

## DEVELOPING A SPECIES PALETTE

Develop a species palette for your polyculture. From the longer list of species you are considering for the whole site, select those that are **a)** suited your site conditions and **b)** meet your goals as far as size, uses, and functions. Here is an example:

Plants 15 meters+ tall									
Latin Name	Common Name	Clump vs. Run	Light	Edible Uses	Nitrogen Fixer	Bene-ficial Insects	Ground Cover	Native	Notes

Add more categories, like: plants 4-15, 2-4, 1-2, 0.5-1, and 0-0.5 meters tall, as well as one for vines. See the next page for an example of a cold humid climate species palette of the Northeastern USA.

Each region should develop its own list of useful species, including the often-overlooked native ones. One might also add or replace columns – for example, in arid regions, moisture is more the variable than light, or you could add many columns for complex sites. For teaching purposes a single site variable (light, moisture, etc.) keeps things simple and teaches the process. People can always add complexity later once they've got the basics down.

In this exercise 3-6 sample species in each height category will work for people. In each height category there will be species for sun and shade, some edibles, some nitrogen fixers, and some native and some non-native species. Of course if you are designing for your own use, only include the species you want – though it may help you identify some gaps that need filling, like a nitrogen fixing groundcover for shade, for example. When using this processes on your own projects you can add columns like chop and drop mulch, firewood species, honey source, or whatever else you like.

DEVELOPING A SPECIES PALETTE (cont'd)

Plants 15 meters+ tall							
Common Name	Clump vs. Run	Light	Edible Uses	Nitrogen Fixer	Bene-ficial Insects	Ground Cover	Native
<i>Robinia pseudoacacia</i> Black locust	Run	Sun	Flowers	Yes			Yes
<i>Tilia cordata</i> Littleleaf linden	Clump	Sun to shade	Leaves, flowers		Yes		
<i>Diospyros virginiana</i> American persimmon	Run	Sun	Fruit				Yes
<i>Alnus glutinosa</i> Black alder	Clump	Sun		Yes			
Plants 4-15 meters tall							
Common Name	Clump vs. Run	Light	Edible Uses	Nitrogen Fixer	Bene-ficial Insects	Ground Cover	Native
<i>Asimina triloba</i> Pawpaw	Run	Sun to part	Fruit				Yes
<i>Pyrus</i> spp. Asian pear	Clump	Sun	Fruit				
<i>Castanea mollissima</i> Chinese chestnut	Clump	Sun	Nuts				
<i>Albizia julibrissin</i> Silk tree mimosa	Clump	Sun		Yes			
Plants 2-4 meters tall							
Common Name	Clump vs. Run	Light	Edible Uses	Nitrogen Fixer	Bene-ficial Insects	Ground Cover	Native
<i>Amorpha fruticosa</i> False indigo	Clump	Sun		Yes	Yes		Yes
<i>Corylus hybrids</i> Hazelnut	Clump	Sun to part	Nuts				
<i>Prunus persica</i> Peach	Clump	Sun	Fruit				
<i>Arundinaria gigantea</i> Native bamboo	Run	Sun to part	Shoots				Yes
Plants 1-2 meters tall							
Common Name	Clump vs. Run	Light	Edible Uses	Nitrogen Fixer	Bene-ficial Insects	Ground Cover	Native
<i>Ribes rubrum</i> Red currant	Clump	Sun to shade	Fruit				
<i>Lycium chinense</i> Edible-leaf goji	Run	Sun to part	Fruit, leaves				
<i>Dystaenia takesimiana</i> Korean pig plant	Clump	Sun to part	Leaves, stems		Yes		
<i>Ribes aureum</i> Golden currant	Run	Sun to part	Fruit				Yes
<i>Calycanthus floridus</i> Carolina allspice	Clump	Sun to shade	Spicy bark				Yes

Plants 0.5-1 meters tall							
Common Name	Clump vs. Run	Light	Edible Uses	Nitrogen Fixer	Bene-ficial Insects	Ground Cover	Native
<i>Ribes uva-crispa</i> Gooseberry	Run	Sun to part	Fruit				
<i>Matteuccia struthiopteris</i> Ostrich fern	Run	Sun to shade	Shoots			Yes	Yes
<i>Cryptotaenia canadensis</i> honewort	Clump	Part to shade	Leaves		Yes		Yes
<i>Asclepias syriaca</i> Common milkweed	Run	Sun to part	Shoots, leaves, flower buds, flowers, pods		Yes		Yes
<i>Amelanchier stolonifera</i> Running serviceberry	Run	Sun to part	Fruit				Yes
Plants 0-0.5 meters tall							
Common Name	Clump vs. Run	Light	Edible Uses	Nitrogen Fixer	Bene-ficial Insects	Ground Cover	Native
<i>Fragaria x anasana</i> Strawberry	Run	Sun	Fruit			Yes	
<i>Chrysogonum virginianum</i> Green and gold	Run	Sun to part			Yes	Yes	Yes
<i>Waldsteinia fragaroides</i> Barren strawberry	Run	Sun to shade			Yes	Yes	Yes
<i>Trifolium repens</i> White clover	Run	Sun to part		Yes	Yes	Yes	
<i>Allium tricoccum</i> Ramps	Clump	Part to shade	Leaves, bulbs				Yes
Vines							
<i>Dioscorea polystachya</i> Chinese yam	Clump	Sun	Tuber, aerial tubers				
<i>Apios americana</i> Groundnut	Run	Sun to part	Tubers	Yes			Yes
<i>Habitia tamnoides</i> Caucasia spinach	Clump	Part	Shoots, leaves				
<i>Vitis labrusca</i> Fox grape	Clump	Sun	Fruit				Yes

## **THE GUIDELINES**

These are broken up by theme. They are not the only ones for certain, and there are surely important exceptions to all of them.

### **SPECIES SELECTION**

- Select species that:
  - Meet your goals for the patch
  - Are tolerant of the conditions there
- Use 2-7 species per polyculture (keep it simple)
- Fill key uses and functions first (start with your most important goals, like fruit production or livestock fodder)
- Select species with similar management needs (like the same level of irrigation or number of visits per week; this is in line with the permaculture zone system)
- Start with the tallest species and work down

### **SPACING AND PATTERNING GUIDELINES**

- Determine the mature height and weight of each species (how big will they get when they grow up under your planned pruning and/or coppicing regime, if any)
- Set spacing between clumping species (those that will not spread vegetatively)
  - Usually such that the edges of their crowns are just touching, or ideally quite a bit wider
  - This varies quite a bit with climate – in areas with intense sun (lowland tropics, high deserts) spacing can be much closer. On the other hand spacing should generally be wider in more arid environments.
- Plant runners (aggressively spreading species) that are shorter than adjacent clumpers (to make sure runners will not smother clumpers)
- Plant shade lovers under taller plants
- Keep pollination needs in mind
- Plant the tallest plants to the north in the northern hemisphere, to the south in the southern hemisphere.

## **FUNCTIONAL SPECIES PATTERNING**

- Plant soil builders like nitrogen fixers and mulch plants in every polyculture or patch where they will be needed (so as not to have to cut and carry the material to another area)
- If all nitrogen is to come from nitrogen-fixing plants, remember they need 25-40% of the overstory or 50-80% of the understory
- Nitrogen fixers and beneficial insect plants don't need to be in harvest reach of pathways
- Provide complete ground cover
- Evergreen, shade-tolerant groundcovers are excellent
- Running groundcovers help fill in empty spaces
- Try to include some beneficial insect species in each polyculture (though the insects can fly 15-30 meters, so they don't need to be right next to the crops they are planting, and could be clustered in islands or strips)

## **SEQUENCING ISSUES**

- Is there a niche for sun-loving, short-term crops in the early years (annual vegetables, strawberries, papayas, pigeon peas, nitrogen-fixing cover crops, etc.)
- Wait to plant shade lovers until there is enough shade (you'd be surprised how many shade plants I've killed through impatience)
- For living trellises, wait to plant climbers until the trellis tree is well established (again, I've killed a lot of plants this way even though I know better)

## **MANAGEMENT ISSUES**

- Consider livestock integration requirements if necessary (see my article on livestock in the food forest for more)
- Choose species of similar vigor (so they don't smother each other)
- Match species to patch management style
- Choose species with similar irrigation and fertility requirements
- Will any aggressive species require control (e.g., rhizome barrier?)

## **HARVEST ISSUES**

- Make sure to have access for harvest
- Will there be a need to pick up fruits and nuts from the understory? (If so, stinging or spiny understory species are undesirable; understory could be harvest-season mow or chop compatible; understory could be tarp-compatible)
- Don't mix toxic species with similar-looking edible, especially in the same layer (we did this with daffodils and garlic chives, oops!)
- Consider adding more shade-loving edibles (mushrooms, shade fruits and vegetables, coffee, cacao, vanilla, etc.)
- Make sure root crop harvest does not damage roots of any sensitive species

## **FINAL TESTING**

- Does the polyculture meet your goals? (products, functions, architecture, management style)
- Are conditions ideal for the "keystone" (most critical) species from your goals?
- Is each species adapted to its niche?
- How will conditions change when the polyculture is mature? What changes will this produce?

## **ESTABLISHMENT**

- What steps must be taken in preparation for planting?