United States Department of Agriculture

EPA/OPP Information & Inquiry
Dacthal (DCPA) Use on Brassica and Cole Crops

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Original Questions from EPA

USDA's Office of Pest Management Policy (OPMP) was sent the following statement and questions from the US EPA Office of Pesticide Programs:

1. *"EPA would like OPMP feedback on the viability of applying DCPA prior to transplanting compared to after transplanting - how important is it that the DCPA application follow the transplanting?*

2. *Is applying DCPA in banded applications, followed by seeding/transplanting crops into those bands, agronomically feasible?*

3. *EPA is requesting information on typical scouting practices for onions and broccoli/brassica, including if USDA knows whether records of scouting activities are generally being kept (and if so, are they required and how)? After the crop is planted, how soon does scouting begin and how frequently does scouting occur?*

4. *The registrant is proposing limitations of 17-20 A/day for mixers and loaders, but EPA has concerns with the likelihood of compliance with these proposed label changes. Does USDA have any feedback on the feasibility of the registrant's proposal?*

5. *Is dacthal (DCPA) typically applied by commercial applicators or growers?*

6. *What herbicides are used by growers as preemergence alternatives to dacthal (DCPA) in Cole crops and onions?"*

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USDA OPMP's Compiled Responses

In an effort to answer EPA's question, USDA OPMP reached out to a limited number of stakeholders to obtain information on agricultural practices. Note that this outreach did not include all US states in which dacthal has been used recently, or all states in which brassica and Cole crops are produced. Below is a compilation of the information that USDA received.

General Overview

- Due to groundwater detections dacthal (DCPA) has been banned in Michigan for almost two decades, and alternative herbicides have been registered for use in the state since. Please see the attached Cancellation Order issued by the Michigan Department of Agriculture on April 21, 2023, for additional information. Given this, Michigan-specific general agronomic information is separately discussed below the compiled responses to EPA's specific questions.
- Similarly, dacthal used to be commonly used in the Treasure Valley of Southwestern Idaho and Eastern Oregon but use there declined substantially due to groundwater contamination issues; Oregon-specific information has still been included below as part of our compiled responses. When these groundwater contamination issues occurred, most growers were using furrow irrigation, and almost all have now switched to drip irrigation, so groundwater contamination issues could potentially be minimized if dacthal use were to expand amongst growers using more efficient irrigation systems.
- Use rates and relative costs for dacthal are high compared to alternatives, but the range of weeds controlled, and efficacy is also high compared to alternatives. In states (i.e., Michigan and Oregon) that have pushed growers away from dacthal, alternatives have become available; however, in states where there has not been regulation due to groundwater issues (i.e., Arizona, California, and Florida), dacthal usage remained high until EPA issued the Notice of Intent to Suspend (NOITS) and there are few and in some cases no available alternatives.
- Across all states onions are generally directly seeded, while Cole crops are directly-seeded and/or transplanted depending on the state. In Michigan almost all Cole crops are transplanted, in Florida leafy Cole crops are directly-seeded and head/stem crops are transplanted, and in Oregon Cole crops are transplanted if being grown for seed but are otherwise directly-seeded. In Arizona and California apparently the majority of broccoli is directly seeded while the majority of cauliflower is transplanted.
    - Planting of directly-seeded onions or Cole crops happens quickly and broadly, e.g., growers can seed 60-90 acres per day for onions and 40-50 acres per day for Cole crops. With directly-seeded onions there is a roughly 30-day window between seeding and emergence, and weeds can grow in quickly during this window and significantly affect yields, so weed control during this window is critical. In California dacthal (alone or tank-mixed) is applied right after planting, while in Oregon applications are made 2-3 weeks after seeding (but seeding is made to planting beds that were treated just prior to seeding with a burndown treatment of glyphosate). Generally, growers try to stay out of the seeded fields during the window between seeding and emergence given the sensitivity of the germinating seeds and seedlings to any disturbances. Growers who are using drip irrigation (common in Arizona) would typically setup the irrigation lines before seeding to enable staying out of the fields in the weeks after seeding. Growers using sprinkler irrigation (common in California) install pipes immediately following seeding to help prevent wind erosion of soil off the bed tops.
    - With transplanted Cole crops herbicide applications are typically made immediately following or at the time of transplant, and growers typically need to re-enter those fields within the first

week after transplanting for scouting (transplants are very sensitive to pest damage) or irrigation. Transplanted crops are only planted at scales that can also be harvested in approximately a day, so production schedules are already staggered so that growers are probably transplanting and then treating somewhere less than 20 acres per day.

1) *EPA would like OPMP feedback on the viability of applying DCPA prior to transplanting compared to after transplanting - how important is it that the DCPA application follow the transplanting?*

It appears that most growers in Florida are already treating 2-3 days before transplanting. On the other hand, growers in all other states transplanting crops are currently doing treatments immediately after transplant; in Arizona respondents noted that they have observed a reduction in weed control anytime the soil is disturbed after applying dacthal. So, while all growers could conceptually shift the timing of dacthal treatments if it allowed them to keep using dacthal, there might be some challenges faced by growers adjusting to this change in current practices. There could also be (as suggested by feedback from Arizona), some upwards adjustment of current relatively low single application rates (i.e., 50-75% of the maximum single application rate) to compensate for what some growers have observed as reduced dacthal efficacy when dacthal-treated soils are disturbed by planting activities.

2) *Is applying DCPA in banded applications, followed by seeding/transplanting crops into those bands, agronomically feasible?*

Apparently some growers in California already typically make dacthal applications in a 22" band on top of a 40" wide bed, and then cultivate the furrows. These growers do so to save on costs given that dacthal is relatively expensive. It was specifically noted, however, that California producers of processing onions do not follow this practice, as their wide beds and tight row spacing make it impractical. Growers in Arizona also make banded applications if they rely on ground broadcast equipment to apply dacthal, though this is minority of dacthal applications in the state (the majority of dacthal applications in Arizona appear to be made via chemigation). There was a consensus from experts in both states that dacthal treatments can be made in banded applications without any reduction in weed control.

Overall, it appears that growers in other states could conceptually follow the typical practices used in Arizona and California, though there may be some challenges faced by growers who don't have the equipment on farm to do in furrow cultivation.

3) *EPA is requesting information on typical scouting practices for onions and broccoli/brassica, including if USDA knows whether records of scouting activities are generally being kept (and if so, are they required and how)? After the crop is planted, how soon does scouting begin and how frequently does scouting occur?*

For transplanted crops growers need to go back into fields within a few days to at most within a week of planting (which would be ~7-10 days after treatments were made depending on the state and timing of applications relative to transplant) to scout for pests. For directly-seeded crops growers typically wait 2-4 weeks to go back into fields for pest scouting because seedlings are very sensitive to any soil disturbance prior to emergence. For example, even soil crusts caused by rainfall during this window can reduce emergence and cause yield reductions.

It seems like the general sense is that growers who do their own scouting probably do not keep records of those activities, but that growers who rely on crop consultants for pest scouting would have records

collected by the consultants (some very large growers might have in-house consultants who would probably perform the same scouting-related record keeping as external consultants). No one was aware of state requirements for pest scouting records. It was noted that as growers are required under WPS to keep records of their pesticide applications, there might be some indirect references to target pests in these records that could in effect be used after the fact as documentation of grower scouting (this is under the assumption that growers would immediately treat a crop-protection issue once it is detected in the field via scouting).

Of the states germane to this inquiry, California has the most extensive and comprehensive pesticide data reporting requirements. Of the remaining states, Arizona requires that commercial applicators submit records of all of their pesticide applications to the state department of agriculture.

4) *The registrant is proposing limitations of 17-20 A/day for mixers and loaders, but EPA has concerns with the likelihood of compliance with these proposed label changes. Does USDA have any feedback on the feasibility of the registrant's proposal?*

It was suggested by respondents that it would be tough to comply with this acreage limitation for growers directly seeding their crops because these growers seed 40-80 acres per day and then these "blocks" are typically also treated quickly at this scale. With this said, if growers really needed dacthal then they may adjust seeding acreages to facilitate treating the amount of acres required by the label, but there would be substantial costs incurred with this dramatic shift in current agronomic practices. Growers may find it more practical to switch to a different crop entirely in the absence of alternative chemical weed control options.

Growers who are transplanting their crops already are more likely to be able to comply with this acreage limitation as they typically stagger production schedules so as to only plant what they can harvest within a day or so (which typically ends up being at most 20 acres).

It was noted that this acreage limitation could pose a particular issue for commercial applicators, who may service multiple growers on a particular day. Commercial applicators may also relatively limited manpower to split up the mixing/loading responsibilities so as to fall under the acreage limitation requirement.

In California and Oregon there are apparently some existing pesticide labels which have this type of acreage limitation, and so contacts in the states expressed few reservations both that growers would comply and that enforcement could occur successfully. While in other states there are no existing pesticide labels with acreage limitations, extension specialists did point out that some aquatic herbicide labels have conceptually similar existing language on labels that restrict applications to a portion of a water body, e.g. the following from the endothall labels approved in September 2021: *"Treatment of aquatic weeds and algae can result in oxygen loss from decomposition of dead biomass. This oxygen loss can cause fish and invertebrate suffocation. To minimize this hazard, do not treat more than [10% or ½ to 1/3, select based on current label restrictions] of the water body (excluding water infrastructure and constructed conveyances such as drainage canals, ditches and pipelines or intakes and aqueducts for drinking water or irrigation use) to avoid depletion of oxygen due to decaying vegetation."* Enforcement authorities in Florida and other states where these aquatic herbicides are commonly used have experience interpreting and ensuring compliance with this type of label language.

Outside of California, contacts at state lead agencies indicated that it could be challenging to enforce this type of label requirement without a specific record-keeping requirement on labels. While growers are of course required under WPS to keep records of their pesticide applications, few SLAs require filing of these records with the state and so there is minimal ability of most SLAs to track in real time grower applications of pesticides. Therefore, these enforcements contacts recommended that specific and detailed reporting requirements be included as a part of the Directions for Use on labels if EPA moves forward with this effort.

5) Is dacthal (DCPA) typically applied by commercial applicators or growers?

Apparently, the relative proportion of applications made by growers versus commercial applicators varies considerably by state. In Michigan and Oregon, it appears that most growers of these crops would make their own pre-emergence herbicides applications (i.e., for dacthal), which for these growers in these states are typically made using ground-based application equipment. If soils are too wet to permit these ground-based applications these growers would then generally contract out to commercial aerial applicators, though this circumstance most commonly occurs later in the growing season when growers would be making postemergence herbicide applications.

On the other hand, in Arizona and California apparently many dacthal and other herbicide applications (PRE and POST) were made by commercial applicators, and a smaller subset of growers would make their own ground-based dacthal applications.

6) What herbicides are used by growers as preemergence alternatives to dacthal (DCPA) in Cole crops and onions?

Responses on alternatives were primarily provided from Michigan and Oregon, states where existing concerns with dacthal (DCPA) groundwater contamination issues have led to substantial reductions over time in dacthal (DCPA) uses. Responses were also received from Washington that largely aligned with those from Oregon, although dacthal (DCPA) use in this state was higher more recently given the absence of specific groundwater concerns in the state. Additional responses were received from Arizona, note that these responses would likely also apply to at least portions of California given that much of the vegetable production areas in these two states are adjacent along the state borders.

- Arizona – primary preemergent alternatives are bensulide and oxyfluorfen:
  - *Bensulide* - registered for use on direct-seeded Cole crops and onions, and also has a 24c SLN registration in Arizona for POST applications in transplanted broccoli, cauliflower and cabbage. Based on feedback from PCAs, bensulide provides effective control of purslane, but poor control of several other key weed species in desert crops, leading to the need for an additional herbicide. Some examples of winter weeds against which DCPA exhibits greater activity compared to bensulide include common chickweed (*Stellaria media*), little mallow or cheeseweed (*Malva parviflora*), mustards (*Brassica* spp.), burning nettle (*Urtica urens*), London rocket (*Sisymbrium irio*), and sowthistles (*Sonchus* spp.) Some summer annuals examples included groundcherries (*Physalis* spp.), common lambsquarters (*Chenopodium album*), nightshades (*Solanum* spp.), and needleleaf goosefoot (*Chenopodium murale*).
  - *Oxyfluorfen* - identified by some PCAs as the main alternative. It is labeled for post emergent use on broccoli/cabbage/cauliflower and onions, including onions grown for seed, but it is not registered for use on other Cole crops, such as kale and Bok choy. The main concern with oxyfluorfen is damage to neighboring crops. In the Yuma region, it can be difficult to find a

field of broccoli or cauliflower that isn't bordered by lettuce, a crop which is highly sensitive to damage from oxyfluorfen. Except for a very short window at the start of the broccoli season (prior to the start of the lettuce season), most growers will avoid use of oxyfluorfen. Another difficulty PCAs report is that you cannot use oxyfluorfen when there is cloud cover or any level of wind. Oxyfluorfen also can damage the appearance (and marketability) of Cole crop plants. Some growers in the Yuma region have stopped using oxyfluorfen altogether due to these concerns.

- Michigan – alternatives used depend on soil type and crop:
  - Onions: pendimethalin is the primary preemergence herbicide, though others that are sometimes used include dimethenamid-P, ethofumesate, flumioxazin, pyroxasulfone, and S-metolachlor .
  - Cole crops: clomazone, napropamide, pendimethalin, S-metolachlor, and treflan.
- Oregon/Washington – information for directly-seeded crops, primarily onions:
  - Growers now rely on ethalfluralin, ethofumesate, or pendimethalin tank mixed with glyphosate and typically applied when 75% of the planted seed have developed radicals (i.e., 2-3 weeks after planting).

<u>Additional Michigan Production Information</u>

Cole crops are almost entirely grown on muck soils and are almost all transplanted. Growers would typically transplant about 5 acres per day, and then immediately treat those transplanted acres. Banded applications of herbicide are not a typical practice but are possible given typical agronomic practices. Onions are primarily grown on muck soils, with some acreage on mineral or sandy soils. When dacthal was available it was only used by a few transplant onions growers who had fields with especially sandy soils. The majority of onions in the state are direct-seeded, with only a few hundred acres of transplanted onions. Typically, growers will plant onion seeds as early in the season as possible and will spray as much of the planted acres as possible as quickly as possible. Current standard herbicide regimens are for an application 3-4 weeks after seeding of a tank mixture of both PRE and POST herbicides. So, conceptually the proposed daily acreage limitations would be a challenge for most onion growers in the state as most onion operations are 100-200 acres in size. Respondents suggested that growers would probably have trouble complying with this type of restriction for onions in Michigan. Growers need to be able to control weeds over the entire field, and so banded applications would conceptually not be possible for direct-seeded onions; however, it was noted that some growers do use hooded sprayers to protect crops.