

A

- ABA, *see* abscisic acid
- abscisic acid, 42-44, 70-71, 94, 97-99, 114-115, 119-120, 123, 126-127, 138, 146, 217, 284, 362
- abscission and, 119-120, 147
- boll age and, 127, 129
- dormancy, 475, 514
- embryo culture, 456-460
- embryo levels, 458-459
- fiber elongation, 278-279, 330, 369-371
- functions, 125
- gene induction, 430
- germination enzymes, 457-460
- maturation phase, 286
- mRNA modulation, 437-438
- nucleolar size, 368
- precocious germination, 457
- secondary wall formation, 371-372
- seed development, 285
- stimulation of ethylene, 119
- stress induction of, 42
- vivipary, 460, 448, 457
- abscission, 41, 43
- abscisic acid and, 119-120, 147
- after irrigation, 70
- amino acids and, 122-123, 148
- CO₂ and, 43, 218-222
- cytokinin and, 121, 148
- enzymes, 116
- ethylene and, 118, 219
- fruit, 115-123
- gibberellin and, 120-121
- hormonal control, 44, 130-131, 144
- leaf, 143-144
- mechanisms, 143-146
- rate and boll age, 129-130, 133
- square, 115, 262
- temperature responses, 43
- water deficit effects, 68-71, 144
- zone, 116-118, 144-150, 219
- acalin A, 415
- chemistry, 416-417
- molecular weight, 416-417
- subunit homology, 418-419
- subunits, 417
- vicilin protein, 419, 421
- acalin B, 415
- chemistry, 416-417
- legumin protein, 419, 421
- molecular weight, 416-417
- subunits, 417-419
- acephate, 139
- ACC *see* L-aminocyclopropane-1-carboxylic acid
- accumulation phase, 282, 284-286, 466
- mineral compartmentation, 307
- aconitase, 445, 449
- adaptation, 1
- aflatoxins, 479
- air pollution, 42-43, 45
- CO₂ moderation of injury, 223
- flowering response, 40
- aleurins, 415
- allometric growth, 280-281
- amino acids
- abscission promotion, 148
- fiber age and incorporation, 407-408
- genotype-environment interaction, 576, 578, 580-583
- ovule incorporation, 407-408
- seed development, 468
- storage protein, 433, 570, 579
- L-aminocyclopropane-1-carboxylic acid, 122
- aminoethoxyvinyl glycine, 119
- ammonium and ovule development, 290
- anthesis, 114
- anthesis, 269-272
- fiber initiation, 327, 377
- anthocyanins
- budworm toxicity, 605
- structure, 604
- tissue location, 604
- ascorbic acid, 123, 146
- asparagine, 289
- Aspergillus flavus*, 478-479
- assimilates, 73-74
- boll sources, 312
- competition, 315
- partitioning *see* partitioning
- supply, 311-314
- transport duration, 323
- auxin, 41, 117, 123
- abscission, 117
- changes with boll age, 127-128
- ethylene interaction, 117, 147
- exogenous application, 133-134
- fiber elongation, 369-371
- fiber quality and, 141
- functions, 125
- mode of action, 371
- nucleolus and, 330, 368
- pollination and, 127
- secondary wall formation, 371-372
- tissue culture, 625-629
- auxin-gradient theory, 117, 146-147
- AVG *see* aminoethoxyvinyl glycine
- axillary branches, 11-13
- schematic representation, 12
- axillary buds, 11
- azinphosmethyl, 138

B

- beta-1,3-glucan, 337, 343
- beta-oxidation enzymes, 444-445, 449, 454, 457-458
 - mature embryos, 453
 - maturing embryos, 451-452
- BGR *see* boll growth rate
- blooms per day, 469
- boll
 - accumulation phase *see* accumulation phase
 - age vs. assimilation, 316, 318
 - assimilate sources, 312
 - carbohydrate sink, 124
 - competition, 294
 - dehiscence, 286
 - development *see* boll development
 - dry weight, 50, 57-62, 185
 - enlargement phase *see* enlargement phase
 - growth rate, 189, 316, 318
 - load *see* boll load
 - maturation phase *see* maturation phase
 - nutrient transport, 289
 - opening, 286-287
 - period, 51, 53-54, 57, 272-297
 - period vs. temperature, 54, 291-293, 352-353
 - plant location, 23
 - retention *see* boll retention
 - rot, 478
 - set, 272-274
 - shedding *see* shedding
 - sugars vs. temperature, 353
 - water potential, 287
- boll development, 51-54
 - calcium compartmentation, 305-306
 - competitive interactions, 293-297
 - dry weight distribution, 302
 - environment, 287-293
 - events, 298-299
 - magnesium compartmentation, 306-307
 - mineral environment, 288-291
 - N compartmentation, 303
 - nitrogen, 288-289
 - phases, 299
 - phosphorus compartmentation, 303-304
 - potassium compartmentation, 304-305
 - temperature, 291-293
 - water stress, 287
- boll load, 187-188
 - cutout, 124
 - hormone balance and, 126
 - leaf area and, 100
 - root growth response to, 125
 - soil water interaction, 67
- boll retention, 60, 62
 - gibberellin and, 132
 - nitrogen, 102

- borescope, 33
- boron and
 - earliness, 85
 - fiber development, 291
 - fruiting index, 84-85
 - relative fruitfulness, 84-85
- bracts, 5, 261
- budworm (*Heliothis*), 59
- bur, 298, 302-308
 - potassium sink, 304
- byssinosis
 - flavonols, 603
 - terpenoid aldehydes, 618

C

- C₂ pathway *see* glycolate pathway
- C₂-PCO *see* glycolate pathway
- C₂-photosynthetic carbon oxidation (PCO), *see* glycolate pathway
- C₃ plants, 216-217, 223
 - CO₂ enrichment and, 194, 197-198
- C₄ plants, 175, 206, 216-217, 223
 - CO₂ enrichment and, 196-198
 - photosynthetic pathway, 167
- C₅-PCR *see* Calvin cycle
- cacodylic acid, 149
- calcium and
 - boll compartmentation, 305-306
 - fruiting index, 83-84
 - relative fruitfulness, 83-84
- calcium arsenate, 138
- callose *see* beta-1,3-glucan
- Calvin cycle, 167-169, 176-177, 232
- canopy, 184
 - carbohydrate production, 183-191
 - development, 68
 - interception of sunlight, 186-187
- carbohydrate
 - canopy production, 183-191
 - distribution in boll, 311-324
 - distribution in the canopy, 183-191
 - elements controlling translocation, 86
 - nitrogen and, 98, 102
 - sink, 27
 - status, 44
 - stress, 252-254
 - translocation pattern, 184
- carbon
 - enzyme regulation of flow, 235
 - exchange rate (CER), 183, 187, 230, 233, 311-314
 - photosynthetic metabolism, 167-180
 - reduction pathway *see* Calvin cycle
- carbon dioxide, 41
 - abscission response, 43

- antitranspirant role, 216-217
 canopy fixation rates, 186
 compensation point, 169, 180, 229, 231, 235, 240
 conductance, 230-232
 ethylene interaction, 219, 221
 flowering response, 40
 global increase, 223-224
 greenhouse effect, 223-224
 interaction with environmental factors, 222-223
 nitrogen fertility interaction, 198-199
 photosynthesis and, 169
 carbon dioxide enrichment, 193-225
 atmospheric, 194-196
 beneficial effects, 194
 controlled environments, 194-195
 crops tested under, 193-194
 dry matter production under, 209-214
 economic costs, 195-196
 frequency of exposure, 212
 length of exposure, 200
 metabolic effects, 197-222
 time of exposure, 212
 under field conditions, 195-196
 carbon dioxide enrichment and
 abscission, 218-222
 air pollution injury, 223
 apical dominance, 214
 branching, 214
 chlorophyll, 204
 dehiscence, 219
 dry weight, 211
 flowering, 194-195
 fruiting position number, 218
 growth, 209-214
 leaf area, 211, 213
 leaf plastochron, 212
 photosynthesis, 197-203, 312, 314
 plant structure, 204
 reproductive development, 218
 senescence, 218-222
 square retention, 218
 stomatal conductance, 214-218
 sugar level, 204-205
 transpiration, 214-218
 water use efficiency, 215-218
 carotene, beta, 160
 carotenoids, 159-161
 carotenols *see* xanthophylls
 carpel
 number and environment, 263-265
 vascular system, 287
 CCC *see* cycocel
 cell division *see* mitosis
 cellulase, 116, 118, 144, 147-148, 219
 cellulose
 degree of polymerization, 55, 336-337, 341
 percent, 55
 cellulose synthesis, 52-55, 283, 342-343
 fiber age, 337
 metabolic inhibitors, 372
 rate, 321
 cellulose synthetase, 392, 395
 central vacuole, 388-389, 391-392
 CER *see* carbon exchange rate
 CF, *see* chloroplast-coupling factor 1
 CGR *see* crop growth rate
 chilling injury
 cortex, 48
 membrane integrity, 539
 metabolic effects, 538-539
 symptoms, 538
 radicle tip, 48
 Chl *see* chlorophyll
 chlorate, Na, Mg, 149
 chlordimeform, 139
 chlorflurenol, 135, 141-142
 chlormequat *see* cycocel
 chlorophyll a, 159-161, 163-164
 absorption maxima, 159
 CO₂ enrichment and, 204
 chlorophyll b, 159-160
 chloroplast, 92-93, 161, 165, 167, 169-178, 203, 229-230, 235-236
 coupling factor 1, 166
 enzymes, 174
 intrachloroplast bodies, 240
 morphology, 157-159
 nitrogen site in leaf, 92
 starch accumulation, 173-174
 chlorosis
 CO₂ enrichment and, 204, 208
 cold tolerance, 6
 competition
 boll to boll, 124-125, 294
 seed to seed, 294
 condensed tannins, 606-608
 conditioning, 475, 502-504, 544
 convolution angle and fiber tenacity, 344
 crop
 dry weight accumulation, 189
 growth rate (CGR), 183-187, 189
 modelling *see* crop simulation
 crop simulation, 183, 245-258
 carbohydrate stress, 252-254
 nitrogen stress, 256-257
 water stress, 254-256
 crop termination
 early harvest and, 141-142
 growth terminators, 141-142
 insect control and, 141-142
 cortex, 29, 48
 COTCROP, 183

cotyledon enzymes, 445, 449
 crowding, 3
 crystallinity, 55
 cuticular wax, 620-621
 cut-out, 18, 21, 57-62, 115, 123-127
 boll load and, 124
 environmental stress and, 45
 factors affecting, 124-127
 insect shedding and, 124
 soil type and, 124
 cyclopropene fatty acids, 619-620
 relative to nitrogen and water, 104
 seed improvement, 593
 cyococel, 134-135, 141
 fiber quality and, 140-141
 plant height and, 139-140
 cyt *see* cytochrome
 cytochrome f, 161-165
 cytochrome b, 161-162, 164-165
 cytokinins, 114, 125-126, 138, 146
 activity in bolls, 121, 362
 changes with boll age, 129, 132
 endosperm and, 280
 functions, 125
 role in abscission, 121, 148
 senescence delay, 121

D

2,4-D, 135, 141-142, 367
 damping-off, 546
 day length, 49
 DD *see* degree-day units
 DDT, 138-139
 DEF, 149
 defloration, 124, 187-188
 defoliants, 149
 physiological action, 149-151
 defoliation, 143-154
 as a cultural practice, 143
 exogenous chemicals, 149-153
 factors limiting efficiency, 152
 optimum conditions, 151-152
 surfactants, 152
 defruiting, 61, 124-125
 photosynthesis and, 313
 degree-day units, 15-16, 27, 54, 185-186
 methods of calculating, 27
 summations for crop phases, 27
 delinting, 495-501
 acid gas process, 496-497
 dilute wet-acid process, 497-498
 disease control, 499
 flame process, 495-496
 germination and, 500-501
 mechanical, 487-488, 495
 wet-acid process, 497-498

dicamba, 141
 dictyosome, 390, 415
 cisternae fibrils, 392, 395
 fiber primordia, 386-388
 ovule epidermis, 383-385
 dieldrin, 138
 dimethylmorpholinium chloride, 135, 140
 DMC *see* dimethylmorpholinium chloride
 dormancy
 ABA, 514
 seedcoat impermeability, 515
 Dropp *see* thidiazuron
 drought, 68, 74, 97, 103-104
 avoidance, 103-104
 resistance, 74, 103
 senescence, 256
 dry weight, 66, 68, 101, 189
 CO₂ enrichment and, 197, 209-214
 defloration and, 187-188
 nitrogen and, 101
 partitioning *see* dry weight
 partitioning
 sinks, 188
 dry weight partitioning, 67, 188-191
 accumulation phase, 284-285
 boll, 302
 enlarging phase, 282
 mechanisms, 190-191
 seed, 275-277, 281-283
 dryland production, 64, 103-104
 DSF, *see* flower

E

earliness, 24-25, 48, 79-81
 boron and, 85
 nitrogen and, 87, 100
 phosphorus and, 82
 potassium and, 83
 salinity and, 110
 stratified harvest, 471
 EC *see* electrical conductivity
 ecology, 1-7
 biotic factors, 3
 climatic cycles, 4
 coastal habitats, 6
 electrical conductivity (EC), 108
 germination correlation, 530
 membrane integrity, 528
 planting seed quality, 527-531
 seed vigor correlation, 528-530
 elongation (E₀ & E₁), 356
 fibril angle relationship, 356
 embryo
 culture *see* embryo culture
 development, 285
 dry weight gain, 285

- elongation, 283
 - fiber competition, 296-297
 - IAA source, 127
 - temperature and development, 293
 - embryo culture, 444, 623-627
 - ABA, 456-460
 - germination enzymes, 456-460
 - in ovulo*, 626-627
 - isolated embryos, 623-624
 - methods, 456
 - protein inhibitors, 459-460
 - embryogenesis
 - experimental system, 427
 - gene activity, 425-439
 - gene transcript number, 430-432
 - mRNA, 428
 - temporal gene expression, 429
 - emergence, 48
 - function of temperature, 48
 - rate, 48
 - endodermis, 29, 98
 - endoplasmic reticulum, 342, 386, 390-391, 415
 - endosperm, 279-280
 - cellular, 283
 - development, 280
 - free-nuclear, 280
 - endosperm-embryo complex, 280
 - development, 283
 - endothall, 152
 - enlargement phase (boll), 280-284, 466
 - mineral compartmentation, 307
 - phytohormone interactions, 284
 - water stress and, 287
 - enzymes
 - abscission zone, 144
 - chloroplasts, 174
 - compartmentalization, 454
 - germination, 447-455
 - glyoxysomal, 454
 - isolation methods, 443
 - maturing embryos, 447
 - mitochondrial, 454
 - regulators of carbon flow, 235
 - seed maturation, 441-462
 - ET *see* evapotranspiration
 - ethephon, 135, 141-142
 - ethylene, 42-44, 70-71, 114, 117-118, 123, 126-128, 130, 146, 217, 274, 368
 - abscission hormone, 110, 147
 - assimilate transport, 372-373
 - auxin and, 147
 - boll dehiscence, 286
 - boll levels, 362
 - cellulase synthesis, 118
 - CO₂ and, 219, 221
 - flowering and, 115
 - microfibril orientation, 342
 - microtubule orientation, 373
 - O₂ and, 219
 - pectinase synthesis, 118
 - stress and, 42, 219
 - evapotranspiration, 66, 68-69
- ## F
- fatty acids
 - free *see* free fatty acids
 - genotype-environment interaction, 577-578
 - oil composition, 562-563, 580
 - Fd *see* ferredoxin
 - feed-back control
 - photosynthesis, 207-209, 214, 227-243
 - ferredoxin, 162-164, 172
 - fertilization, 272-274, 278
 - boll retention, 273
 - events associated, 274
 - in vitro*, 625
 - fiber
 - age vs. assimilation, 317, 319-320
 - bilateral structure, 344
 - cellular morphology, 377-383
 - cellulose synthesis and temperature, 347-348
 - cytoplasm changes, 342
 - dehydration, 344
 - development *see* fiber development
 - differentiation, 278-279, 363-365
 - elbow, 399
 - elongation *see* fiber elongation
 - elongation (E₀ & E₁) *see* elongation
 - elongation-deposition transition, 336
 - embryo competition, 296-297
 - epidermal cell ratio, 412-413
 - fibril angle, 339
 - fineness, 346
 - foot, 331, 399
 - growth rings, 52
 - index, 285
 - initiation *see* fiber initiation
 - lamellae, 397
 - lateral expansion, 327
 - length *see* fiber length
 - mature structure, 338
 - maturity, 345-346, 353
 - mechanical breakage, 346-347
 - mechanical properties, 356-357
 - microtubules, 342
 - morphogenetic relations, 346-347
 - nitrogen, 352
 - nucleolus *see* nucleolus
 - nucleus, 329, 393
 - number per unit area, 278
 - overlapping phase, 336-339
 - polarity of growth, 327
 - polysomes, 342, 392

- potassium sink, 304-305
- primordial cells *see* fiber primordia
- protein synthesis, 407-408
- quality *see* fiber quality
- reversals *see* reversals
- ribosomes, 342
- RNA synthesis, 279, 406-407
- S₁ layer *see* S₁ layer
- S₂ layers *see* S₂ layers
- secondary wall *see* secondary wall
- shank, 331, 399-401, 412
- spiral growth, 329
- strength, 55, 346, 356-357
- tenacity (T₀ & T₁) *see* tenacity
- tip ultrastructure, 389-390
- wall composition, 336-337
- weight gain, 317, 319-320
- ultrastructure, 388-402
- fiber development, 325-349
 - boron, 291, 352
 - period, 55
 - phytohormones, 361-373
 - stress influences, 351-359
- fiber elongation, 140, 327-332, 356-357
 - ABA and, 330, 369-371
 - auxin, 369-371
 - dictyosomes, 335
 - GA and, 278, 329-331, 369-371
 - growth curve, 382
 - intercalary addition, 335
 - morphogenetic aspects, 327-329
 - phytohormones, 368-371
 - potassium malate and, 290
 - rate, 330
 - temperature and, 51-52, 291-292, 347
 - ultrastructure, 329
- fiber initiation, 326-327
 - anthesis, 327, 377
 - GA, 364
 - IAA, 364
 - phenolics, 326, 363-364
 - phytohormones, 363-368
 - temperature, 292
 - ultrastructure, 388-393
- fiber length
 - distribution, 344-345
 - loc position, 294-295
 - moisture supply, 354
 - nucleolus size, 367
 - ovule volume, 280-281
 - perimeter relationship, 346
 - temperature, 353
 - variation, 345
 - weight relationship, 295
- fiber primordia, 363, 377-378
 - ultrastructure, 385-388
- fiber quality
 - auxin and, 141
 - environment and, 347-348, 358
 - gibberellin and, 141
 - growth regulators, 355
 - humidity and, 348
 - minerals and, 290-291
 - models, 348-349
 - nitrogen and, 289
 - parameters, 54-55
 - pesticides, 355
 - Phymatotrichum*, 355
 - temperature, 352-353
 - Verticillium*, 355
 - water stress and, 287
- fibril, 329, 338
 - angle, 339
 - dictyosome cisternae, 392, 395
 - orientation, 333
 - primary wall, 332-333
 - secondary wall, 340-341
- filling phase *see* accumulation phase
- flavanols, 605-609
 - adverse effects, 608
 - disease resistance, 608
 - insect resistance, 608-609
 - seed quality and, 608
 - structures, 605
 - tissue levels, 605-607
- flavones, 604-605
- flavonoids, 599-609
- flavonols, 599-604
 - byssinosis, 603
 - cottonseed flour and, 603
 - insect responses, 602
 - structure, 600
 - tissue location, 599, 601, 603
- florigen, 114
- FLOSS, 248
 - fruit loss function of GOSSYM, 250-251
- flower
 - abscission, 41
 - bud development, 262
 - days to first (DSF), 15-16, 24
 - development rate, 14, 16, 22
 - induction, 2
 - initiation, 15, 39-40, 113-115
 - opening, 269
 - structures, 261-262
- flowering, 15-17
 - air pollution and, 40
 - CO₂ enrichment and, 40, 194-195
 - determinant, 123
 - ethylene stimulation, 115
 - G. aridum*, 4
 - gibberellin and, 114
 - horizontal interval (HF1), 16-17, 19, 22, 24-25

- indeterminant, 123
 - inheritance, 40
 - night temperature and, 113-115
 - plant bug, 115
 - rate, 264
 - stress stimulation, 115
 - temperature and, 40, 113-115
 - vegetative growth and, 16
 - vertical interval (VFI), 16-19, 22, 24-25
 - water stress and, 264
 - zinc and, 86
 - fluorescence, 161
 - Folex *see* merphos
 - fraction I protein *see* ribulose-P₂
 - carboxylase/oxygenase
 - free fatty acids
 - seed density relation, 504
 - seed deterioration, 476
 - fruit abscission, 41, 115-123
 - controlled retention, 62
 - function in GOSSYM, 246, 251
 - fruiting
 - capacity, 59
 - efficiency, 79-81, 100
 - environment and, 43-45
 - first cycle, 60
 - plant height and, 64-66
 - prime sites, 19, 248
 - fruiting branch, 20-21, 39, 51, 102
 - nitrogen stress and, 102
 - node of first (NFB), 15, 24, 26, 40, 50
 - fruiting index, 80-89
 - elements affecting, 81
 - elements not affecting, 81
 - fruiting index and
 - boron, 84-85
 - calcium, 83-84
 - magnesium, 84
 - manganese, 88
 - molybdenum, 88-89
 - nitrogen, 87, 101
 - phosphorus, 82
 - potassium, 83
 - zinc, 85-86
 - fruiting nodes, 19-20, 102
 - nitrogen level and, 102
 - percent yield at, 20
 - physiological limitation, 20
 - FSTRES, 248
 - CHO-N stress function of GOSSYM, 250-251
 - funiculus, 323
 - atrophy, 442-443
 - functional period, 285
 - fuzz fibers, 337
 - development, 283
 - epidermal cell ratio, 413
 - initiation, 380, 383
 - nucleolus, 366
 - pigmentation, 396-397
 - shank, 399-402, 412
 - ultrastructure, 394, 396-397
- G**
- GDD, *see* degree days
 - gene activity
 - coordinate regulation, 432, 438
 - embryogenesis, 425-439
 - multigene families, 438
 - genetic-physiology interaction, 631-637
 - genotype-environment interactions, 633
 - genotypic differences in
 - drought tolerance, 104
 - fiber initiation pattern, 410
 - fiber vs. environment, 355-356
 - gossypol, 561-562, 564
 - nucleolus size, 366
 - oil percent, 560-564
 - pollen heat sensitivity, 268
 - protein percent, 560-562, 564
 - response to gibberellin, 138
 - salinity tolerance, 110
 - germination
 - accelerated ageing, 503
 - chemical aids, 540-541
 - cold test, 503
 - electrical conductivity and, 530
 - environment and, 537-540
 - enzymology, 444-446, 455, 461-462, 536-537
 - dehiscing and, 500-501
 - gene expression, 430
 - genetic modification, 549
 - mechanical seed damage and, 494-495
 - minerals and, 540
 - oxygen requirements, 539
 - precocious, 430, 457
 - rate vs. stand establishment, 546
 - seed density, 503, 532, 534
 - seed hydration, 535-536
 - seed impact and, 493
 - stand establishment *see* stand establishment
 - standard test, 509
 - static loading and, 490, 493
 - storage and, 506-507
 - transient dormancy, 475
 - germination temperature, 537
 - chilling sensitive stages, 537-538
 - fruiting and, 40
 - minimum, 47, 538
 - germplasm utilization, 638
 - gibberellic acid, 114, 126, 146, 274, 280, 284
 - abscisic acid antagonist, 120
 - defoliant aid, 152

functions, 125
 genotype response to, 138
 mode of action, 371
 gibberellic acid and
 abscission, 120-121, 147-148
 boll age, 128-129, 131, 362
 boll retention, 132-133
 fiber elongation, 278-279, 329-331, 369-371,
 397
 fiber initiation, 364
 fiber quality, 141
 flowering, 114
 glyphosate, 141
 nucleolar size, 368
 square development, 262
 tissue culture, 624-625
 ginning seed damage, 486-488
 glands, 614
 glandless seed, 566-570
 glanded comparisons, 567-570
 gluconeogenesis, 441
 glycolate
 biosynthesis, 176-177
 oxidation in peroxisomes, 176-177
 glycolate pathway, 167, 169, 176-178, 232
 glycine and, 176-178
 serine and, 176-178
 glyoxylate cycle, 441-442, 444, 537
 enzymes, 442, 444-454
 glyoxysomes, 442, 445
 biosynthesis, 455
 enzyme activity, 447, 450
 golgi apparatus, 335
 GOSSYM, 183, 248-258
 FLOSS variable, 248
 FSTRES variable, 248, 250-251
 fruit abscission function in, 251
Gossypium, 1-7
 habitats, 1-4
 wild species, 1-7
 gossypol, 617-619
 biosynthesis, 616
 environment and, 561-562
 genotype-environment interaction, 574-575,
 580-583
 seed quality improvement, 593
 grana, 157-160, 163
 green boll harvesting, 585-586
 growing degree days (GDD) *see* degree days
 growth
 atmospheric parameters, 39-46, 241
 available soil water and, 13, 97
 isophases, 17
 limitation, 13
 maximum rate, 184-186
 retardants, 134-135
 stage, 27

growth regulators
 crop modification, 131-135, 137-142
 fiber quality, 355
 pollen tube growth and, 270-271
 guard cell
 abscisic acid, 99
 ovule epidermis, 379

H

habitats, 1
 hard seedcoat
 hot water treatment, 535
 seed deterioration, 480
 Harvade *see* dimethipim
 harvest index, 67, 80, 313-314
 harvestable boll, 20
 heat
 stress, 57-60
 units, 54, 185-186, 291, 553
Heliothis, 59
 hexose monophosphate shunt, 168-169
 Hill reaction, 237
 hormones *see* phytohormones
 hot water treatment, 535
 hydraulic conductivity, 94-99
 nitrogen and, 94-99

I

IAA *see* indole-3-acetic acid
 IAA oxidase, 118, 326
 indole-3-acetic acid, 117-118, 126, 146, 270,
 274, 280, 284
 boll levels, 362
 fiber initiation, 364
 inhibitors
 cellulose synthesis, 372
 growth, 134-135
 protein synthesis, 459-460
 starch synthesis, 174
 insect damage, 26
 insecticides
 as growth regulators, 138-139
 integument
 cell division, 279, 403-405
 development, 278-280
 differentiation and potentiation, 278-280
 starch, 279-280, 466-467
 internode
 length and salinity, 109
 ion toxicity, 108
 irrigation, 104
 frequency, 69
 water salinity, 107

L

- LAI, *see* leaf area index
- lamellae
epidermal cells, 399-400
fuzz fibers, 399
- leaf
development rate, 14
differentiation, 13
expansion and nitrogen, 94-96
growth rate (LGR), 189
heliotropic movement, 187
main stem, 17
unit number, 16
water conductance, 238
- leaf area, 13-14, 74
CO₂ and, 197, 213
index (LAI), 66-68, 185-187
leaf perforator (*Bucculatrix*), 59
- leaf-stem ratio
salinity and, 108
- leaf water potential, 68
photorespiration and, 237-239
photosynthetic rate and, 237-239
- legumins, 419-421
see acalin B
- LGR *see* leaf growth rate
- light
conversion to chemical energy, 229
interception, 188-189
photorespiration and, 180
response curve, 184
saturation of photosynthesis, 184
shedding and, 221
- lignin, 598-599
- lint per seed, 294-295
- lipid
accumulation, 285-286
bodies, 388-390
chloroplasts, 240-241
mobilization, 441
protection against photoinhibition, 241-242
vs. starch in chloroplasts, 241
- lipolysis seed deterioration, 479
- locs per boll, 263-264
- lumen, 52
- Lygus, 154
- M
- magnesium,
activation of ribulose-P₂-carboxylase,
170-171
boll compartmentation, 306-307
fruiting index, 84
relative fruitfulness, 84
- main stem nodes *see* nodes, main stem
- malate
endosperm and, 279, 283
fibers and, 279, 331
manganese, 88, 92, 163, 235
earliness and, 88
yield and, 88
- MAR *see* multi-adversity resistance
- maturation phase, 286-287, 301, 466
mineral compartmentation, 307-308
- membrane integrity, 121-122
- mepiquat chloride, 134-135, 140, 142
- 2-mercaptoethanol, 135
- merphos, 149
- mesophyll resistance, 199, 203, 207, 230-232,
235, 237
salinity and, 110
starch accumulation and, 240
- messenger ribonucleic acid, 425-426
ABA modulated set, 437-438
abundance groups, 430-432
developmental changes, 431-432
developmental regulation, 429
embryogenesis, 428
frequency distribution, 431-432
late embryo abundant, 436-438
translatable, 428
translation techniques, 427-428
- MET *see* 2-mercaptoethanol
- methyl parathion, 138-139
- microfibril *see* fibril
- micronaire, 53-55, 355
fibers per seed and, 295
moisture supply, 354
oil correlation, 296
seed per boll and, 294
temperature and, 292, 353
tenacity relationship, 357
- microsporogenesis, 267-269
- microtubules, 342, 392, 395
- middle lamella, 116, 123, 144, 219
- mineral compartmentation, 301, 466
dynamic relationships, 307-308
- minirhizotron, 32-33
- mitochondria, 165, 441-442
glycolate pathway and, 177-178
ovule epidermis, 383-385, 390
- mitosis
ovule epidermis, 327-328, 377, 380, 386,
403-405
thymidine incorporation, 403-405
- modelling crop responses, 245-258
- moisture, seed deterioration, 477
- molybdenum, 88-89
growth and, 89
- monopodium, 11, 115 (*also see* vegetative
branches)
- morphological development, 11

motes, 265, 273-274
 environment and, 273
 fertilization efficiency and, 273
 ovary position, 274
 mRNA *see* messenger ribonucleic acid
 MSN, *see* nodes, main stem
 multi-adversity resistance, 549
 multinet theory, 333

N

NAA *see* naphthalene acetic acid
 naphthalene acetic acid, 117, 120, 133-134, 146
 NAR *see* net assimilation rate
 net assimilation rate (NAR), 94-95, 207, 211-212, 222
 NFB, *see* fruiting branch
 nitrogen,
 boll compartmentation, 303
 deficiency, 87
 transport form, 289
 water relations, 96-98
 nitrogen and
 boll development, 288-289
 boll retention, 102
 carbohydrates, 102
 dry matter partitioning, 94
 earliness, 100
 fiber quality, 289, 352
 fruiting efficiency, 100
 fruiting nodes, 102
 growth, 87
 leaf area, 94-95
 leaf expansion, 94
 leaf water potential, 97
 partitioning, 91
 planting seed quality, 473
 seed oil, 288-289
 seed protein, 288-289
 shedding, 102
 termination of flowering, 87
 tissue sugar levels, 101
 nitrogen stress, 91-105
 characteristics affected by, 103
 characteristics not affected by, 103
 plant responses, 91
 syndrome, 91-105
 water stress similarity, 95-97
 nitrogen-stress and
 hydraulic conductivity, 95-98
 leaf water deficit, 95
 mesophyll resistance, 93
 photosynthesis, 91-94
 ribulose-P₂ carboxylase, 92
 stomata, 93-94, 96-97
 transpiration, 93, 256

water uptake rate, 256
 water use efficiency, 216
 node
 first sympodium, 25, 50
 main stem (MSN), 17, 23, 26, 248
 simulation of main stem, 247
 nub-root, 476-477
 nucleolus, 327, 377-378, 380, 393
 auxin action, 330
 diameter vs. age, 330, 365, 381
 fiber length correlation, 279, 329-331, 365-367
 genotypic differences, 366
 phytohormones and, 330-331, 365-368
 pollination, 366, 368
 ribosome synthesis, 365-366, 368, 381
 size vs. ovule position, 366
 structure, 389-390
 vacuolation, 365-366, 368
 nucleus, 393
 nutrient elements, 79-89
 fruiting index and, 81-89
 balance, 79, 81
 nutritional theory, 41, 43, 69-70, 137-138, 221

O

oil
 environment and, 558-560, 562, 565-566
 fatty acid composition, 562-563
 genotype-environment interaction, 574, 580-583
 micronaire correlation, 296
 nitrogen and, 288-290
 protein correlation, 296, 469, 559-566
 seed development and, 467-468
 water availability and, 287
 organelle
 isolation, 444
 marker enzymes, 446
 osmoregulation, 68, 255
 osmotic potential
 potassium malate in fiber, 352
 soil water, 108
 ovary development, 263-266
 ovule
 ABA levels, 370-371
 auxin levels, 369
 culture *see* ovule culture
 cytokinin levels, 370
 development *see* ovule development
 epidermis *see* ovule epidermis
 GA levels, 370
 outer epidermis *see* ovule epidermis
 ovule culture, 274, 284, 290, 291, 372
 ammonium, 364
 fiber studies, 363, 625-626

in ovulo embryo culture, 626-627
interspecific hybridization, 624, 627
phytohormones, 363, 370
temperature, 364
unfertilized, 364
ovule development, 265-266
 ammonium and, 290
 temperature and, 265
ovule epidermis, 328
 autoradiographic analyses, 403-410
 cell number, 379
 cell wall, 383
 cellular morphology, 376-383
 guard cells, 379
 mature structure, 399-400
 mitosis, 327, 377, 380
 preanthesis, 376-377, 383-387
ovule number
 nitrogen and, 265
 potassium and, 265
 seasonal trend, 265-266
 temperature and, 265
oxygen, 41
 ethylene interaction, 219
 evolution in photosynthesis, 163
 low levels, 214
 photorespiration and, 179
ozone, 42, 44
 inhibition of photosynthesis, 42

P

P-700, 163-165
 primary donor of PS I, 161
palisade layer, 283, 285
PAR *see* photosynthetically active radiation
paraquat
 defoliant aid, 152
partitioning, 77
 boll age and, 317-319
 fiber age and, 317, 319-321
 nitrogen and, 101
 potassium and, 322
 sucrose phosphate synthetase and, 209
PC *see* plastocyanin
pectinase, 116, 118, 144, 147-148, 219
penetrometer, 35
pericycle, 29
peroxisomes
 glycolate pathway, 176-178
pH
 photorespiration and, 180
phenolics, 383-385, 597-599
 fiber initiation, 326, 363
 fiber primordia, 386-388
 nonfiber epidermal cells, 380-382
 phenylalanine, 408
 phenotypic variance, 634
phenylalanine
 ovule epidermis incorporation, 408-410
 phenolic precursor, 408
phloem, 29, 34-35
phosphoenolpyruvate carboxylase pathway
 CO₂ fixation via, 279
 fiber expansion and, 279, 331
phosphorus and
 boll compartmentation, 303-304
 earliness, 82
 fiber length, 290
 fruiting index, 81-82
 relative fruitfulness, 81-82
 starch synthesis, 236
photoinhibition, 175, 229
 lipid role, 241
photoperiod, 39, 50
 shedding and, 220-221
 sugar content and, 220
photophosphorylation, 165-166
 coupling sites, 165
 cyclic, 162, 166
 noncyclic, 161
photorespiration, 167, 170, 174-180, 232, 240
 carbon pathway, 176-178
 CO₂:O₂ ratio, 233
 competition with photosynthesis, 179
 definition, 174
 factors affecting, 175, 180
 inhibitors, 235
 light and, 180
 oxygen and, 175, 179, 233
 pH and, 180
 protection against photoinhibition, 175
 rates, 179
 temperature and, 180, 233-234
photosynthate, 59, 73
photosynthesis, 41, 176, 197-207, 223
 biochemical limitations, 180-181
 biochemistry, 157-182
 CO₂ and, 180, 197-203, 312, 314
 CO₂-nitrogen interaction, 198-199
 carbon metabolism, 167-180
 carbon reduction pathway, 167-169
 carbon reduction-oxidation cycle, 233
 dark reactions, 159
 decline during drought, 70
 deficiency, 25
 defruiting and, 313
 electron flow, 161-162
 electron transport intermediates, 164-165
 end products, 207-208, 227-228
 energy processes, 159-166
 enzyme activation mechanisms, 172
 feedback control, 203-209, 227-243
 field vs. environmental chamber plants,

- 201-203
- leaf water potential, 237-239
- light-effect mediators, 172
- light reactions, 159
- light regulated enzymes, 172
- nitrogen-stress and, 91-94, 97
- organ rates, 311
- PAR and, 201-202
- peak time, 311
- photorespiration competition, 179
- pigment systems, 159-160
- pseudocyclic electron transport, 166
- rate, 73-75
- regulation of CO₂ fixation, 169
- salinity and, 110
- starch accumulation and, 173-174, 203-209, 231, 313
- stress and, 227-243
- sugar and, 173, 206
- temperature and, 239-240
- translocation and, 313
- water potential, 76
- water stress and, 313
- yield relationships, 211-212
- Z-scheme of electron flow, 162
- photosynthetically active radiation (PAR), 196, 199, 213, 217, 220-221
- photosynthesis and, 201-202
- photosystem I, 159-162, 164, 166
 - composition, 160
 - Q, primary electron acceptor, 162-163
 - reduction of NADP⁺, 163-164
 - spatial orientation, 160-161
- photosystem II, 159-160, 164, 229
 - composition, 160
 - evolution of oxygen, 162-163
 - oxidation of water, 161
 - spatial orientation, 160-161
 - X, primary electron acceptor, 161-162
- physiology-genetics interaction, 633-639
- phytin, 290
- phytochrome, 114
- phytohormones, 70-71, 113-114
 - abscission and, 117-121, 130-131, 146-148
 - auxin *see* auxin
 - boll levels, 362
 - cytokinin *see* cytokinins
 - ethylene *see* ethylene
 - external application to flowers, 362
 - gibberellic acid *see* gibberellic acid
 - ovule and fiber culture, 370
 - reproduction and, 113-136
 - research methods on fibers, 362-363
 - secondary wall, 371-372
 - theory, 41, 44, 69-70, 138, 221
 - water deficits and, 70-71
- pink bollworm (*Pectinophora*), 59
- PIX *see* mepiquat chloride
- plant bugs and flowering, 115
- plant height simulation, 247
- plant water deficit, 67-71
 - fruiting and, 71
 - stomatal and growth sensitivity, 68
- planting density, 21
- shading effects with high, 221
- planting seed quality, 519-534
 - characteristics, 507, 454
 - conditioning *see* conditioning
 - date of bloom, 469
 - density *see* density
 - earliness, 471
 - electrical conductivity *see* electrical conductivity
 - emergence rate, 470
 - evaluation, 470-472, 509-515, 525-534
 - factors, 483-484, 470, 508
 - genetic selection, 472
 - germination tests, 509-510
 - gin damage, 484
 - harvester damage, 484-485
 - heat in storage, 505-506
 - improvement, 515-517
 - mechanical damage *see* seed mechanical damage
 - moisture in storage, 504-507
 - moisture-temperature relationship, 521
 - N fertilization and, 473
 - percentage germination, 470
 - plant population density, 473
 - seasonal distribution, 473
 - seedcoat, 484
 - seed production, 472-474
 - seed quality curve, 543-546
 - seed quality index, 470
 - stand establishment, 472, 543-550
 - stratified harvests, 471-472
 - temperature, 470, 473
 - tetrazolium test, 526-527
 - weight, 531-532
 - yield, 471-472
- plasmalemma, 333
 - globules, 341
 - vesicles, 388-390
- plastids
 - outer epidermis, 383-385, 390
- plastochron, 13, 21
 - CO₂ enrichment and, 212
- plastocyanin, 162-165
- plastoquinone, 162, 164
- Pn *see* photosynthesis
- pollen, 269-272
 - germination *in vitro*, 270-271
 - germination media, 270
 - growth regulators and, 270-271

sterility, 45, 267-269
 sterility and temperature, 267
 storage, 271
 TD-1123 as chemical sterilant, 140
 tube growth, 270-272
 pollination, 272
 pollution tolerance, 44
 polysomes in fibers, 392
 potassium, 83, 217
 boll compartmentation, 304-305
 malate and osmotic potential, 290, 352
 potassium and,
 earliness, 83
 fruiting index, 83
 relative fruitfulness, 83
 seed weight, 290
 PQ *see* plastoquinone
 precipitation
 seasonal distribution, 2-3
 Pressley Index *see* tenacity
 primary wall, 332-336
 Albersheim model, 333, 335
 chemical composition, 332
 extension, 333-336
 microfibrils, 332-333
 synthesis, 334-335
 prophyll, 16-17
 protein
 accumulation, 285
 nitrogen fertilization and, 288-290
 oil correlation, 296
 ovule epidermis synthesis, 407-408
 storage *see* storage proteins

Q

Q, primary acceptor of photosystem I, 161-164
 quantum

R

R_A *see* relative leaf growth rate
 relative fruitfulness, 80-89
 elements affecting, 81
 elements not affecting, 81
 relative fruitfulness and
 boron, 85
 calcium, 83-84
 magnesium, 84
 nitrogen, 87, 99-100
 phosphorus, 82
 potassium, 83
 relative growth rate (RGR), 211-212
 relative humidity, 44-45

 defoliant and, 152
 relative leaf growth rate (R_A), 94-95
 relative water content, 237
 respiration, 41
 growth rates, 184, 186
 maintenance rates, 184, 186
 reversals, 338, 340, 348
 fiber strength and, 341-342
 RF *see* relative fruitfulness
 RGR *see* relative growth rate
 rhizobotoxin, 43
 RHIZOS, 248
 rhizotron, 31, 33
 ribosomes, 342
 elongating fiber, 392
 fiber primordial, 386-387
 maturing fiber, 392
 ribulose- P_2 carboxylase/oxygenase, 158,
 169-172, 176, 179-180, 211, 232, 238
 activation, 170-171
 carboxylation:oxygenation ratio, 233
 effectors, 232
 mechanisms of activation, 171
 photosynthesis limited by, 181
 structure, 169-170
 substrate kinetics, 170
 root
 anatomy, 29-31
 carbohydrate content, 38
 density, 34
 development, 33-34
 distribution, 33
 elongation rate, 33
 epidermis, 29, 98
 lateral, 29, 33-34
 length, 32-33
 length density, 32-33, 37
 penetration, 35
 primary, 29-30, 33
 primordia, 29
 secondary, 29
 root growth, 13-14, 29-38
 high strength soils and, 35-36
 hormone balance and, 126
 methods for measuring, 31-33
 soil water and, 37
 temperature and, 35
 root/leaf ratio, 34
 nitrogen stress and, 96
 root-shoot relationships, 37-38
 Roundup *see* glyphosate
 row
 orientation, 187
 RuBPCase *see* ribulose- P_2
 carboxylase/oxygenase
 RWC *see* relative water content

S

- S₁ layer, 337-338, 342
 S₂ layers, 338-339
 salinity, 107-111
 - genotypic differences in tolerance, 109
 - irrigation water, 107
 - plant response, 108
 - salts contributing to, 107
 - seedling emergence, 554
 - tolerance, 6, 108-109
 - tolerance classification, 108
 - yield-decline threshold, 108
 salinity effects on
 - growth, 109
 - internode length, 109
 - leaf:stem ratio, 108
 - photosynthesis, 110
 - physiological functions, 110
 - transpiration, 110
 - water use efficiency, 110
 - yield, 109-110
 S/B *see* seeds per boll
 secondary products, 597-618
 secondary wall
 - abscisic acid, 371-372
 - auxin, 371-372
 - beta-1,3-glucan, 343
 - chemical composition, 340-341
 - formation, 341-342
 - growth rings, 339-340
 - microfibrils, 340
 - physical composition, 339-340
 - phytohormones and, 371-373
 - plasmalemma globules, 341
 - thickening, 52-54, 140
 - UDPG-glucose glucan synthetase, 343
 - ultrastructure, 392-402
 seed
 - ABA and hardness, 286, 514
 - competition, 294
 - conditioning *see* conditioning
 - density *see* seed density
 - deterioration *see* seed deterioration
 - development *see* seed development
 - dry weight distribution, 275-277
 - feeding quality *see* seed feeding quality
 - fiber number, 410
 - germination enzymes, 461-462
 - hydration, 535-536
 - longevity, 521
 - maturation and amino acids, 585
 - maturation enzymes, 441-462
 - maturation oil synthesis, 585-586
 - mechanical damage *see* seed mechanical damage
 - parameters and environment, 294
 - phosphorus sink, 304
 - planting quality *see* planting seed quality
 - set, 272-274
 - setting efficiency, 273-274
 - storage *see* seed storage
 - surface area, 296, 410-411
 - surface cell number, 410
 - surface morphology, 410-413
 - viability *see* seed viability
 - volume, 296
 - water impermeability and hardness, 286
 - weathering *see* seed deterioration
 - weight and potassium, 290
 seed density
 - germination and, 502-503, 532, 534
 - seedling performance and, 532, 534
 - separation methods, 533
 seed deterioration 475-481
 - avoidance, 480
 - biological processes, 477-480
 - boll rot, 478
 - environmental factors, 477
 - field fungi, 478
 - free fatty acids, 476
 - hard loc, 478
 - hard seed coat, 480
 - indeterminant fruiting, 477
 - lipolysis, 476, 479
 - microorganisms, 477-479
 - moisture, 477
 - nub-root, 476-477
 - pinched root tip, 476
 - resistance, 480
 - secondary products, 479-480
 - seed changes, 476-477
 - specific gravity, 476
 - storage fungi, 478
 - tight loc, 478
 - toxins, 479
 seed development, 466-468
 - amino acids, 468
 - date of bloom, 469
 - integument starch, 466-467
 - oil, 467-468
 - phases, 466
 - storage protein, 468
 - sugars, 467
 seed feeding quality, 557-595
 - environment-genotype interaction, 572-583
 - factors affecting value, 571
 - genetic resources, 590
 - improvement approaches, 589-590
 - improvement goals, 592-595
 - module storage, 584
 - pink bollworm contamination, 583
 - quality factor-environment, 572-583
 - quality factor-genotype, 572-583

- seed index, 285
 - environment and, 565-566
 - water stress and, 287
- seed mechanical damage
 - acid delinting, 494
 - cold test emergence, 494-495
 - delinting, 487-488
 - germination percentage, 488, 494-495
 - gin, 484, 486-489
 - ginning rate and, 487
 - handling and conveying, 489
 - harvester, 484-486
 - impact, 491-492
 - microorganisms, 493-494
 - moisture and, 487, 490-492
 - radicle, 491-493
 - seedcoat, 484
 - static loading, 490
- seed planting quality *see* planting seed quality
- seed quality curve, 543-546
 - field performance correlations, 547
- seed storage, 520-525
 - drying and aeration, 524-525
 - field, 524
 - heat, 505
 - moisture, 504-507, 520
 - trailer, 524
 - trash moisture, 522-523
- seed viability
 - electrical conductivity, 510
 - free fatty acid content, 511
 - tetrazolium test, 510
- seed vigor, 511-514
 - cold germination tests, 513
 - cool germination test, 513
 - electrical conductivity, 513
 - field emergence, 512
 - productivity, 512
 - tetrazolium test, 513
- seedcoat, 286
 - energy to rupture, 489
 - mechanical properties, 489-493
 - ultrastructure, 394
- seedling emergence
 - crusting, 553-554
 - oxygen, 554
 - salinity, 554
 - soil parameters, 551
 - stand yield potential, 551-552
- seeds per ball, 265, 294-295
 - micronaire and, 294
- senescence, 43-45, 98, 121-123, 138, 256
 - CO₂ enrichment and, 218-222
 - cytokinin and, 125
 - induced, 144
 - precedent to abscission, 144
- senescence factor, 122, 146, 148
- sesquiterpenoids, 611-612
 - byssinosis, 612
 - pest resistance, 612
 - stress response, 612
 - structure, 612
- SF *see* senescence factor
- SGR *see* stem growth rate
- shade tolerance, 6
- shading, 3, 26
 - fiber quality and, 354-355
 - shedding response to, 220
- shedding
 - delay by flower removal, 124
 - environmental factors and, 220
 - hormonal factors and, 220
 - light effects and, 221
 - nitrogen and, 102
 - shading and, 220
- short season cotton, 104
- side-by-side (opposite) sympodia, 25
- sieve tubes, 31
- simulation of
 - boll number with age, 249
 - crop responses, 245-258
 - fruit abscission, 246
 - fruit abscission function, 251
 - fruiting sites, 247
 - main stem nodes, 247
 - plant height, 247
 - square number with age, 249
- sink strength, 124, 314-321
 - metabolic demand and, 315
- sodium substitution for K, 83
- soil
 - aeration, 36
 - carbon dioxide, 36
 - osmotic water potential, 108
 - oxygen, 36
 - resistance, 35
 - strength, 35
 - temperature, 34-35
 - type, 3
 - water, 36, 63, 65, 67-68
 - water deficit, 237
- source-sink relations, 73-77, 228, 236, 241, 246
 - basis of simulation model, 251
 - efflux-influx, 322
 - proximity, 317, 322
 - sink response to water stress, 76-77
 - source response to water stress, 74-76
- species, 1
 - geographic locations, 5
 - xeromorphic adaptations, 5
- specific gravity
 - seed deterioration, 477
- sperm cells, 274

- square, 11, 21, 248
 abscission, 115
 abscission and temperature, 263
 abscission and water stress, 262-263
 development, 261-262
 development and temperature, 263
 period, 19, 261-272
 period and environment, 262-263
 production vs. plant height, 64-65
 production vs. vegetative growth, 64
 second axillary, 24-25
 shedding, 26, 80
 time to first, 25
 stag plants, 26
 stamen development, 267-269
 environment and, 267
 stand establishment, 535-541
 field environment, 551-554
 planting date, 553
 planting depth, 552
 planting seed quality, 472, 543-550
 post-planting factors, 552-554
 soil crusting, 553-554
 starch, 173-174
 biosynthesis, 173-174
 CER and, 313-314
 CO₂ compensation point and, 231
 correlation with photosynthetic rate, 204-209
 degradation vs. leaf age, 322
 inhibitors of biosynthesis, 174
 integumental, 279-280, 466-467
 mobilization at night, 174
 phosphorus effects on synthesis, 236
 photosynthesis and, 173, 229, 231
 seed, 466-467
 starch accumulation, 228
 CO₂ enrichment and, 203-205
 CER and, 187
 mesophyll resistance and, 240
 nitrogen-stress and, 92
 stele, 29, 34, 98
 stem growth rate, 189
 stomata,
 factors controlling behavior, 246
 ovular, 279, 328
 sensitivity to CO₂, 93-94
 sensitivity to water stress, 96-97, 99
 stomatal conductance, 70, 97, 230, 237
 CO₂ enrichment and, 214-218
 relation to CER, 230
 stomatal resistance, 110, 181, 199, 203, 207,
 230, 232, 235
 leaf age effects, 217
 storage protein, 415-422
 acalin A *see* acalin A
 acalin B *see* acalin B
 amino acid composition, 433, 570, 579
 cDNA clones, 434-435
 coordinate regulation, 434
 genotype-environment interaction, 574-575,
 580-583
 in vitro translation, 433-434
 model requirements, 422
 mRNAs, 433-436
 oil correlation, 296, 559-566
 processing scheme, 434-435
 regulatory sequences, 436
 seed development and, 468
 transcript families, 435
 wild species, 587-589
 stratified harvests, 471
 stress
 carbohydrate, 252-254
 photosynthesis response, 236-242
 stimulation of flowering, 115
 unified theory, 252
 stroma, 157-160, 172
 sucrose
 photosynthesis and, 173
 sugar
 levels in developing bolls, 44
 nitrogen and, 101
 seed development, 467
 translocation vs. starch degradation, 322
 sulfur, 88
 relative fruitfulness and, 88
 sunlight, 3
 supply/demand ratio *see* source-sink ratio
 sympodium, 11, 18-19, 21, 26, 115
 initiation, 13
 reversion to monopodium, 115-116
 synergids, 274
- T**
- T₀ *see* tenacity gauge
 T₁ *see* tenacity gauge
 taproot, 34
 TD-1123, 140-142
 chemical male sterility, 140
 defoliant aid, 152-153
 temperature
 adverse high, 57-60
 cold tolerance, 6
 day-night regimes, 49-50
 extremes, 2
 fluctuations, 2
 maximum, 2
 minimum, 2
 minimum for germination, 47
 soil, 34-35
 species adaptation, 2
 temperature and
 boll development, 291-293
 boll maturation period, 54, 291-293, 352-353

- boll retention, 45
 CO₂ compensation point, 235, 240
 CO₂-O₂ solubility ratio, 233, 240
 cellulose synthesis, 297
 embryo development, 293
 flowering, 40, 49-50
 fiber elongation, 291-292
 fiber initiation, 292
 fiber length, 55
 fiber quality, 352-354
 fruiting index, 86
 germination, 47
 micronaire, 292
 ovules per ovary, 265-266
 photorespiration, 180, 233-234
 photosynthesis, 41, 239-240
 planting seed quality, 473
 pollen sterility, 267-269
 square abscission, 263
 squaring, 49
 VFI, 18
- tenacity, 55, 356
- convolution angle and, 347
 - environment and, 356-357
 - guage, 357
 - micronaire and, 357
 - secondary wall thickness, 356-357
- terpenes, 609-611
- volatile *see* volatile terpenes
- terpenoid aldehydes, 614-619
- biological activities, 616-617
 - byssinosis, 618
 - defense response, 614
 - gossypol biosynthesis, 616
 - structures, 615-616
 - tissue location, 614
- terpenoids
- sesquiterpenes *see* sesquiterpenes
- thidiazuron, 141, 149
- thioredoxin, 172
- thylakoid, 157-161, 163, 165-166, 172, 229
- thymidine
- epidermal incorporation, 403-406
 - incorporation vs. age, 405
- TIBA *see* 2,3,5-triiodobenzoic acid
- tight loc, 478
- tissue culture, 625-631
- anther and microspore, 629
 - callus, 627-628
 - ovule, 624-627
 - protoplasts, 630
 - regeneration of plantlets, 630-631
 - suspension cells, 628-629
- toxaphene, 138-139
- translocation, 76, 228
- photosynthesis and, 313
 - water potential and, 76
- transpiration, 68, 93, 110, 246
- CO₂ enrichment and, 214-218
 - N-stress and, 93
 - salinity and, 110
- 2,3,5-triiodobenzoic acid, 132, 140
- tryptophan, 126
- two-stage theory, 146-147
- U**
- UDP-glucose glucan synthetase, 343
- uridine
- fiber incorporation, 405-407
- V**
- vacuoles
- electron dense pigment, 384
 - elongating fiber, 377-380
 - ovule epidermis, 383-385
 - storage protein, 415
- vascular bundle, 29-30, 34
- vegetative branches, 21, 51
- vegetative growth, 13, 26
- CO₂ enrichment and, 194-195
 - water status and, 64
- vegetative-fruiting ratio, 26-27, 63, 81-86
- nutrient elements affecting, 81-86
- vesicles
- dictyosome, 390, 392
 - plasmamembrane-associated, 388-390
- vicilins, 419, 421
- see* acalin A
- vivipary, 439, 448, 457, 460
- volatile terpenes, 609-611
- boll weevil attractants, 611
 - structures, 610
 - tissue concentrations, 610
- W**
- water
- deficit, 63
 - potential, 74-75
 - stress, 15, 74-75, 217, 222-223, 237-239
- water stress and
- assimilation, 74
 - carbohydrate utilization, 222-223
 - CER, 313
 - fiber quality, 287
 - flowering, 264
 - photosynthesis, 237-239
 - seed index, 287
 - source-sink activity, 75
 - square abscission, 262-263
 - stomatal response, 217
 - translocation, 74-75

- yield, 222-223
- water-use-efficiency, 67, 110
 - CO₂ enrichment and, 215-218
 - nitrogen and, 216
 - salinity and, 110
- wild species, 1
 - storage protein, 587-589
- winding layer *see* S₁ layer

X

- X, primary acceptor of photosystem II,
161-162, 164-165
- xanthophylls, 160
- xylem, 29, 35, 98-99

Y

- yield
 - CO₂ enrichment and, 195-196, 210
 - components, 210, 245
 - photosynthesis relationship, 211
 - theoretical maximum, 184-186
 - water stress and, 222-223

Z

- Z, primary electron donor, 163
- zinc
 - flowering and, 86
 - fruiting index and, 85
 - partitioning and, 86
 - tryptophan synthesis and, 86
 - yield and, 85