatography, 46
- GBIF project, 25
- GenBank, 38, 50, 183, 201, 214, 217
- gene, 108
- candidate, 40, 50
- coalescents, 217
- family, 50
- long branches, 220
- sequences, 213
- short sequences, 220
- gene expression, 88
- gene flow, 38, 47, 51, 54, 62, 81, 102, 146, 151, 157–8, 172, 174, 258, 264–5
- need for threshold measures, 69
- semi-permeability, 56
- gene sequencing, 43, 50
- gene trees, 198
- metric, 218
- general properties
- cryptic species, 146
- living organisms, 80
- generalist/specialist
- species status, 282
- generalised species definitions, 200
- generation time, 150, 199–200, 217
- genetic divergence, 264, 289
- lag, 55
- genetic diversity
- intra- and inter-specific, 288
- genetic drift, 143, 173, 243
- genetic similarity
- between species, 48
- genetic structure, 256, 287–9
- genome duplication, 43
- genome skimming, 47, 49, 51
- genomic, 48, 70, 94

**300** INDEX

- genomic (cont.)
  - background, 148
  - conserved regions, 151
  - data, 68–9, 137, 198
  - incongruence, 55
  - information, 58
  - methods, 235
  - system, 101
- genomic studies, 135
- genotyping, 69, 71
- genotyping-by-sequencing, 41, 49
- geographical
  - characterisation, 19
  - coherence, 26
  - data, 7
  - distance, 219
  - distinction, 197
  - inaccuracy, 197
  - partition, 256
  - profiling, 21
  - range, 134, 217, 282
  - regions, 21, 135, 216
  - structure, 255, 259, 263
  - variation, 213, 216, 234
- Geoplanidae, 281–2
- Germany, 41–2, 285
- ghost-worms, 3
- glacial periods, 159, 287
- glaciations, 285, 287
- global taxonomy
  - collective enterprise, 26
- Glycine*, 206
- Gondwana, 245, 247, 265
- gradualism, 144, 149
- Grandisonia*, 253
- GrassBase, 24
- grouping patterns
  - observed, 16
- Gymnadenia*, 44, 48, 50, 63, 65
- Gymnophiona, 253
- habitat choice, 181
- Haeckel, 83, 88, 91
- haplotypes, 52, 252, 256, 288
- hawthorn, 182
- Heliconius*, 174
- Heliothis*, 178
- helleborine orchids, 40
- Henderson, Andrew, 24
- herbarium, 1, 27, 59
  - identification, 61
  - morphological data, 62
  - online, 25
- Rio de Janeiro, 25
- specimens, 28, 37, 58, 67
- taxonomists, 70
- taxonomy, 56
- herpetology, 242
- Heterobranchia, 113
- heterochrony, 88
- heteroplasmy, 234
- hidden signals
  - inaccessible to humans, 175
- hierarchies, 95, 111
  - structured, 131
- Himalaya, 216
- holobiont, 98, 113–14
- Holocene, 288
- hologeny, 84, 104
- holotype, 20, 67
  - not necessarily typical, 20
- homeobox, 96, 101
- Homo*, 79, 81
- homology, 4, 87, 132
- homoplasious, 132–3
- homoplasy, 49, 132–3, 243
- horizontal gene transfer, 82, 99, 102
- human cognition, 14–15, 28
- human eye, 58, 176, 183
- humid forests, 283–4, 289
- hybrid swarms, 44
- hybridisation, 43, 46, 51, 69, 81, 102, 139, 174, 259, 264
  - catalyst for speciation, 81
  - meaning, 54
- hybrids, 8, 41, 46, 102, 178
  - low fitness, 174
  - non-sterile, 174
  - speciation, 38
- Hyb-seq, 49, 58
- hydrodynamic
  - envelope, 178
  - wake, 178
- hydrothermal vents, 6
- Hypertaxonomy*, 25
- hypobranch, 89, 91
- hypodigm, 14, 19–20, 22, 25–7
  - definition, 19
  - geography and ecology, 21
  - as population sample, 19
  - publication online, 23
  - as sample of real species, 19
  - sources of molecular data, 27
- Hypogeophis*, 253, 263–4
- hypotheses
  - causes of crypsis, 266
  - of groups, 16
  - of homology, 94
  - of monophyly, 96
  - of noumenal patterns, 14
  - of origin, 16
  - of phylogenetic lineages, 104
  - of processes, 16
  - sandbox, 29

- Iberia, 41, 284–5, 288
- identification, 284
  - automated, 70
  - barcoding, 284
  - diagnostic characters, 134
  - early diverging lineages, 5
  - field, 45
  - keys, 1
  - misidentification, 214
  - online, 24
  - phylotypic periods, 106
  - reliable, 236
  - species, 8, 19
  - specimen, 25
  - subspecies, 254
  - system, 7
- ILDIS, 24
- ILS. *See* incomplete lineage-sorting
- immune protection principle, 98
- incidental evidence, 4–5
- incomplete lineage sorting, 51, 53, 69, 198
- incongruence, 55
  - branch-length, 49
  - morphology and molecules, 55
  - organellar and nuclear genomes, 49
  - topological, 49–51
- INCT Herbário Virtual, 25
- Indian Ocean, 245–6, 255, 258–60, 262–3
- individuality, 104
- individuals, 3
  - as clade, 27
  - as exemplars, 18
  - as hypodigm, 20
  - clonal, 101–2
  - data sets from the same, 68, 70
  - genetic, 217
  - habitat competition, 179
  - immune properties, 98
  - living material as representative, 27
  - migration, 282
  - and MOD, 111, 114
  - need for extensive sampling, 242
  - not genetically homogeneous, 109
  - ontogenetic patterns, 95
  - ontological, 15
  - plesiomorphies, 97
  - rather than species, 104
  - representing species, 17
  - and sampling error, 220
  - self identification, 183
  - sensory capability, 181
  - simulation sampling, 214–15
  - single representative, 52
  - and taxa, 81
- information content, 52, 131
- information used by organisms themselves, 185
- Inga*, 198
- inheritance
  - of acquired characters, 88
  - epigenetic, 84
  - uniparental, 69
- integrative assessment. *See* taxonomy
- integrative taxonomy, 26, 110, 169, 172, 183
- intensional class definition, 20
- inter-Andean valleys, 202
- interbreeding, 16, 38, 69, 81, 172, 176, 215
- inter-kingdom organism, 98
- inter-taxon relations, 104
- introgression, 6, 51, 81, 139, 264
- introgressive hybridization, 199, 207
- intuitive species delimitation, 47
- invertebrates, 177
  - soil-dwelling, 282
- Ipomoea*, 57, 130, 132–5, 139–40, 198
- Ipomoeae*, 134, 140
- Iran, 217
- island biogeography theory, 246
- islands, 243, 245–7, 252, 254–60, 262, 264–5
  - isolated block, 247
- islands (and island-like biogeographic systems), 243
- isolation, 98
  - effective, 38
  - genetic, 55, 79, 82
  - geographic, 182, 202, 246
  - geographical, 178
  - post-zygotic, 48
  - premating, 175, 177, 181–2
  - reproductive, 38, 56, 61, 69, 102, 143, 146–7
  - as species criterion, 27, 38, 98, 101
  - statistical, 38
- Italy, 285, 288
  - central, 46
- ITIS, 23
- Janetaescincus*, 257–8, 264
- jordanons, 102
- juvenile, 89
  - features, 96
  - forms, 92
  - ontogenetic patterns, 89
  - paedomorphosis, 87
  - phenotypes, 96
  - plesiomorphies, 97
  - plesiomorphies, 91, 98
  - traits, 88
- karyotypes, 45
- Kelvin, 109
- kernels, 113
- Kew
  - Royal Botanic Gardens, 24–5, 57
- La Digue
  - Seychelles, 252, 255–8, 261

**302** INDEX

- lacewings, 177
- Lake Victoria, 173
- Lamarckian evolution, 88
- Lamiaceae, 132
- Lamprophis*, 260
- language, 98
  - taxonomic, 9
- larvae, 87
- Last Glacial Maximum, 288
- LEAFY*, 50
- leaves, 139
- Leguminosae, 198, 205–6
- León, 285
- Lepidonotothen*, 159
- Leucaena*, 202, 205–6
- Leucothoe*, 157
- LGM. *See* Last Glacial Maximum
- life cycle, 95, 103–4
  - ontogeny, 83, 88
- lineages, 5, 97, 264
  - allopatric, 264
  - allopolyploid, 44
  - amphibian, 265
  - ancient, 288
  - asexual, 102
  - clonal, 101
  - convergence, 6, 54
  - cryptic, 242, 262
  - cryptic species, 169
  - distinction of, 255
  - early diverging, 5
  - E-species, 26
  - evolutionary, 3–4
  - evolving, 4, 16
  - gene flow between, 38
  - genetic, 254, 256, 284
  - herpetofauna, 263
  - high turnover, 54
  - identifying, 215
  - as insufficient criterion, 202
  - intermediate, 52
  - isolated, 69, 178
  - molecular, 51
  - monophyletic, 134
  - mtDNA, 257
  - multiple origins, 55
  - phylogenetic, 8, 95, 104
  - polyploid, 45
  - previously established, 202
  - radiation, 149
  - recent origin, 56
  - separate, 98
  - species as, 15
  - stasis, 7
  - subject to gene flow, 62
  - surviving, 53
  - linkage disequilibrium, 173
  - Linnaean taxonomy, 183
  - linneons, 102
  - lizards, 3, 255–6, 263
  - Lorentz, 109
  - Lotus*, 206
  - low dispersal ability, 243, 265
  - low-copy nuclear genes, 45, 54
  - LSF, 220, 224, *See* Poisson-tree-process
  - Lucid, 24
  - Luetzelburgia*, 205
  - Lupinus*, 206
  - lycaenid butterflies, 176
  - Lycognathophis*, 259–60, 265
  - Lysenko, 88
  - macroevolution, 87, 143, 145, 149–51, 157
    - stasis in, 151
  - macroevolutionary research, 145, 149
  - macrospecies, 45–7, 71
  - Madagascar, 245–6, 252, 255, 261–2
  - MADS-box, 50
  - magnetoreception, 5, 179
  - Mahé, 252–3, 255–7, 259, 261
  - Malvaceae, 198, 204
  - Manihot*, 202
  - Mantel test, 219
  - Markov-chain Monte-Carlo, 218
  - Marphysa*, 145
  - Mastigias*, 148–9
  - mate choice, 176, 178
  - mate guarding, 178
  - mate localisation, 177
  - mate recognition, 174–6
    - for premating isolation, 175
    - sensory systems, 175
  - matK*, 50, 199
  - maximum likelihood, 217, 227, 233
  - mechanical waves, 177
  - mechanisms of coexistence, 175
  - mechanisms of speciation, 43
  - Melanobombus*, 215–20, 222, 226, 231, 235
  - membership
    - degrees of, 15
    - of groups, 64, 132
  - mental concepts, 15, 18
  - mesospecies, 45
  - metamorphosis, 83
  - metapopulation, 7, 69, 108, 200, 281
  - metazoan, 82, 84, 92, 98–9, 101–3, 107–8, 112–13
  - microevolution, 151
  - Microplana*, 281, 283–5, 287, 289
  - microspecies, 45–6, 49, 64, 102
  - mimicry, 176, 289
  - Mimosa*, 202, 205
  - mitochondrial gene, 198, 284, 289
  - mixed forest, 286
  - model organisms

- for palaeoclimatic study and conservation, 283
- Modern Synthesis, 15, 21, 87, 91
- molecular analysis
  - and integrative taxonomy, 110
  - Ipomoea*, 134
  - and ontogeny, 85
- molecular clocks
  - errors in, 56
- molecular data, 4, 26, 40, 43, 57, 67–8, 70, 79–81, 85, 92, 96, 106, 111, 131, 200, 242–3, 255, 265, 285, 289
  - accelerated species detection, 172
  - accessibility, 8
  - and cryptic species, 144, 146, 169, 179
  - genetic variation, 254, 259
  - and monophyly, 135
  - and phyloperiods, 112
  - and populations, 252
  - and species, 254, 258–9, 264, 281, 284
- molecular dating, 55, 261, 266
- molecular delimitation, 172, 242
- molecular developmental genetics, 105
- molecular differentiation, 261
- molecular divergence, 80
- molecular diversity, 50
- molecular formulae, 115
- molecular genealogies, 105
- Molecular Operational Taxonomic Units MOTU, 183, 287
- molecular phylogeny, 45, 49–50, 54, 62, 69, 96, 105, 107
  - and nomenclature, 113
- molecular reproductive barriers, 178
- molecular revolution, 6, 88, 186, 262
- molecular systematics, 108
- molecular systematists, 20, 69–70
- molecular taxa, 183
- molecular taxonomy, 183
  - and nomenclature, 113
- molecular trees, 48, 54, 64, 68
- molecular variation, 264
- molluscan teeth, 85
- molluscs, 79, 87
- Mongolia, 217
- monographs, 17, 23–5
  - demographic, 66
  - importance of international collaboration, 61
  - limits on accelerated production, 62
- monography, 56
  - demographic, 62
  - description, 56
  - foundation, 57–8
  - global, 70
  - integrated, 56
- monophyletic conspecific plant genetic samples, 202
- monophyly, 37–8, 96, 131, 135, 138, 199, 202
  - and diagnosability, 130–1, 133–4
  - less useful than similarity for species delimitation, 69
- shortcomings as species criterion, 38
  - and species, 41, 61
- monothetic, 132–3
- Mormyridae, 179
- morphological
  - cladistics, 38
  - morphological adaptations, 157
  - morphological characters, 68, 289
  - morphological continuum, 59, 63
  - morphological crypsis, 5–6, 80, 169, 174, 178, 183, 243, 282
  - morphological data, 4–5, 25, 70, 79, 87, 254
    - integration, 110
    - need for, 258
  - morphological descriptions, 56, 61
    - as matrices, 27
  - morphological diagnosability, 82, 130, 133, 136, 139, 235
  - morphological differentiation, 41, 58, 82, 172–3, 180, 197, 218, 252, 261
    - in clones, 101
  - morphological diversification, 148–9
  - morphological features
    - in phyloperiodic tables, 96
  - morphological homologies, 79
  - morphological matrix
    - problems of, 58
  - morphological methods, 38, 40, 115
  - morphological patterns
    - in ontogeny, 92
  - morphological phylogenies, 45, 62
  - morphological similarity, 26, 46, 145–7, 177, 182–3
  - morphological species, 3
  - morphological stages, 94
  - morphological stasis, 149
  - morphological support, 133
  - morphological synapomorphies, 135
  - morphological taxonomy, 56, 59, 62, 66, 68
  - morphological traits, 112
  - morphological variation, 184, 254–5
    - intraspecific, 259
  - morphological vouchers, 263
  - morphology, 3, 5–6, 8, 16, 27, 39, 44, 48–9, 58, 61, 64, 67, 83, 96, 106, 110–12, 137, 140, 145, 148, 172, 215–16, 218–19, 223, 231, 233, 235–6, 260
  - morphometrics, 8, 41, 68
    - 3D, 151
    - in *Dactylorhiza*, 44
    - field-based, 59
  - morphotype, 145, 148–9, 151, 284, 287
    - ancestral, 148
    - symplesiomorphic, 148
  - mosses, 3
  - moth, 178
  - MOTU. *See* Molecular Operational Taxonomic Units
  - mtDNA, 252, 255, 257–9
  - Müllerian mimicry, 174

**304** INDEX

- multidisciplinary studies
  - link classification and evolutionary biology, 65
- multilevel organismal diversity, 78, 99, 102, 105
- multimodal courtship, 179
- multimodal signalling, 179
- multiple conspecific accessions, 198, 200
- multi-rate PTP (mPTP). *See* Poisson-tree-process
  - multi-rate
- multivariate ordinations
  - preferred analytical approach, 68
- mutual mimics, 174
- mycorrhizal partners, 44, 48
- Mytilus*, 81
- naming, 65–6, 70, 140
  - of species, 169
- national parks, 285, 287–8
- natural group, 130
- natural selection, 84, 173
- nectar rewards, 45
- Neotropical dry forests, 201
- Neotropics, 135, 139, 202
- Neottieae, 40
- neotypological concept, 18
- Netherlands, 41
- neurotoxin
  - defence against predators, 289
- next-generation sequencing, 40, 45, 49, 51, 68, 71, 207
- NGS. *See* next-generation sequencing
- NHM, NHMUK (Natural History Museum London), 215, 217, 219
- Nigritella*, 44
- node, 48, 54, 89, 106, 112, 130–2
- nomenclatural type, 20
- code, 8, 82, 103, 114
- nomenclature, 7, 19, 39, 66, 70, 81, 96, 104, 107, 111–12
  - Linnean, 115
  - virus, 103
- non-binomial names, 103
- non-cellular, 99
- non-coalescence, 199
- North America, 137, 200, 236, 262
- nothotaxa, 8
- Notostraca, 157
- noumenal
  - world, 15
- nrITS, 41–2, 45, 48, 58, 64
- nuclear loci, 198, 204
- nuclear orthologues, 51
- nuclear-plastid conflict
  - phylogenetic signal erosion, 51
- nucleotide sequences
  - DNA or RNA, 79
- nudibranchs, 79, 87, 92–4, 95–7, 107, 112
  - aeolidacean, 92
  - nuDNA, 252, 254–9
  - nuptial coloration, 173, 175
- oak forest, 286, 288–9
- ochlospecies, 7
- online databases, 15, 24–5, 29
- online identification systems, 24
- ontogenetic ancestral traits, 87
- ontogenetic cycles, 87–8, 98
- ontogenetic data, 4, 84, 111
- ontogenetic dimension, 83
- ontogenetic framework, 78, 91, 96, 108
- ontogenetic model, 107
- ontogenetic modes, 99
- ontogenetic nomenclature, 113–14
- ontogenetic patterns, 85
- ontogenetic period, 88–9, 92–4, 95
- ontogenetic principles, 84
- ontogenetic properties, 101–3, 110
- ontogenetic systematics, 97, 104–5, 109–12, 115–16
  - workflow, 105
- ontogenetic taxonomy, 105, 112, 114
- ontogeny, 80, 83, 106
  - ancestral, 84, 89
  - descendant, 84
  - individual, 84
  - trajectories, 89
- operational criteria, 4, 7–8
- operational taxonomic units, 79
- Ophrys*, 45–9, 55, 64
- Opisthobranchia, 113
- Orangutan, 1, 6
- ordinations, 62–4
  - advantages as species models, 62
  - algorithms that distort feature space, 64
  - detecting discontinuity, 62
  - greater stability, 62
- organellar genes
  - unreliability for cryptic clades, 69
- orography of the Pyrenees, 289
- oscillation, merge-and-diverge, 158
- OTUs. *See* operational taxonomic units
- ovary, 139–40
- Oxytropis*, 206
- Pacific blue mussel, 81
- paedomorphosis, 84, 88–9, 97
- palaeopolyploid genomes, 205
- Palaeotropics, 135, 139
- PalmTraits, 25
- Palmweb, 24
- Pamelaeascincus*, 258
- Pan*, 79
- Paraguay, 138
- parallelism, 6, 147, 173
- paraphyly, 5, 114, 198–9, 202
  - species, 41, 198
- parasitism
  - differential, 180
- Paris, 25
- parthenogenesis, 99, 101–3

- passion vine butterflies, 174
- Pelusios*, 261
- periodic arrangement, 92
- periodic processes, 85
- Periodic Table, 91, 93–5
- Peru, 202
- pharyngeal clefts, 87
- Phelsuma*, 255–6, 263, 266
- phenologies, 180
- phenomenal contours, 16
- phenomenal world, 15
- phenon, phena, 18
- phenotype, 44, 57, 61, 64–5, 67, 69, 145, 148, 159, 173, 178, 200
  - data, 264
  - distinctions, 40, 197
  - divergence, 243
  - variation, 149
- phenotypic divergence
  - quantification, 197
- pheromone signals, 178
- phonic types, 182
- Phylloscopus*, 144, 177
- PhyloCode, 111, 113, 133
- phylogenetic analysis, 79–80, 133
- phylogenetic applications, 84
- phylogenetic constraints, 160
- phylogenetic distance, 87
- phylogenetic inference, 104, 133, 135
- phylogenetic lineage, 4
- phylogenetic niche conservatism, 205
- phylogenetic nodes, 5
- phylogenetic nomenclature, 111
- phylogenetic periodicity, 92
- phylogenetic reconstruction, 106
- phylogenetic relationship, 16, 45, 82, 287
- phylogenetic signal, 49–50
- phylogenetic studies
  - plants, 200
- phylogenetic systematics, 16, 84, 97, 103, 109–11
- phylogenetic trait conservation, 206
- phylogenetic tree, 38, 287–8
- phylogenomics, 247
- phylogeography, 247, 261, 266
- phylotypic periods, 85, 87–9, 91–2, 94, 95, 98, 106, 110–11, 114
- phylotypic stage, 89
- physical separation, 55, 175, 243
- physics, 109
- phytography, 17
- pierid butterflies, 176
- Pipistrellus*, 181
- planarians, 282, 284–6, 288–9
- plant taxonomy, 65
  - traditional, 37
- plants, 17, 22, 25, 47, 49–51, 55, 58, 62, 82, 84, 99, 102, 112, 131, 134, 197, 204, 206, 214
  - nomenclature, 8, 20
  - species number, 79
- Plants of the World Online (POWO), 25
- plastid genotype, 47
- plastid markers, 198
- plastid sequences
  - use for detecting hybridisation, 51
- plastomes, 47, 69
- Platanthera*, 44, 48
- Plato
  - theory of forms, 15
- Platyhelminthes*, 281–2
- pleiotropy, 159
- Pleistocene, 257, 261, 288
- plesiomorphy, 97, 132
- pleurobranchids, 89
- Poincaré, 109
- Poisson-tree-process (PTP),
  - 217, 264
  - unfiltered, 224
- Poland, 285
- pollen, 26, 38, 132, 134–5, 140, 199, 288
- pollination syndromes, 48
- pollinators, 43–4, 48, 60, 64
- Polyceridae, 95, 113
- Polygordius*, 145
- polymorphic species, 5
- polyploidy, 27, 43, 198, 204, 206
- polythetic, 132–3
- polytomy, 48, 51, 54, 68, 139
  - hard and soft, 53
  - statistical, 53
- Ponderosa pine, 200
- population, 5, 22, 27, 40, 53, 59, 61–2, 64, 67–8, 82, 84, 101, 104, 108, 116, 146, 151, 157, 159, 173, 180, 182, 184, 198, 204, 206, 215, 219, 230, 236, 243, 246, 252, 256–9, 262–4, 266, 284, 289
  - an a priori concept, 29
  - effective sizes, 217
  - genetic analyses, 38
  - genetic diversity, 288
  - processes, 101
- population biologists, 6, 38
- population biology, 16
- Porifera, 107
- Portugal, 285
- post larval, 85, 89
- post-zygotic, 44, 55
  - isolating mechanisms, 41
  - reproductive barriers, 45
- potential species, 54, 113
- POWO. *See* Plants of the World Online
- Praslin, 252–4, 256–7, 261
- Praslinia*, 253
- PRECIS, 24
- predation, 180–1
  - differential, 180

**306** INDEX

- predator-prey interaction, 176
- predictivity, 8, 85
- pre-evolutionary, 87, 109, 115
- premating
  - timing difference, 175
- prescientific times, 78
- previously unrecognised species, 205, 254
- prokaryotes, 8, 82, 99, 102, 106, 112, 133
- prospecies, 54
- prototypes, 18
- prototypicality
  - a cognitive bias, 22
- psbA*, 199
- pseudo-copulation, 46
- pseudo-cryptic clades, 47
- pseudo-pheromone cocktails, 47–8
- pseudo-sibling species, 82
- PTP. *See* Poisson-tree-process
- publication, 19, 22–5, 27, 36, 57, 114
  - conventional paradigms, 26
- punctuated equilibria, 3, 149
  - gradualism, 6
- Pundamilia*, 173–4, 182
  - P. nyererei*, 173
  - P. pundamilia*, 173
- Pyrenees, 288–9
- Qinghai-Tibetan Plateau, 222
- Quercus*, 288
- R package for taxonomy, 25
- races, 174, 182
- radiations, 54, 68, 135, 138, 143, 243
- RAD-seq, 41, 43, 45, 49–50, 53, 63–4, *See* restriction site-associated sequencing
- radular features, 92
- radular teeth, 92, 95, 97
- rain forests, 206
- rapid biodiversity assessments, 183
- rbcL*, 50, 199
- recapitulations, 89
- recent lineage divergence, 6
- reciprocal illumination, 61, 66–7
- reciprocally monophyletic clades, 202
- reducing bias, 231
- reference system for biodiversity, 14
- refugia, 246, 263, 285, 288–9
- repeating patterns, 92
- repetitive structures, 92
- reproductive isolation, 37, 80, 101, 174–5
  - post-zygotic, 174
- reproductive status, 177
- reproductive success, 176
- resource partitioning, 182
- restriction site-associated sequencing, 40
- reticulate network, 82
- revision, 24, 184, 213, 220, 235
  - taxonomic, 19, 21–3, 57
- Rhagoletis*, 182, 184
- rhinophoral papillae, 97
- rhinophores, 89
- ribosomal ITS, 50
- Rio de Janeiro, 25
- Robinieae, 200, 205
- rodents, 91
- Rosaceae, 206
- rotifers, 3
- roundworms, 3
- Rubus*, 71
- Russia, 146, 217
- Rutaceae, 202
- Sacccopteryx*, 179
- sampling, 5, 20, 23, 27, 39, 49, 67, 202, 204, 206–7, 213–14, 254–5, 261, 285–6
  - ambiguous data, 219, 224
  - global, 216
  - improvements by technology, 69
  - over-sampling, 216, 220, 225, 232, 234
  - planned in populations, 67
  - problems in molecular delimitation, 61
  - stratification, 216, 221–2, 231
  - systematic, 216
  - taxon, 135, 140
  - under-represented taxa, 216
  - under-sampling, 219, 223, 234
- savanna, 200, 202, 206
- scale, 64, 78, 80–1, 83, 94–6, 99, 110, 112, 150, 157
  - butterfly wing, 176
  - importance in taxonomic analysis, 64
- Squamata, 259
- scanning electron microscopy, 26
- Schizocoza*, 179
- Scratchpads, 24
- sea-slugs, 3
- secondary contacts, 289
- segmentation, 92
- selection, 53, 84, 159, 173, 182
  - balancing, 159
  - directional, 149, 158
  - frequency dependent, 173
  - stabilising, 6, 150–1, 156
- self-recognition
  - by species, 181
- semaphoronts, 97
- sensory data, 5
- sensory drive, 174
  - speciation, 182
- sensory ecology, 172, 181, 183, 186
  - taxonomy, 182
- sensory systems
  - species-specific, 181
- sepals, 139–40
- sequences, 38, 49, 68, 183, 214, 220, 232, 284, 288
  - duplicate, 225
  - short sequences, 224
- sequencing, 3, 51, 54, 63, 69, 139, 207, 284
- sex ratio, 180

- sexual selection, 173
- Seychelles, 242–3, 245
- sibling species, 26, 79–80, 82, 144
- signals, 174–9, 184
  - for danger, 289
  - frequency, 182
- Silhouette, 252, 254, 256–7, 261
- small patch sizes, 202
- SNPs, 45, 49–50, 52, 64
- social calls, 181
- societal benefit, 140
- soil communities, 283
- Solanaceae Source, 24
- somatic tissue, 101
- songs, 177, 179, 181–2
- Sooglossus*, 247, 252
- sound, 175, 177
- South America, 137, 205, 242, 258
- Southeastern Brazil, 206
- Spain, 285
  - Añisclo, 286
  - Asturias, 285
  - Basque region, 288
  - Cantabria, 285, 288
  - Catalonia, 288
  - Escuaín, 286
  - Huesca, 285
  - Ordesa, 286
  - Ordesa y Monte Perdido, 285, 288–9
  - Pineta, 286
- spatial segregation, 180
  - relation to ecology, 181
- specialist pollination, 46
- speciation, 15, 40, 172
  - allochronic, 172
  - allopatric, 172, 264
  - allopolyploid origin, 44
  - cryptic, 48
  - definition, 172
  - explosive, 46
  - islands, 246
  - mechanism, 47, 61
  - metapopulations, 281
  - models, 69
  - modes, 172
  - multiple, 51
  - polyploid, 44
  - process, 169
  - rare events, 215
  - rates, 54, 138
  - recent, 147
  - and sensory ecology, 185
  - from signal differentiation, 175
- species, 105, 234
  - a posteriori distinguished, 80
  - a unique set of traits, 282
  - accumulation curve, 284, 289
  - ambiguous data, 216
  - an a priori concept, 29
- based on biological collections, 58
- based on fragmentary data, 16
- basic cognitive level of biodiversity, 29
- basic unit of biological currency, 67
- candidate, 217–18, 223–4, 229, 231, 233–4
- coalescence, 67, 198, 200, 205, 215–16, 218, 220, 233–4, 236, 252
- co-mimetic, 174
- distribution, 214
- endemic, rare, local, 41
- evolutionarily independent lineages, 215
- false, 220, 232
- formal taxonomic species mostly untested hypotheses, 68
- geographical range, 213–14
- as hypotheses, 5
- hypothesis not delimitation, 67
- identification, 217
- locally restricted, 236
- molecular, 46
- in monographs and floras, 17
- monophly, 202
- natural, 144
- need for correct delimitation, 281
- overlooked, 197–8
- persistent crisis, 78
- polytypic, 229
- prior demonstration for evolutionary interpretations, 54
- pseudo-cryptic, 40, 146, 282, 285, 287, 289
- rare, 234
- reality in nature, 15
- recognition criteria, 213
- as taxa, 15–16
- true, 220
- typological, 27
- under-sampling, 216
- woody plant, 202
- Species 2000 23
- species circumscription. *See* species delimitation
- species classification
  - suboptimality, 66
- species complex, 258
- species concepts, 1, 4–5, 8–9, 14, 22, 28–9, 36–7, 39, 45, 56, 66, 78, 80–1, 98–9, 102–3, 108, 113, 115, 144–6, 213, 262, 281
- biological, 17, 26, 38–9, 101, 103, 109
- cohesion, 4–5
- microspecies, 46
- morphological, 58
- operational, 264
- phylogenetic, 39
- polytypic, 78
- taxonomic, 27
- universal, 103, 108, 200
- species constancy, 143
- species delimitation, 4, 16, 26, 37, 40, 44, 56, 58, 61–3, 68–9, 71, 169, 200, 264
- accuracy, 281

**308** INDEX

- species delimitation (cont.)
  - bias, 37
  - by anatomy, 284
  - discontinuities in several data categories, 59
  - integrative methods, 282
  - multivariate discontinuity, 59
  - self-identification, 183
  - sensory ecology, 184
- species description, 14, 17–18, 20–1, 25–6, 56, 61, 65, 83, 218, 242, 252, 282–3
  - account of central tendency, 20
  - aims, 20
  - living plant, 70
  - matrix, 27
  - molecular, 183
  - morphological, 37
  - objectification, 20
  - prototypical effects, 20
- species discovery, 236, 262
  - vs. new synonymy, 57
- species identity
  - cues, 174
- species level groups, 79
- species limits, 78, 199
- species numbers
  - estimates of number, 78
- Species Plantarum, 22
- species problem, 4
- species richness, 282
- species taxa
  - constantly redefined, 19
  - problems of equivalence, 65
  - subjectivity, 18
- species taxon concept, 14, 16–18, 20, 26–7, 29
  - by computation, 24
- species to population continuum, 82
- species-level molecular phylogenies, 200
- SpeciesLink, 25
- species-rich genera, 57
- speleobiology, 6
- spiders, 179
- sponges, 3, 79, 99, 107, 157
- SQSS, 22–7, 29, *See* status quo species system
- Squamata, 254, 257–60
- stable coexistence, 179–80
- stasis, 146–7, 157, 173
  - evolutionary, 144
  - excessive variability, 159
  - long-term, 147
  - morphological, 3, 6, 8–9, 148–9, 151, 157
  - taxonomic, 110
- status quo species system (SQSS), 14, 17, 22
- STC. *See* species taxon concept
- stochastic fluctuations, 180
- Streptococcus*, 108
- Stygocapitella*, 145, 148–9, 157
- subjective concepts, 15
- subspecies, 4, 8, 41, 53, 57, 63, 103, 109, 182, 253, 255, 259, 263
- succulent biome, 202, 206
- Sweden, 285
- sweet potato, 137, 140
- Sylvidae, 177
- sympatry, 173–4, 176–7, 258
- synapomorphy, 132–3, 135, 140
- systematic biology, 3, 36, 95, 104, 107
- systematics, 17, 27, 49, 70, 80, 132–3, 143, 243
  - need for multidisciplinary approach, 70
- Tachycinemis*, 252, 263–5
- tapir, 1
- tâtonnement, 18
- taxa, 71, 91
  - consensus, 24
  - construction, 105
  - distinct, 263
  - higher, 111
  - monophyletic, 131
  - system, 16
  - terminal, 133
- taxonomic bias, 186
- taxonomic gazumping, 66
- taxonomic institutions, 25
- taxonomic practice, 23, 67, 70, 79, 81, 147, 172, 184
- taxonomic species, 14–16, 19–21, 23, 25–7, 29, 285
- taxonomists, 1, 4, 15–16, 21–4, 26–8, 45, 62, 65–6, 80, 107, 115, 169, 198, 235
- taxonomy, 7–8, 18–19, 22–3, 29, 65, 83, 91, 169, 176, 186
  - an ad hoc enterprise, 66
  - Aristotelian, 3
  - benefits of knowledge of biology, 183
  - best practice, 213
  - broad geographical coverage, 213
  - Candolleian, 3, 24
  - classical, 105, 132
  - cognitive necessity, 28
  - communication, 107
  - computer-aided, 24
  - feedback from biological theory, 17
  - as global enterprise, 66
  - guerrilla, 213, 215, 235
  - herbarium-based, 57
  - Homo*, 109
  - integrative, 110, 215–16, 218
  - Ipomoea*, 137
  - Linnean, 3
  - monophyletic group, 219
  - morphological, 217
  - ontogeny, 83–4
  - polythetic groups, 132
  - principles, 61
  - revisions, 213–16, 219, 234–5
  - short projects, 213, 234–5

- traditional, 39, 61, 68, 111, 115
- weakened focus, 25
- territoriality, 177
- Testudines, 260–1
- Thamnosma*, 202
- The Plant List, 23
- three-dimensional landmark morphometrics, 64
- three-dimensional shape, 46
- thyroid hormone, 89
- tobacco budworm, 178
- tokogeny, 15, 51
- topology
  - robustness, 52–3
- tortoise
  - giant, 246, 260–1, 265
- total evidence, 55
- Trachylepis*, 258
- training
  - MSc, 213
  - PhD, 213
  - taxonomists, 18, 22
- training set, 20
- traits, 7, 79, 84, 98, 133, 147, 150, 157–9, 172, 175, 183–4, 205
- divergent, 169
- online databases, 25
- trans-Atlantic, 202
- transcriptomes, 50, 69
- Tree of Life, 4
- treehopper, 182
- trees
  - deforestation, 246
  - hosts for fungi, 43
  - inadequacy for establishing species, 68
  - as models of species, 62
  - phenetic, 64
  - phylogenetic, 49–50, 54, 59, 62, 68–9, 213
  - rain forest, 199
- Tricladida*, 281–2
- Trifolium*, 206
- triploblastic tissues, 99
- trnL*, 50
- trophic niches, 180
- tropical forests
  - seasonally dry, 202, 204–6
- Tropicos, 23
- TRY, 25
- T-species, 29, *See* taxonomic species
  - multiple taxon concepts, 18
  - patterns for general society, 16
- Simpson's statistical view, 21
- Simpson's theory, 21
- twins, 83, 98
- type concepts, 15
- type specimen, 21, 59, 213
- typicality, 15
- typological
  - approach, 53, 67, 71, 111
  - comparison, 52
  - distinctions, 45
  - representation, 27
  - studies, 40, 68
  - taxonomy, 58, 68
- typology, 22, 59, 61–2, 70
  - definition, 39
- UAF-PTP analyses, 225, 230, 232
- ultraviolet light, 176
- uniparental, 103
- unique allele filter, 220
- unrecognised diversity, 262
- unstable coexistence, 179–80
- Urocotyledon*, 256, 258, 264
- vagility, 265
- vertebrates, 89, 96, 102–3, 132, 144, 177, 265
- vibration, 177
- vicariants, 247
- viruses
  - nomenclature, 8
  - ontogeny, 99, 112
  - species number, 79
- vision divergence, 173
- visual pigments, 173
- vocal communication
  - aggression, 177
  - danger, 177
- vocalisations, 177, 181
- von Baer, 88–9
- Wajira*, 205
- WCSP, 23
- western Europe, 41
- western lineage, 284
- wing pattern, 176
  - mixed, 174
- woodlands, 202, 204–6
- World Flora Online, 25
- Xenoturbellida, 114
- Xper, 24
- Yukon, 221
- Yule-coalescent, 264