

National Organic Standards Board
Crops Subcommittee Petitioned Material Proposal
Paper Based Crop Planting Aids
January 19, 2021

Summary of Petition and Petition Addendum for Paper (Plant Pots and Containers)

The NOSB received a petition in August 2018 for the addition of paper planting pots to the National List: **§ 205.601(o) production aids- Plant pot or growing container-hemp or other paper, without glossy or colored inks.**

This material has not been petitioned for inclusion on the National List in the past. However, paper chain pots have historically been allowed for the past 12 years by some organic certification agencies, under the allowance for “Newspaper or Other Recycled Paper as a mulch or compost feedstock”.

In February 2018, the NOP notified all certifiers that paper chain pots are not allowed in organic systems. However, because some certifiers had previously approved their use, NOP allowed a phase-out period until the end of the 2018 crop season. The NOP’s decision on this material was based primarily on the presence of an unapproved synthetic adhesive in the product and the use of virgin paper. Further, the current allowance for paper on the National List does not extend to the use associated with paper pots. At the October 2018 and April 2019 NOSB meetings, there were numerous oral and written public comments requesting a longer time period allowing use of these paper pots while the NOSB reviewed the petition. The NOSB also formally requested this extension in November 2018. The NOP agreed to allow the use of paper pots in organic agriculture in late Fall 2018, with no time restriction, to give the NOSB time to go through the review process of this material.

Paper pots are used by small scale farming operations to efficiently transplant using a non-motorized machine transplanting system. More information on this transplanting method can be found on these websites: <http://paper-pot.com/> and <http://www.smallfarmworks.com/>. This equipment, along with the paper pots, is imported from a manufacturer in Japan. According to the petition, the Nitten paper pot chain system uses paper, produced from a non-bleached Kraft pulp, and adhesives. Non-paper synthetic fibers have been used in small quantities (15%) in the paper pots, but these fibers are proposed to be replaced by a natural hemp fiber. The petitioner and public comment at the Spring and Fall 2018 NOSB meetings stated this system is unique and essential for smaller scale growers. The only alternative would be the much slower and more costly hand planting of individual plants. The system is used for closely spaced crops such as onions, beets, baby salad, etc. The petition states that, like newspaper, these pots decompose in the soil readily. At the time of this proposal, the first trial replacing the synthetic fibers with hemp fibers was not successful, and a second trial was in process.

In addition to the paper pots indicated in the petition, there are numerous other paper pot systems, both to be used to transplant single plants as well as in chains. In addition to paper, these other paper pot systems have various percentages of non-paper synthetic fibers, which may or may not be biobased. Paper pots can also include other ingredients, such as cow manure, synthetic antimicrobials, fungicides, and fertilizers. Public comment from another manufacturer based in Denmark, Ellepot (<https://www.ellepot.com/>), provided further information on non-chain paper pots for a variety of uses from fast maturing annuals to long term woody perennial crops. The percentage of cellulose based synthetic fibers in their paper pots can be 20-100%. Synthetic adhesives are currently the only synthetic material used in the Ellepots other than the paper itself.

The petition states that, in addition to information on paper, the TR on newspaper addresses the presence of adhesives and synthetic fibers in recycled newspaper as well. The three adhesives in the Nitten paper chain pots are vinyl-acetate resin (water soluble and stated to be leached from the pots before transplanting), ethylene-vinyl-acetate resin, and acrylic acid ester copolymer.

It should be noted that paper itself is a synthetic fiber due to the manufacturing process. However, for the purposes of this discussion, a distinction is made between synthetic paper fibers and synthetic fibers that are not strictly paper. These non-paper synthetic fibers can be biobased and made from cellulose or they can be non-biobased and made from several other materials such as petroleum-based plastics. Additionally, some synthetic cellulose-based materials may not be biodegradable. In general, many of the biobased, cellulose derived synthetic fibers used in paper pots are expected to biodegrade whereas the same might not be true of other petroleum-based fibers. Thus, it can be important to distinguish not only between synthetic paper fibers and other non-paper synthetic fibers but also between whether fibers from any source are biodegradable (as referenced to some recognized standard) or might persist in the soil.

The Crops Subcommittee has viewed paper pots, used as a crop production aid, as another use of paper beyond compost feedstocks and mulch, which are allowed under the NOP regulation. However, in order to do due diligence, the Crops Subcommittee requested a Technical Review (TR) to help identify the adhesives and synthetic fibers used in paper pots and identify if there are any that would not be present in the already allowed paper used in compost and mulch. Pots, compost, and mulch all degrade into the soil, and the Subcommittee believes if the fibers and adhesives are allowed in the other listings for paper, then their use in pots should be allowed as well.

The Technical Review clarified that the adhesives and non-paper synthetic fibers found in a variety of paper pots are also found in newspaper and recycled paper that are allowed for compost feedstock and mulch. Other possible adhesives and synthetic fibers for paper pots that were not mentioned in the petition are described in the TR.

Summary of Public Comment:

Many users of the paper pot chain system provided written and verbal comment to the NOSB at the Fall 2018 through Fall 2020 public meetings. They spoke in favor of its use due to its efficiency in transplanting at a small-scale level. Some certifiers spoke in favor of this material and noted that if the paper was torn off the pot before transplanting, it would then be allowed as a mulch or as a compost feedstock under our current regulation. Certifiers who had not allowed the use of these paper pots still supported the extended allowance for use while the NOSB performed its review.

There is more than one supplier of paper pots beyond the supplier noted in the petition. Approval of this material will open the door for other manufacturers to produce these pots once there is clarity on what would be allowed under the organic regulations. Paper pots can be made with all-natural fibers or with a mixture of synthetic and natural fibers. The pots with higher non-paper, synthetic fiber contents are more typically used in the nursery trade where perennial plants may be in the pots for 9-12 months before transplanting into the field. Natural fiber pots can, at times, be sufficient for use in transplanting annual vegetable and flower plants, depending on the time frame from planting into the pot to planting in the field and if the pots need extra strength for a “chain of pots” planting system. All the paper pots contain some type of synthetic adhesive, but these same adhesives are also found on recycled paper which is already allowed in organic agriculture.

Numerous commenters mentioned that all uses of paper as production aids should be included when the NOSB does its review for paper pots. Cloches or hot caps, seed tape, and cutworm prevention collars are other examples of production aids made from paper and typical paper adhesives.

There were also a number of comments about whether the listing for paper pots should be expanded to include additional distinct uses of paper as a production aid. Many commenters favored a listing that extended beyond only paper pots to include, but not be limited to, items such as seed tape, and other materials with direct soil contact. However, commenters also wanted to make sure that there was a differentiation between paper materials being used that are later incorporated into the soil versus paper materials that are intended to be removed after use. The Crops Subcommittee has narrowed the use from a “production aid” to a “planting aid” to limit the use of this paper to that period of the crop production, and to those aids that would be incorporated into the soil.

Comments submitted during both Spring and Fall 2020 meetings asked for further refinement of the definition and annotation for paper planting aids. These comments included the inclusion of nutrient and pesticide limitations, restricting the potential use of biodegradable biobased mulch under this definition, clarification of the makeup of the 40% of the products that are not cellulose based and who would qualify as a third party reviewer for biobased or cellulose based content.

Specific Uses of the Substance:

Paper pots are either single or in chains to allow for “mechanical” transplanting, either with a hand driven machine or with a tractor implement. The paper pots decompose into the soil and lessen transplant shock since the roots are not exposed to the air before transplanting like plants being removed from plastic pots. The use of paper pots can contribute to less use of plastic in the produce industry. Growers can also use soil blocks, which are compressed soil without any container, to grow transplants.

Other paper crop production aids include: cloches (a temporary covering used to protect newly transplanted plants), seed tape (where individual seed is spaced correctly on a paper tape which lessens the need for thinning), and collars to prevent cutworm damage to plants at the soil line. There could be other uses of paper currently used as crop production aids or there may be other uses developed over time. The composition of the paper allowed in paper pots and other planting aids, as well as the adhesives approved, would meet the manufacturer needs of these other paper planting aids.

Approved Legal Uses of the Substance:

Newspaper and recycled paper are allowed under the organic regulations in these two references:

Reference: 205.601(b) As herbicides, weed barriers, as applicable. (2) Mulches. (i) newspapers or other recycled paper, without glossy or colored inks.

Reference: 205.601(c) - As compost feedstocks - Newspapers or other recycled paper, without glossy or colored inks.

There have been three technical reports (TRs) for Newspaper, in 1995, 2006 and 2017, which can be found here: <https://www.ams.usda.gov/rules-regulations/organic/national-list/n>.

NOP guidance 5034-1 “Materials for Organic Crop Production” from December 2016 excludes virgin paper from the “newspaper or other recycled paper” allowance for mulch or compost feed stocks. The

guidance states: *“Includes newspaper and other recycled paper such as cardboard, without glossy or colored inks. Does not include paper that is not recycled (i.e., virgin paper).”*

The [July 2019 Technical Review of Paper Pots and Containers](#), detailing the specific possible synthetic and natural fibers as well as synthetic adhesives found in paper pots currently commercially available, provided more clarity for the NOSB.

Manufacture:

Paper can be made from various plant sources including wood, trees, straw, hemp, bamboo, reeds, kenaf, sisal, jute, sugarcane bagasse, sunflower stalks as well as recycled sources of pulp. Cellulose sources are typically mechanically ground and then chemically “cooked” using an alkali or sulfite process. Newspaper and recycled papers can also have a variety of inks, although colored ink and glossy paper are not allowed as compost feedstocks or mulch under the organic rule. The paper used as a planting aid could include the typical adhesives found in newspaper and recycled paper.

Subcommittee Discussion:

The Crops Subcommittee has reviewed the petition, technical reviews, and public comments and has developed a listing and annotation that we believe meets the needs of producers while addressing environmental concerns that might be associated with some types of paper. When discussing the possible allowance for paper used as a planting aid, the Subcommittee also considered the fact that currently there is an allowance for “newspaper or other recycled paper” as weed control or as compost feed stocks and there are very few differences between the currently allowed paper and the paper as a planting aid under review, with the exception of paper pots that have a very high percentage of non-cellulose synthetic fibers. Requiring 60% cellulose fiber prevents the planting aids from being completely made of biobased, non-degradable plastics and yet allows current products on the market. It is hoped that this percentage can increase over time. Requiring 80% biobased content prevents the use of planting aids made primarily from petroleum sources and also allows the products currently on the market. Again, it is hoped that this percentage can be increased over time and that future Boards will be able to modify this annotation to reflect manufacturing technological advances that incorporate more natural materials and additional cellulose and biobased content. These future reviews should also encompass the biodegradability of both fibers and adhesives.

Small changes have been made to the annotation to reflect concerns from stakeholders.

- There was concern that the annotation specifically notes that allowed paper planting aids are not limited to those listed and that the materials will be incorporated into the soil (without reference of intent to biodegrade).
- As pointed out in public comment, the wording that allows the use of newspaper “without colored or glossy inks” was intended to prevent use of glossy paper and colored inks and the wording for paper planting aids is changed to prevent the use of glossy paper or colored inks.
- Stakeholders had asked for language regarding nutrient and pesticide inclusions in the paper planting aids to prevent the use of materials not allowed on the National List. However, later comments noted that the inclusion of pesticide language runs counter to the legal use of pesticides, so that language was removed.
- Concern was expressed by stakeholders about substances that might be included in the 40% non-cellulose portion of the paper planting aids. They suggested language limiting those materials and specifying what their uses might be. That language has been added to the definition.

- For clarity in listing, language needs modified in §205.601: *In accordance with restrictions specified in this section, the following synthetic substances may be used in organic crop production: Provided, That, use of such substances do not contribute to contamination of crops, soil, or water. Substances allowed by this section, except disinfectants and sanitizers in paragraph (a) and those substances in paragraphs (c), (j), (k) (l), (n),(o) and (p) of this section, may only be used when the provisions set forth in §205.206(a) through (d) prove insufficient to prevent or control the target pest.*

The Board acknowledges that the percentage specificities in this listing should be reviewed by future Boards as technology and materials change. It seems likely that there will continue to be advances in fiber types that can be used in these paper planting aids. If so, the percentage of cellulose or biobased materials could be increased. It is hoped that at some point in the future this listing could be changed to 100% biobased, biodegradable fiber content as well as examining adhesives to address biodegradability.

Category 1: Classification

1. **For CROP use: Is the substance _____ Non-synthetic or x Synthetic?**
Is the substance formulated or manufactured by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources? [OFPA §6502(21)] If so, describe, using NOP 5033-1 as a guide.

Due to the paper pulping production process and use of synthetic adhesives, this material is considered to be synthetic.

2. **For CROPS: Reference to appropriate OFPA category:**
Is the substance used in production, and does it contain an active synthetic ingredient in the following categories: [§6517(c)(1)(B)(i)]; copper and sulfur compounds; toxins derived from bacteria; pheromones, soaps, horticultural oils, fish emulsions, treated seed, vitamins and minerals; livestock parasiticides and medicines and production aids including netting, tree wraps and seals, insect traps, sticky barriers, row covers, and equipment cleansers; or (ii) is used in production and contains synthetic inert ingredients that are not classified by the Administrator of the Environmental Protection Agency as inerts of toxicological concern?

This material is considered a crop planting aid and is not a pesticide. Although some paper pots available on the market might have prohibited pesticides (insecticides, antimicrobials, fungicides etc.) embedded in the fiber, these would not be allowed in organic production. To be explicit, the annotation states that any added nutrients must conform to the National List or be allowed under OFPA. Additionally, the non-cellulose based content is expressly limited to non-synthetic materials, other permitted synthetic ingredients at §205.601(j), or synthetic strengthening fibers, adhesives, or resins.

Category 2: Adverse Impacts

1. **What is the potential for the substance to have detrimental chemical interactions with other materials used in organic farming systems? [§6518(m)(1)]**
Most of the paper used as a crop planting aid is functionally identical to newspaper and recycled paper. The current listing of newspaper and recycled paper has been found to have no detrimental interactions with other materials in organic agriculture.

2. What is the toxicity and mode of action of the substance and of its breakdown products or any contaminants, and their persistence and areas of concentration in the environment? [§6518(m)(2)]

No toxicity or negative mode of action has been found in the breakdown of paper (cellulose) in the environment. No colored inks or glossy paper would be allowed for paper as a crop planting aid, similar to paper as it is currently annotated as a compost feedstock and/or mulch. The 2019 TR found many of the adhesives and synthetic fibers biodegraded with no negative impacts. There were some that were not as environmentally neutral as others, but all were also present in newspaper. The percentage of adhesives in the paper pots is very small. There could be an issue with paper used as a planting aid, containing large percentages of synthetic fibers that would not biodegrade readily.

3. Describe the probability of environmental contamination during manufacture, use, misuse, or disposal of such substance? [§6518(m)(3)]

There could be contaminants released into the environment during the manufacture of paper, and environmental degradation caused by harvest of cellulose, but no more than newspaper or recycled paper, which historically have been approved for use in organic agriculture. A difference between this paper and the previously approved newspaper is that we are not restricting it to the use of only recycled paper products. The annotation will allow virgin stocks of cellulose to be used in the paper used as a planting aid in organic agriculture. There are negative environmental impacts from harvesting trees to make paper such as road building, soil erosion, degraded water quality, and loss of habitat, but there are forestry best management practices that can mitigate some of these negative effects. Furthermore, there are non-tree cellulose sources that could be utilized in the future. The synthetic fibers that could be used in paper are manufactured in a wide range of production systems. These were not specifically addressed in the TR.

4. Discuss the effect of the substance on human health. [§6517 (c)(1)(A)(i); §6517 (c)(2)(A)(i); §6518(m)(4)].

Paper, depending on the percentage of cellulose and type of synthetic fibers/materials used, is biodegradable and has no negative effects on human health. The 2019 TR did not find any evidence of harmful effects to human health.

5. Discuss any effects the substance may have on biological and chemical interactions in the agroecosystem, including the physiological effects of the substance on soil organisms (including the salt index and solubility of the soil), crops and livestock. [§6518(m)(5)]

Paper, depending on the percentage of cellulose and type of synthetic fibers/materials used, is not harmful to the environment. The 2019 TR did not find any evidence of harmful effects to environmental health.

6. Are there any adverse impacts on biodiversity? (§205.200)

Paper planting aids with high percentages of synthetic fibers that do not biodegrade readily could leave residues that would be harmful to terrestrial, avian, and aquatic wildlife if

consumed. Use of synthetic pesticides embedded in the pots could also have adverse impacts on biodiversity, but only organically allowable nutrients would be allowed in the paper used as a planting aid and there is a restriction on the types of materials allowed in the 40% non-cellulose based portion of the planting aids.

Category 3: Alternatives/Compatibility

1. Are there alternatives to using the substance? Evaluate alternative practices as well as non-synthetic and synthetic available materials. [§6518(m)(6)]

There are biodegradable pots made from composted cow manure (<https://cowpots.com/>) but these have never been petitioned for use in organic agriculture. We do not know if they could be approved or not. The manufacturer states the pots contain post-consumer newsprint and are 100% biodegradable. In addition, they state they are not approved for Certified Organic operations as of January 2020. It is unclear if there are adhesives or synthetic fibers as well and what they are.

There are also tools to help growers roll up newspaper into a pot. The paper chain pots offer greater efficiency for small scale transplanting, although mechanical or hand transplanting operations can be used in both small- and large-scale operations with other types of pots or soil blocks.

2. In balancing the responses to the criteria above, is the substance compatible with a system of sustainable agriculture? [§6518(m)(7)]

The Crops Subcommittee has developed the definition and annotation described in the motion below to both meet the OFPA criteria and to provide a practical and achievable material for manufacturers to produce and for organic farmers to use. The material is a planting aid and the intent is to limit the use of this material to activities around planting of seeds or plants.

While hand planting, machine planting, and other methods may provide some alternatives to paper planting aids, testimony provided to the Board indicates that the use of paper planting aids is critical for a segment of organic growers.

The annotation of no less than 60% cellulose-based fiber content meets the needs of current manufacturers with the possibility that hemp or other natural cellulose fibers, capable of providing the strength needed to meet this annotation, could be used in the future. The 80% biobased requirement ensures that materials beyond the cellulose base are derived from biological sources. Both the 60% cellulose based fiber content and 80% biobased content requirements could be made more stringent by future Boards through an annotation change. As the technology of these planting aids advances it is possible manufacturers will be able to use more natural and biobased materials to strengthen the planting aids. Continuing the prohibition on glossy paper and colored inks prevents the incorporation into organic soil of the worst contaminants. It is understood that there would be a small percentage of adhesives and coatings and the Technical Reviews on paper and paper pots described how these are already allowed in paper as mulch or compost feedstocks.

The allowance for virgin paper allows for special papers to be developed that meet the specific crop planting needs for a variety of uses, and the amount of paper produced from virgin sources for these planting aids would be very small compared to the amount of paper manufactured for

all uses. Added fungicides, antimicrobials, insecticides, or other synthetic items not typically found in paper would not be allowed under the current annotation unless they were on the National List for that purpose or otherwise compliant with the OFPA. Genetically modified materials are prohibited under the organic regulation and would not be allowed as ingredients in paper-based crop planting aids. With the recommended annotation, paper-based crop planting aids are compatible with a sustainable system of agriculture.

The Crops Subcommittee did not include a biodegradability standard in this proposal due to the time and cost needed for testing to that standard. The Subcommittee would like to see continued innovation to move to 100% biobased as well as an increase in the natural fiber content of these planting aids. Additionally, the Subcommittee wants to make sure that these materials are promptly and economically available to growers of all sizes. The Subcommittee would like to encourage testing and trials of increased natural and/or biobased contents and believe that manufacturers would be less likely to provide small innovations of these new products to organic farmers if this testing were required.

Subcommittee Vote:

Classification Motion:

Motion to classify paper-based crop planting aid as a synthetic substance.

Motion by: Steve Ela

Seconded by: Jerry D'Amore

Yes: 6 No: 0 Abstain: 0 Absent: 1 Recuse: 0

National List Motions:

Motion to add to 205.2 Terms Defined:

Paper-based crop planting aid. A material that is comprised of at least 60% cellulose-based fiber by weight, including, but not limited to, pots, seed tape, and collars that are placed in or on the soil and later incorporated into the soil, excluding biodegradable mulch film. Up to 40% of the ingredients can be non-synthetic, other permitted synthetic ingredients at §205.601(j), or synthetic strengthening fibers, adhesives, or resins. Contains no less than 80% biobased content as verified by a qualified third-party assessment (e.g. laboratory test using ASTM D6866 or composition review by qualified personnel).

Added nutrients must comply with §205.105, 205.203, and 205.206.

Motion by: Steve Ela

Seconded by: Rick Greenwood

Yes: 6 No: 0 Abstain: 0 Absent: 1 Recuse: 0

Motion to add to 205.601 (p) Production Aids:

Paper-based crop planting aids as defined in 205.2. Virgin or recycled paper without glossy paper or colored inks.

Motion by: Steve Ela

Seconded by: Emily Oakley

Yes: 6 No: 0 Abstain: 0 Absent: 1 Recuse: 0

Approved by Rick Greenwood, Crop Subcommittee Chair, to transmit to NOP January 19, 2021.