

Hydroponic Primer & Library Map

Guide 1 · Library Front Door

Get Started · Find Your Way · Master Calendar

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RELATED GUIDES

This guide is the front door to the Dragoon Mountains Growing Guides Library, a set of seventeen: - **Guide 1 — Hydroponic Primer & Library Map** (this guide) · the front door + master multi-crop calendar - **Guide 2 — Peppers in the Dragoons** · soil + hydroponic + variety-specific staking — the cornerstone fruiting-crop guide, with the full Rocoto protocol - **Guide 3 — Bato Bucket Hydroponic Systems** · system build, water-treatment protocol, operations — the canonical home for the 5-step Cochise bicarbonate scrub - **Guide 4 — Hydroponic Nutrients** · Masterblend Part 1, locally-sourced DIY Part 2, pH-adjustment recipes Part 3, Indoor/LED Part 4 - **Guide 5 — Grapes in the Dragoons** · Cochise County viticulture, VSP trellising, late-pruning frost strategy - **Guide 6 — Cool-Season Crops** · *brassicas* (the cabbage family — *Brassicaceae*: broccoli, cauliflower, kale, cabbage, brussels sprouts, kohlrabi) + *alliums* (the onion-and-garlic family — *Allium spp.*) + greens + roots — the October-through-May complement to the warm-season fruiting crops - **Guide 7 — Warm-Season Companions** · tomatoes, cucurbits, beans, corn, sweet potatoes — the broad-shouldered companion to Guide 2 - **Guide 8 — Herbs in the Dragoons** · annual + perennial · soil & hydroponic — the kitchen-garden companion guide - **Guide 9 — Backyard Orchard in the Dragoons** · figs, pomegranates, jujubes, stone fruits — the perennial companion to Guide 5 - **Guide 10 — Pest, Disease & Wildlife** · IPM framework + the full pest/disease catalog + Cochise wildlife exclusion (javelina, gopher, deer, bird) - **Guide 11 — Foundations: Soil & Seed** · soil-building, composting, seed-starting under LED, propagation, transplanting — the cross-cutting basics every crop guide rests on - **Guide 12 — Harvest, Preservation & Storage** · water-bath and pressure canning, lacto-fermentation, drying, ristras, root cellaring — the post-harvest companion to every crop guide - **Guide 13 — Water in Cochise County** · well sourcing, water testing, treatment, rainwater harvesting, drip-irrigation design, conservation - **Guide 14 — Season Extension Structures** · cold frames, low tunnels, row cover, hoop houses, high tunnels — the structures that stretch the cool season and protect the orchard - **Guide 15 — Native Food Crops of the Sonoran-Madrean Region** · the indigenous food complex of the Dragoons — tepary beans, Hopi Blue corn, Chiltepin, native squash, devil's claw, mesquite, agave, prickly pear, amaranth, yucca — equal-weight cultivated and wild-harvested - **Guide 16 — Companion Plantings & Polycultures** · the design layer — companion matrix, anti-companions, cover crops, 9 Dragoons-specific guild designs - **Guide 17 — Recipes & Kitchen Integration** · what to cook with what came out of the garden this morning · by-crop recipes + seasonal menus

Start here if it's your first day. This is the front door to a library of seventeen guides — not a guide you read end-to-end with a project in hand. Read this primer first, all the way through. Then skip to **§2 (How to use this library by goal)** before opening any other guide. That single table will route you to the right next guide based on what you actually want to grow. The rest of this primer (climate baseline, water short version, master calendar, troubleshooting tree) is reference material to come back to when you need it.

About this library

What it is · who it is for · how to navigate

The Dragoon Mountains Growing Library is a seventeen-guide reference set for serious household food and wine growing on the east side of the Dragons, at roughly 4,500 – 5,500 ft elevation in Cochise County, southeastern Arizona. The guides sit beside each other rather than stacking on top of each other: pick the one that answers your current question, follow its cross-references where they point, and you will not have to read all seventeen to plant a crop.

This is Guide 1, the front door. It is the one to read first if you are new — and the one to come back to when you cannot remember which guide covers a given subject. Everything in this primer is also covered more thoroughly somewhere else in the library; nothing important lives in only one place except the things explicitly named as canonical (the bicarbonate water-treatment protocol in Guide 3 §4, the Masterblend recipes in Guide 4 Parts 1-2, the pH recipes in Guide 4 Part 3).

Revision history lives in the project changelog, not in this guide.

If you are new here: read this guide (Guide 1) first, end to end. Then pick **one** of Guide 2 (peppers), Guide 6 (cool-season), Guide 7 (warm-season companions), Guide 8 (herbs), or Guide 9 (orchard) depending on the season you are entering and what you want to grow, and read it next. Guide 3 (the Bato build), Guide 4 (nutrients), Guide 10 (pest/wildlife), Guide 11 (foundations), Guide 12 (preservation), Guide 13 (water), and Guide 14 (season extension) are reference works — dip into them when you need them, do not try to read them through.

How to use this library — by goal

Find the right guide for what you are actually trying to do

The fastest way through the library is by goal, not by topic. Pick the row that matches what you want to do and follow the cross-reference. Most goals touch two guides; a few touch three.

If you want to...	Start with	Then read
Grow peppers — any species, any system	Guide 2 entire	Guide 4 Part 1 for the nutrient program (if hydroponic)
Grow tomatoes this year	Guide 7 §3 (full chapter on tomatoes)	Guide 3 (Bato build) + Guide 4 Part 1 §1.4.1 for the canonical tomato hydroponic program
Grow melons (cantaloupe, watermelon, <i>Charentais</i>)	Guide 7 §7	This guide §9 for May 15 plant-date timing
Grow cucumbers, summer squash, or zucchini	Guide 7 §5–§6	Guide 6 §1 (raised-bed soil chemistry) if growing in beds
Grow sweet corn, beans, or sweet potatoes	Guide 7 §8–§10	Guide 6 §1 (soil prep) for bed planning
Set up a kitchen herb garden	Guide 8 entire	Guide 4 Part 1 §1.4.3 for hydroponic basil/parsley recipes
Plant a fig or pomegranate tree this winter	Guide 9 §5 (Dragoons classics)	Guide 9 §4 for bareroot vs container; §9 for irrigation
Plant a peach, apricot, or plum (stone fruit)	Guide 9 §6 (with the chill-hours rule)	Guide 9 §11 for peach leaf curl + frost protection
Plant an apple or pear tree	Guide 9 §7 (low-chill varieties, codling moth)	Guide 9 §10 (annual calendar)
Grow citrus in Cochise County	Guide 9 §8 (container-only)	Guide 4 Part 4 for the indoor-LED winter program
Build a Bato bucket system from scratch	Guide 3 §1–§6	Guide 2 §6 for pepper-specific operation; Guide 4 Part 1 for the recipe
Formulate your own nutrients from local materials	Guide 4 Part 2	Guide 4 Part 1 for the target ppm profile to match

If you want to...	Start with	Then read
Make your own pH-up or pH-down from foraged materials	Guide 4 Part 3	Guide 3 §4 for where to use them in the bicarbonate protocol
Plant a vineyard	Guide 5 entire	Guide 4 Part 3 if you need to acidify irrigation water
Grow lettuce, kale, and brassicas through the winter	Guide 6 §1, §2, §4	Guide 4 Part 1 §1.4.3 for leafy-greens hydroponic recipes
Plant garlic this fall	Guide 6 §3	This guide §9 (master calendar) for the Oct 15–Nov 15 window
Plant overwintering onions	Guide 6 §3	This guide §9 (master calendar) for the Aug 25–Sep 15 window
Treat hard well water for hydroponic use	Guide 3 §4 (canonical)	Guide 4 Part 3 if you want to make your own acid
Overwinter a Rocoto plant indoors under LEDs	Guide 2 §10	Guide 4 Part 4 for the LED program
Set up rainwater catchment for the monsoon	This guide §6 + Guide 3 §4	Guide 5 §6 if irrigating vines from catchment
Figure out what to plant in October	This guide §9 (master calendar)	Guide 6 entire
Diagnose a sick plant	This guide §11 (decision tree)	Guide 2 §8 or Guide 4 §1.7 for deficiency tables
Diagnose a pest or disease I've spotted	Guide 10 (pest catalog)	Guide 10 §18 (spray decision tree); the relevant crop guide for crop-specific notes
Plan a wildlife-exclusion strategy (javelina, gopher, deer, bird)	Guide 10 §12–§17	Guide 9 §11 for orchard-specific fencing; Guide 5 §10 for vineyard
Test my well water	Guide 13 §2 (water testing)	Guide 3 §4 for hydroponic treatment of the result
Set up rainwater harvesting	Guide 13 §4 (rainwater)	Guide 3 §4 if blending catchment with treated well water
Design a drip-irrigation system	Guide 13 §5 (drip design)	Guide 9 §9 for orchard deep-soak; Guide 5 §6 for vineyard
Build a cold frame this fall	Guide 14 §2 (cold frames)	Guide 6 for overwintering crop selection

If you want to...	Start with	Then read
Build a low tunnel over a bed	Guide 14 §3 (low tunnels)	Guide 6 §4 for under-tunnel greens
Build a hoop house	Guide 14 §7 (hoop houses)	Guide 6 entire; Guide 7 for warm-season tomatoes under cover
Protect the orchard against late spring frost	Guide 14 §10 (thermal mass + frost)	Guide 9 §6 for stone-fruit bloom-frost defense
Start seeds indoors for spring	Guide 11 Part 2 (seed starting under LED)	Guide 4 Part 4 for the LED specifics; Guide 2 §10 for pepper timing
Build my compost pile	Guide 11 Part 1 (composting)	Guide 11 Part 1 for the alkaline-Cochise amendment program
Read a soil test	Guide 11 Part 1 (soil tests)	Guide 11 Part 1 for the amendment program
Propagate fig or pomegranate cuttings	Guide 11 Part 3 (propagation)	Guide 9 §5 for the variety-specific notes
Can my tomato sauce	Guide 12 (water-bath canning)	Guide 7 §3 for paste-tomato varieties
Make a pepper ristra	Guide 12 (drying)	Guide 2 §9 (pepper drying and processing)
Pressure-can dried beans	Guide 12 (pressure canning)	Guide 7 §8 for tepary and dry-bean varieties
Ferment sauerkraut, kimchi, or hot sauce	Guide 12 (lacto-fermentation)	Guide 6 §2 (brassicas) or Guide 2 §9 (hot sauce)
Set up a root cellar / cure sweet potatoes	Guide 12 (curing + cellaring)	Guide 7 §10 for the sweet-potato curing rule; Guide 6 §5 for root storage

LOCAL TIP

The library is built for sideways navigation. Almost every chapter ends with a relatedguides callout pointing to the next thing you would naturally want to read. Follow those — they were written for exactly this purpose.

The 17-guide map

A one-paragraph overview of each guide and a topic list

Guide 1 — Hydroponic Primer & Library Map (*this guide*)

The front door. Use it for orientation, environmental context (climate, water, soils), the master multi-crop calendar, and the troubleshooting decision tree that routes problems to the right specialist guide.

- About the library and how to use it
- Decision tree by goal — including the new Guide 7, 8, and 9 routes
- Know your Dragoons — climate, water, wind, sun, soil
- Systems at a glance
- Water — short version (full procedure → Guide 3 §4)
- Nutrients — short version (full recipes → Guide 4 Parts 1-2)
- pH — short version (full recipes → Guide 4 Part 3)
- **Master Dragoons multi-crop calendar** (this guide's unique content) — now covering peppers, grapes, brassicas, alliums, greens, roots, warm-season companions, and the orchard
- Troubleshooting decision tree

Guide 2 — Peppers in the Dragoons

The cornerstone fruiting-crop guide. Covers soil and hydroponic tracks for every commonly-grown *Capsicum* species, with a dedicated Rocoto section (the species most suited to Dragoon elevation), full staking and pruning, pest and disease management, harvest and drying, and a chapter on overwintering. The two seasonal calendars at the end (soil track and hydroponic track) feed directly into this primer's master calendar.

- Why the Dragoons for peppers · the Chiltepin connection
- Variety reference for all five domesticated *Capsicum* species
- The Rocoto special section (*C. pubescens*)
- Soil track: bed prep, irrigation, nutrition, calendar
- Hydroponic track: system selection, water, EC/pH, nutrients, environmental control, calendar
- Staking, pruning, multi-string trellising per variety
- Pest and disease management
- Harvest, drying, and processing for the Dragoon climate
- Overwintering — which peppers are worth the trouble

Guide 3 — Bato Bucket Hydroponic Systems

The system-build and operations guide. Covers the recommended Bato (Dutch) bucket setup for the Dragoons — bench frame, downspout drain channel, RAINPOINT solar pump, 15-gallon reservoir — plus the canonical 5-step Cochise bicarbonate water-treatment protocol that every other guide references. Crop-agnostic by design: the same build runs peppers, tomatoes, and cool-season crops with parameter changes only.

- Why Bato buckets for Cochise County
- Equipment, components, sourcing
- Bench construction, downspout drilling, medium fill
- **The 5-step Cochise bicarbonate water-treatment protocol** (canonical)
- Plumbing, RAINPOINT solar pump, cycle programming
- Daily and weekly operations; reading runoff; end-of-crop flush
- Adapting the system between crops (peppers → cool-season → tomatoes)
- Materials list and cost breakdown
- System-side troubleshooting

Guide 4 — Hydroponic Nutrients

The nutrient-program reference, organized in four numbered Parts. Part 1 is the purchased Masterblend program with full per-crop feeding charts. Part 2 is the locally-sourced DIY equivalent — oak ash, bat guano tea, caliche calcium, epsomite magnesium. Part 3 holds every pH-adjustment recipe in the library (prickly-pear vinegar, fermented citric acid, oak-ash lye, and the purchased alternatives). Part 4 covers indoor LED growing, VPD, and CO₂ — relevant for winter overwintering and year-round indoor production.

- **Part 1 — Masterblend.** Why 4-18-38; stock-solution preparation; mixing order; per-crop feeding charts (tomato, pepper, leafy greens); EC and pH daily protocol; deficiency diagnosis
- **Part 2 — Locally-sourced DIY.** Target ppm profile; oak ash for potassium; bat guano for nitrogen; caliche for calcium; epsomite for magnesium; micronutrient sourcing; the 8-step DIY workflow
- **Part 3 — pH adjustment.** Six pH-down recipes; four pH-up recipes; comparison tables; universal dosing protocol
- **Part 4 — Indoor environment.** LED basics; *PPFD* targets (photosynthetic photon flux density, in $\mu\text{mol}/\text{m}^2/\text{s}$ — the rate of usable light photons hitting the canopy); *DLI* (daily light integral, in $\text{mol}/\text{m}^2/\text{day}$ — the cumulative day's-worth of those photons); *VPD* (vapor pressure deficit — the difference between how much moisture the air is holding and how much it could hold at that temperature, the single best proxy for transpiration drive); CO₂; sensor priority list; off-grid solar automation

Guide 5 — Grapes in the Dragoons

Cochise County viticulture, in full. Covers why the Dragoons are a viable wine region (and how they compare to the Sonoita and Willcox AVAs), site selection, variety recommendations, soil preparation and pH management, VSP trellising, irrigation, nutrition, pruning, and the fruit-to-wine handoff. The grape calendar feeds the master calendar in §9 of this primer.

- Why the Dragoons for wine — comparison to Sonoita and Willcox
- Terroir, site selection, frost-pocket avoidance
- Red and white variety recommendations
- Soil preparation and bicarbonate treatment for irrigation
- Planting, vine spacing, VSP trellis
- Irrigation, salt management, nutrition
- Seasonal management calendar
- Spur vs cane pruning; canopy management through monsoon
- Pest, disease, wildlife management
- Harvest by *Brix* (sugar content in degrees, measured with a refractometer from a single crushed berry); year-2+ dormancy and fruit-to-wine handoff

Guide 6 — Cool-Season Crops

The fall/winter/spring complement to Guide 2's warm-season work. Covers brassicas (the cool-season anchor), alliums (the long-occupancy crops — garlic, onions, leeks), cool-season greens (spinach, lettuce, mâche, arugula), and root crops (carrots, beets, parsnips, turnips, radishes). Includes a master cool-season planting calendar and the four-year rotation handoff with peppers.

- Common ground for the cool season — Dragoon window, frost behavior, family overview, master cool-season planting calendar
- Brassicas — broccoli, cauliflower, cabbage, kale, brussels sprouts, kohlrabi
- Alliums — garlic, shallots, onions (spring and overwintering), leeks
- Cool-season greens — spinach, lettuce, mâche, arugula, mustards
- Root crops — carrots, beets, turnips, radishes, parsnips
- Pest management for the cool season
- Crop rotation handoff with peppers (4-year cycle)

Guide 7 — Warm-Season Companions

The broad-shouldered companion to Guide 2 (Peppers), covering every other warm-season fruiting crop that shares the April-through-October window. Tomatoes get the longest chapter, mirroring the structure of the pepper guide — full soil track and full hydroponic track, the canonical Bato program for the single most-grown crop in Cochise County. Eggplant runs as a near-clone of pepper biology. Cucurbits (cucumbers, summer squash, zucchini, melons) get full chapters with the squash-vine-borer

protocol and a real watermelon section. Beans cover snap, dry, fresh shellies, and *Phaseolus acutifolius* (the Sonoran tepary). Sweet corn and sweet potatoes round out the storage and rotation crops.

- Common ground for the warm season — the 95 °F heat-stress ceiling, monsoon dynamics, soil-temperature targets
- Master warm-season planting calendar — every crop in this guide on one chart
- Tomatoes (full soil + hydroponic chapter, parallel to Guide 2's pepper structure)
- Eggplant, cucumbers, summer squash & zucchini, melons
- Beans (including teparies), sweet corn (with pollination-block geometry), sweet potatoes
- Pest & disease summary; crop-rotation handoff with cool season

Guide 8 — Herbs in the Dragoons

The kitchen-garden companion, covering the annual-vs-perennial split that defines herb growing at this elevation. The perennial half — rosemary, thyme, sage, oregano — reads Cochise County as Mediterranean home and asks for a one-time bed-prep investment and very little else. The annual half — basil, cilantro, dill, parsley — needs a timing strategy and shade discipline to dodge the bolt window. Mint gets its own short chapter because it cannot go in the ground here without consequences. Includes a full hydroponic herbs chapter (NFT basil, DWC cilantro and parsley, Bato for hardy perennials) and a drying-and-preserving chapter that leans into the Dragoons low-humidity advantage.

- The bolt problem and the window strategy for annual herbs
- Annual herbs (basil, cilantro, dill, parsley) — varieties, timing, harvest
- Mediterranean perennials (rosemary, thyme, sage, oregano) — bed prep, calendar
- Mint — the container caveat
- Hydroponic herbs · drying & preserving · companion planting & IPM

Guide 9 — Backyard Orchard in the Dragoons

The perennial companion to Guide 5 (Grapes), covering the rest of the woody fruit that thrives in this landscape. The heat-and-drought-tolerant Mediterranean classics — figs, pomegranates, jujubes — genuinely love it here; the stone fruits (peaches, apricots, plums, almonds) and pome fruits (apples, pears) need more care and have a chill-hours problem to solve; citrus has to live in pots because Cochise winters will kill it in the ground. The guide covers bareroot-vs-container selection, rootstocks, the chill-hours math, frost protection, peach leaf curl, codling moth, wildlife pressure (javelina, gophers, deer), the deep-soak irrigation pattern for perennials, and a month-by-month annual orchard calendar.

- The Dragoons orchard environment — climate, chill hours, frost windows

- Site selection · bareroot vs container · rootstocks · chill-hours rule
- The Dragoons classics — figs, pomegranates, jujubes
- Stone fruits (with the frost-protection chapter) · pome fruits · citrus (container-only)
- Irrigation, annual calendar, pest/disease/wildlife, harvest & storage

Guide 10 — Pest, Disease & Wildlife

The cross-cutting IPM and wildlife reference, pulled out of the individual crop guides so a single working catalog lives in one place. The structure is three layered references: the IPM framework chapters (prevention, scouting, biological controls, targeted intervention) followed by a full pest catalog (insects by feeding type, then diseases by pathogen type, then the physiological disorders that look like disease but aren't), followed by the Cochise vertebrate-pressure chapters (small mammals, large mammals, birds, the reptile allies, dogs as security, the fencing reference). Action references at the end include a beneficial-insect guide, a spray decision tree, and a month-by-month scouting calendar.

- IPM framework — prevention, scouting, biological controls, targeted intervention
- Insect pests — sucking (aphids, whiteflies), chewing (caterpillars, beetles), soil-dwelling (cutworms, root maggots), mites
- Diseases — fungal (powdery mildew, leaf curl, *Pythium*), bacterial, viral
- Physiological disorders — BER, sunscald, edema (the disease-mimics)
- Vertebrate pressure — javelina, gophers, ground squirrels, packrats, deer, rabbits, birds
- Reptile and dog allies · the fencing reference
- Beneficial insects + insectary plantings · spray decision tree · scouting calendar

Guide 11 — Foundations: Soil & Seed

The cross-cutting foundations guide, covering the soil-building, composting, seed-starting, and propagation basics that every crop guide assumes you already know. Part 1 (Soil) covers reading a soil test, the alkaline-Cochise amendment program, compost-pile design at this elevation, mulching strategy, no-till bed building, and cover-cropping for the in-bed off-season. Part 2 (Seed) covers seed sourcing, the under-LED seed-starting setup, germination temperature management, hardening off, transplant timing, and the propagation chapters (cuttings, layering, division, scarification) that the perennial guides reference.

- Part 1 — Soil: soil tests, alkaline amendment, compost-pile design, mulching, no-till, cover crops
- Part 2 — Seed: seed sourcing, under-LED starting, germination temperatures, hardening off, transplant timing
- Part 3 — Propagation: cuttings, layering, division, scarification, grafting basics

Guide 12 — Harvest, Preservation & Storage

The post-harvest companion to every crop guide. Covers the four major preservation tracks for the Dragoons household — water-bath canning (high-acid fruits, tomatoes, pickles), pressure canning (low-acid vegetables, beans, meat broths), lacto-fermentation (sauerkraut, kimchi, hot sauce, pickles), and drying (the Dragoons' single greatest preservation advantage — low humidity and intense sun make pepper ristras, sun-dried tomatoes, herbs, and fruit-leather almost trivial). Includes a root-cellar chapter for the cool-season storage crops (carrots, beets, parsnips, winter squash, garlic, onions, apples) and the curing protocols for the trickier crops (sweet potatoes, alliums, winter squash).

- Water-bath canning (tomatoes, pickles, high-acid fruits, jams)
- Pressure canning (beans, vegetables, broths)
- Lacto-fermentation (sauerkraut, kimchi, hot sauce, fermented pickles)
- Drying — ristras, sun-dried tomatoes, dried herbs, fruit leather
- Root cellaring + curing protocols (sweet potatoes, alliums, winter squash)
- Freezer strategy · pickling pantry · jam & jelly reference

Guide 13 — Water in Cochise County

The water-source guide, expanding the hydroponic-only treatment in Guide 3 §4 into the full household water picture. Covers well sourcing and the regional aquifer context (Sulphur Springs vs San Pedro vs Whetstone), water testing (what to test for, where to send samples, how to read the report), treatment options for the household (RO, softener trade-offs, the bicarbonate-scrub for irrigation), rainwater harvesting design (the 500 sq ft / 3,000 gallon monsoon math, tank sizing, first-flush diverters, mosquito control), greywater basics, drip-irrigation design (emitter selection, line layout, runtime calculation), and household-level conservation tactics.

- Well sourcing and regional aquifer context
- Water testing — what to test for, where to send, how to read the report
- Household water treatment (RO, softener trade-offs, irrigation treatment)
- Rainwater harvesting — tank sizing, first-flush, mosquito control
- Drip-irrigation design — emitter selection, line layout, runtime
- Greywater · conservation tactics

Guide 14 — Season Extension Structures

The structures guide. Covers the four levels of cool-season protection — row cover (the lightest, used over established beds), cold frames (the simplest static structure, for seedlings and overwintering greens), low tunnels (hoop-and-plastic over a bed), hoop houses (walk-in unheated, the workhorse for serious season extension), and high tunnels (the largest, heated or unheated, the closest thing to a greenhouse on a Dragoons budget). Each chapter covers materials, build, ventilation, and the calendar

for using it at 4,700 ft. The thermal-mass and frost-protection chapter at the end is the orchard's reference for spring frost defense (water barrels, wind machines, frost cloth deployment).

- Row cover · cold frames · low tunnels · hoop houses · high tunnels
- Build materials, ventilation, and per-structure calendar
- Thermal-mass strategy (water barrels, rock walls)
- Frost-protection methods for the orchard
- Crop pairings — what to grow under which structure when

Guide 15 — Native Food Crops of the Sonoran-Madrean Region

The place-anchor guide. Covers the indigenous food complex of the Dragoons and the wider sky-island region at equal weight — cultivated annuals (tepary beans, Hopi Blue corn, Painted Mountain, O'odham 60-day, Anasazi, native squash, devil's claw, amaranth) and wild-harvested perennials (Chiltepin, mesquite, agave, prickly pear, yucca). Light cultural framing — acknowledges and attributes the Tohono O'odham, Hopi, Apache, and Spanish/mestizo agricultural traditions that produced the inheritance, without centering the cultural piece. Native Seeds/SEARCH and Tohono O'odham Community Action are the canonical seed and knowledge sources throughout. Cross-references heavily into Guides 7 (cultivation) and 2 (Chiltepin) rather than repeating their content.

- Beans · corn · peppers · squash · cactus · agave · mesquite · yucca · devil's claw · amaranth — ten crop families
- Monsoon-keyed sowing patterns (tepary, O'odham corn, native squash)
- Pit-roast and processing protocols for wild perennials
- Native crop annual calendar (a stagger against the European-crop calendar)
- Seed sources, the literature foundation (Nabhan, Niethammer, Hodgson, Rea)

Guide 16 — Companion Plantings & Polycultures

The design layer. The first guide in the library that is not about a crop — it is about how the crops fit together. Five biological mechanisms (repellence, attraction, allelopathy, nitrogen exchange, structural). A consolidated master matrix covering every cultivated crop in the library × its companions, with plant-with / plant-near / never-near columns. A short anti-companions reference. A cover-crop chapter (winter peas, hairy vetch, crimson clover, winter rye, buckwheat, daikon radish, mustard catch crops, native bunchgrass). And nine worked-out Dragoons-specific guild designs — three sisters in the Cochise context, pepper-basil-marigold, brassica-allium harlequin defense, stone-fruit orchard guild, fig + Mediterranean herbs, mesquite-anchored native guild, vineyard cover-crop interrow, continuous-bloom insectary strip, and a monsoon-fed three-bean polyculture. Each guild has a sketch diagram, planting calendar, and a “what to expect” closer.

- Five mechanisms framework · master companion matrix · anti-companions
- Cover crops for the Dragoons — species, timing, succession
- Nine worked guild designs with sketch diagrams + planting calendars
- The first pattern-level guide — sits on top of the crop guides

Guide 17 — Recipes & Kitchen Integration

The kitchen guide. The second pattern-level guide in the library — what to do with the harvest once it gets to the counter. Sixteen recipe chapters (by crop, parallel to the library) plus a “menus through the seasons” chapter pulling recipes together into ten worked seasonal meals. Around 80 recipes total, all calibrated to a Dragoons-grown harvest. Cross-references heavily into *Guide 12* for any preserve-bound preparation; this guide is the fresh-eating daily-cooking counterpart.

- Sixteen by-crop chapters — peppers · tomatoes · cucurbits · beans · corn · sweet potatoes · brassicas · alliums · greens · roots · grapes · herbs · orchard fruits · native crops · plus two open-frame chapters
- Ten worked menus through the year — January cold-frame greens, July monsoon tomato, September peak-harvest feast, Thanksgiving, Christmas Eve, New Year’s
- A Dragoons-kitchen pantry baseline — Hopi Blue cornmeal, tepary, prickly-pear vinegar, dried Chiltepin, mesquite flour as year-round staples

Know your Dragoons

The environmental baseline — climate, water, wind, sun, soil

The east side of the Dragoon Mountains, at roughly 4,500 – 5,500 ft elevation in Cochise County, is a sky-island grassland-and-oak environment. It is **not low desert** and it is not high desert; it is genuinely cooler than Phoenix, genuinely drier than the Mogollon Rim, and has a sharper diurnal temperature swing than either. This is the canonical home in the library for “what conditions are we actually growing in” — every other guide refers back to this section for environmental context.



Figure 1: The Dragoon Mountains from the south pasture. Grassland and oak at roughly 4,700 ft — the sky-island environment every guide in this library is anchored to.

Climate

Factor	Condition	What it means for growing
USDA zone	8a (10 – 15 °F average annual minimum)	Long mild winter; supports overwintering brassicas, alliums, garlic in-ground; frost-tender crops need protection or come out by October
Elevation	4,500 – 5,500 ft typical operating range	Cooler summers than Phoenix or Tucson; longer hang time for grapes; 15–20% stronger UV than sea level
Summer high	85 – 95 °F	Manageable; peppers and grapes set fruit reliably; tomatoes need shade in late June
Summer low	55 – 70 °F	Cool nights are an asset — fruit-set is reliable; flavor compounds and capsaicin concentrate
Winter high	55 – 67 °F	Open-field harvest of cold-tolerant crops all winter
Winter low	22 – 32 °F most nights; 3–6 nights below 25 °F in deep January	Hard freezes are short; row cover handles the worst nights
Diurnal swing	30 – 40 °F daily, year-round	Concentrates flavor; stresses unprotected hydroponic reservoirs
Annual rainfall	15 – 22"	About 60% falls July–September during the monsoon
Monsoon	Mid-July to mid-September	8–12" of soft, low-TDS rainwater; 50–70% humidity; afternoon storms
First frost	Late October to early November	Plan pepper turnover for mid-October
Last frost	Mid-March to early April	Spring brassicas race against May heat after last frost

Factor	Condition	What it means for growing
Frost-free days	~180 - 220 at typical elevation	Long enough for any pepper species; long enough for two grape vintages of cane growth
Sun hours	2,800+ hours/year	More than any commercial European wine region; supports any sun-loving crop

The Dragoons' best growing window is fall — September through November. Cool nights, warm days, clear skies, no monsoon, no frost. Plan your biggest harvests to mature in this window: peak pepper harvest, grape harvest, fall brassicas establishing, garlic going in the ground. This single fact organizes most of the planting calendar in §9.

Water

The valleys below the Dragoons — Sulphur Springs, San Pedro, Whetstone — pull groundwater from carbonate-bearing aquifers. The result is stubbornly hard, alkaline, bicarbonate-rich well water that is **the single most consequential variable in hydroponic growing here**, and a meaningful one even for soil growing on the alkaline native dirt.

Cochise County well water typically reads high on two related measurements: **TDS** (total dissolved solids, in ppm — a proxy for how much mineral is in the water) and **pH** (acidity/alkalinity on the 0-14 logarithmic scale, where 7 is neutral; most plants want their root zone at 5.8-6.5 in hydroponics, 6.5-7.0 in soil). The reservoir version of TDS is **EC** (electrical conductivity, in mS/cm — a measure of dissolved nutrient concentration in a hydroponic solution); EC and TDS measure the same thing in slightly different units (1 mS/cm $\approx$ 500-700 ppm depending on the meter).

Source	TDS	pH	Treatment needed
Monsoon rainwater (collected)	< 20 ppm	6.0 - 6.5	Minimal — just pH fine-tune
RO-filtered well water	< 50 ppm	6.5 - 7.0	Light pH adjustment
Untreated well water	200 - 500 ppm (some wells > 600)	7.5 - 8.5	Full 5-step bicarbonate protocol

Source	TDS	pH	Treatment needed
Surface / stock-tank water	Highly variable	Highly variable	Test before use; may contain pathogens

LOCAL TIP

The well at our place runs about 330 ppm TDS at pH 8.1 — workable with the full protocol but never trivial. If your well measures over 500 ppm consider a small under-counter RO unit purely for hydroponic use; over 600 ppm it is essentially required. **Always meter your own well** before designing a hydroponic system — the variance between wells in Cochise County is large enough that you cannot rely on a neighbor's number.

A 500 sq ft covered patio roof collects 3,000+ gallons of low-TDS rainwater per monsoon season — that is the entire summer reservoir requirement for a 20-bucket Bato system. Catchment is the single most-leveraged piece of infrastructure on the property. Full procedure for treating well water lives in **Guide 3 §4**.

Wind, sun, and air

Wind matters in the Dragoons but is rarely catastrophic at the typical garden elevation. Sustained prevailing winds run 5–15 mph from the southwest; spring (March–May) brings the windiest stretch, with occasional gusts above 35 mph that can shred unsupported pepper plants and tear improperly-secured shade cloth. Monsoon storms bring short, intense gusts from the east — train trellises and stakes accordingly.

UV intensity is roughly 15–20% higher than sea level. This deepens flavor and pigment in fruit but also bleaches leaves, degrades plastic, and overheats unshaded reservoirs. **30–40% shade cloth from mid-June through early September** is essential for most crops; black/yellow UV-stabilized reservoir tubs are essential year-round.

Soil character

Native soils on the east side of the Dragoons are mostly sandy loams developed over granite or alluvial caliche. The defining features for a grower:

Soil property	Typical reading	Implication
pH	7.5 – 8.5	Iron and phosphorus locked up; sulfur amendment needed for acid-loving crops; many cool-season crops are happy as-is
Organic matter	1 – 2%	Native soils are low — needs 2-4" of finished compost worked in for any annual vegetable bed
Caliche layer	12 – 36" below surface, variable	Restricts deep root growth; break through at planting for grapes and Rocoto
Drainage	Generally excellent	Sandy texture and slope drain well; rare to have wet-feet problems outside monsoon
Salt accumulation	Mild but real	Monsoon naturally flushes salts; well-water irrigation can accumulate them; deep-water periodically
Native fertility	Calcium-rich, potassium-moderate, low N and P	Caliche supplies calcium freely; nitrogen and phosphorus must be added
Iron in soil	Present but locked up by high pH	Foliar iron useful early-season; oak-tannin chelation works (see Guide 4 Part 2)

WARNING

Caliche is not negotiable. When you dig a hole for a grape vine or a long-lived Rocoto and hit a layer of cement-like calcium carbonate, you must either break through it (rock bar, pickaxe, sometimes a rented breaker hammer) or move the planting hole. Roots cannot penetrate intact caliche. Half-hearted hole prep is the single biggest cause of slow-failing perennial plantings in the Dragoons.

Systems at a glance

The eight common growing approaches — what they are good for, where to read

There is no single “right system” for the Dragoons. The right choice depends on the crop, the water source, the available infrastructure, and how much daily attention you want to spend on the garden. This section is the comparison table — see the cross-referenced guide for the actual build.

System	Best for	Dragoon strength	Dragoon weakness	Read
In-ground soil	Long-lived perennials (grapes, Chiltepin, garlic); deep-rooted crops (parsnip, carrot)	Native soil is well-drained; calcium-rich from caliche	Alkaline pH locks up iron; needs heavy compost amendment	Guide 2 §5 (peppers); Guide 5 (grapes); Guide 6 (cool-season)
Raised beds (soil)	Brassicas, alliums, greens, roots — anything annual	Bypasses the worst caliche pockets; warmer in spring; easier to amend	Dries out faster in pre-monsoon June; needs mulch	Guide 6 entire
Containers (soil/coco)	Movable plantings (Rocoto, herbs); patio growing; overwintering	Move indoors against frost; control mix exactly	Heat-stress through summer afternoons; constant watering	Guide 2 §5, §10
Bato (Dutch) buckets	Large fruiting crops (peppers, tomatoes, cucumbers, eggplant)	Recirculates expensive treated water; elevated above wildlife; modular	Reservoir-temperature control needed in pre-monsoon heat	Guide 3 entire — the canonical build

System	Best for	Dragoon strength	Dragoon weakness	Read
NFT (Nutrient Film Technique) — a thin film of nutrient solution flows down a slightly-sloped channel past bare roots	Leafy greens, herbs, strawberries — small-root crops only	Highly water-efficient	Cannot run on poorly-treated well water (precipitation); needs constant power	Brief in Guide 6 \$4.8
DWC (Deep Water Culture) — roots sit submerged in an aerated tank of nutrient solution	Tomatoes, peppers, cucumbers; herb starts	Simple, high-yield, easy temperature management with a buried tank	Air pump required; reservoir-temperature critical	Brief in Guide 2 \$6.1
Kratky (passive)	Lettuce, basil, single-harvest greens	No pump, no electricity — ideal off-grid; very quick to set up	Single-crop cycle (no top-off mid-grow); not for fruiting crops	Brief in Guide 6 \$4.8
Ebb-and-flow / flood-and-drain	Mid-size fruiting crops; trays of seedlings	Flexible; good for nursery propagation	More plumbing complexity than Bato; more pump cycling	Not covered in depth — apply Guide 3 water and Guide 4 nutrients

For the Dragoons, the **default recommendation** is a Bato bucket bench for warm-season fruiting crops (peppers, tomatoes, cucumbers) and a mix of raised beds + Kratky/NFT for cool-season greens and brassicas. This pairing covers more than 90% of household production and shares one set of nutrient stocks. Start here unless you have a specific reason to do otherwise.

Water — short version

The 5-step protocol in one page · full procedure → Guide 3 §4

Cochise County well water is hard, alkaline, and high in bicarbonates. The bicarbonates are the active problem: they act as a chemical buffer that neutralizes acid as fast as you add it, then pushes pH back up overnight. The fix is to neutralize them **before** adding any nutrients. This procedure is called the bicarbonate scrub or the 5-step Cochise protocol; it is the foundation of every hydroponic system in this library.

The 5 steps (compressed)

Step	Action	What happens
1. Fill	Fill reservoir with source water	Starting pH likely 7.5–8.5; EC 0.3–0.8
2. Acid in	Add acid slowly while stirring (citric stock, phosphoric pH Down, or prickly-pear vinegar)	Water fizzes — CO ₂ is releasing
3. Wait	Wait until fizzing completely stops, 5–15 minutes	Bicarbonates are now neutralized
4. pH adjust	Fine-tune to 5.8–6.0 (or 6.0–6.5 for brassicas/grapes)	pH is now stable — will not bounce back
5. Nutrients	Add Masterblend → Epsom → calcium nitrate, dissolved one at a time	Nutrients dissolve into stable, pre-treated water

WARNING

Never skip Step 3. Adding nutrients while bicarbonates are still active causes calcium and magnesium to precipitate within hours — visible as cloudiness or white film on the tub. Your nutrients are now locked up and your plants are starving.

Always add calcium nitrate last. This rule appears in every hydroponic guide in this library because violating it causes immediate calcium-sulfate precipitation regardless of how well the water was treated.

RELATED GUIDES

For the full procedure — acid selection (prickly-pear vinegar, citric stock, phosphoric, sulfur burn), base selection (oak-ash lye, KOH, baking soda), water-source ranking, and step-by-step dosing — see **Guide 3 — Bato Bucket Hydroponic Systems, §4**. For the acid and base recipes themselves see **Guide 4 Part 3**.

Nutrients — short version

Masterblend vs DIY in one page · full recipes → Guide 4 Parts 1-2

The same target nutrient profile drives both the purchased Masterblend program (Guide 4 Part 1) and the locally-sourced DIY program (Guide 4 Part 2). They are two paths to the same destination. Pick the path that fits your priorities; do not mix them in the same reservoir.

The target profile

Per gallon, full-strength fruiting solution:

Macro	Target	Micro	Target
Nitrogen (N)	116 ppm	Iron (Fe)	2.4 ppm
Phosphorus (P)	47 ppm	Boron (B)	1.2 ppm
Potassium (K)	188 ppm	Manganese (Mn)	1.2 ppm
Calcium (Ca)	113 ppm	Zinc (Zn)	0.3 ppm
Magnesium (Mg)	41 ppm	Copper (Cu)	0.3 ppm
Sulfur (S)	58 ppm	Molybdenum (Mo)	0.06 ppm

When to pick which

Pick Masterblend if...

You want a turnkey system that works the first time

You are running a 20+ bucket commercial-scale operation

You need predictable, repeatable results between batches

Your nearest oak woodland is far away

You don't have time to brew teas

Pick DIY if...

You enjoy the foraging process and want a local closed loop

You are running a small, attention-rich household garden

You are willing to take occasional crop hits as the price of learning

You have oak woodland on the property

You have a bat colony nearby (Kartchner area, etc.)

For most growers the practical answer is: **start with Masterblend for the first year**, get comfortable with EC and pH meters, learn what a healthy plant looks like in hydroponics. **Add DIY substitutions selectively in year two** — start with oak-ash potassium and prickly-pear vinegar pH Down, both of which are forgiving. Move other inputs to local sources as you build confidence with each one.

RELATED GUIDES

For the full Masterblend program — per-crop feeding charts, stock-solution preparation, EC and pH daily protocol, deficiency diagnosis — see **Guide 4 Part 1**. **For the DIY locally-sourced recipes** — oak ash, bat guano tea, caliche calcium, epsomite magnesium, the 8-step DIY workflow — see **Guide 4 Part 2**. The two Parts share a single ppm target profile.

pH — short version

Why it matters · target ranges · adjustment recipes → Guide 4 Part 3

pH is the second-most-consequential daily variable after water hardness. Outside the right pH range, even a perfectly mixed nutrient solution becomes effectively unavailable to the plant — iron, manganese, and phosphorus all lock up at high pH, and calcium and magnesium become less available at low pH. The good news is that pH responds quickly and predictably to small doses of acid or base **once the bicarbonates have been neutralized first** (see §6).

Target ranges

Growing context	Target pH	Why
Hydroponic fruiting crops (peppers, tomatoes, cucumbers)	5.8 - 6.2	Iron and phosphorus most available; matches Masterblend chemistry
Hydroponic leafy greens and herbs	5.8 - 6.3	Slightly wider tolerance; lettuce slightly higher than peppers
Hydroponic brassicas	6.0 - 6.5	Brassicas tolerate (and prefer) slightly higher than fruiting crops
In-ground soil — most vegetables	6.5 - 7.0	Microbial activity and nutrient cycling optimal
In-ground soil — brassicas	6.5 - 7.5	Higher pH suppresses clubroot disease
In-ground soil — grapes	6.0 - 7.0	Lower than most vegetable crops; sulfur amendment usually needed
In-ground soil — Rocoto and other Capsicum	6.0 - 6.5	Sulfur amendment needed against native 7.5–8.5
In-ground soil — alliums	6.2 - 7.0	Moderately flexible

LOCAL TIP

Drift direction tells the story. In a healthy hydroponic reservoir on well-treated water, pH drifts slowly upward over a week as plants consume nitrate (which releases hydroxide). If yours is drifting upward fast, bicarbonates were not fully neutralized in the original treatment. If it drifts downward, ammonium-N is being absorbed faster than nitrate, or the reservoir has gone biologically off. **Watch the direction, not just the number.**

Acid and base options at a glance

pH Down	Best for	pH Up	Best for
Citric acid stock (1 g/mL)	Standard daily use; accurate dosing	Potassium hydroxide stock	Standard daily use; accurate dosing
Phosphoric acid (commercial)	Hardest well water; adds useful P at fruiting	Oak-ash lye (foraged)	Local source; adds useful K at fruiting
Prickly-pear vinegar (foraged)	Gentle daily nudges; unlimited local supply	Hydrated lime (foraged caliche)	Backup; adds Ca
White vinegar	Budget option	Baking soda	Emergency only — sodium accumulates

RELATED GUIDES

Full recipes for every acid and base — quantities, fermentation times, safety notes, dilution ratios, and the universal dosing protocol — live in **Guide 4 Part 3**.

Master Dragoons multi-crop calendar

The single-source-of-truth for “what is going on in the garden right now”

How to read this calendar. Each row is a month, each column is a crop family, and each cell answers *what should I be doing this week*. Two tables, twelve months each — read across to see what is happening simultaneously, read down to see how one crop family moves through the year. The narrative paragraphs after the tables (**Per-month detail callouts**) explain the *why* behind each row. Pin a printed copy to the shed wall and circle the current month — that single habit replaces about half the reminder app entries a Dragoons garden generates.

This is the synthesized calendar that ties the whole library together. Each crop guide has its own per-crop calendar, but in practice you do not garden one crop at a time — you garden five or six families at once (often more, once an orchard and a perennial herb bed enter the mix) and need to know what to do **this week** across all of them. The two tables below answer that question: the first covers the warm-season anchor (peppers), the grape vineyard, and the four cool-season families; the second covers the warm-season companions (tomatoes, cucurbits, beans, corn, sweet potatoes), the herb garden, and the orchard.

The calendar reflects east-side Dragoons at roughly 4,700 ft elevation, USDA zone 8a. Shift dates 1–2 weeks earlier at lower elevations (4,200–4,500 ft, valley floors) and 1–2 weeks later at higher elevations (5,000–5,500 ft). For exact per-crop dates, see the specific guide.

The master table — annual & cool-season crops

Month	Peppers (Guide 2)	Grapes (Guide 5)	Brassicas (Guide 6)	Alliums (Guide 6)	Greens (Guide 6)	Roots (Guide 6)
Jan	Start Rocoto + habanero seeds indoors under LED; apply sulfur to outdoor beds if pH > 7.5	Full dormancy; plan pruning strategy; soil samples; sulfur amendment	Harvest mature heads on warm days; protect during 25°F nights	Garlic dormant under mulch; harvest stored bulbs	Harvest spinach, mâche, arugula under row cover	Pull carrots, beets, parsnips as needed from in-ground storage

Month	Peppers (Guide 2)	Grapes (Guide 5)	Brassicas (Guide 6)	Alliums (Guide 6)	Greens (Guide 6)	Roots (Guide 6)
Feb	Start all <i>C. annuum</i> seeds indoors; clean reservoirs; order Masterblend stocks	Late-dormancy pruning (delay to dodge frost); compost around bases; frost cloth standby	Sow spring brassicas indoors (Feb 1-15)	Garlic still dormant; sow spring onions/leeks indoors (Jan 15-Feb 1)	Continue winter harvest; sow successions of arugula, spinach	Sow successions of radishes
Mar	Pot up seedlings; build/prep outdoor systems; set up monsoon catchment; last sulfur application	Bud break — FROST WATCH ; begin drip irrigation; first N application; frost cloth ready	Transplant spring brassicas (Mar 1-15); direct-sow broccoli	Transplant spring onions/leeks (Mar 1-15); side-dress fall garlic with blood meal	Sow lettuce, radish, arugula successions outside	Sow carrots, beets (Feb 15-Mar 15)
Apr	Harden off; check soil temp 60°F+; transplant late April after last frost; install drip	Active shoot growth; shoot positioning on trellis; frost still possible — keep cloth	Spring brassicas race against May heat; harvest overwintered crops	Side-dress garlic with N (last app before bulbing); fall garlic scapes coming	Last spring sowings of greens; transition beds	Spring root crops continue

Month	Peppers (Guide 2)	Grapes (Guide 5)	Brassicas (Guide 6)	Alliums (Guide 6)	Greens (Guide 6)	Roots (Guide 6)
May	Final trans-plants out; mulch heavily; first fertilizer; watch late frost until mid-month	Flowering — CRITICAL MONTH; even irrigation; boron foliar before bloom; no copper during bloom	Cool-season crops bolt; bed turnover for peppers; spring brassicas wrap up	Garlic scapes harvest (cut for flavor + bulb size); pull spring onions	Bolt watch — pull and replace before going to seed	Pull spring carrots, beets as ready
Jun	Peak pre-monsoon heat; first flower buds; low-N switch; shade cloth on if > 95°F	Fruit set complete; canopy management; prep monsoon catchment; rising irrigation	Beds resting or sown to summer cover; first brussels sprouts indoor sowing late June	Garlic ready: bulb-formation complete; harvest hard-neck Jun 20-Jul 10	Few greens this month; basil takes over the bed	Beds resting; soil prep for fall sowings
Jul	Monsoon begins; reduce drip; stake heavy plants; Rocoto flowering heavily; aphid watch	Monsoon arrives mid-month; reduce drip; powdery mildew watch; sulfur/copper preventive	Sow fall brassicas indoors (Jul 5-Aug 5 — broccoli, cabbage, brussels)	Soft-neck and shallot harvest Jul 1-20; cure for 3 weeks	Sow leek trans-plants indoors (Jul 1-20) for fall transplant	Soil prep finalized for Aug-Sep direct sowings

Month	Peppers (Guide 2)	Grapes (Guide 5)	Brassicas (Guide 6)	Alliums (Guide 6)	Greens (Guide 6)	Roots (Guide 6)
Aug	Peak production <i>C. annuum</i> ; harvest jalapeños, serranos, cayenne; habaneros start; Rocoto approaching	Veraison (color change); reduce to deficit irrigation; weekly Brix; leaf-strip east side; white varieties harvest late Aug	Sow more fall brassicas indoors; transplant first brassicas out (Aug 25+); sow fall kale	Transplant overwintering onions (Aug 25-Sep 15)	Late August: prep for September direct-sow window	Late August: prep beds; soil cooling toward 65°F
Sep	● BEST MONTH — peak harvest all varieties; cool nights return; Rocoto ripe	● PRIMARY HARVEST MONTH — reds ready; pick by Brix; harvest early morning; post-harvest fish emulsion	Transplant brassicas all month; direct-sow broccoli through Sep 25; sow cabbage; sow kale Sep 1-Oct 15	Transplant overwintering onions/leeks early Sep; sow scallions; bunching onions	Direct-sow window opens: spinach, lettuce, arugula, mustards Sep 1+	Direct-sow carrots, beets, turnips, parsnips, radishes — primary fall sowing window
Oct	Continue harvest; first frost late Oct possible; pot up Rocoto and overwintering plants; pull last vines	Continue irrigation until leaf fall; compost around vines; plant cover crop; last sulfur app	Harvest first fall heads (late Oct); transplant last brassicas early Oct only	Plant garlic (Oct 15–Nov 15); plant shallot sets; plant overwintering leek transplants	Continue lettuce, spinach, arugula sowings under row cover	Continue carrot, beet, radish sowings through Oct 15; sow mâche

Month	Peppers (Guide 2)	Grapes (Guide 5)	Brassicas (Guide 6)	Alliums (Guide 6)	Greens (Guide 6)	Roots (Guide 6)
Nov	Frost ends outdoors; bring over-wintering plants in under LED; dry remaining harvest; compost beds	Leaf fall; irrigation taper to monthly deep soak; mow/terminate; cover crop; soil test; return grape marc to compost	Heavy fall harvest — broccoli, cauliflower, cabbage, kale; row cover ready	Garlic and shallots establishing in-ground; last fall planting	Continuous harvest under row cover; mâche thriving	First fall carrot harvest; beets, turnips ready; storage in-ground
Dec	Overwintered plants under LED (16 hr); EC 1.0-1.4; minimal feeding; plan next season	Full dormancy; final amend-ments; review season notes; plan variety additions	Harvest mature heads on warm days; brussels sprouts at peak after frost	Garlic dormant; mulch in place; harvest stored bulbs	Spinach, mâche, kale continuous harvest; cilantro thriving	Pull as needed; parsnips developing sweetness with each freeze

The master table — warm-season companions, herbs & orchard

Month	Warm-Season Companions (Guide 7)	Herbs (Guide 8)	Orchard (Guide 9)
Jan	Start tomato + eggplant seeds indoors under LED alongside peppers (Guide 2 §10 indoor program applies)	Plan herb bed; order seed; perennial herbs dormant outside	Bareroot planting window — figs, pomegranates, jujubes, stone fruits, pome fruits go in the ground while dormant; dormant pruning of all fruit trees

Month	Warm-Season Companions (Guide 7)	Herbs (Guide 8)	Orchard (Guide 9)
Feb	Continue indoor seed-starting (toms, eggplant); set up tomato hydroponic systems in greenhouse	Sow parsley indoors; perennials still dormant	Frost-watch for stone fruits — peaches and apricots bloom early; deploy frost cloth on bud-break nights; finish dormant pruning; dormant copper spray for peach leaf curl
Mar	Pot up tomatoes; harden off mid-month; build trellising; sweet potato slip propagation starts	Sow basil indoors (Mar 15+); transplant cilantro, dill outside	Bud break on pome fruits; copper spray cutoff; bloom on stone fruits; honeybee window — no insecticides during bloom
Apr	Last spring frost; transplant tomatoes Apr 15-30 after soil reaches 60 °F; direct-sow cucumbers, melons, summer squash, beans late April	Direct-sow cilantro, dill outside; harden basil; plant rosemary/thyme/sage transplants	First-fruit setting on stone fruits; thinning window for peaches starts late month; mulch around tree bases
May	Plant cucumbers, summer squash, melons May 15 (the canonical date); plant sweet corn in blocks; plant sweet potato slips late May; final tomato transplants; eggplant out	Plant basil outside after May 1 nights warm; harvest cilantro before bolt	Thinning continues on stone fruits (one fruit per 6"); first codling moth flight on apples — pheromone traps up

Month	Warm-Season Companions (Guide 7)	Herbs (Guide 8)	Orchard (Guide 9)
Jun	Tomatoes flowering; cucurbits sizing; sweet corn knee-high; sweet potatoes vining; shade cloth at 95 °F ; pre-monsoon heat hole begins	Basil thriving; cilantro bolting — harvest seed; mint contained; perennials growing	Pre-monsoon deep soak — orchard irrigation peaks; thin remaining stone fruits; second codling moth flight; bird netting on cherries
Jul	Monsoon arrives ; tomato fruit-set resumes; cucumber peak; squash-vine-borer watch; first sweet corn ripening late month	Drying window for oregano, thyme, sage — cut at first storm	First fig harvest (early-summer breba crop); first peach/apricot/plum harvest ; bird netting essential; tomato hornworm patrols
Aug	Peak production — tomatoes, cucurbits, beans, sweet corn; sweet potato vines covering ground; second succession of beans, cucumbers	Basil harvest peak; second basil sowing for fall pesto; preserve in oil cubes	Black Mission fig peak ; Asian pear and early apple harvest ; jujube fruit sizing; pomegranates sizing — deep soak for fruit split prevention
Sep	Peak month — fall tomato harvest, second cucumber crop, dry beans curing, sweet corn finishing	Cilantro window reopens — sow Sep 15+; basil peaks then declines	Pomegranate harvest mid-Sep onward; late apple and pear harvest ; jujube harvest (drying types in Sep, fresh-eating in early Oct)

Month	Warm-Season Companions (Guide 7)	Herbs (Guide 8)	Orchard (Guide 9)
Oct	Sweet potato harvest before frost (mid-October); curing in warm shed; pull tomatoes after first frost; bean dry-down	Rosemary, thyme, sage cuttings for new starts; cilantro and parsley going strong; last basil before frost	Final pomegranate harvest; fig second crop finishing; persimmon harvest; mulch trees with monsoon-collected mulch; final orchard fertilizer of year
Nov	Beds cleared; tomato cages stored; sweet-potato curing finishing; legumes dug under as green manure	Mulch perennials before hard freeze; bring potted herbs indoors; cilantro thriving	Leaf-fall pruning of damaged/diseased wood only (save structural pruning for January); deep dormant soak; copper spray for peach leaf curl prevention
Dec	Beds resting or in cover crop; planning next year's tomato varieties	Indoor herb pots under LED; perennials dormant outside under mulch	Order bareroot stock for January planting; dormant copper spray completed; trees fully dormant; planning chapter for next year

Per-month detail callouts

The table above is the navigation surface. The notes below are the at-a-glance reasons behind each row — the *why* behind the *what*.

January — the planning month. The garden is mostly dormant outdoors. The most consequential January action is starting Rocoto and other long-season peppers under LED indoors; they need 10–14 weeks before transplant and germination is slow (14–28 days). The under-LED seed-starting setup itself lives in **Guide 11 Part 2**. January is also the right month for elemental sulfur on alkaline soil-track beds — sulfur takes weeks of bacterial action to lower pH and needs to be in place before spring planting; the full amendment program is in **Guide 11 Part 1**. **In the orchard, January is the**

bareroot planting window — figs, pomegranates, jujubes, stone fruits, and pome fruits all go in the ground while dormant; dormant pruning happens this month too (Guide 9 §4, §10). Inventory the pantry: this is also the right month to plan canning targets for the year and order canning lids (**Guide 12**), and to plan any cold-frame, low-tunnel, or hoop-house builds you want finished before fall (**Guide 14**).

February — start everything that wants a long indoor head start. All *C. annuum* peppers and tomatoes, eggplant, spring brassicas, spring onions and leeks. Seed-starting protocol in **Guide 11 Part 2**. Outdoors, the garden is mostly waiting; this is when reservoir cleaning, system inspection, and material ordering happen. **In the orchard, February is the frost-watch month for stone fruits** — peaches and apricots bloom early at this elevation and a hard February freeze can cost the year's crop; keep frost cloth deployed on bud-break nights (Guide 9 §6), and review the thermal-mass and frost-protection methods in **Guide 14 §10** if you have water barrels or windbreaks to position before bloom.

March — bud break and the start of the active season. Grape bud break is the single highest-stakes event of the spring — once buds break, frost damage becomes irreversible (review **Guide 14 §10** for spring frost defense). Spring brassicas and onions go out under row cover (**Guide 14 §1** for row-cover materials and deployment). Last chance for sulfur amendment before warm-season planting. Pest scouting begins — aphid and flea-beetle pressure on the first warm days (**Guide 10** scouting calendar).

April — the bridge month. Hardening off, transplanting peppers, racing spring brassicas. Frost is still possible into mid-April at higher elevations, so frost cloth stays accessible. **Frost risk for orchard blooms is real all month** — thermal-mass tactics (water barrels under canopy, wind-machine timing, frost-cloth deployment over young trees) live in **Guide 14 §10**. Drip irrigation goes in (**Guide 13 §5** for design and emitter selection). Spring pest watch on brassicas: cabbage worms and aphids ramp up with warming days (**Guide 10**).

May — the flowering and fruiting setup month. Grapes flower (the single most weather-dependent event of the grape year). Peppers and tomatoes establish in beds and buckets. **May 15 is the canonical plant date for cucumbers, summer squash, and melons** (Guide 7 §5–§7). Sweet potato slips go in late May. Spring brassicas bolt by Memorial Day. Garlic finishes its top-growth phase and begins moving energy into bulbs. First codling moth flight in the orchard — pheromone traps up (**Guide 10**).

June — the pre-monsoon stress month. The hardest month for the garden. Heat hits 95°F+ but the monsoon hasn't started. Reservoir-temperature management peaks. Garlic harvest begins (cure protocol in **Guide 12**). Shade cloth goes on. Cool-season beds are empty or in summer cover crop (**Guide 11 Part 1** for cover-crop selection). Pre-monsoon **deep orchard soak** (Guide 9 §9). Squash-vine-borer watch

begins on cucurbits (**Guide 10**).

July — the monsoon arrives. Mid-July through mid-September the climate shifts: 50–70% humidity, daily afternoon storms, soft rainwater. Soft-neck garlic and shallots harvest and cure (curing protocol in **Guide 12**). Rainwater catchment fills — this is the high-leverage window for monsoon rainwater capture (**Guide 13 §4**). Fall brassica seeds start indoors. Powdery mildew watch begins on grapes (**Guide 10** disease catalog). Tomato hornworm patrols (**Guide 10**). **In the orchard, July opens the harvest window** — early figs (the breba crop), the first peaches, apricots, and plums all come off this month (Guide 9 §6, §12). Begin **water-bath canning** of the first stone-fruit jams (**Guide 12**).

August — peak summer production + fall setup. *C. annuum* peppers hit peak harvest. Grape veraison. First fall brassicas transplant out the last week. Overwintering onions go in late August through mid-September. Beds get prepped for the September direct-sow blitz. **Harlequin bugs on brassicas** are at peak — scouting and hand-pick before they take down the new transplants (**Guide 10**). Begin heavy canning and preserving: tomato sauce, salsa, pickles, jams (**Guide 12**). Pull dormant cold-frame and low-tunnel hardware out of storage for September deployment (**Guide 14**).

September — the Dragoons’ best month. Peak grape harvest, peak pepper harvest, peak tomato harvest, the cool-season direct-sow window opens, and the orchard delivers pomegranates, late apples and pears, and jujubes. The single most important month in the calendar. Plan around it. **Peak preservation month** — canning, fermenting, drying all run continuously (**Guide 12**). Pepper-ristra drying begins as the first harvests come out of the field (**Guide 12** drying chapter). Last chance to install cold frames and low tunnels over fall greens beds before October’s first frost (**Guide 14**).

October — turnover. First frost arrives late in the month. Garlic goes in mid-October. Last brassica transplants early in the month. Peppers wind down; Rocotos come indoors. **Sweet potatoes come out of the ground before first frost** (Guide 7 §10 — the curing rule is the trickiest step; full curing protocol in **Guide 12**). Cover crops sown between grape rows (**Guide 11 Part 1**). In the orchard, the final pomegranate and persimmon harvest closes out the fruit year. **Deploy row cover, cold frames, and low tunnels** over the cool-season beds (**Guide 14**). Begin root cellaring — carrots, beets, winter squash, apples (**Guide 12**).

November — fall harvest and overwintering setup. Frost ends the warm-season garden but the cool-season garden is at peak. Brassicas, kale, brussels sprouts, root crops, greens — all harvesting heavily, much of it under row cover or hoop house (**Guide 14**). Indoor overwintering peppers settle into LED routines (**Guide 11 Part 2** for the indoor station; Guide 4 Part 4 for the LED program). **Dormant copper spray**

on peach trees against leaf curl (**Guide 10**). Final fermenting and root-cellarizing of the year's harvest (**Guide 12**).

December — dormancy with continuous cool-season harvest. Grapes fully dormant. Peppers indoors. Outside, the cool-season garden under row cover, cold frame, and low tunnel keeps producing greens, brassicas, and roots through the deepest weeks of winter (**Guide 14**). Order bareroot stock for January orchard planting (Guide 9 §3). Review and rebuild the compost pile against next season's amendment needs (**Guide 11 Part 1**).

Crop selection beyond the named guides

Short pointers to crops that have moved into their own dedicated guides, plus heritage staples

Most of the warm-season companion crops that used to live in this chapter — tomatoes, cucumbers, summer squash, melons, beans, sweet corn, sweet potatoes, eggplant — now have their own full chapters in **Guide 7 (Warm-Season Companions)**. Herbs (basil, cilantro, rosemary, thyme, sage, oregano, mint, parsley, dill) have their own full guide as **Guide 8 (Herbs in the Dragoons)**. Figs, pomegranates, jujubes, stone fruits, pome fruits, and citrus are covered in **Guide 9 (Backyard Orchard in the Dragoons)**. The library now covers essentially every food crop a Dragoons household will grow. The short pointers below remain here for orientation; for the full treatment of any of these crops, follow the cross-references into the specialist guide.

Tomatoes, cucumbers, squash, melons, beans, corn, sweet potatoes, eggplant

A natural pairing with peppers — same warm season, similar bucket system, similar nutrient program scaled to crop. All of these crops now have full chapters in **Guide 7 (Warm-Season Companions)**, including the canonical tomato hydroponic program (mirroring Guide 2's pepper structure), the squash-vine-borer protocol, the watermelon section, the tepary-bean chapter, sweet corn pollination-block geometry, and the sweet-potato curing rule.

- **Cross-ref: Guide 7 entire;** Guide 4 Part 1 §1.4.1 (tomato nutrient program); Guide 3 (Bato build for any large fruiting crop).

Basil and the full kitchen herb garden

Basil is the single best summer/monsoon herb here, and it now has a dedicated chapter alongside the rest of the kitchen herbs in **Guide 8 (Herbs in the Dragoons)** — annual herbs (basil, cilantro, dill, parsley), Mediterranean perennials (rosemary, thyme, sage, oregano), the mint container caveat, and a full hydroponic herbs chapter.

- **Cross-ref: Guide 8 entire;** Guide 4 Part 1 §1.4.3 (leafy/herb nutrient program).

Figs, pomegranates, jujubes, stone fruits, pome fruits, citrus

Backyard fruit trees are covered in **Guide 9 (Backyard Orchard in the Dragoons)**, which is the perennial companion to the grape guide (Guide 5). Figs, pomegranates, and jujubes are the easy Dragoons wins; stone fruits and pome fruits need more care and have a chill-hours problem to solve; citrus has to stay in pots because Cochise winters will kill it in the ground.



Figure 2: A 4-channel PVC NFT tower running mature romaine alongside empty channels staged for the next succession. Greens are the easiest hydroponic match here and the easiest place to extend the library beyond peppers, grapes, and brassicas.

- **Cross-ref: Guide 9 entire;** Guide 5 for grape parallels; Guide 4 Part 4 for the indoor citrus winter program.

Native and heritage staples

The Dragoons sit at the intersection of three native agricultural traditions — Apache, Tohono O’odham, and Pueblo. Heritage staples worth growing include Chiltepin (Guide 2 §2), tepary beans (above), amaranth (heat-tolerant grain green), and devil’s claw. These crops were bred for exactly the conditions you are growing in — they tend to outperform supermarket varieties at our elevation with less water and zero pampering.

LOCAL TIP

Source heritage Southwest varieties from Native Seeds/SEARCH (Tucson) or local seed swaps. They are routinely better-adapted to Cochise County than commercial seed-catalog varieties, often by a wide margin.

Troubleshooting decision tree

When something is wrong — where to look

This is the navigation table for problems. Each row maps a symptom to the guide and section that contains the actual diagnosis and fix. The principle: this primer routes you to the right specialist, but the specialist is where the answer lives.

By visible symptom

Symptom	Likely cause	Where to read
Yellow leaves at the bottom of pepper plants	Nitrogen deficiency (common in fruiting peppers)	Guide 2 §6.5 deficiency reference; Guide 4 Part 1 §1.7 for the full deficiency table
Yellow leaves with green veins on new growth	Iron deficiency from high pH or bicarbonates	Guide 3 §4 (water treatment); Guide 4 Part 1 §1.7 (Fe deficiency)
White crust on reservoir walls / cloudy reservoir within 24 hrs	Bicarbonates not fully neutralized; or wrong mix order	Guide 3 §4 — review Steps 3 and 5 carefully
pH climbs back overnight after adjustment	Step 3 of bicarbonate scrub truncated — wait longer	Guide 3 §4 Step 3
Brown leaf edges / tip burn on lettuce or peppers	Salt burn (high EC) or calcium deficiency	Guide 4 Part 1 §1.7 ; check EC meter first
Wilting despite wet roots	Root rot from warm reservoir (>75°F) or pythium	Guide 2 §6.2 (reservoir temperature); Guide 3 §6 (warning callout on disease)
Blossom drop on peppers (or tomatoes)	Heat stress, humidity stress, or boron deficiency	Guide 2 §5.3 (soil) and §6.6 (hydroponic)
Blossom end rot on peppers / tomatoes	Inconsistent water (soil); calcium availability	Guide 2 §5.4 “calcium management”
Broccoli buttoning (tiny premature head)	Plants stressed by heat or transplanted too small	Guide 6 §2.5 (broccoli) — review timing
Brassica heads splitting	Heat stress; uneven water; over-mature	Guide 6 §2.5 — harvest sooner; mulch heavily
Aphid colonies in monsoon	High humidity + new growth	Guide 2 §8 (peppers); Guide 6 §6 (brassicas/cool-season)

Symptom	Likely cause	Where to read
Powdery white coating on grape or cucurbit leaves	Powdery mildew — monsoon humidity	Guide 5 §10 (grape); Guide 6 §6 (squash family) — sulfur or apple-cider vinegar spray
White cabbage butterflies all over brassicas	<i>Pieris rapae</i> — primary fall brassica pest	Guide 6 §6.2 — row cover, <i>Bt</i> , hand-pick
Garlic bulbs small / single-clove	Planted too late or insufficient cold	Guide 6 §3 — review October planting date; this guide §9
Carrots forking / stubby	Caliche or rocks in bed; insufficient depth prep	Guide 6 §5.3 — soil-prep is the make-or-break factor
Brussels sprouts not forming	Insufficient frost exposure or planted too late	Guide 6 §2 — need August transplant for full winter season
Rocoto not setting fruit in summer	Daytime heat above 85°F; needs cool nights	Guide 2 §3 (Rocoto special section)
Grape vine no fruit second year	Normal — vines fruit year 3	Guide 5 §12 (year 2+ dormancy)
Slow growth in summer despite healthy color	Heat stress above 95°F	This guide §4 — review climate; install shade cloth
Oak ash lye is not bringing pH up enough	Ash too old, leach too dilute, or buffering against bicarbonates	Guide 4 Part 3 §3.3.1 — review concentration
Prickly-pear vinegar is not bringing pH down enough	Fermentation incomplete or batch too dilute	Guide 4 Part 3 §3.2.1 — check Brix/pH of batch
Drip emitters clogging on Bato system	Calcium nitrate scale	Guide 3 §9 — vinegar soak; weekly maintenance
Algae bloom in reservoir	Light reaching solution	Guide 3 §9 — opaque tub + lid
Solar pump not running scheduled cycle	Battery undercharged or panel obstructed	Guide 3 §9 — clean panel, check angle
Bolting greens in spring	Daylength + heat	Guide 6 §4 — succession plan; choose slow-bolt varieties

By guide if you do not know where to start

If your problem is...	Read first
Anything about pepper cultivation (any system)	Guide 2
Anything about a Bato bucket build or operations	Guide 3
Anything about nutrient mixing or deficiency	Guide 4 Parts 1 (Masterblend) or 2 (DIY)
Anything about pH or water-treatment chemistry	Guide 4 Part 3 (recipes), Guide 3 §4 (procedure)
Anything about LED, indoor, VPD, or CO ₂	Guide 4 Part 4
Anything about a grape vine	Guide 5
Anything about cool-season crops (Sep–May)	Guide 6
Anything about tomatoes, cucumbers, melons, squash, beans, corn, sweet potatoes, or eggplant	Guide 7
Anything about kitchen herbs (annual or perennial, soil or hydroponic)	Guide 8
Anything about backyard fruit trees (figs, pomegranates, jujubes, stone fruits, apples, pears, citrus)	Guide 9
Anything about pests, disease, IPM, or wildlife pressure (any crop)	Guide 10
Anything about soil-building, composting, seed-starting, or propagation	Guide 11
Anything about canning, fermenting, drying, curing, or root cellaring	Guide 12
Anything about well water, water testing, rainwater, or drip-irrigation design	Guide 13
Anything about cold frames, low tunnels, hoop houses, or frost protection	Guide 14
Anything about a crop not in the named guides	This guide §10

The 80/20 rule for Dragoon problems: roughly 80% of problems trace back to one of three root causes — untreated bicarbonates (Guide 3 §4), reservoir temperature too high (Guide 2 §6.2 or Guide 3 §6), or the wrong nutrient EC for the crop and stage (Guide 4 Part 1 §1.4). Check those three first before chasing more exotic explanations.

Sources & references

Reference material consulted, suggested for further reading, and where to verify or extend the claims in this guide.

Local resources

- **UA Cooperative Extension — Cochise County office (Sierra Vista)** — soil testing, water-chemistry workups, variety advice, and the *Vegetable Variety Recommendations for Arizona* bulletin. Phone 520-458-8278. The single most useful first call for any new grower in the Dragoons.
- **UA Cooperative Extension Master Gardener program** — Cochise County volunteer-led help desk and class series; the right place to walk a sample of a sick plant in person.
- **Native Seeds/SEARCH (Tucson)** — heritage Southwest-adapted seed: Chiltepin, teparies, Hopi corn, devil's claw, amaranth. The canonical regional seed source.
- **Borderlands Restoration Network (Patagonia)** — native plant, pollinator, and seed resources for the SE Arizona sky islands.
- **Sulphur Springs Valley feed and farm supply** — bulk *Masterblend*, calcium nitrate, alfalfa hay, and amendments at agricultural rather than hobby pricing.

Books & references

- *Growing Food in a Hotter, Drier Land* by Gary Paul Nabhan — Sonoran-Desert food crops, dry-adapted growing technique, and the broader cultural context for high-desert agriculture. The single most relevant book for the Dragoons.
- *Southwest Foraging* by John Slattery — wild edibles, including the wild Chiltepin and prickly-pear material referenced in Guide 4.
- *Hydroponic Food Production* by Howard Resh — the standard commercial-hydroponic reference; the Dutch/Bato bucket lineage starts here.
- *Plant Propagation: Principles and Practices* by Hartmann & Kester — seed starting, scarification, cuttings, and the propagation chapters that underpin Guides 1, 5, 8, and 9.
- *The Winter Harvest Handbook* by Eliot Coleman — the cool-season-growing canon; Guide 6 leans on its row-cover and succession-sowing logic.

Online resources

- **UA Cooperative Extension publications** (extension.arizona.edu) — water-chemistry, alkalinity, salinity, and Sonoran IPM bulletins.
- **Cornell Controlled Environment Agriculture** (cea.cals.cornell.edu) — peer-reviewed PPFD, DLI, and VPD targets by crop; the dataset behind Guide 4 Part 4.
- **PennState Extension IPM bulletins** (extension.psu.edu) — generic IPM references for the warm- and cool-season pests in this library.

- **OMRI (Organic Materials Review Institute)** (omri.org) — verify any input for organic certification before applying.
- **Bluelab knowledge base** (bluelab.com) — practical EC/pH meter calibration and reservoir-monitoring guides.

Beyond the Dragoons — adapting the library to other sky islands

If you are not actually in the Dragoons, this chapter shows how the library transfers to the rest of the Madrean Sky Islands archipelago.

The Dragoons are one range in a chain of isolated mountains that rise above the desert floor across southeastern Arizona, southwestern New Mexico, and northern Sonora. These sky islands share enough climate, soil, water, and pest characteristics that the agronomy in this library is broadly regional, not narrowly Cochise-only. The Dragoons-anchored voice (the named vendors, the specific Sonoita vineyards, the Sulphur Springs Valley feed supply) is local color — the substance underneath is Madrean.

How close a fit are you?

The single best predictor of fit is **elevation**. Populated zones of the sky islands run from roughly 2,400 ft (Tucson basin floor) up to 7,000+ ft (Mt. Lemmon, the upper Chiricahuas). The library is written for the 4,000–5,500 ft band — the elevation range where the Dragoons sit and where most of the populated foothills of the surrounding sky islands also sit. At that elevation the chill hours, frost windows, monsoon delivery, and soil chemistry are essentially common across the archipelago.

The library transfers cleanly across the 4,000–5,500 ft band of the Madrean Sky Islands. Outside that band — Tucson basin floor below, Mt. Lemmon and Coconino Plateau above — the timing tables, chill-hour assumptions, and variety recommendations need real adjustment, not just substitution.

Close fits — the library reads as-is

These ranges share Cochise conditions so closely that you can use the library without modification. Substitute local vendor names and you are done.

Range	Population centers	Typical elevation	Notes
Mule Mountains	Bisbee, Naco	5,000–5,500 ft	Slightly cooler and wetter than the Dragoons; same monsoon, same aquifer family, same chill hours. The closest analog.

Range	Population centers	Typical elevation	Notes
Huachuca Mountains	Sierra Vista, Hereford, Whetstone	4,500–4,800 ft	Essentially identical conditions. Guide 13's Sierra Vista municipal water profile already documents the local well chemistry.
Whetstone Mountains	St. David, Benson foothills	4,000–4,500 ft	Same dynamics; slightly drier in the lower elevations. Guide 13's Benson profile applies.
Chiricahua Mountains	Portal, Paradise, Rodeo (NM)	4,500–5,500 ft	A bit wetter (~18 in/year) and more remote. More wildlife pressure (bear, mountain lion) — see Guide 10. Library transfers fully.
Animas / Peloncillo (NM)	Animas, Rodeo, Granite Gap	4,400–5,200 ft	Cross-border twin of the Chiricahuas. Same monsoon, same crops.

Partial fits — adjust elevation, chill hours, and timing

These ranges are climatically similar but at enough elevation difference (or wetter, or with different sub-aquifer chemistry) that one or two parameters need conscious adjustment.

Range	Population centers	Typical elevation	What to adjust
Santa Rita Mountains	Patagonia, Sonoita, Elgin	4,000–5,000 ft	Wetter (~18 in/year vs the Dragoons' 12). Stone-fruit bloom is ~1 week earlier in spring. Guide 5 (Grapes) is anchored on the Sonoita AVA so it's directly applicable; viticulture transfers exactly.
Santa Catalina foothills	Oracle, Catalina, San Manuel	4,000–4,500 ft	Pine-oak woodland edge. Hotter, drier monsoon than the Dragoons. Bump warm-season planting ~1 week earlier; bump chill-hour-sensitive orchard varieties to slightly higher chill targets.
Pinaleno Mountains	Safford, Thatcher, Pima	2,900–4,500 ft	Lower-elevation populated zones — longer summer, hotter, fewer chill hours (400–600 vs the Dragoons' 700–900). Cool-season window is shorter; orchard variety selection shifts toward Tucson-basin recommendations.
Galiuro Mountains	Aravaipa Canyon area, Klondyke	3,500–5,000 ft	Very few residents; same agronomy as the Dragoons. Mostly relevant for the ranching community.

Range	Population centers	Typical elevation	What to adjust
Patagonia / Canelo Hills	Patagonia, Lochiel, Duquesne	4,000-5,200 ft	Wettest of the sky islands (~22 in/year in Patagonia). Powdery mildew pressure higher; otherwise applicable.

LOCAL TIP

The “±1 week per 500 ft” rule. When you move from the Dragoons (~4,700 ft) to a sky-island foothill at a different elevation, shift every date in the library’s calendars by roughly one week per 500 ft of elevation difference. Higher and cooler — push spring dates later, push fall dates earlier. Lower and warmer — the opposite. The rule is approximate but accurate enough to bootstrap a new region in one season.

Poor fits — different references needed

These zones are different enough that you should not lean on this library as the primary reference. The IPM, preservation, and structural-build content still applies, but the timing tables, variety selections, and crop windows will mislead.

Zone	Centers	Elevation	Why it's different
Tucson basin / Sonoran Desert floor	Tucson metro, Marana, Sahuarita	2,200-2,800 ft	Too hot, longer summer (frost-free March through November), only 200-400 chill hours, monsoon delivery less reliable. Many crops never make it through July. The orchard guide barely applies; the cool-season window is shorter; the warm-season window is much longer. Use UA Cooperative Extension's Tucson basin guidance instead.
Phoenix metro / lower Sonoran Desert	Phoenix, Tempe, Mesa, Scottsdale	1,000-1,800 ft	More extreme version of Tucson. Different reference entirely.
Mt. Lemmon, Mt. Graham, upper Huachucas	Summerhaven, Mt. Lemmon, Carr Canyon	7,000-9,000 ft	Cool-temperate mixed conifer; closer to Flagstaff than to Cochise. Short growing season; cold winters; mountain forest agriculture, not desert agriculture.
Flagstaff / Coconino Plateau	Flagstaff, Williams, Sedona-rim	5,000-7,000 ft	Ponderosa pine zone, cold winters, summer monsoon but very different temperature profile. Use Northern Arizona resources.

What transfers and what doesn't

Across all matched sky islands, the following content from the library transfers without modification:

- **Water chemistry & treatment** — Cochise alkaline-bicarbonate well chemistry is broadly typical of southern Arizona wells (Guide 13 documents Tombstone, Benson, Sierra Vista, Willcox, and Bisbee profiles, which already cover most of the populated sky-island foothills).
- **Pest pressure** — *harlequin bug*, cucumber beetle, *javelina*, *packrat*, squash vine borer, peach leaf curl, monsoon-driven powdery mildew all range across the entire archipelago (Guide 10).
- **Native and heritage crops** — tepary beans, *Chiltepin*, Hopi corn, O'odham 60-day are regional cultivars adapted to the broader Sonoran-Madrean climate (Guide 7).
- **Soil-building principles** — alkaline, low-OM, caliche-drainage soils are universal across the archipelago (Guide 11 Part 1).
- **IPM strategies** — the four-step decision sequence and scouting framework (Guide 10) is regional, not range-specific.
- **Season-extension structure designs** — cold frames, low tunnels, hoop houses (Guide 14) — the build math works at any sky-island elevation 4,000–5,500 ft; ventilation matters even more at higher elevation due to stronger solar.
- **Preservation tables** — the canning altitude-adjustment table (Guide 12 §4) covers 4,000–6,000 ft; readers above or below that range need the standard altitude-adjustment formula instead of the canned table.

The following content needs **conscious adjustment** when applied outside the Dragoons:

- **Chill hours for orchard variety selection** — Guide 9's chill-hour assumption (700–900 hours) needs to be re-measured for your specific elevation. Lower foothills: drop chill-hour-dependent stone-fruit varieties, lean on the low-chill end of every variety table. Higher foothills: the Dragoon recommendations still apply with a slight bias toward higher-chill varieties.
- **Frost-window dates** — shift by roughly ± 1 week per 500 ft of elevation difference from 4,700 ft (the Dragoons baseline).
- **Specific AVA references** in Guide 5 (Sonoita and Willcox) are real places. Guide 5's variety recommendations transfer to the Santa Cruz and Cochise wine-growing regions verbatim; viticulture elsewhere in the archipelago is not commercially developed at this time but the same agronomy works.
- **Specific local vendors** — Sulphur Springs Valley feed supply, the named Sonoita vineyards, UA Cochise County Extension. Generic equivalents exist near every sky island. UA Cooperative Extension has offices in Pima, Pinal, Graham, Greenlee, Santa Cruz, and Cochise counties — find your county's office and the relationship

is the same.

- **Municipal water profiles** — Guide 13 covers Cochise municipalities. Tucson Water, Sahuarita Water, Marana Water, and the Pima County rural water utilities all have different chemistry and should be tested individually.

Where to start if you're new to a different sky island

1. **Test your water.** UA Cooperative Extension at your county office runs the same panel UA Cochise runs (~\$50, 2-4 week turnaround). Whatever your sky island, water chemistry is the foundation under everything else.
2. **Identify your elevation.** Use it to shift the calendars in Guide 1 §9 and Guide 9 §3 (chill hours) by the ± 1 week per 500 ft rule.
3. **Buy heritage seed from Native Seeds/SEARCH.** Their adapted cultivars work across the entire Madrean archipelago.
4. **Find your local Master Gardener program.** Every Arizona county has one. They are the local-knowledge layer this library can't provide for ranges outside the Dragoons.
5. **Start with one bed and one crop.** The first year in a new sky-island foothill is a learning year. Use this library as the framework; let your specific microclimate teach you the details.

RELATED GUIDES

The library still works: every other guide in this set applies across the Madrean Sky Islands archipelago in its matched-fit zones. Read this chapter once as orientation, then use the rest of the library as written. The Dragoons accent is a feature, not a constraint.

Glossary

Terms used across the library, in plain definitions. Cross-references point to where each term is explained at length or first introduced.

Alkalinity — the buffering capacity of water against acid, dominated by dissolved bicarbonate (HCO_3^-). Cochise wells typically run 150–250 ppm as CaCO_3 . Bicarbonate must be neutralized before nutrient feeding. *See Guide 3 §4.*

Allium — the genus that includes onions, garlic, leeks, shallots, and chives. Pest-resistant, mostly cool-season, fall-planted in the Dragoons. *See Guide 6 §3.*

Bareroot — dormant trees and vines sold without soil, available January–February. The best window for planting stone-fruit and pome-fruit trees in the Dragoons. *See Guide 9 §3.1.*

BER (blossom-end rot) — dark sunken tissue at the bottom of a fruit (tomato, pepper, eggplant) caused by interrupted calcium delivery during cell expansion. Triggered by uneven watering, not low soil calcium. *See Guide 7 §3.13 and Guide 2 §8.*

Bicarbonate — the dissolved HCO_3^- ion that drives water alkalinity. The single most important water-chemistry parameter in Cochise County. *See Guide 3 §4.*

Bolt / bolting — premature flowering of a leaf crop, triggered by heat or daylength. Cilantro bolts in 6 weeks of any warmth; spinach, lettuce, and cool-season brassicas bolt with rising May temperatures. *See Guide 6 §4 and Guide 8 §2.*

Brassicas / Brassicaceae — the family that includes broccoli, cauliflower, cabbage, kale, brussels sprouts, kohlrabi, and the leafy mustards. Cool-season. *See Guide 6 §2.*

Brix — sugar content in degrees Brix ($^{\circ}\text{Bx}$), measured by hand refractometer; the harvest-timing parameter for grapes (target 22–26 $^{\circ}\text{Bx}$ for most wine grapes). *See Guide 5 §11.*

Buttoning — a brassica disorder where the plant skips its leaf stage and forms a tiny premature head. Caused by transplanting too small, too cold, or by a hot week during head initiation. *See Guide 6 §2.6.*

Caliche — the cemented calcium-carbonate hardpan beneath most Dragoons topsoil. Excellent drainage layer; difficult to root through; useful source of free calcium for DIY nutrient programs. *See Guide 4 Part 2.*

Capsicum — the pepper genus. *C. annuum* (jalapeño, poblano, serrano, bell, Hatch, Anaheim, Chiltepin), *C. chinense* (habanero, ghost), *C. pubescens* (Rocoto), *C. baccatum* (Aji), *C. frutescens* (Tabasco). *See Guide 2 §2.*

CalNit / Calcium nitrate — the calcium and nitrate component of the three-part hydroponic nutrient program. Must be dissolved separately from the *Masterblend*

salts to prevent precipitation. *See Guide 4 Part 1 §1.2.*

Chill hours — cumulative hours below 45°F a fruit tree receives in winter. The Dragoons accumulate 700–900 hours; variety selection must match. *See Guide 9 §3.*

Chiltepin — the wild pepper (*C. annuum* var. *glabriusculum*) native to the Dragoons and other sky-island ranges. The botanical ancestor of cultivated *C. annuum*. *See Guide 2 §1, §2.*

Cochise County — the southeastern Arizona county that includes the Dragoon Mountains, Sulphur Springs Valley, Sonoita, and Willcox. USDA zone 8a at the elevations covered by this library.

Cucurbits / Cucurbitaceae — the family that includes cucumbers, melons, summer and winter squash, gourds. Warm-season; heat-loving; share pest pressure (vine borer, cucumber beetle). *See Guide 7 §§5–7.*

Determinate / Indeterminate — tomato growth habit. Determinates set a single flush of fruit and finish; indeterminates keep growing and fruiting until frost. The training and pruning regimes differ. *See Guide 7 §3.*

DLI (daily light integral) — total photosynthetically-active photons delivered per square meter per day, in mol/m²/day. Each crop has a target DLI; the Dragoon sun gives roughly 30 mol/m²/day in summer. *See Guide 4 Part 4.*

DWC (deep water culture) — hydroponic technique where roots hang in a constantly-aerated nutrient reservoir. Excellent for leafy crops; trickier for fruiting crops. *See Guide 1 §5 and Guide 6 §4.*

EC (electrical conductivity) — the standard hydroponic measure of dissolved nutrient concentration, in mS/cm (millisiemens per centimeter) or µS/cm. Each crop has a target EC by stage. *See Guide 4 Part 1 §1.3.*

Epsom salt / Magnesium sulfate — *MgSO₄·7H₂O*. The third part of the *Masterblend* three-part program; supplies magnesium and sulfur. Cochise's Sulphur Springs Valley has natural epsomite deposits — a free local source. *See Guide 4 Part 1 and Part 2.*

Ficus carica — the common fig. One of the three Dragoons classic fruit trees (with pomegranate and jujube). *See Guide 9 §4.*

Florida weave — a tomato-training method using horizontal strings between stakes to support indeterminates. Standard for hydroponic tomatoes in bato buckets. *See Guide 7 §3.*

Foliar spray — a dilute nutrient solution applied directly to leaves with a sprayer. Used for boron, calcium, and iron corrections that bypass root uptake. *See Guide 4 Part 1 and Guide 6 §2.6.*

Hollow stem — a broccoli and cauliflower disorder where the central stem develops a hollow corky cavity. A boron-deficiency disorder; foliar borax spray at heading prevents it. *See Guide 6 §2.6.*

IPM (integrated pest management) — the approach of layered, mostly non-chemical pest controls: prevention, scouting, biological controls, and targeted intervention only when thresholds warrant. *See Guide 6 §6, Guide 7 §11, Guide 2 §8.*

Kratky method — a passive hydroponic technique with no pumps or aerators; roots split between a stagnant nutrient reservoir and an air gap. Suited to leafy crops; the simplest possible setup. *See Guide 1 §5.*

Masterblend 4-18-38 — the proprietary three-part hydroponic fertilizer recipe (a blend of macronutrients and micronutrients) combined with calcium nitrate and Epsom salt. The canonical purchased-salts approach in this library. *See Guide 4 Part 1.*

Monsoon — the summer rainfall regime in southeastern Arizona, typically late June through September. The Dragoons receive 8-12 inches in the monsoon and 4-6 inches the rest of the year. *See Guide 1 §2.*

NFT (nutrient film technique) — hydroponic technique where a thin stream of nutrient solution flows continuously across the roots in sloped troughs. Excellent for lettuce, basil, herbs. *See Guide 6 §4 and Guide 8 §6.*

Open-vase pruning — the standard pruning shape for stone fruits (peach, plum, apricot, almond): an open center with 3-4 main scaffold branches. *See Guide 9 §6.*

Peach leaf curl — a fungal disease (*Taphrina deformans*) of stone fruits that distorts and discolors emerging leaves in spring. Controlled by dormant copper spray in January. *See Guide 9 §11.*

PPFD (photosynthetic photon flux density) — instantaneous light-flux measurement, in $\mu\text{mol}/\text{m}^2/\text{s}$. Crop-specific targets range from 200 (lettuce) to 1000 (fruiting tomato). *See Guide 4 Part 4.*

ppm (parts per million) — concentration unit, equivalent to mg/L in water. Used for TDS, alkalinity, and individual nutrient concentrations.

Pierce's disease — a bacterial disease of grapes vectored by glassy-winged sharpshooter; major threat to vineyards in lower-elevation Cochise. *See Guide 5 §1.*

Powdery mildew — a fungal foliar disease showing as white powder on leaves; arrives in late July with monsoon humidity. Affects cucurbits, grapes, brassicas. *See Guide 5 §10, Guide 7 §5.*

Pythium — a water-mold pathogen (*Pythium spp.*) that causes root rot in hydroponic systems running above $\sim 72^\circ\text{F}$. Prevention is keeping the reservoir cool. *See Guide 2*

§6.2 and Guide 3 §6.

Punica granatum — the pomegranate. Second of the three Dragoons classic fruit trees. Practically maintenance-free here. *See Guide 9 §4.*

Reservoir — the holding tank in a hydroponic system where the nutrient solution lives between feed cycles. Capacity, temperature, and oxygenation are the three management parameters. *See Guide 3 §6.*

Rootstock / Scion — fruit-tree propagation pair. The rootstock controls vigor, disease resistance, and soil tolerance; the scion is the variety whose fruit you want. Joined by grafting. *See Guide 9 §3.3.*

Runoff (leachate) — the nutrient solution that drains out the bottom of a bato bucket after each feed cycle. Reading runoff EC and pH is the diagnostic tool for the root zone. *See Guide 3 §6.*

SHU (Scoville Heat Units) — the standard scale for chili heat, 0 (bell pepper) to 2,200,000 (Carolina Reaper). *See Guide 2 §2.*

Slip propagation — the technique for starting sweet potatoes from sprouts (“slips”) grown off a stored tuber, then separated and planted. *See Guide 7 §10.*

Solanaceae / Solanums — the nightshade family, including tomatoes, peppers, eggplant, potatoes, tobacco. Share pests (hornworm, psyllid) and disease vulnerabilities (tobacco mosaic virus). *See Guide 2 and Guide 7.*

Sonoita AVA / Willcox AVA — the two American Viticultural Areas in Cochise County recognized for wine grape production. Both relevant to Dragoons viticulture. *See Guide 5 §1.*

Squash vine borer — a clearwing moth larva that bores into squash stems in mid-summer, killing plants. Prevention: aluminum foil wrap at the lower stem. *See Guide 7 §6.*

Tepary bean (Phaseolus acutifolius) — indigenous Sonoran Desert bean, the most drought-tolerant cultivated legume. Brown and white forms. Cultural and culinary depth in Cochise. *See Guide 7 §8.*

Tipburn — brassica disorder where leaf margins die back; calcium delivery failure during rapid leaf expansion. Common in cabbage and brussels sprouts in cool overcast weather. *See Guide 6 §2.6.*

TA (titratable acidity) — total acid content of a juice, in g/L tartaric acid equivalent; one of the harvest-timing parameters for wine grapes (target 6–9 g/L). *See Guide 5 §11.*

TDS (total dissolved solids) — the catch-all measure of dissolved mineral content in water, in ppm. Cochise wells typically run 250–600 ppm TDS before treatment.

See Guide 3 §4.

VPD (vapor pressure deficit) — the difference between current and saturation vapor pressure, in kPa. Drives plant transpiration. Each growth stage has a target VPD. *See Guide 4 Part 4.*

VSP (vertical shoot positioning) — the standard trellis system for wine grapes: a single fruiting wire with vertical shoots trained up through catch wires. *See Guide 5 §5.*

Vitis vinifera — the European wine grape. Dominant species for quality wine in Cochise vineyards. *See Guide 5 §3.*

Ziziphus jujuba — the jujube or Chinese date. Third of the three Dragoons classic fruit trees; minimal-maintenance once established. *See Guide 9 §4.*

Variety Index

Every named variety in the library, with a one-line note and a pointer to the guide that covers it. Use this when you're trying to remember "where did I read about that one?"

Peppers (*Capsicum* spp.) — Guide 2

Variety	Notes	Where
Anaheim / Hatch	<i>C. annuum</i> ; mild New Mexico-type, thrives at elevation	Guide 2 §2
Bell Pepper	<i>C. annuum</i> ; sweet, plant for fall to dodge summer blossom drop	Guide 2 §2
Cayenne	<i>C. annuum</i> ; hot, productive, easy to dry	Guide 2 §2, §7
Chiltepin	<i>C. annuum</i> var. <i>glabriusculum</i> ; wild native of the Dragoons	Guide 2 §1, §2
Ghost / Bhut Jolokia	<i>C. chinense</i> ; superhot, lower elevations only	Guide 2 §2
Habanero	<i>C. chinense</i> ; very hot, fruity; needs heat	Guide 2 §2
Jalapeño	<i>C. annuum</i> ; the workhorse; Mucho Nacho, Early Jalapeño	Guide 2 §2, §7
Manzano	<i>C. pubescens</i> ; cool-night specialist	Guide 2 §2, §3
Poblano / Ancho	<i>C. annuum</i> ; mild, thick-walled, classic fall crop	Guide 2 §2, §7
Rocoto	<i>C. pubescens</i> ; cool-highland species; needs Dragoon cool nights	Guide 2 §3, §7
Scotch Bonnet	<i>C. chinense</i> ; Caribbean cousin of habanero	Guide 2 §2
Serrano	<i>C. annuum</i> ; hot, productive, container-friendly	Guide 2 §2
Tabasco	<i>C. frutescens</i> ; classic hot sauce pepper	Guide 2 §2

Tomatoes — Guide 7

Variety	Notes	Where
Black Krim	Russian heirloom; deep purple shoulders; works at elevation	Guide 7 §3
Cherokee Purple	Heirloom slicer; tolerates Dragoon dry heat	Guide 7 §3
Heatmaster	F1 hybrid bred for blossom set in heat	Guide 7 §3
Juliet	F1 grape/saladette; productive, crack-resistant	Guide 7 §3
Phoenix	F1 heat-tolerant slicer	Guide 7 §3
Sun Gold	F1 orange cherry; gold-standard flavor in dry heat	Guide 7 §3

Eggplant — Guide 7

Variety	Notes	Where
Black Beauty	Italian, classic open-pollinated	Guide 7 §4
Orient Express	Asian long type; less bitter, fast	Guide 7 §4
Ping Tung Long	Taiwanese long type; heat tolerant	Guide 7 §4
Rosa Bianca	Italian; rounded pink-and-white; mild	Guide 7 §4
Striped Toga	African; small striped	Guide 7 §4

Cucurbits (cucumbers, squash, melons) — Guide 7

Variety	Notes	Where
Black Beauty zucchini	Open-pollinated standard	Guide 7 §6
Boston Pickling cucumber	High-yielding pickler	Guide 7 §5
Calypso F1 cucumber	Pickling, compact, heat tolerant	Guide 7 §5
Charentais melon	French heirloom, exceptional in dry heat	Guide 7 §7
Costata Romanesco zucchini	Italian ribbed; holds quality oversized	Guide 7 §6

Variety	Notes	Where
Crimson Sweet watermelon	Reliable, large fruit	Guide 7 \$7
Hale's Best Jumbo cantaloupe	Southwest standard	Guide 7 \$7
Marketmore 76 cucumber	American slicer for spring	Guide 7 \$5
Sugar Baby watermelon	Small icebox type, trellis-friendly	Guide 7 \$7
Suyo Long cucumber	Asian/Burpless, never bitter, heat champion	Guide 7 \$5
Tasty Jade cucumber	Asian/Burpless, productive in heat	Guide 7 \$5

Beans — Guide 7

Variety	Notes	Where
Anasazi	Heritage Southwest dry bean	Guide 7 \$8
Blue Lake	American snap bean	Guide 7 \$8
Hopi yellow	Heritage dry bean	Guide 7 \$8
Kentucky Wonder	Pole snap, heavy producer	Guide 7 \$8
Pinto	Staple Southwestern dry bean	Guide 7 \$8
Provider	Early bush snap bean	Guide 7 \$8
Rattlesnake	Pole snap, striped pods, heat tolerant	Guide 7 \$8
Romano	Italian flat-pod snap	Guide 7 \$8
Tepary (brown / white)	<i>Phaseolus acutifolius</i> , native Sonoran legume	Guide 7 \$8.7

Sweet corn — Guide 7

Variety	Notes	Where
Bloody Butcher	Heirloom red, dent type	Guide 7 \$9
Glass Gem	Multicolored ornamental + flour	Guide 7 \$9
Hopi Blue	Heritage flour corn, regional	Guide 7 \$9
O'odham 60-day	Tohono O'odham heritage; monsoon-keyed	Guide 7 \$9

Variety	Notes	Where
Painted Mountain	Short-season, regionally adapted	Guide 7 §9

Sweet potatoes — Guide 7

Variety	Notes	Where
Beauregard	Standard orange-flesh variety	Guide 7 §10
Georgia Jet	Fast-maturing orange	Guide 7 §10
Hannah	Yellow-flesh, sweet, dry-textured	Guide 7 §10
Murasaki	Japanese purple-skinned, white flesh	Guide 7 §10

Brassicas — Guide 6

Variety	Notes	Where
Belstar F1 broccoli	Heat-tolerant F1, large heads	Guide 6 §2
Calabrese broccoli	Open-pollinated; abundant side shoots	Guide 6 §2
Cheddar F1 cauliflower	Orange, self-blanching	Guide 6 §2
De Cicco broccoli	Small heads, long picking window	Guide 6 §2
Diablo F1 brussels sprouts	Uniform sprouts, long holding	Guide 6 §2
Early Jersey Wakefield cabbage	Conical, very early	Guide 6 §2
Early White Vienna kohlrabi	Fast, mild	Guide 6 §2
Falstaff F1 brussels sprouts	Purple, decorative	Guide 6 §2
Graffiti F1 cauliflower	Purple, color holds	Guide 6 §2
Kossak F1 kohlrabi	Stores in-ground, no woodiness	Guide 6 §2
Lacinato (dinosaur) kale	Narrow strap leaves, frost-hardy	Guide 6 §2
Late Flat Dutch cabbage	Large storage type, 100-day	Guide 6 §2
Long Island Improved brussels sprouts	Open-pollinated standard	Guide 6 §2
Purple Vienna kohlrabi	Purple-skin form	Guide 6 §2
Red Russian kale	Purple-veined, tender, cold-hardy	Guide 6 §2
Savoy Ace F1 cabbage	Most cold-hardy; crinkled leaves	Guide 6 §2
Snowball Y cauliflower	Classic white, needs blanching	Guide 6 §2
Winterbor F1 kale	Curly green, productive	Guide 6 §2

Alliums — Guide 6

Variety	Notes	Where
American Flag leek	Winter-hardy	Guide 6 §3
Bandit leek	Late-season	Guide 6 §3
California Early garlic	Soft-neck, mild, large bulbs	Guide 6 §3
Conservor shallot	Bulb shallot	Guide 6 §3
French Red shallot	True French shallot	Guide 6 §3
German Red garlic	Hard-neck, strong, scape producer	Guide 6 §3
Inchelium Red garlic	Soft-neck, mellow, regionally bred	Guide 6 §3
King Richard leek	Fast, summer-fall	Guide 6 §3
Music garlic	Hard-neck, large cloves, excellent flavor	Guide 6 §3
Spanish Roja garlic	Hard-neck, intensely flavored	Guide 6 §3

Cool-season greens — Guide 6

Variety	Notes	Where
Arctic King lettuce	Overwintering, hardy	Guide 6 §4
Astro arugula	Bolt-resistant, mild	Guide 6 §4
Bloomsdale spinach	Savoyed, cold-hardy	Guide 6 §4
Mâche (corn salad)	Most cold-hardy salad green	Guide 6 §4
Mizuna mustard	Japanese feathery, mild	Guide 6 §4
Red Giant mustard	Red, spicy	Guide 6 §4
Rocket arugula	Sharp, fast	Guide 6 §4
Rouge d'Hiver lettuce	French overwintering romaine	Guide 6 §4
Space spinach	Heat-tolerant	Guide 6 §4
Tyee spinach	Savoyed, bolt-resistant	Guide 6 §4
Winter Density lettuce	Cold-hardy semi-cos	Guide 6 §4

Root crops — Guide 6

Variety	Notes	Where
Bolero F1 carrot	Nantes type, stores	Guide 6 §5
Cherry Belle radish	Round red, fast	Guide 6 §5
Chioggia beet	Italian striped (ringed) heirloom	Guide 6 §5

Variety	Notes	Where
Cylindra beet	Long cylindrical for slicing	Guide 6 §5
Daikon Long White radish	Long Asian radish	Guide 6 §5
Danvers carrot	Heritage, stocky	Guide 6 §5
Detroit Dark Red beet	Standard storage	Guide 6 §5
French Breakfast radish	Long red-and-white	Guide 6 §5
Hakurei F1 turnip	Sweet white salad turnip	Guide 6 §5
Hollow Crown parsnip	Long-season standard	Guide 6 §5
Nantes carrot	Sweet, short	Guide 6 §5
Purple Top White Globe turnip	Old standard	Guide 6 §5
Scarlet Nantes carrot	Bright red-orange	Guide 6 §5
Tokyo Cross turnip	Fast, salad-type	Guide 6 §5
Watermelon radish	Pink-fleshed daikon	Guide 6 §5

Grapes — Guide 5

Variety	Notes	Where
Cabernet Sauvignon	Proven at Sonoita Vineyards	Guide 5 §3
Mourvèdre (Monastrell)	Late-ripening, heat tolerant	Guide 5 §3
Petit Verdot	Sturdy, rot-resistant	Guide 5 §3
Sangiovese	High-acid Italian, suits Sonoita and Willcox	Guide 5 §3
Tannat	Thick-skinned, structured	Guide 5 §3

(Additional white and red varieties named in Guide 5 §3.)

Orchard — Guide 9

Variety	Notes	Where
All-In-One almond	Self-fertile, semi-dwarf	Guide 9 §6
Anna apple	Low-chill (200 hr); pairs with Dorsett or Pink Lady	Guide 9 §7
Babcock peach	White-fleshed, low-chill	Guide 9 §6
Bartlett pear	European; lower-elevation	Guide 9 §7
Black Mission fig	Purple, classic	Guide 9 §4
Brown Turkey fig	Large brown, two crops	Guide 9 §4

Variety	Notes	Where
Celeste fig	Small sweet, hardy	Guide 9 §4
Comice pear	European, late dessert	Guide 9 §7
Desert King fig	Green, breba crop	Guide 9 §4
Dorsett Golden apple	Low-chill; pollinator for Anna	Guide 9 §7
Elberta peach	Yellow freestone classic	Guide 9 §6
Eversweet pomegranate	Pink, sweet, soft seeds	Guide 9 §4
Florida Prince peach	Very low chill (150 hr)	Guide 9 §6
Goldcot apricot	Late-blooming, frost-tolerant	Guide 9 §6
Granny Smith apple	Needs higher chill; Dragoon-borderline	Guide 9 §7
Hall's Hardy almond	Cold-tolerant	Guide 9 §6
Harglow apricot	Late-blooming, disease-resistant	Guide 9 §6
Honey Jar jujube	Small sweet, high yields	Guide 9 §4
Lang jujube	Large fruit, drying type	Guide 9 §4
Li jujube	Large fresh-eating type	Guide 9 §4
Meyer lemon	Container citrus, mild winter only	Guide 9 §8
Methley plum	Japanese, self-fertile	Guide 9 §6
Moorpark apricot	Classic dessert variety	Guide 9 §6
Parfianka pomegranate	High-quality, sweet-tart	Guide 9 §4
Persian lime	Container citrus	Guide 9 §8
Pink Lady apple	Low-chill late apple	Guide 9 §7
Red Haven peach	Yellow freestone, productive	Guide 9 §6
Royal Blenheim apricot	Classic California variety	Guide 9 §6
Salavatski pomegranate	Cold-hardy Russian variety	Guide 9 §4
Santa Rosa plum	Self-fertile Japanese plum	Guide 9 §6
Sherwood jujube	Late-season jujube	Guide 9 §4
Shinseiki Asian pear	Better than European pears at elevation	Guide 9 §7
Stanley plum	European prune-type	Guide 9 §6
Wonderful pomegranate	Commercial standard	Guide 9 §4

Herbs — Guide 8

Variety	Notes	Where
Arp rosemary	Most cold-hardy	Guide 8 §4
Berggarten sage	Broad-leaved culinary	Guide 8 §4
Bouquet dill	Leaf-and-seed dual-purpose	Guide 8 §3
Calypso cilantro	Slow-bolt variety	Guide 8 §3
Common thyme (<i>T. vulgaris</i>)	Culinary thyme	Guide 8 §4
Fernleaf dill	Compact, container-friendly	Guide 8 §3
Genovese basil	Classic Italian basil	Guide 8 §3
Greek oregano (<i>O. vulgare</i> subsp. <i>hirtum</i>)	True culinary oregano	Guide 8 §4
Italian flat-leaf parsley	Culinary standard	Guide 8 §3
Italian Large Leaf basil	Productive Mediterranean	Guide 8 §3
Lemon basil	Fragrant, fast	Guide 8 §3
Lemon thyme (<i>T. citriodorus</i>)	Citrus-scented form	Guide 8 §4
Mint (<i>Mentha</i> spp.)	Invasive; always in containers	Guide 8 §5
Purple Opal basil	Purple, ornamental and culinary	Guide 8 §3
Purple sage	Purple form, slightly milder	Guide 8 §4
Salem rosemary	Culinary, upright	Guide 8 §4
Slow Bolt cilantro	For warmer planting windows	Guide 8 §3
Thai basil	Anise-flavored, holds in heat	Guide 8 §3
Tricolor sage	Variegated; ornamental	Guide 8 §4
Tuscan Blue rosemary	Large culinary variety	Guide 8 §4

Closing

The Dragoon Mountains are an exceptional place to grow food. The monsoon gives you soft water, the elevation gives you cool summers and a true winter, the local geology gives you nearly every element you need, and the long, clear fall gives you the single best growing window in the American Southwest. Match crops to seasons, treat the water, watch the meters, and pay attention to which guide answers which question.

This primer is deliberately thin. It is the map, not the terrain. When you want to build a system, brew a nutrient, ferment an acid, prune a vine, or understand why broccoli buttons when transplanted late, step sideways into the specialist guide that covers it. The library is designed that way — shallow here, deep where it matters.

Plant for fall. Collect the monsoon. Treat the water. The rest follows.