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The Genus Agastache as Bee Forage: An Analysis of Reader Returns

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The Genus Agastache *as Bee Forage: An Analysis of Reader Returns*[1]

by GEORGE S. AYERS[2] and MARK P. WIDRLECHNER[3]

BEFORE YOU START

If you are considering planting *Agastache* (anise hyssop) for your bees, we offer two pieces of advice crucial for avoiding disappointment. First and foremost, resist unreasonable expectations. The often-quoted figure from Terry (1872) of supporting 100 hives of bees on an acre of anise hyssop is almost certainly an exaggeration. Further, production of over a ton of honey per acre as suggested by Mayer et al. (1982) may be possible, but in our opinion is unlikely to be realized by most beekeepers. In the previous two articles of this series, we suggested 1,000 lbs. of honey per acre as a potential production goal. Consider planting for bees as an investment where the time, effort and resources used to establish the planting represent the amount of initial investment, the cost of land and maintenance as the overhead, and the nectar collected each year as the interest. If you are in this only for the short term, you will likely be disappointed. Planting for bees is a long-term proposition. It is not a panacea, and it is not for everyone.

Second, think of your planting as a ongoing research endeavor that is breaking new ground. To appreciate the significance of this statement, consider two fields of corn. The first is a contemporary corn field that could be found on many modern farms. If the farmer is skilled, there is not a weed in the field, the plants are of uniform height and development and are precisely spaced in uniform rows. The field is lush green and growing "like a weed", efficiently using the water and fertilizer that the farmer has provided.

Now, consider the story we have all heard about the Native Americans teaching the Pilgrims to grow corn. As the story goes, several seeds were placed in small hills that had been made with a digging stick. For best results, each hill was furnished with a fish as fertilizer. We might envision these early corn patches as series of scattered hills, each containing several plants of varying quality, but without the robustness of today's corn. The patch was probably replete with weeds and a variety of other pests. Although this may seem crude by our standards, it represented an improved corn production technology that had advanced considerably over the previous thousands of years. The corn that the Pilgrims planted had already been developed to the point where it had diverged considerably from its original wild progenitors, and it would clearly have been recognizable today as corn.

Native Americans were actually fairly sophisticated when it came to developing crops. By the time they were teaching the Pilgrims how to plant corn, they had developed many strains of corn and other crops (see Smith, 1992). The point is: the corn patch we just envisioned, perhaps a little condescendingly, was well on its way to becoming the corn of today. Most changes that occur as a plant species becomes domesticated (Harlan, 1992) had already occurred. Its ears were fewer and much larger than its progenitors. They retained their kernels until harvest, and the kernels germinated only a few days after planting. Modern corn breeding has intensified these changes and added some new ones as well. Whereas corn might have originally been planted in hills to facilitate pollination, and perhaps to use the fish as fertilizer, it can now effectively be planted

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in rows. It responds very efficiently to the inorganic fertilizer the farmer gives it. It has been selected for minimal adverse effects from the variety of herbicides commonly applied in its production. It has also been selected to be resistant to many corn insects and diseases.

To conclude our analogy, when you make an *Agastache* planting, you are at a stage several thousand years before the "hill and fish" stage of agriculture. *Agastache* are still wild plants without centuries of genetic adaptation to cultivation. There are no cooperative extension recommendations for fertilizer, varieties, or weed control. You are starting on the bottom floor: so don't expect the perfection you see in the modern corn field. The potential for failure is fairly high. You will be working in a research mode, setting your own standards.

Start Small

The next piece of advice is to start small and expand based on your experiences. The plethora of problems that beekeepers shared with us in the July 1994 issue of this column suggests that devoting the effort to establish a single acre of *Agastache* without prior experience would be very risky. One beekeeper in California, for example, invested several thousand dollars and considerable energy attempting to establish a two-acre planting, only to have it disappear within three years, without any return on his investment.

Expand your initial planting as you learn more about what is successful for you. Remember you are working in a research mode. Your initial planting will serve as your first indicator of future problems. It will, for instance, indicate how much weeding will be required. Our experience is that weeding can be daunting for the first two years. We speculate that this is one of the main reasons why few large *Agastache* plantings have been made. Suggestions for weed control follow later in this article.

A small planting can also serve as an indicator of attractiveness to honey bees. As we pointed out in the July article, we are unsure why *Agastache* is occasionally attractive only to bumble bees. Although we believe that this is often related to corolla tube length, we also offered other hypotheses. One of the best ways to determine the attractiveness of *Agastache* under your conditions is to plant a small trial patch and then monitor bee visitation (Ayers et al., 1987; Widrlechner, 1992). In our opinion, the trial should include a minimum of 100 plants, and we suspect that it need not number more than 500. We think this minimum-size recommendation is important for avoiding false negative results because it ensures that enough nectar will be available to "attract the bees' attention."

Among the many dividends that this first small planting can provide should be copious amounts of seeds for later plantings. Seeds can be easily collected by shaking the inflorescences into a bucket, beginning about 30 days after flowering starts and repeating the procedure at two-week intervals until a hard freeze occurs.

Location

Because of the uncertainty associated with local conditions at planting sites, we strongly suggest locating your small test plantings where you expect to make larger plantings. Your test plantings will help you judge the adaptability of *Agastache* to the site. Perhaps the site will be too wet or dry or will have an extreme soil pH. Inappropriate site selection can show itself in several ways. First, the plants may simply grow very slowly or even die. At other times, the plants may grow reasonably well, but the weeds grow even better. It becomes a constant battle to keep weeds from overrunning the *Agastache*. You should expect to provide considerable weed control during the first two years, but if the weed populations have not diminished considerably by year three, consider planting some other crop. Our experience has been that, by the third year, a planting that will be successful over the long-term should be capable of outcompeting most weeds on a suitable site.

Diversify Your Planting

Our experiences indicate that different populations of *Agastache* vary in attractiveness to bees (Widrlechner, 1992), in disease resistance (Fuentes-Granados, 1993), in essential oil composition (Charles et al., 1991), and in their ability to compete with weeds. We speculate that similar genetic diversity also exists for adaptation to different soils and climates. Unfortunately, these qualities will be somewhat site specific, and even the best accessions in our trials may not perform well under other circumstances. Therefore, we suggest making several small plantings from different sources, and then retaining the best for future propagation.

For beekeepers in the western Great Lakes and northern Great Plains states, we suggest that the bulk of your planting should be of *A. foeniculum*. This is its native range (Lint and Epling, 1945) and it has grown well for both of us. One of our respondents from Maine also reported good results with this species, so we would not limit plantings to the Upper Midwest. We caution, however, that Melvin Pellett (1965) indicated that a disproportionately large number of failures of *A. foeniculum* plantings seemed to occur in the eastern United States. From our responses, one from California and two from North Carolina reported difficulty with maintaining plantings of this species.

Both *A. nepetoides* and *A. scrophulariifolia* are native to the eastern United States (Lint and Epling, 1945), but our experience indicates that they grow poorly under open-field cultivation, especially under dry conditions. We speculate that they may be useful for planting in partial shade, such as along woodlot edges, resembling their natural habitat.

We recommend avoiding large plantings of *A. rugosa* for we have both found it to be short lived and research at the North Central Regional Plant Introduction Station (Block et al., 1989; Fuentes-

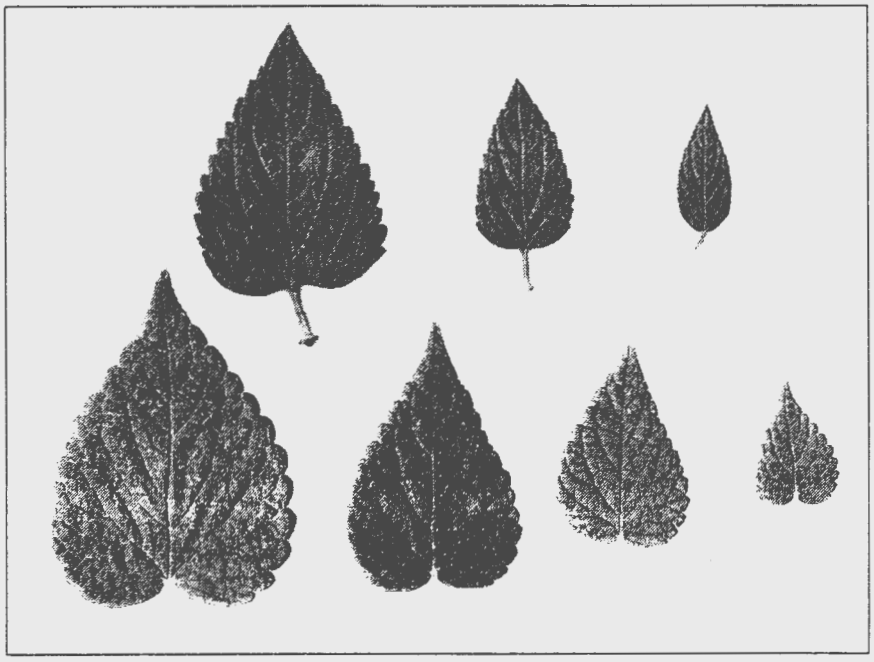

Figure 1 - Leaves of *Agastache foeniculum* (top) and *A. rugosa* (bottom). Photo by E. Van Tassell.

Granados, 1993) showed it to be very susceptible to at least one strain of *Verticillium*. The junior author has seen cut stems of selected varieties of *A. rugosa* with very long, showy inflorescences sold in European flower markets; such selections may be worthy of a small-scale trial in the flower garden.

In the May 1994 article of this series, we described the confusion among some gardeners and nurseries about the proper naming of *Agastache*. One of the most troublesome results of this confusion is that seeds sold as *A. foeniculum* sometimes turn out to be *A. rugosa*. There are several characteristics that can help distinguish young plants of *A. rugosa* from those of *A. foeniculum*. First, the leaves of *A. rugosa* tend to be heart-shaped whereas those of *A. foeniculum* are more arrowhead-shaped (see Fig. 1). The most diagnostic characteristic can be distinguished with a dissecting microscope on the underside of the leaves (see Fig. 2). The undersurfaces of *A. foeniculum* leaves are covered with very short, felt-like hairs, so that the leaf surface is obscured, whereas the undersides of *A. rugosa* leaves are relatively free of hairs.

To assist you in acquiring collections, a list of *Agastache* suppliers is included at the end of this article.

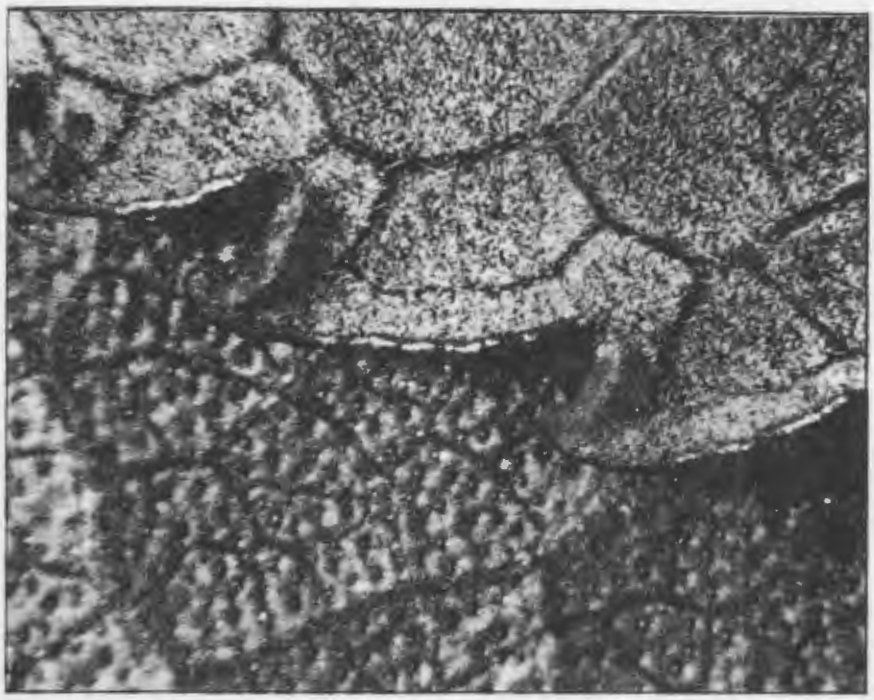

Figure 2 - Leaves of *Agastache foeniculum* (upper) and *A. rugosa* (bottom) as viewed through a dissecting microscope (magnification 6 x 20). In the *A. rugosa* the leaf surface can be seen, whereas in the *A. foeniculum* the surface is largely hidden by the many tiny hairs which give the leaf a felt-like appearance.

Establishment

Agastache needs special attention during the establishment phase. Simply broadcasting the seeds into a poorly prepared field will almost certainly result in failure.

Seeds of wild plants often require cold treatment to promote germination. Although *Agastache* seeds will often germinate without a cold treatment, our experience shows that moist chilling increases both total germination and its synchrony. We recommend placing the seeds between sheets of undyed, unscented paper towels that have been moistened with water and hand-squeezed till no more water drips out. These towels should be folded carefully and placed in plastic bags which should then be held in a refrigerator for about one week. The seeds can then be removed from the towels for planting.

At present, probably the best way to establish *Agastache* is by growing seedlings in flats and then transplanting these to their permanent location. For this purpose, we prefer flats that are partitioned for individual plants. The flats used at Michigan State are partitioned into 1 7/8 inch circular compartments 2 5/16 inches deep and are filled with a 50/50 sandy loam/peat mix. The seeds are placed on the planting mixture's surface and then covered with approximately 1/16 inch of fine peat. The surface must be kept moist till the seeds germinate (usually about a week). The plants are transplanted when they are three to four inches tall. Because initially the plants grow very slowly, this requires six to eight weeks under greenhouse conditions. This is a very labor-intensive procedure, but currently it is the most dependable.

Direct seeding is a possible alternative, but several requirements are absolutely essential for desirable results. The seeds must be planted very shallowly, no deeper than 1/16 inch. Surface planting, followed by rolling the surface with a lawn roller or tamping with a garden rake, generally gives a good planting depth. The seeds require daily moisture during germination and until the roots are well established. This irrigation must be gentle or the seeds will become covered too deeply with soil to germinate. Heavy rain can also cause sufficient soil movement and seed washout to make direct planting undependable.

Pellett Gardens suggested late fall planting in directions they shipped with seeds. One such set of directions reads:

> "Prepare the seedbed in the fall. Then sow the seed on top of the ground either in last weeks before freezeup or anytime during the winter; so the snow, rain and winter freezes will take the small seeds into the soil surface ready to start growing with the coming of spring. When planted, then sprinkle just a little straw or chaff over the seedbed to help keep the surface from crusting and give some protection to the small seedlings while getting started."

Our experience with late fall planting at Michigan State has been that, by spring, sufficient erosion has occurred that the procedure has never given good results. In the same directions as quoted above, they recommend for early spring planting:

> ".....the seed may be sown on a prepared seedbed in the spring (the earlier the better). If planted at this time, rake the small seed to cover very lightly with soil then apply very little mulch to the surface. In many situations, watering of the seedbed will be needed to supplement the natural rainfall during the critical germination period. Use sprinkler or soil soaker to apply the water slowly."

We think variations of this spring planting procedure could work if spring rains were gentle and if light irrigation were available almost daily. We recommend that, instead of raking the seeds into the soil, the seed bed be rolled with a lawn roller or tamped with a garden rake after sowing the seed on the soil's surface. We fear that raking will bury many of the seeds too deeply for good germination. If you attempt one of these direct-seeding procedures, we suggest sowing the seeds in rows, rather than broadcasting, to facilitate weeding later in the growing season.

Early in the Michigan State Bee Forage

Project it became clear that conventional direct-seeding produced inconsistent results. Transplanting was an option, but it required greenhouse space and was very labor intensive, especially if no transplanting equipment was available. The hours of labor involved in growing and hand transplanting approximately 40,000 plants for an acre planting are staggering. As a result, research is underway at Michigan State University to develop dependable direct seeding methods, not only for *Agastache,* but also for other small-seeded species that are exceptional bee forages. The most promising procedure at present is a modified plug-planting procedure. Flowers, herbs, and vegetables are sometimes started in divided flats similar to those described above, except that each compartment is typically only 9/16 inches square and 3/4 inch deep. Transplanting from these flats is often referred to as plug planting because of the small plug of planting medium that accompanies the plant during transplanting (Ball, 1991). Commercially-available planting medium (plug mix) is usually composed of fine peat, vermiculite or a similar material, fertilizer, pH-altering chemicals, and perhaps wetting agents. The procedure being developed at Michigan State differs from the preceding one in that the plug mixture, instead of being placed in plug flats, is placed directly into holes in the plot that are made by pressing a No. 9 rubber stopper into soft soil (see Fig. 3). Each approximately 30 ml (a heaping tablespoon) plug is dropped into the hole through a tube fitted with a funnel on one end (see Fig. 3). The plug mix is then compacted with the rubber stopper that is attached to the tube at the end opposite the funnel. In this procedure, seeds are mixed together with the plug mix so that approximately 25 seeds are delivered with each 30 ml plug. Water is added to the mixture just to the point that only a drop of water can be hand squeezed from a fist full of mix. The seeded plug is chilled to 40ºF for one week and then is kept at room temperature for 2-3 days before planting to initiate germination. Many of the plots in the diversionary planting described by Ayers et al. (1991) were planted with this procedure. Because germinating seeds are planted, the procedure should theoretically shorten the germination period in the field. This has not been the case, though, and final field germination takes longer than if the seeds were left to germinate undisturbed in the container in which they are pregerminated. We do not understand the cause for this phenomenon. Although this procedure has worked relatively well at Michigan State University, it is not foolproof and there have been failures. Timing of the pregermination period is critical. The plugs should be planted just prior to seedling emergence. Beyond that point, favorable results diminish quickly. The plugs may desiccate in the field, especially during hot weather. Also, hard rains may bury the plugs and inhibit germination. To reduce desiccation, research at Michigan State is now testing superabsorbent hydrogels to modify the plug medium (Wang & Gregg, 1990). These gels can absorb hundreds of times their weight in water (see Fig. 4). Although addition of these gels has improved germination in preliminary trials, it has not yet made the plug planting procedure foolproof.

Weed control

Although weed control is the last major topic covered in this article, it is by no means the least important. Weed control can make or break a bee forage planting and you must plan for it from the start. One of the big differences between the modern corn field described earlier, and a planting of *Agastache*, is weed control. Nearly all corn plantings are protected from weeds by one or more very effective herbicides. For the most part, there are no herbicide counterparts for an *Agastache* planting, so you must rely largely on weed control practices that were used before the introduction of herbicides. Before this, the main techniques for combatting weeds were tillage, cultivation, crop rotation, fallowing, covercropping, hand weeding and sanitation. Fortunately, modern technology has added a few tools to this list that may be enlisted by the *Agastache* grower.

The planting area must be free of competing weeds. Planting into a field with established, living plant cover will not be successful. It is possible to sterilize the soil prior to planting. Initial weed control in the diversionary planting (Ayers et al., 1991) used this procedure. The chemicals that accomplish soil sterilization, however, are very toxic, environmentally damaging, and often require EPA certification for use. Unless you already have experience with these chemicals and the equipment to apply them, we suggest that you consider this alternative no further.

When selecting alternative weed control strategies, a few less noxious chemicals are available that can be of considerable help. There are herbicides, primarily formulations of glyphosate (Roundup®), that can be used to kill most preexisting vegetation. Although glyphosate kills most actively growing vegetation, it does nothing to the many seeds that lie dormant in the soil. Areas cleared with glyphosate often become infested with weeds that develop from these dormant seeds. For this reason, later weed control must also be considered. Despite glyphosate's shortcomings, it is the fastest way to destroy an established perennial weed stand, such as quackgrass sod. Plowing, followed by several cultivations which are timed to remove developing shoots from their root systems and thus force the root systems to deplete their stored energy reserves, is an alternative to glyphosate for initial clearing.

It is often desirable to plant a covercrop that can suppress weeds (Sustainable Agriculture Research and Education Program, 1993). This is particularly true where herbicides are not relied upon as the main method of weed control. These covercrops function either by direct competition, or by producing chemicals that act as herbicides, i.e. are allelopathic. Grain rye is among the best known of the allelopathic covercrops, but it might interfere with *Agastache* because it may interfere with germination of small seeds (Sustainable Agriculture Research and Education Program, 1993). Buckwheat, also considered to be allelopathic, will probably be of more interest to beekeepers, because under some conditions, it is also a good nectar producer (Anonymous, 1945). Jablonski

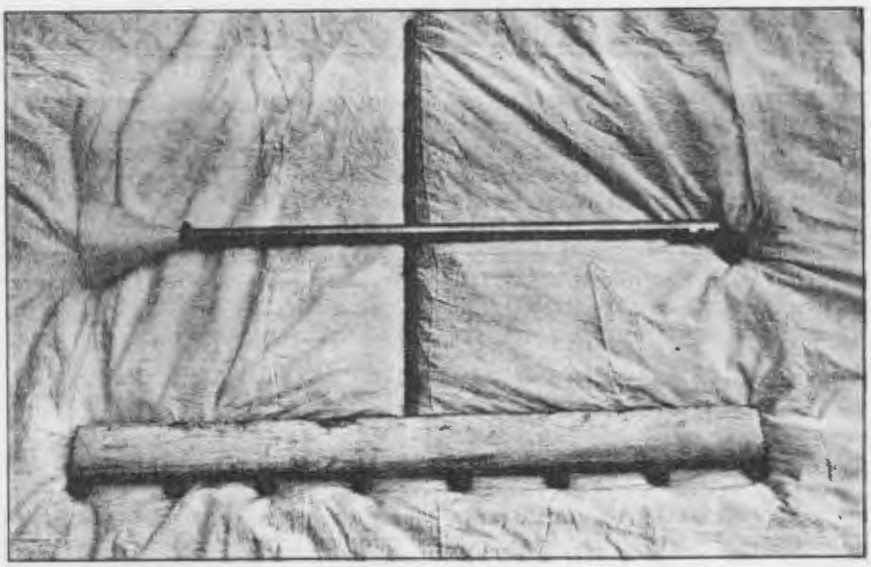

Figure 3 - Simple equipment used to plug plant the plots for the diversionary planting study by Ayers *et. al.* (1991).

(1986) reported honey potentials of 81 to 441 lbs. per acre (average 179 lbs. per acre) over a six year period for buckwheat in Poland.

One respondent from Massachusetts reported success with two techniques that employed buckwheat. In the first and more reliable procedure, a buckwheat cover was established and maintained for several years prior to anise hyssop establishment. In the second procedure, seeds of anise hyssop and buckwheat were planted together. The respondent warns that the second procedure is very touchy and in his words, "This (procedure) calls for very close and careful balance in mixing and sowing, the ever little too much buckwheat and the whole thing fails!" Even after applying glyphosate to kill established perennial weeds, a year or two with an allelopathic covercrop such as buckwheat may be advisable because it probably will help control broadleaf weeds that are derived from the dormant seed bank that glyphosate misses. The only postemergence herbicide for established *Agastache* plantings we have tried is fluazifop-P-butyl (Fusilade ®). This herbicide will only control grasses, though, and some type of broadleaf control will still be needed. There are probably preemergence herbicides that could be applied to *Agastache* plantings especially during or just prior to transplanting, but most of these are not labeled in such a way that they may be legally applied to *Agastache*. In addition to labelling, beekeepers should keep in mind that herbicides used in bee pasture during the flowering season may interfere with honey bee foraging. Elliott et al. (1979) reported that honey bees are repelled by many common herbicides.

For broadleaf weed control, alternatives to pre-emergence herbicides include forms of mechanical cultivation, hand weeding and mulching. Weeds can be removed mechanically in many situations, so plan for this before you plant. *Agastache* plants can be spaced closely enough so they will close canopy by the end of the second year and provide for much of their own weed control thereafter. We suggest that a spacing of both a foot within and between rows is about right for rapid canopy closure. By the start of the second year, *Agastache* crowns should be about three to four inches wide. This leaves only about eight inches of space to cultivate, which during the second year, will continue to diminish. This situation restricts the use of many kinds of cultivation equipment and it may be necessary to increase row width but, in our opinion, this tradeoff against early canopy closure should be avoided whenever possible. To facilitate cultivation, it is important that the rows be straight. At Michigan State, plants are sometimes spaced in a regular foot-by-foot grid so that plants can be cultivated in both directions.

Galambosi and Galambosi-Szebeni (1992) reported an 80% reduction in manual labor for weeding by using ridge cultivation. Presumably, their procedure resembled "hilling" that is often done in potatoes where soil is mounded from between the rows up around the plants. In potatoes, this practice serves as a weed control strategy but, more importantly, it covers the potato tubers and keeps them from "greening". This practice would only be useful after the *Agastache* plants were about four inches tall. In the Galambosi and Galambosi-Szebeni (1992) paper, the plants were transplanted and therefore allowed almost immediate ridging.

At Michigan State University, mulching is also used to control weeds in selected *Agastache* plantings. This is a very labor-intensive procedure but, in addition to weed control, it seemed to provide a desirable microhabitat for *Agastache* at two sites at Michigan State. Finding sufficient mulch for very large areas is often a problem. At Michigan State, the university grounds crew delivers several loads of leaves from their annual fall leaf-gathering program. Large quantities of leaves might also be available for this purpose from local municipalities. The plots in the initial Michigan State University bee forage screening study (Ayers et al., 1987) were mulched with leaves obtained from a local municipality. Galambosi and Galambosi-Szebeni (1992) found that a black plastic mulch reduced manual labor associated with weed control by 80%. Porous materials that allow water to percolate through them are also available for this purpose. In addition to the extra expense incurred with these types of mulch, it is possible that they would also interfere with expansion of the *Agastache* crown and thus retard canopy closure.

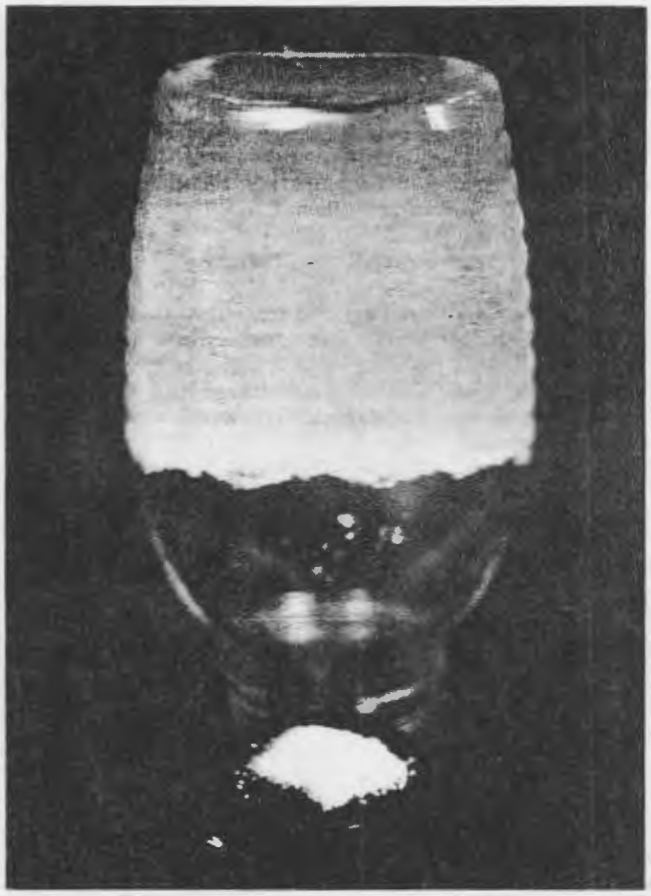

Figure 4 - Viterra AGRI-GEL® in a hydrated and dry state. A small amount of dry jel equal to the amount on the jar cap (2g) was expanded with 400 ml of water to form the material inside the standard two pound honey jar.*

In closing this section, we offer the following suggestion concerning a different aspect of weed control. Many roadside vegetation managers are searching for alternatives to herbicides for weed suppression. Management programs that emphasize the protection and re-establishment of native vegetation along road rights-of-way instead of indiscriminate herbicide application are becoming popular (Ehley, 1992; Jacobson et al., 1992). Considering the vast areas occupied by highway rights-of-way, it might be worthwhile for beekeepers in the Upper Midwest and northern Great Plains, where *A. foeniculum* is native, to encourage roadside vegetation managers and state nurseries to add *A. foeniculum* to their lists of plants used for revegetation. The proper choices of roadside wild flowers and cutting schedules could supplement cultivated bee forage and thus benefit beekeepers.

* Brand names are necessary to report factually on available data; however, the USDA and cooperating agencies neither guarantee nor warrant the standard of the product, and the use of these names implies no approval of these products to the exclusion of others that may also be suitable.

List of seed and plant suppliers

The following list of seed and plant suppliers is arranged alphabetically. The list has been compiled primarily from the listing provided by Andersen Horticultural Library (Isaacson, 1993) and from van Hevelingen (1994). Headings for each company indicate what that company expects to offer during 1995. Northern readers should beware that, with the exception of *A. foeniculum, A. rugosa, A. scrophulariifolia, A. nepetoides* and *A. urticifolia* and their cultivars (probably 'Blue Spike', 'Alba' and 'Snow Spike'), the offerings listed below are not likely to be very winter-hardy. We have no experience with these southern plants, but van Hevelingen (1994) describes them largely as zone 7 and 8 plants. They may, however, be good choices for southern or southwestern beekeepers.

Burpee, W. Atlee, and Co.
[Offers *A. foeniculum* (seeds)]
300 Park Avenue
Warminster, PA 18974

Canyon Creek Nursery
[Offers *A. mexicana* and the hybrids 'Pink Panther' and 'Apricot Sunrise' (plants)]
3527 Dry Creek Rd.
Oroville, CA 95965

Carroll Gardens
[Offers *A. foeniculum* (plants)]
444 East Main St. P. O. Box 310
Westminster, MD 21157

Dyas Roberts
[Offers *A. foeniculum* (seeds)]
Box 145
LaGrange, MO 63448-0145

Fieldstone Gardens, Inc.
[Offers *A. scrophulariifolia* (plants)]
620 Quaker Lane
Vassalboro, ME 04989

Forest Farm
[Offers *A. foeniculum* and *A. urticifolia* (plants)]
990 Tetherow Road
Williams, OR 97544

Goodwin Creek Gardens
[Offers *A. foeniculum* and *A.f.* 'alba' (seeds) and *A. coccinea* and hybrids 'Firebird' and Tutti-Frutti' (plants)]
P.O. Box 83
Williams, OR 97544

High Altitude Gardens
[Offers *A. urticifolia*(seeds)]
P. O. Box 1048
Hailey, ID 83333

Hudson, J. L. Seedsman
[Offers *A. foeniculum* and *A. nepetoides* (seeds)]
P.O. Box 1058
Redwood City, CA 94064

Landscape Alternatives, Inc.
[Offers *A. foeniculum* (plants)]
1465 N. Pascal St.
St. Paul, MN 55108

Logee's Greenhouses [Offers *A. foeniculum* and hybrids 'Firebird' and 'Tutti-Frutti'(plants)]
141 North St.
Danielson, CT 06239

Mellinger's Inc.
[Offers *A. foeniculum* (seeds and plants)]
2310 W. South Range Rd.
North Lima, OH 44452

Nichols Garden Nursery [Offers *A. mexicana* (seeds)]
1190 N. Pacific Hwy.
Albany, OR 97321

Plants of the Southwest
[Offers *A. cana* (plants and seeds)]
Agua Fria, Rt. 6 Box 11A
Sante Fe, NM 87505

Richters [Offers *A. foeniculum* and *A. rugosa*(seeds and plants)]
357 Highway 47
Goodwood, Ontario LOC 1AO
Canada

Sandy Mush Herb Nursery [Offers *A. foeniculum, A. aurantiaca, A. coccinea, A. cana, A. rugosa, A. mexicana* and the hybrids 'Apricot Sunrise', 'Firebird', 'Pink Panther', and 'Tutti-Frutti' (plants)]
316 Surrett Cove Rd.
Leicester, NC 28748-9622

Shady Acres Herb Farm
[Offers *A. foeniculum* (plants)]
7815 Highway 212
Chaska, MN 55318

Stokes Seeds, Inc.
[Offers cultivars 'Blue Spike' and 'Snow Spike'(seeds)]
Box 548
Buffalo, NY 14240

Sunnybrook Farms [Offers *A. foeniculum* and *A. mexicana* and cultivar 'Blue Spike'(plants)]
9448 Mayfield Rd., P. O. Box 6
Chesterland, OH 44026

Thompson and Morgan [Offers *A. foeniculum, A. mexicana* 'Champagne', and a mixture called 'Fragrant Delight' (seeds)]
P.O. Box 1308
Jackson, NJ 08527

Wrenwood of Berkeley Springs
(Offers *A. foeniculum, A. rugosa* and a cultivar called 'Camphor'(plants)]
Rt 4 Box 361
Berkeley Springs, WV 25411

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