MARKET GARDENING & AGROFORESTRY

Cultivating the Morel Mushroom

Probiotic Approach

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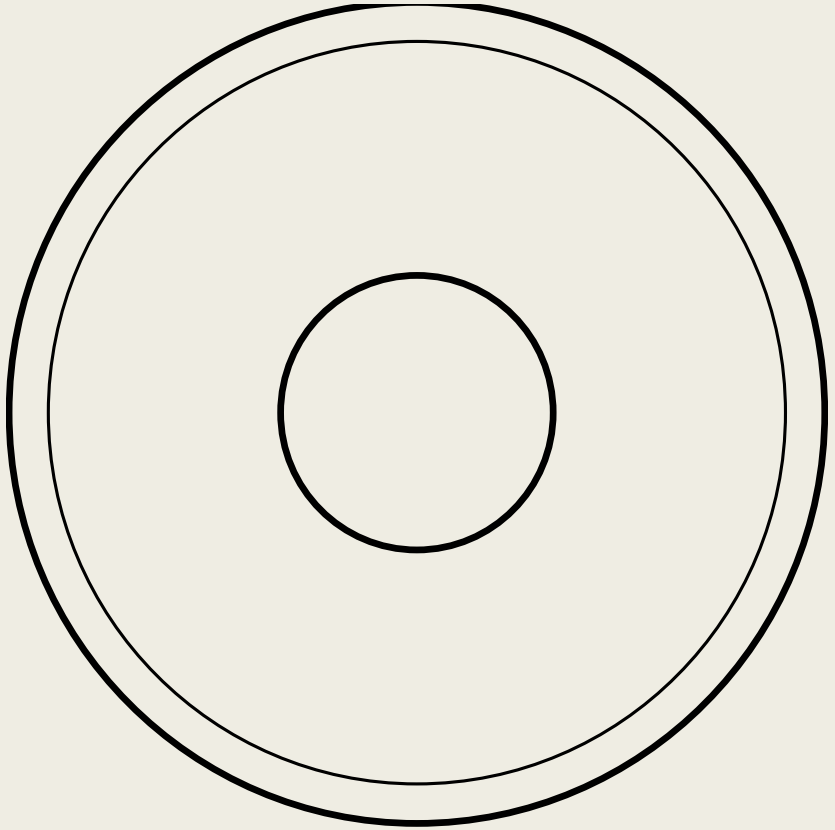


Preamble

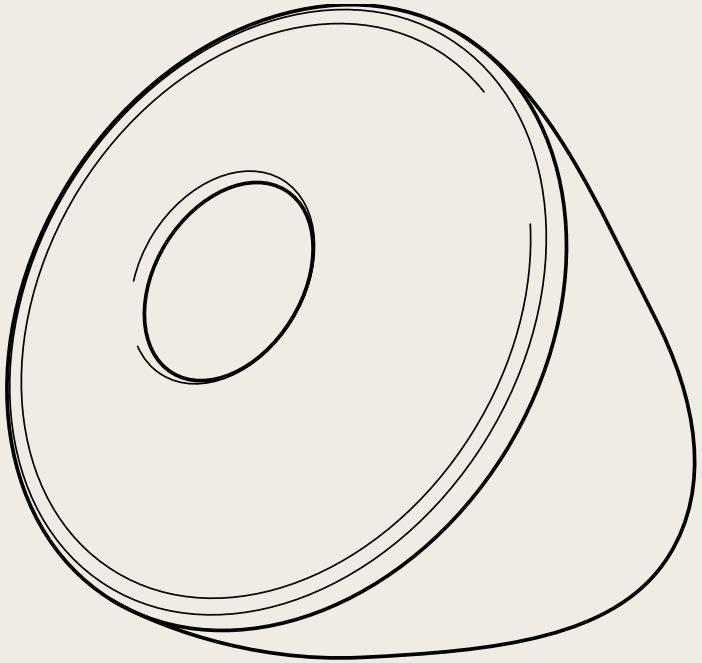
Discovered and patented in 1985 by Ronald D. Ower and Gary Mills, the demonstration of morel cultivation was applied by several operators around the world from 2015, upon expiration of the American patent protections.

This discovery, conditioned on the use of a saprophytic morel strain adapted to its biotope, characterizes the feasibility of morel cultivation.

The POD and Serre-Flex are patented devices that enable a probiotic approach to this cultivation.

“Since antiquity, terracotta amphorae have been used in Europe to cultivate mushrooms, such as the Poplar Pholiota”

- Jérôme Legros, Mycologist.

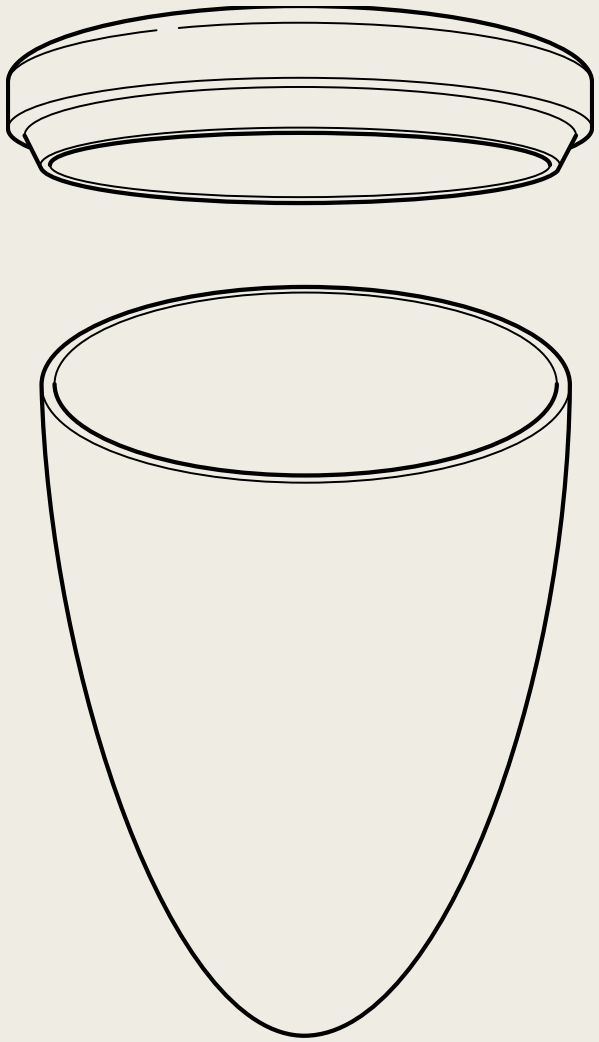


State of the Art of Morel Cultivation

The application of the Ronald D. Ower patent involves burying the spawn within the substrate for incubation. The innovative aspect of his discovery resides in the biological principle of separating a nutrient-rich medium (the morel mycelium on a cereal grain) from a nutrient-poor medium (the substrate, the soil).

Traditional sowing methods, sometimes called "broadcast sowing" or "sowing in rows or clusters," are now considered outdated. This method yields inconsistent results in the first year, and then fails completely, leaving the farmer in an unenviable position, facing soil depleted of the morel's symbiotic bacteria, which would have been consumed rapidly during the first year of cultivation. Indeed, traditional sowing persists in the soil out of season, continuing to deplete these bacteria. Moreover, sclerotia formed too deep in the soil are not utilized during fruiting. Early cultivators are well aware of the limitations of this technique and have devised precarious workarounds.

The POD device directs the morel mycelium to the surface, allowing the soil's bacterial life to flourish during and after cultivation, thus avoiding the pitfalls of traditional sowing. Also, the PODs, due to their terracotta composition, capture symbiotic bacteria such as Pseudomonas Putida, which nourishes the morel mycelium with lipids during its vernalization phase. The POD is a bacteria trap that will positively affect the yield, replicability, and organoleptic properties of the morels.



Key phases of cultivation using PODs

- Verification of the climate shelter and prerequisites
- Mycelium reception
- Soil preparation
- Conducting the sowing (inoculation)
- Propagation (incubation)
- Nourishment
- Sclerotia formation (vernalization)
- Triggering fruiting
- Harvest
- Off-season ground cover

Morel mycelium specifications

Sowing

- October to December
- Operate below 20°
- Store bags between 2° and 4°

Incubation

- Min 1.5 months
- 20° (October) to 13° (November)

Vernalization

- Min 1.5 months
- 13° (November) to 5° (December)

Harvest

- February to May
- 20° air
- 7 to 15° soil measured at 10cm depth

Sunlight

- Textile shade or net to be placed in full sun

Temperatures

- Min -8°
- Max +28°

measured under tunnel

Varieties

- Importuna
- Septentrionalis
- Sextelata
- Rufobrunnea

Equipment

- Shade ¾ woodland edge type
- Sprinkling, micro sprinkling, drip irrigation

Conditions conducive to cultivation

Before considering introducing your mycelium, it is necessary to ensure that the environment possesses certain qualities and meets specific conditions for cultivation. All soil types exhibiting these qualities are suitable for morel cultivation:

- Soil with a **pH KCl (mineral pH) adjusted to 8 is required**. Adjusting the soil with calcium carbonate (CaCO3, chalk – with less than 1% of magnesium) is possible when aiming to reduce acidity. A soil analysis will determine the necessary proportion of amendment. Warning: do not use slaked/quicklime or marine carbonate.
- Ensure the fungal properties of your target substrate: be aware of tannins or inhibitory substances that may be present in certain tree species (conifers, walnuts, etc.) or plants (sage, bay laurel, garlic, onions…), fresh wood chips, various fresh foliage, etc.
- **Access to fresh surface water (no chlorinated tap water, no hard water).**
- The absence of chemical inputs and agricultural treatments such as antifungicides. The morel mushroom works in symbiosis with other bacteria.
- Beware of deceptively good ideas, such as using rotten, contaminated apples.

Equipment Necessary for Cultivation

A climate-controlled shelter is necessary to successfully cultivate mushrooms like morels. The shelter is characterized by the use of a climate cover with several functions:

- **Protect your substrate from surface crusting** (settling and asphyxiation) caused by rain and irrigation,
- Reproduce the light atmosphere of a « **woodland edge » - ¾ of shade,**
- **Consolidate the humidity** (maximum protection against wind and drying out) while maintaining passive air renewal.

An irrigation system RainSystem or another sprinkling system.

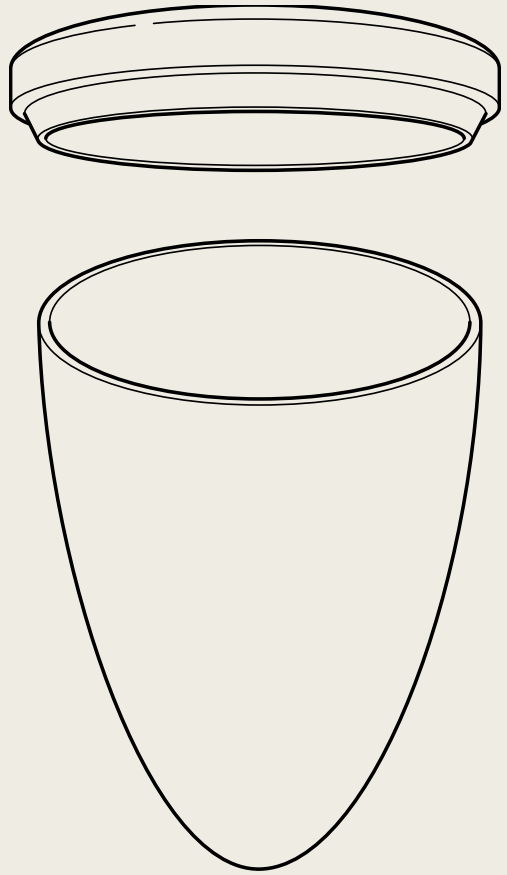
A **temperature and humidity monitor** like the **Weenat** will allow you to read data in real time as well as data that has been recorded throughout your cultivation. The tool determines the frequency and timing of irrigation.

A fruiting tarp will help you combat pathogens while protecting your morels from damage during the fruiting phase.

A patented ceramic device

The ceramic device, called POD, is an inoculum that enables morel sowing by encapsulating the mycelium in a ceramic container, providing it with a healthy, exclusive, and replicable environment to develop:

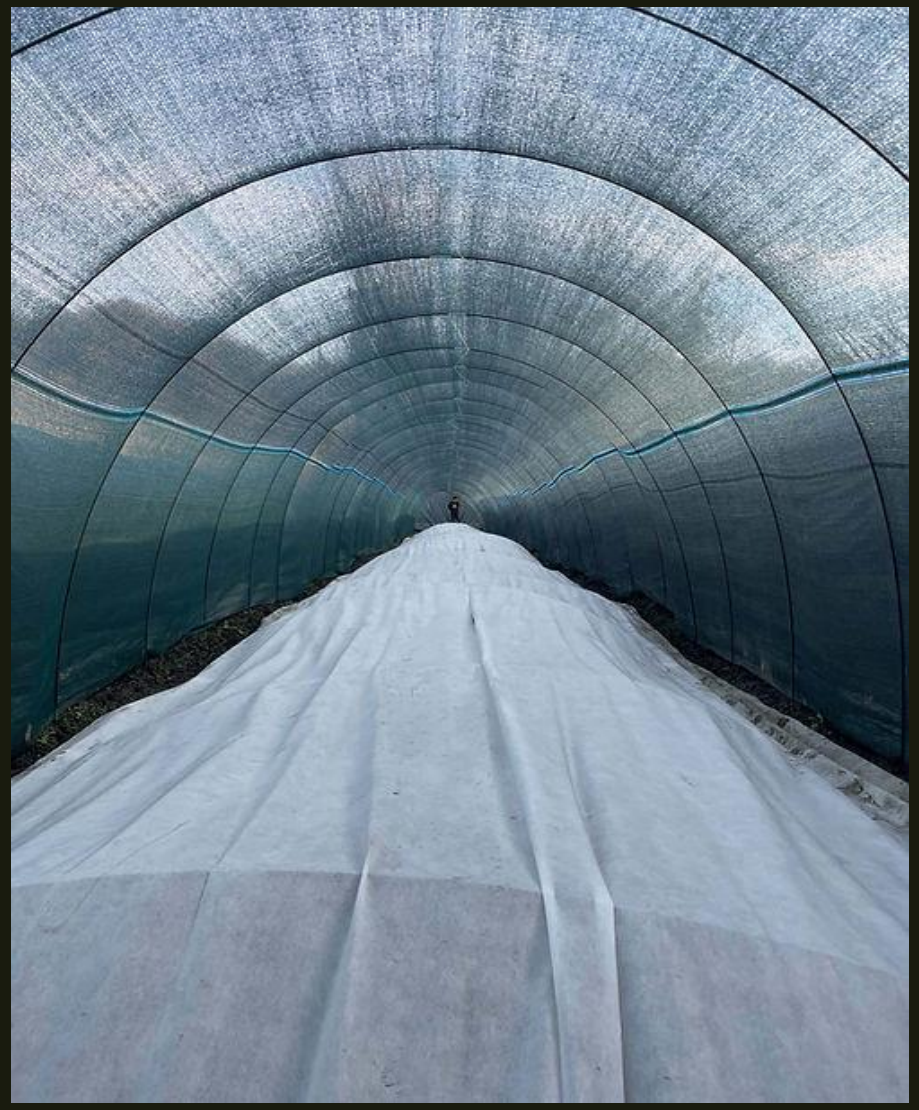
- ***Buried and encapsulated**, it will remain free from degradation or contamination and will benefit from favorable thermal conditions,*
- ***Directed**, the mycelium exits through the POD's operculum and connects to a nutritive source (endogenous and exogenous) with maximum success rate,*
- ***Made of terracotta**, the POD is a bacteria trap that encourages trophic symbiosis to occur for the benefit of the morel mycelium,*
- ***Reusable**, it allows the grower to reduce production costs and control inputs.*



These factors make it possible to consider morel cultivation through a strong mycelium network, enabling controllable and consistent yields.

There are two types of PODs: the **gardener POD, which is autonomous** and requires no nutrition, and the **POD Pro** designed for market gardeners and farmers that necessarily requires nutritional inputs. The POD Pro allows for use by the thousands on large plots as it does not require a pre-dug hole. It is also easier to insert and remove from the soil.

Installing a Serre-Flex

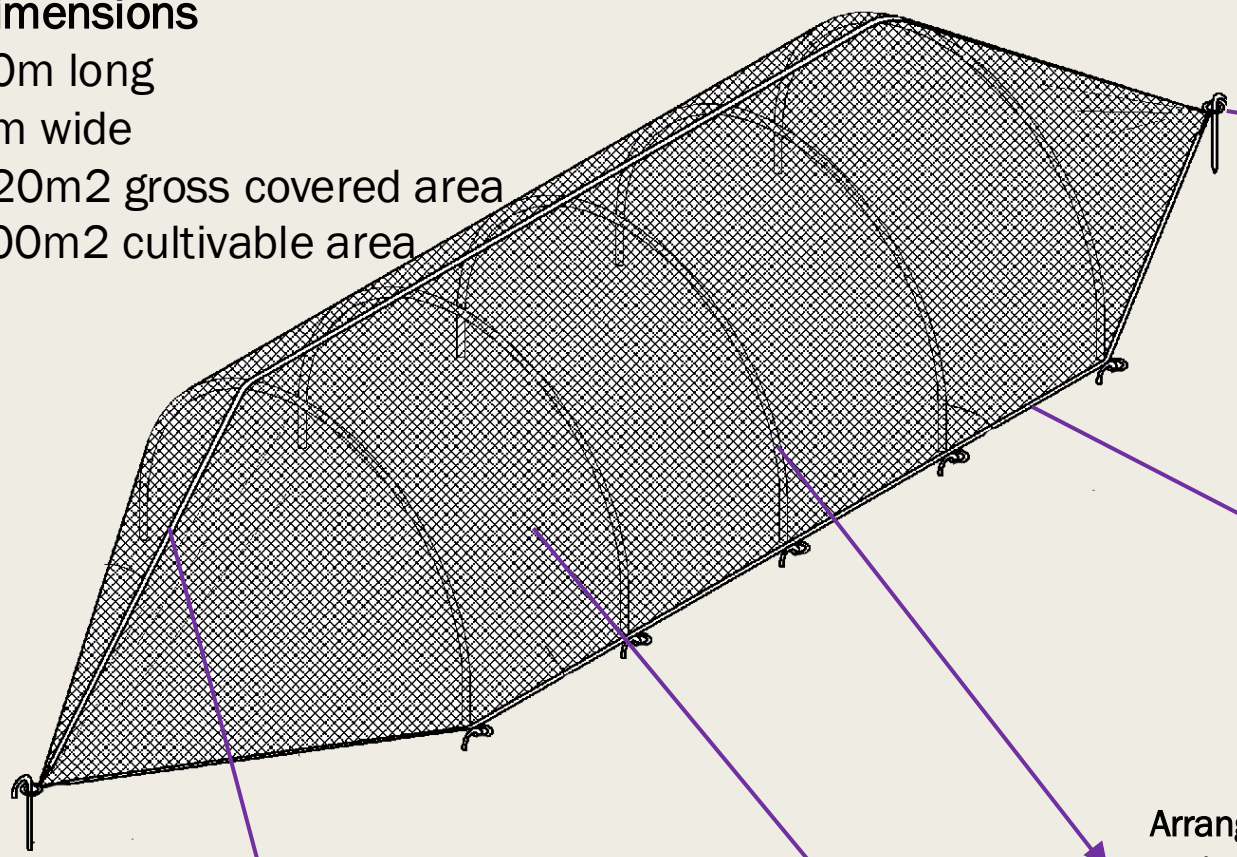


The Serre-Flex is a mushroom-specific climate shelter that allows you to create suitable cultivation conditions for different mushroom varieties. The Serre-Flex protects you from extreme weather conditions (temperatures, winds, etc.) and maximizes expected yields by providing better humidity control.

1. **Place your hoops** of 7 meters (4 fiberglass rods of 1.75m joined (glued with Sika) using 3 aluminum connectors) every 1m by pushing the ends 50cm into the ground. **Double the entrance and exit hoops of your greenhouse for better stability of the gables.**
2. Center **and screw your anchors** at a distance of 3 meters and facing the first and last hoop of your greenhouse.
3. **Interconnect each hoop using agricultural twine** (deltane) by making a clove hitch at each hoop connector.
4. **Connect your ridge line** to one of the anchors with a permanent knot, and the other end with a detachable knot (or carabiner).
5. **Unroll the 9m x 50m textile roll above your hoops**.
6. Gather each end of the textile using a Colson collar and secure everything to the anchors. **The Colson 9mm collar serves as a fuse**: if excessive tension is applied to your textile, the Colson collar will break and the greenhouse will collapse.
7. Finally, **place ballast bags** (or shovelfuls of soil) on the sides of your greenhouse to keep the climate textile taut.

Important: a Serre-Flex must be installed in dry weather.

Dimensions
40m long
3m wide
120m2 gross covered area
100m2 cultivable area



Center **and screw your anchors** at a distance of 3 meters facing the first and last hoop (doubled for the classic version, not for the + version) of your greenhouse. Gather each end of the textile using a Colson collar and secure everything to the anchors. **The Colson 9mm collar serves as a fuse**: if excessive tension is applied to your textile, the Colson collar will break and the greenhouse will collapse.

Place ballast bags (or shovelfuls of soil, etc.) on the sides of your greenhouse to keep the climate textile taut

Arrange your hoops of 7 meters (4 fiberglass rods of 1.75m joined and glued with Sika using 3 aluminum connectors) every 1.50m (or 1m for the + version) by driving the ends 50cm into the ground. For the textile version of the Serre-Flex, **double the entrance and exit hoops of your greenhouse for better gable support during rainy weather.**

Ridge line: Interconnect each hoop using agricultural twine (deltane) by making a clove hitch knot at the highest connector of the hoop.

Roll of netting measuring 9m x 50m unrolled above the hoops

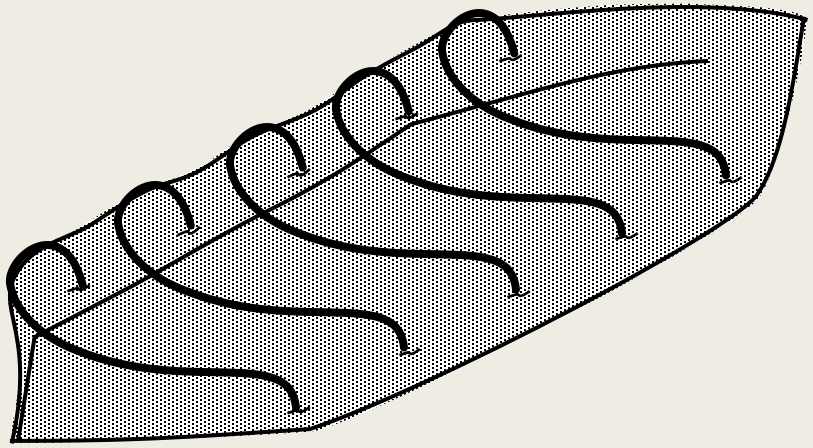
Important: a Serre-Flex must be installed in dry weather.

One Serre-Flex, two modes

- Work mode (sowing or fruiting) : the Serre-Flex is tensioned uniformly on its two anchors allowing work under the tunnel in any weather conditions. It is easier to have a sunny first day when setting up and securing a Serre-Flex in work mode. Ideal for sowing or harvesting.
- Snow or storm mode : the ridge is locked to one of the anchors when the greenhouse is laid down in order to prevent it from being raised. It is easier to have a first rainy day to set up a Serre-Flex in lowered mode. Ideal for increasing the incubation of mycelium during winter or reducing the exposure to wind during a storm.

Precautions for Use

Indicative wind resistance when properly assembled:
70kmh in gusts. Beyond this speed, lay down your Serre-Flex.



Using 9mm wide Colson cable ties (not supplied) provides a safety mechanism in case you forget to adjust the Serre-Flex left in "work" mode during bad weather, allowing the greenhouse to collapse under excessive stress rather than sustaining damage.

We recommend using these zip ties both to secure the climate textile to the anchor and also to secure the ridge to the anchor.

<u>Make sure to install the Serre-Flex during good weather.</u>

Upon receipt, you will find the connectors, anchors as well as the ridge packaged in your parcel.

Use an exterior adhesive, such as Sikaflex 11FC, to secure the connectors to their rods during installation. This safety measure reduces the risk of net perforation.

When setting up the ridge, ensure consistent tension between each rod, which guarantees the greenhouse remains as a single unit held together by its ridge. The ridge must always be under tension between two rods, never hanging loose.

After tensioning the ridge, you will inevitably notice a preferred direction of settlement in your installation.

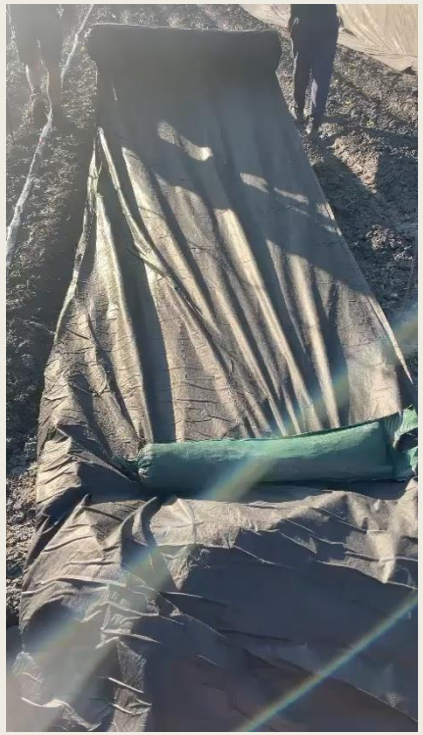
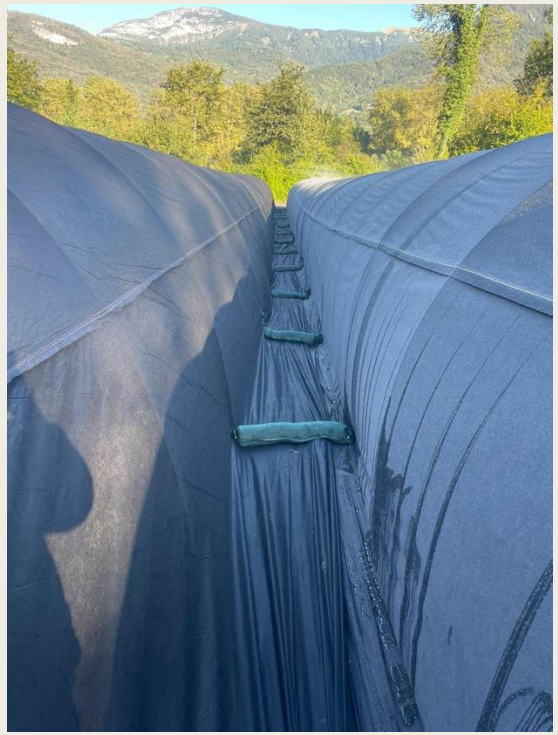
Assembly notes

It can be helpful to mark the rods with spray paint before driving them 50cm into the ground.

Assembly note

The ridge interconnects each hoop. A knot is made on each hoop in a staggered pattern: once to the left of the connector, once to the right, etc.

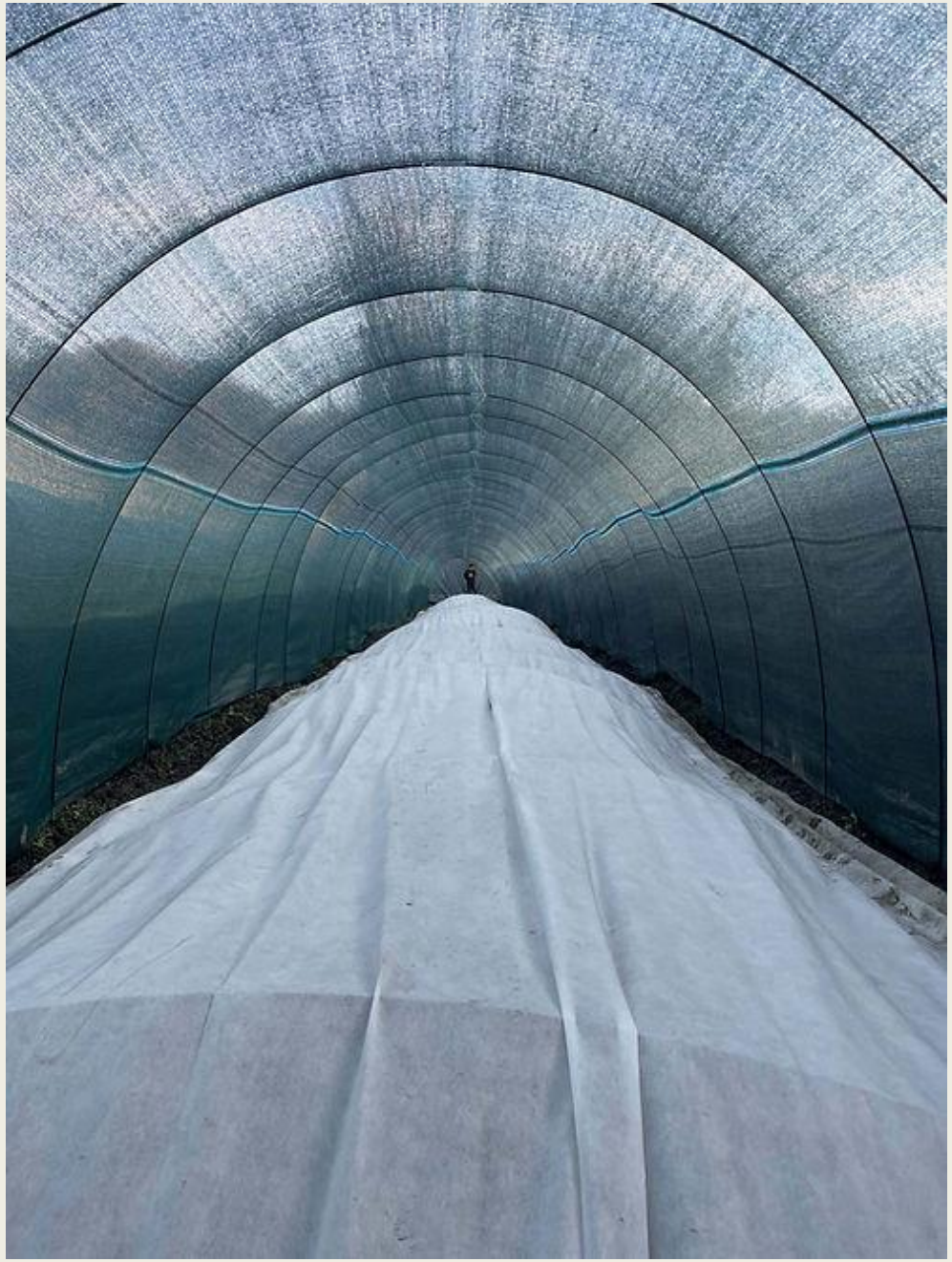
Assembly note


Sausage-shaped weights or shovelfuls of soil can be used to weigh down the sides of your greenhouse. The textile/net must be tightly stretched!

Assembly note

The 'candy knots' are two Colson 9mm ties intertwined. One serves to gather the textile, the other to secure the anchor. These cable ties also serve as fuses in case the greenhouse experiences excessive stress from natural elements.



Forcing Cloth and Fruiting Tarp

Under your Serre-Flex, **a small tunnel adorned with a forcing veil** is arranged for the incubation and protection of your sowing during the mycelium propagation phase and its vernalization.

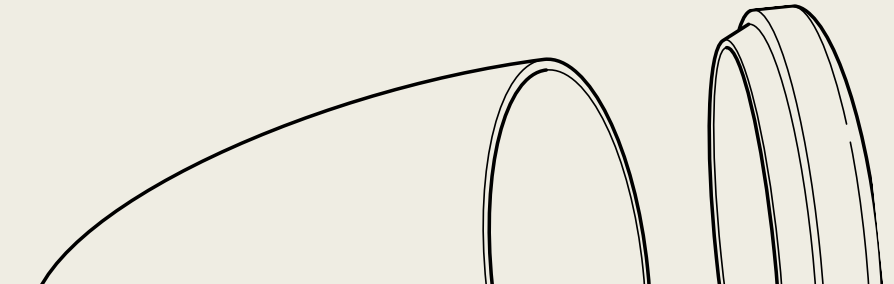
The hoops (2x 1.75m with glued aluminum connector) of the forcing tunnel placed every 2 meters cover two to three cultivation beds. Do not try to force them to cover a single cultivation bed, as the rods would break!

The forcing veil ensures the proper development of the cultivation by protecting it from soil crusting caused by rain, wind, and frost. The forcing veil is replaced by **a fruiting tarp** (optional) during the fruiting stage to maintain optimal humidity.

Pests and Biological Control

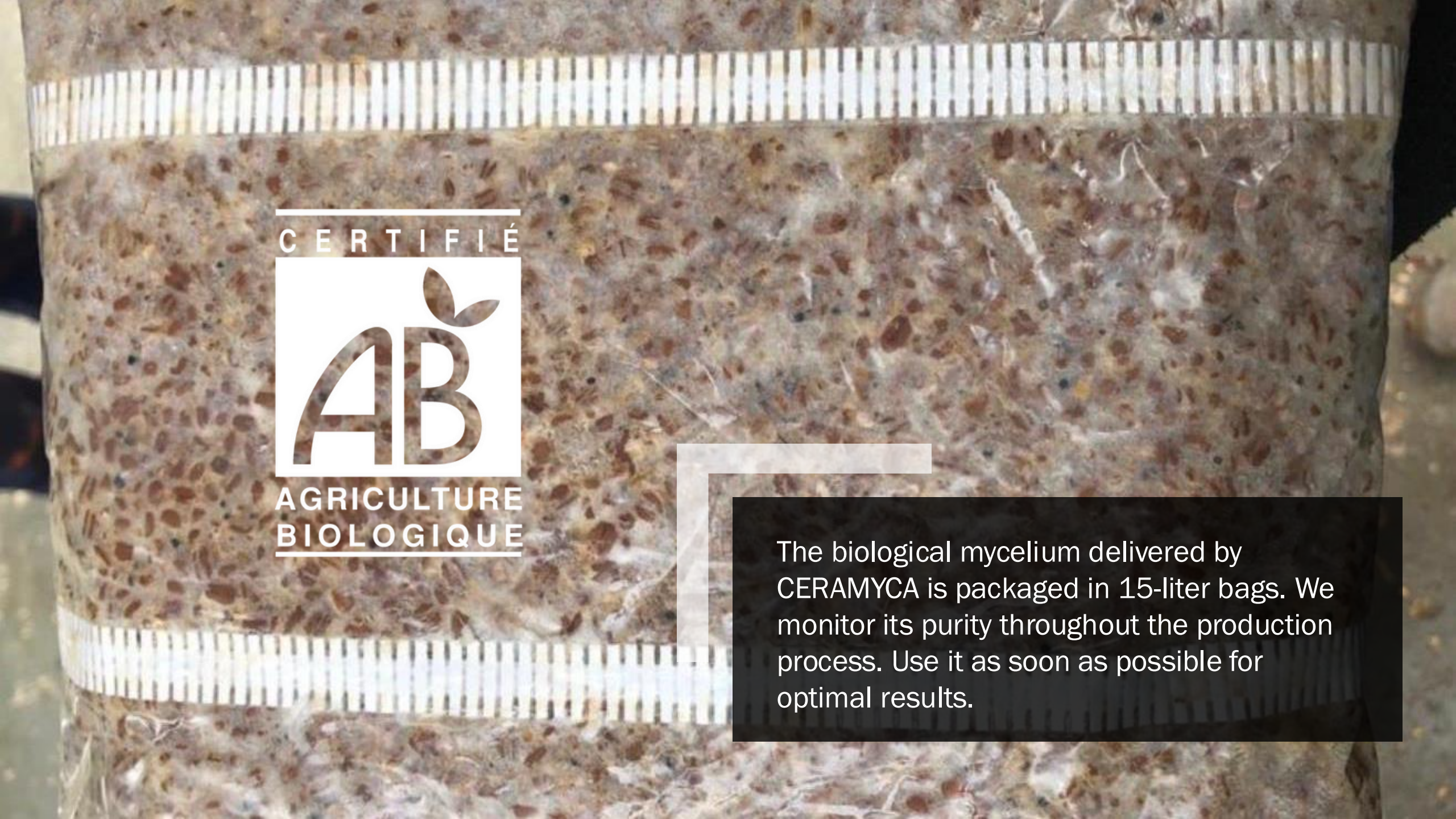
It is sometimes necessary to protect against typical attacks and anticipate the behavior of known pests. Here are your allies in this battle, always used in the context of **organic** cultivation.

- The **Bacillus thuringiensis** (BTi) will allow you to significantly reduce the larval population of the fungus gnat – mushroom fly. Follow the dosage recommendations of the purchased product.
- The **ferric phosphate** is an ally in spring to counter the external slug population. Follow the dosage recommendations of the purchased product if the ferric phosphate **content is dosed at 3%.** To be used following the manufacturer's dosages and only upon seeing morel primordia, never in anticipation.
- **Piles of cooked wheat mixed with 30% of CaCO3 (calcium carbonate)** or slaked lime can be placed near greenhouses to reduce rodent populations during your cultivation. These rodents will turn away from your crop in favor of this easily accessible food source.



Receiving and Storing the Mycelium

- Mycelium delivery via refrigerated transport (for professionals) occurs from mid-October to mid-November. Note any concerns about the condition of the goods to the carrier upon delivery.
- If conditions permit (see the "Sowing Management" section below), it is recommended to use the mycelium immediately upon receipt.
- If you cannot use the mycelium immediately, you must open the boxes and place each bag on a shelf in a cold storage unit maintained at 2 degrees. If you do not have shelving, you can use stacked cardboard boxes while ensuring that the bags do not stick together.
- Keep the delivery boxes of the PODs. Also keep the bubble wrap that will allow you to store them off-season without risk of breakage.

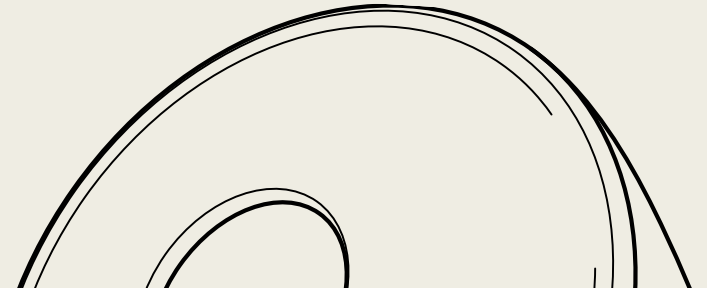


The biological mycelium delivered by CERAMYCA is packaged in 15-liter bags. We monitor its purity throughout the production process. Use it as soon as possible for optimal results.

Soil Preparation and Tilling

Soil preparation is one of the pillars of morel cultivation. Keep in mind that this cultivation extends over a long period subject to harsh conditions. Protecting your soil work from the elements represents one of the major challenges to overcome in this cultivation approach.

- If you are considering cultivation for the first time and your plot was previously uncultivated, it will be necessary **to perform several passes of** sowing in order to minimize weeds present on your plot.
- If you wish to amend your soil with inputs to regulate one or more harmful populations or if you wish to balance the pH of your soil, you should incorporate this addition right after plowing, but always before the final pass of soil preparation.
- **Your soil preparation should be cloddy** (clods the size of an egg), in strips of 0.80m to 1.50m, **and ridged (above water level)** to the maximum extent possible depending on the tools you have available.



A cloddy and ridged soil preparation: in the photo on the right, the two central strips have been rotavated (with a rotary harrow) after plowing, while the others are plowed and awaiting rotavation.

Organic Amendment

The cultivated morel is a saprophytic mushroom that draws the substances it needs from decomposed organic matter **of the hardwood type (deciduous). It is a secondary degrader that does not tolerate fresh decomposing matter: these inputs must have completed their ammoniacal decomposition and tend toward a pH of 8.** Any fresh carbon input or nitrogenous product that will lead to the nitritation phenomenon followed by nitratation in the subsequent months (processes that last several months) is unsuitable for morel cultivation. Finally, implementing a cover crop strategy is interesting but cannot be considered as a means of providing sufficient carbon input.

Conducting soil analyses allows for measuring the humic content of your soil and determining the organic matter percentage. You will then need to consider compensatory inputs: composted hardwood chips with a minimum age of 2 years is an interesting input that presents a C/N ratio (carbon/nitrogen) around 9. This input is buried and mixed into the superficial soil layer at the first 10 to 15 centimeters.

Recommendation

- 20 liters per m² amended initially between plowing and tilling are sufficient to create a balanced, high-performing soil. **Double the amount (40l/m²) in case of** organic matter deficit (rate below 5%), and **double again (80l/m²) if the soil presents characteristics unsuitable for** morel cultivation (100% simulated substrate or indoor cultivation),

- 10 liters per square meter are sufficient for annual maintenance.

Probiotic amendment

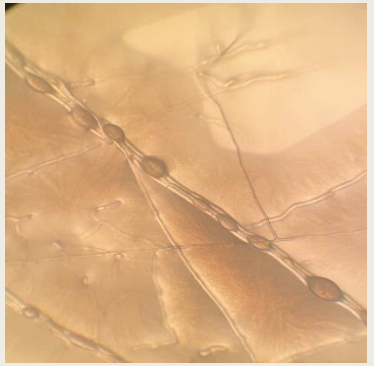
- **The day before your morel sowing and just after your carbon-based organic amendments, inoculate your soil with the Pseudomonas Putida bacteria to strengthen the presence of this symbiotic bacteria of the morel in your soil.** This liquid and living amendment is done through copious watering just before the morel sowing. It must be covered with the nantait tunnel to protect it from UV. It is delivered to you at the same time as your mycelium.

  This spreading represents a decisive step for high-yield morel sowing. This bacteria is naturally present in a random manner in unexploited soil but may in some cases be either absent (bare soil out of season) or diminished from a previous morel culture. The burial of plant cover is a minimal prerequisite and cannot be considered as compensation for the consumption of morel mycelium in commercial cultivation.

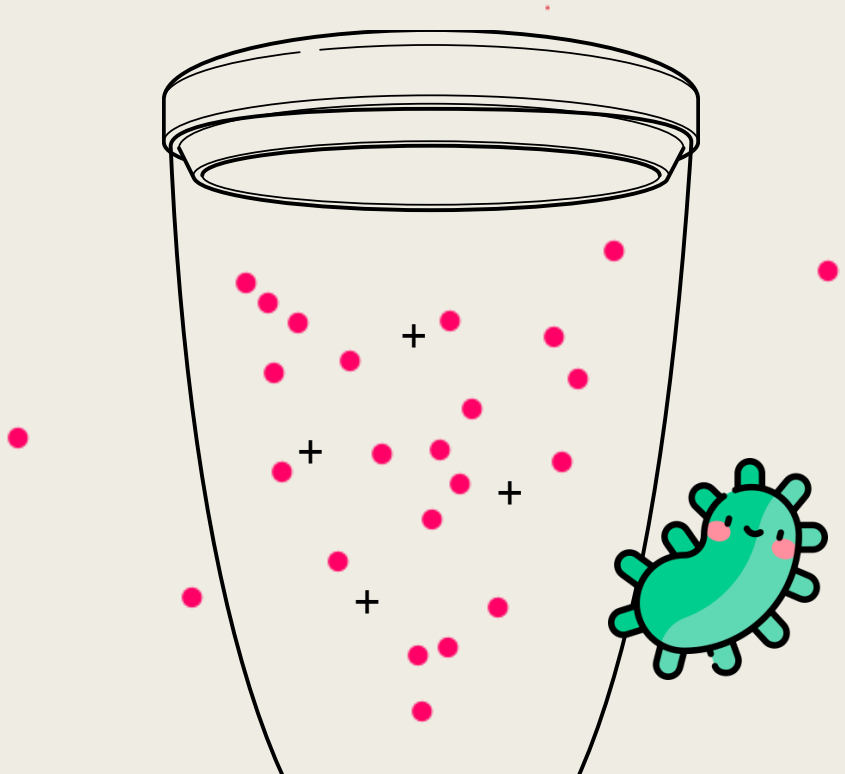
  The terracotta that your PODs are made of acts as a trap for pseudomonas bacteria due to its porosity and iron oxide component. Once trapped, the bacteria **fuses from the very first hours** with the morel mycelium and begins storing its own nutritional reserves before returning them to the latter in the form of assimilable lipids during vernalization, establishing a strict symbiosis. **Without this bacteria, no morels!**

  WARNING: A non-encapsulated (traditional) sowing consumes a large amount of symbiotic bacteria. Growers who experiment with it observe a drop in yields from the 2nd year of cultivation because the mycelium persists in the soil outside the growing season. These sowing methods are deprecated.

- At the same time, **inoculate your soil with the Bacillus thuringiensis Israelensis** bacteria, powder to be diluted, in your irrigation to establish control against pest larvae such as the fungus gnat.



Pseudomonas symbiosis
and hyphae of morel mycelium



Irrigation and moisture management

Different stages of morel cultivation require choosing an irrigation system. The nature of your soil largely determines the type of irrigation you should choose. Water requirements are primarily concentrated during the fruiting period. Each location and soil texture requires its own estimation of water consumption. **Plan for an average of 10m3 of water per 100m2 area needed throughout a season.**

Essential guidelines to follow:

- Sowing must be performed **after soil saturation,**

- The cultivation substrate must **always** remain moist,

- Avoid watering the mycelium while it is spreading,

- Do not water young morels (smaller than 3/4cm).

The "Rain System" is our preferred solution as it offers versatile compatibility with all soil types. It enables both gentle watering (rain-like) and thorough irrigation operations in a short time period (unlike misting). Turned face down against the soil, it allows watering by capillarity similar to drip irrigation. Finally, its cost is low.

Irrigation hose type "Rain System"

We recommend the use of Weenat monitors (weather station and tensiometer) which will allow you to track your humidity and tensiometry (soil moisture) remotely. The Ceramyca team can also monitor your parameters upon request and help you make decisions during the management of your cultivation.

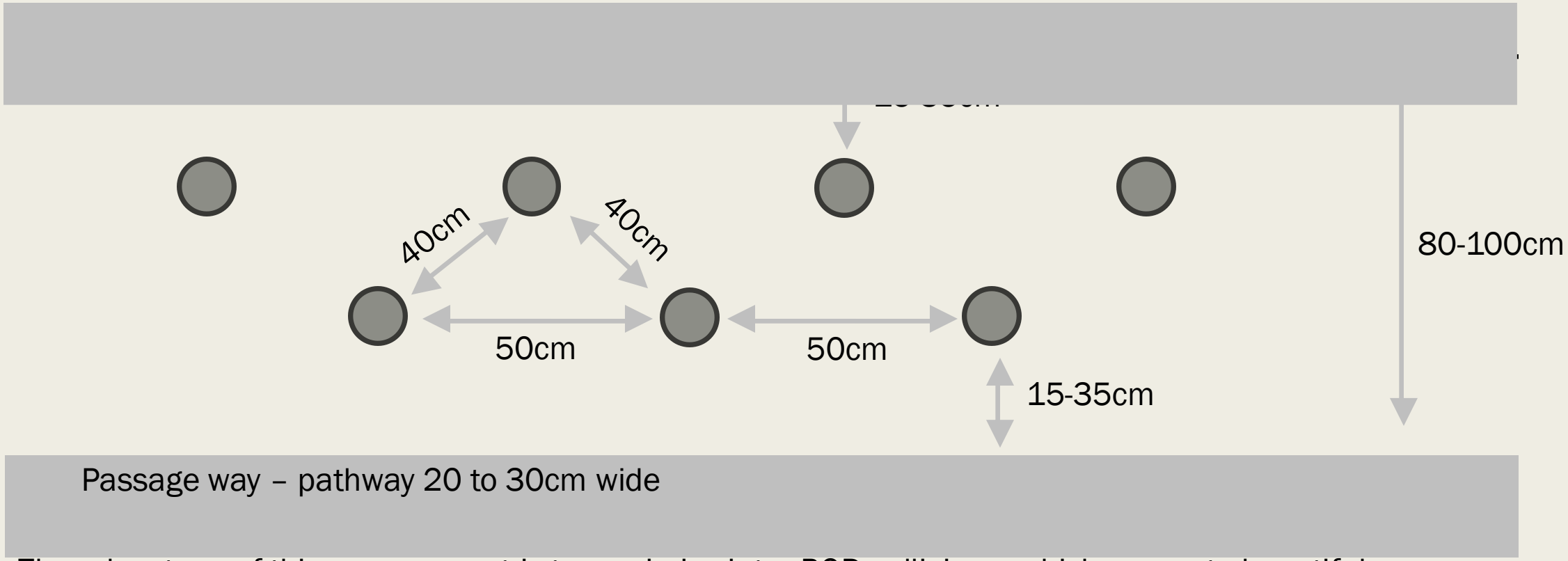
Management of sowing (inoculation)

The successful start of your PODs depends on a few vital factors: water availability within an adequate substrate and a favorable temperature.

- **The morel sowing should be initiated when the air temperature under your climate shelter does not exceed and will no longer exceed 20 degrees.** This measurement should be taken under the climate shelter, 10 cm above the soil surface, at the peak temperature of the day.
- **Therefore, water saturation of your growing** substrate is essential to ensure good mycelium development within the PODs. The initial watering, which can come from rainfall, **must precede the sowing operation**. The objective is to moisten the PODs and their contents through their ceramic walls, by capillarity.
- **Break up the received mycelium** bags without opening them and without being gentle (the mycelium is not fragile). Once the mycelium is scattered, fill the PODs generously without compacting the mycelium.
- Arrange your PODs in a staggered pattern and **cover them with 2-3 cm of soil** to achieve a level surface (diagram on next page).
- Cover your cultivation strip with a forcing tunnel (small salad tunnel) equipped with an incubation textile or the fruiting tarp.


2-3 cm

Optimal arrangement of PODs



The advantage of this arrangement is to maximize inter-POD collisions, which generate beautiful sclerotia and allow for easy connection to an exogenous food source. Under a Serre-Flex, it is possible to arrange three 0.80m-wide bands adjacent to 5 pathways. Thus, a Serre-Flex type tunnel with 100m^2 of cultivable area can cover 400 PODs.

Mycelium incubation

The incubation of morel mycelium is a particularly demonstrative stage due to the rapid rate at which the morel mycelium develops.

- If sowing is performed under ideal thermal conditions, mycelium impacts will appear above the PODs in less than a week. **These impacts constitute the beginning of an outgrowth whose diameter will measure approximately 15-20cm after 10-15 days.**
- If sowing is performed under unfavorable thermal conditions, the impacts will be visible but the mycelium outgrowth will occur beneath the first centimeter of soil and will therefore be invisible to the naked eye.
- **Note: the proper development of the mycelium depends on several factors including the quality of your soil and its preparation, the stability of its tensiometry (soil moisture), favorable temperature conditions, and the quality of your organic matter or calcium amendments (if necessary).**
- If autumn and the onset of winter are expected to be dry, do not hesitate to perform maintenance irrigation. In this case, avoid watering directly on your cultivation bed and instead water the pathways. Do not wait for your soil surface to dry out, as this would cause the mycelium development to stop at the surface and continue underground where you cannot observe its progress.

Propagation after 10 days of incubation: you can connect a nutrient source at this stage.

Feeding the mycelium

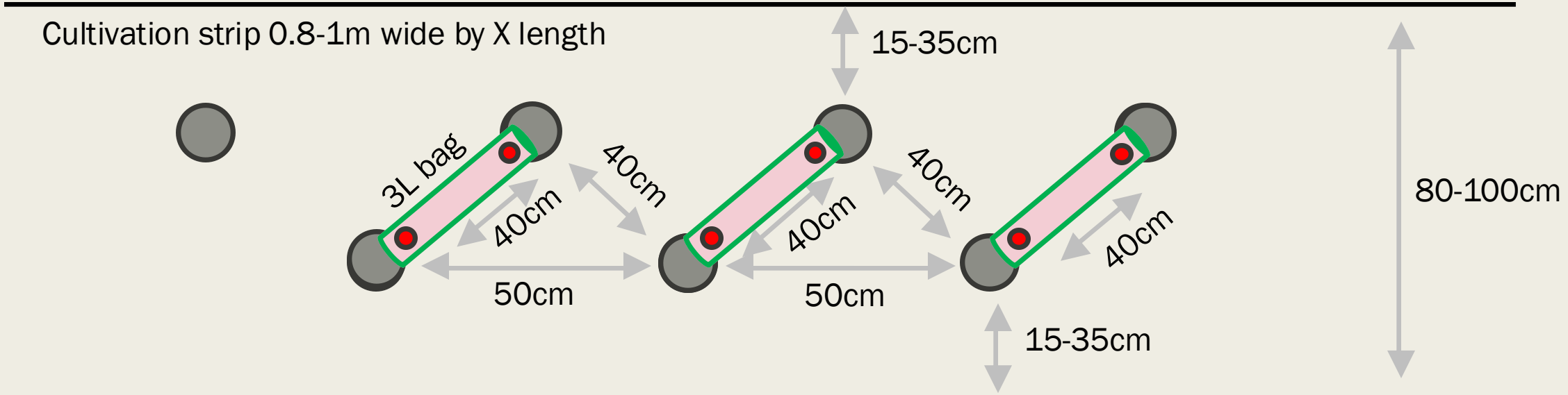
Your nutrition per liter consists of 3-liter bags of sterilized grains whose sterility you are about to break to allocate the maximum amount of this food source to benefit the morel mycelium. A 3-liter bag will be allocated for the nourishment of two PODs spaced 40cm apart in a staggered pattern.

It involves placing the nutritive bag above the two PODs **once their growth areas have reached at least 15-20cm in diameter. This generally occurs 7-10 days after the placement of the PODs.**

Place each of the two ends of a bag above the two growth areas of the PODs spaced 40cm apart in a staggered pattern.

Note: use a storm lighter to make a hole the size of a 2€ coin on each end of the nutritional bag.

Optimal arrangement of nutrition on PODs



Place a 3L bag above two **PODs once their eruptions have reached at least 15-20cm in diameter. If the sowing has been performed under good conditions, this diameter is achieved within a maximum of 7 to 10 days. Do not exceed 10 days for placing your nutrition above your PODs PRO.**

- Tilt the bag to the side so that the surface that was against the ground faces you,
- Make two holes ● with the storm lighter the size of a 2€ coin, then return the bag to its original position. You have just connected your nutrition to your PODs.

Sclerotia formation, vernalization

The formation of sclerotia is a crucial new stage. The larger, stronger, and more numerous the sclerotia are, the higher your yield will be.

- The outgrowths begin white and continue to progress as long as there is food to consume. It is possible, as long as the mycelium on the surface progresses, **to connect an exogenous food source** such as cooked and sterilized grain bags.
- **Once the mycelium browns** (turns orangish), **the nutritive conversion begins** from all previously colonized nutritive media in favor of sclerotia formation. It is at this stage that the biological particularity of the morel makes complete sense: extracting from the rich medium (the content of the inocula, the organic matter, and the additional nourishment) and transferring it to a poor medium (the soil) to form sclerotia, nutritive reserves above which the morels will fruit. This stage lasts from 1.5 to 4 months depending on the region and weather conditions.

Typical surface sclerotia of PODs
after 2 months of vernalization.

Prepare the fruiting

Fruiting is the combination of 3 factors. Combined, they allow mushrooms to avoid emerging too early: it is a natural safety mechanism.

- 1. **The availability of sclerotia** is the result of correctly performed sowing.
- **2. The stress temperature for morel sclerotia starts at 7 degrees and can go up to 15 degrees in the soil.**
- 3. **The photoreaction** is allowed under **a** layer of climatic textile or shade netting and ideally under a fruiting tarp.

It is appropriate to monitor its soil temperature and to restore a ¾ shade in order to enable the photoreaction as soon as when one sees its soil temperatures rising. A soil temperature is measured at 10cm depth, in the morning (measurement of the soil temperature inertia).

Note: In regions where it snows, proceed with raising your Serre-Flex if it was laid down as soon as you are clear of the risk of damage from snowfall, this is to avoid a premature start of the fruiting. The risk being to accumulate heat on the black textile and consequently in your soil, and therefore triggering the fruiting too early.In general, the Serre-Flex are raised at the end of January, early February.

Start of fruiting

- Proceedwith a saturation watering as soon as you observe the soil temperature increasing and reaching 7 degrees in the morning, at 10cm depth. Note that this soil temperature is generally reached when night temperatures reach 4 to 5 degrees and when a minimum of 14-15 degrees is observed during the day over 2 to 3 consecutive days. Rain generally also warms the soil. Following this saturation watering, the humidity* will be around 85% during the day, thus allowing the primordia formation phase.

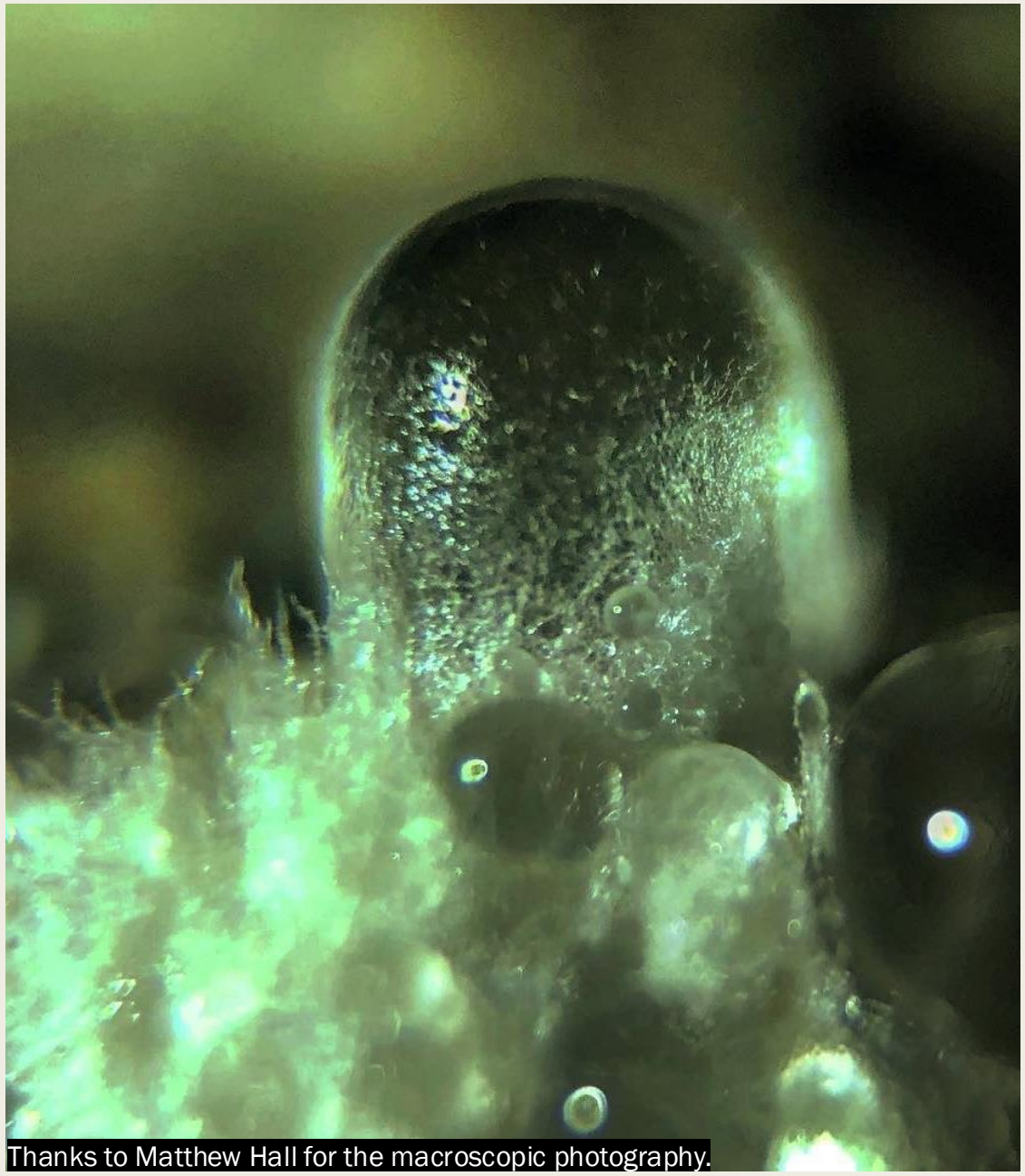
Note: By saturation watering, we mean watering until puddles form in the pathways that will disappear in a few hours afterward.

Note: If you observe humidity that is too low at this stage (often on loamy, sandy soil), use a fruiting tarp mounted on a Nantes tunnel to stabilize this value.

* Humidity is measured 10cm above the soil surface, **in the shade**, at the peak temperature of the day (around 12h - 14h).

- The beginning of fruiting (the formation of primordia) will start after a few days of good conditions. The thermal accumulation during the day and the thermal restitution in early evening triggers a stable evaporation phenomenon over several hours of the water reserves in your soil.

- To respect the phenomena of thermal accumulation and restitution, and if there is a need to proceed with consolidation watering, always water in the early morning. Never water at the end of the morning/midday, in the afternoon or at the beginning of the evening, as this would stop thermal accumulation or thermal restitution and therefore evaporation. During this phase, the humidity during the day will oscillate between 85% (after watering) and 75%.



Thanks to Matthew Hall for the macroscopic photography.

Morel growth

After a few days of evaporation, your primordia become young morels of 2-4cm as the ambient humidity decreases (a function of the soil's hydric capacity which decreases in tandem). **From the moment you observe surface humidity (at 10 cm) less than or equal to 65% during the day, it is necessary to perform a consolidation watering the following morning.**

If your soil dries out and shows primordia, it is not possible to water directly on the cultivation beds. If you have a RainSystem, turn it face down in the pathways to perform consolidation watering through capillarity.

Once your morels reach at least 2cm in height, you can water directly on your growing strips in intervals (10-minute sessions) in the early morning using your sprinklers. It is also possible to opt for a drip irrigation system to avoid questioning the optimal timing of irrigation operations based on the size of the morels. Caution, drip irrigation should be used proactively, without waiting to observe surface drying. Otherwise, the phenomenon of capillarity cannot occur. The use of a tensiometer is often necessary for optimal use of this equipment.

How to maximize primordia survival

- Use **a fruiting tarp** placed over your Nantes tunnel (protection against drying due to temperature or wind and against soil crusting from rain),
- Avoid thermal shock when watering. Maintenance watering, if **necessary, should always take place in the morning,** avoiding direct contact with morels (water through capillarity) while they are less than 2cm in size.

Pests, pathogens & injuries

Too hot, head drying

Mushroom fly (Sting at the Head)

Slug damage

Cracking (frost)

Pests, pathogens & injuries

Cathedral stem: soil pH defect
Or growth inhibitor in the soil

Morel simultaneously stung in the head by a Sciarid (mushroom fly) and attacked at the stem by Nematodes or Springtails

Morel previously contaminated with cyanobacteria (red stem = too much water) then infected with Dactylium Dendroides (living matter decomposer)

After their formation, the primordia must "rise" in less than a week to persist. Otherwise, they will disappear to reappear later.

Good harvesting practices

To optimize the weight yield of your harvest and the feasibility of shipping your morels, it is imperative to follow certain best practices.

- **An adult morel should be cut at 10/12cm, stem included (cut sizing 8/10cm).** It is unnecessary to let your morels grow beyond this point; cutting them at this stage will redirect energy from the sclerotia to other developing morels. The alveoli of the carpophore (morel head) are open at the "belly" level but not at the top. The stem of harvested morels should be creamy white. These criteria may vary slightly from one variety to another.
- **Do not harvest after watering or rainfall**, as this will degrade the flavor (through water dilution) and prevent the morel from draining excess water through its stem, resulting in cyanobacteria contamination (red stem). This contamination makes product transit impossible and can contaminate healthy specimens within the same crate.
- **Ship or deliver your morels immediately after harvesting** in a container where the space is fully occupied by your product. Free space left in transit packaging will result in systematic breakage: the morel is fragile and cannot withstand jostling.

Reuse of PODs

It is possible to reuse your PODs for each new season. Keep the cardboard boxes in which they are packaged upon delivery!

- At the end of a season, dig up the PODs using a small fork (a small 2-pronged fork is sufficient),
- Let the PODs and their contents dry in the sun,
- Once dry, empty the contents of the PODs and store them in the packaging boxes in which they were delivered to you.
- Just before the next season, soak your PODs in lime water (a solution of water saturated with slaked lime at a rate of 850 grams per 1000 liters of water) for half an hour. Alternative: leave them in the sun for several days.
- Refill your PODs.