Spawn production, the spawn run, and fruiting

These parameters can have a huge effect on bioefficiency and quality

What is spawn? Why do we use spawn?

- **Spawn is the inoculum that begins the process of fungal colonization of the substrate you use for fruiting**
- **Many types of materials can be used to inoculate your substrate**
- **Using spawn as inoculum is a way to increase fungal biomass and prime/stimulate the fungus for rapid growth and rapid fruiting.**

Should I make spawn or should on buy spawn?

- **The importance of high quality spawn cannot be overstated.**
- **Poor quality spawn will result in slow colonization and higher contamination rates. It may also introduce contamination.**
- **Poor quality spawn will result in reduced colonization and reduced bioefficiency**
- **Poor quality spawn may introduce variation in your production system through genetic drift and mutations**

Solid spawn vs liquid spawn

- A big decision among vertically integrated mushroom operations
- By far, most use is solid spawn
- Advantages of solid is its easier to make, let prone to contamination
- Advantages of liquid is its faster to make and is faster in colonizing grain. Easy to make large quantities
- Big disadvantage of liquid is its easier to have serious contamination

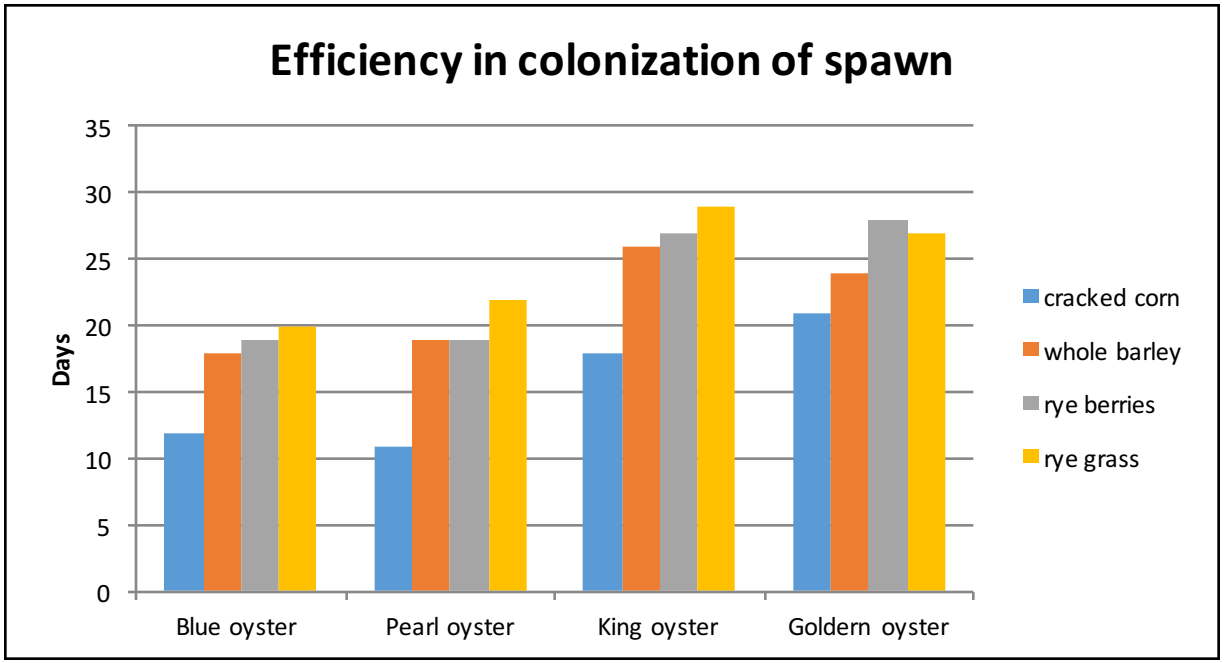
Different grains have different nutritional properties

Most growers prefer rye as the grain of choice

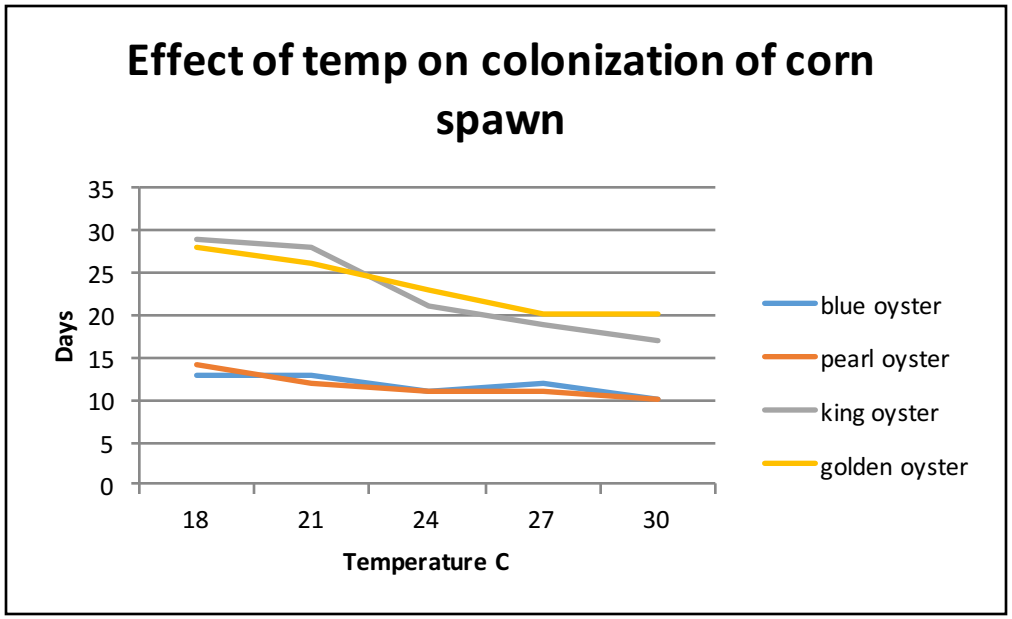
Rye grass Rye berry

Millet is often mixed in

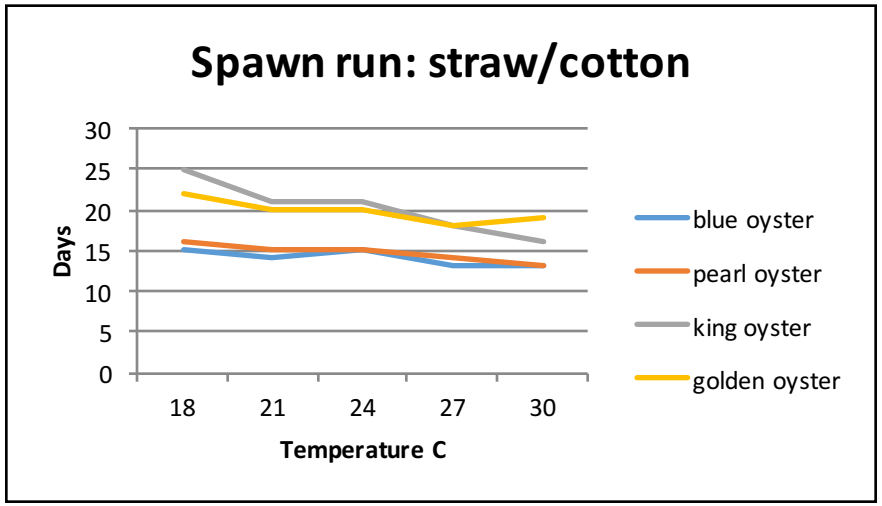
Impact of substrate on spawn production

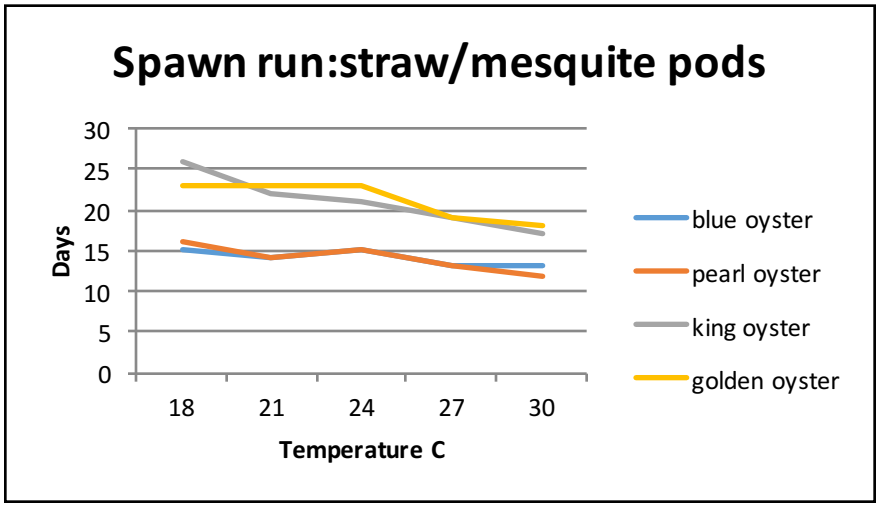


Impact of temperature on spawn production

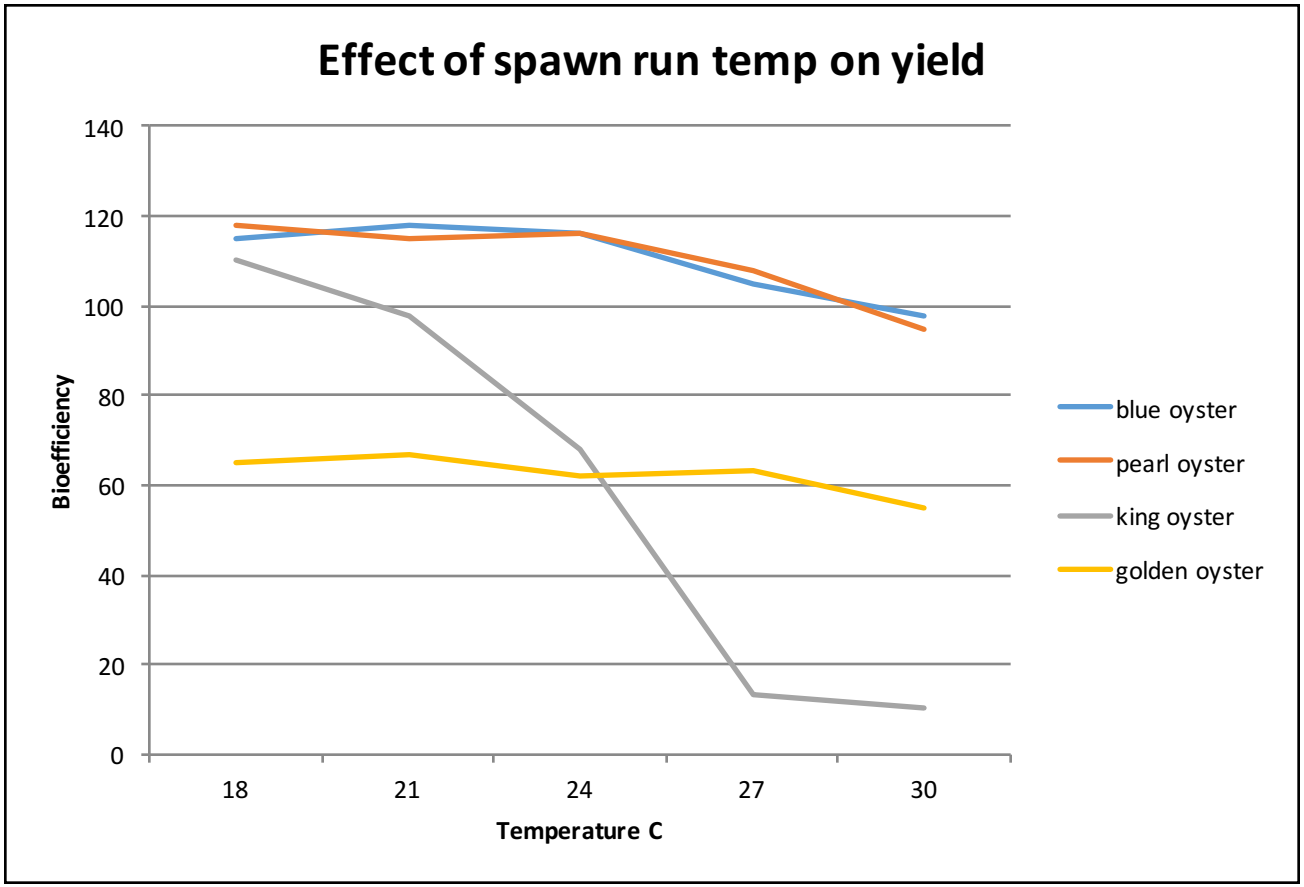


Impact of temperature on spawn run





Impact of spawn run temperature on bioefficiency: The lesson of the kings



Other Spawn Amendments

Alkalinizing Agents

- Wood Ash
- Hydrated Lime
- Chalk
- Oyster Shell
- Limestone
- Ground Limestone
- Limestone Grit

Other Amendments (N and Texture)

- Gypsum
- Worm Castings (10% - 15%)
- Spent Malt
- Vermiculite
- Coconut Coir

The question is: should the spawn be amended or the substrate??

Grain spawn should always be sterilized!

Or not……

Some local growers are creative in making use of what is available

Mushroom pieces after harvest

Spent fruiting bags

The ratio between spawn and substrate is an important consideration.

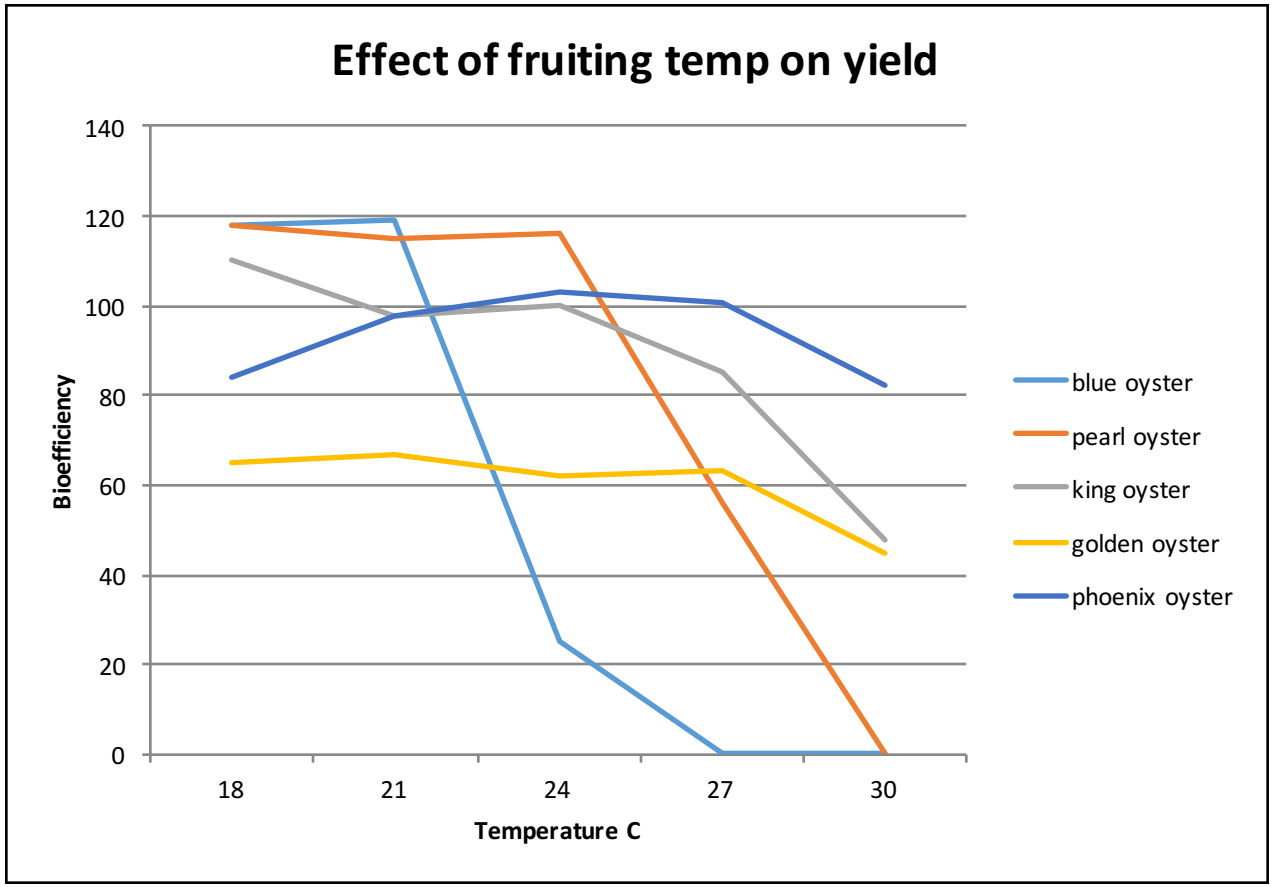
- Two factors to consider: the speed of colonization and the cost
- Higher spawning rates result in faster colonization
- Faster colonization results in less contamination and less time to fruiting
- Commercial spawn is often used at a 3-7% rate: home spawn is often used at a 10-20% rate
- Excessive spawn amounts result in excessive thermogenesis; must be managed

Fruiting

What this process is all about!

- The four parameters: sCO2, temperature, humidity, lighting
- In hot areas, start with CO2 and balance everything after that
- But if relying on vaporative cooling, start with temperature, then H2O, then CO2
- In cool areas, start with temperature and balance everything after that

Impact of fruiting temperature on bioefficiency: The lesson of the blues



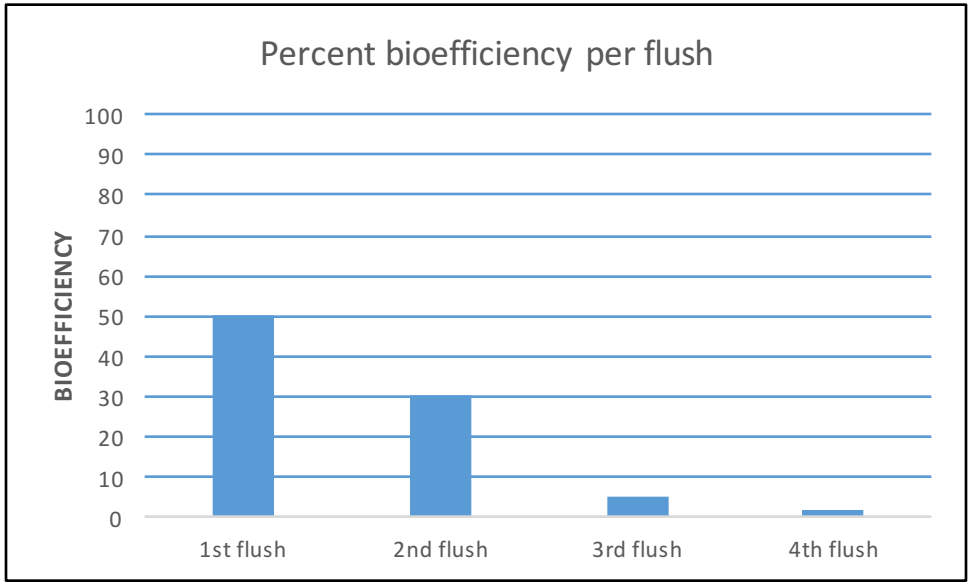
Other environmental effects on production

Water	95-100%	Pearl oyster mushrooms get soggy
	85-90%	Everything is fine
	<65%	Many small clusters abort
CO2	450-550 ppm	Everything is fine
	700-800 ppm	mushrooms begin to get “stemmy”
	900-1100 ppm	Mushrooms begin to get deformed
	> 1200 ppm	???

Lighting dim incandescent pearl oysters are pearly white
blue oysters are light gray
bright fluorescent pearl oyster are tan colored
blue oysters are deep blue, almost iridescent on the first flush

The flushes: the fruiting cycle

- Each flush occurs on a cycle; the mycelium “re-sets” between flushes
- The length of the cycle depends upon the species of mushroom
- A substrate bag will continue to flush until it runs out of nutrients or H2O
- The first flush always has the highest bioeffeciency. Why?



When to stop flushing? A number of considerations…..

- How much room do you have?
- Do you have other bags ready to fruit?
- Do you have plenty of ventilation?
- How contaminated are the flushed bags?

- A rule of thumb…do not keep old bags with new bags. Why??

Selection parameter for harvest

-when the mushroom is at maximum weight before spore drop

Just about perfect! Not too small, still slightly concave. As the mushroom gets closer to becoming convex, its shelf-life decreases and it threatens to drop spores.

These still have a little ways to go - they'll get bigger before they drop spores, maximizing bioefficiency!

Data acquisition and tracking BE

Summary

- Each species is unique in its biology and productivity
- The processes for each must be learned from beginning to end to make solid judgements in individual production programs
- As a general rule it is not good to mix species in a growing room, with some exceptions
- Its better to master species production one at a time, then add more species for a diversified mushroom production operation