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DISK CLEARING BEHAVIOR OF THE RED HARVESTER ANT, *POGONOMYRMEX BARBATUS* SMITH[1,2]

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Huei-Jung Wu (1990) Disk clearing behavior of the red harvester ant, *Pogonomyrmex barbatus* Smith. *Bull. Inst. Zool., Academia Sinica* **29**(3): 153-164. The paper gives a detailed analysis of the behavior that *Pogonomyrmex barbatus* workers display as they establish and maintain the barren disk on their nests. The ants invest considerable time and energy each year from March to May to clear all plants and non-plant matters on their nest surface by subdividing the materials into small pieces that are transportable by 1-3 ants at a time. Tough, large, solid material is left on the disk. Live animals are driven away or killed and removed. Semiliquid or sticky matter is covered up by dumping gravel or bits of earth on it. Various skills and methods are applied by the ants to subdivide and to transport plants and non-plant matters. The regular sequence of disk clearing is from the side nearest the center nest entrance to the side farthest from it. There is a tendency for the denuded disk to have a circular shape, playing an important role in minimizing disk clearing costs. The disks are kept denuded throughout the foraging seasons from May to November. They are obscured by encroaching grass during the ants' winter dormancy from late November to the ensuing February.

Key words: Disk clearing, Harvester ant, Ant's behavior.

Pogonomyrmex barbatus Smith is one of the most abundant and specialized species of Western granivorous ants in the United States (Cole, 1968). The unusually large nests of this ant are usually found in hot, grassy plains. The nest itself is constructed in the ground and, in general, has a cleared disk, 1-3 m in diameter, over the nest (Fig. 11). 1-6 smooth ant trails, 5-15 cm wide, radiate from the disk to distances of 10-50 m (Wu, 1989). The workers of this ant mainly collect seeds for food along the sides of ant trails. Wheeler (1960) suggested that the cleared disk is an adaptation for getting more heat from the sun to incubate the brood in the nest and to secure maximum dryness of seeds stored within. In view of the great abundance of this ant in many areas of the United States and their considerable ecological importance, surprisingly little has been learned to the present concerning the ecology of their annual disk clearing behavior. The amount of work involved each year in the process of the spring disk reconstruction is truly immense. Prior studies of how *P. barbatus* clears plants and non-plant matters from

1. The worker of *Pogonomyrmex barbatus* must have the spirit of the pioneers of the American backwoods to accomplish the clearing of their large nest disk (McCook, 1879).
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their nest surface are almost non-existent.

This paper gives an analysis of the behavior that *P. barbatus* workers display as they establish and maintain the disks of their nests.

METHODS

Partitioning plant and non-plant matter

Plants and non-plant matters have commonly seen strewn or encroaching onto the surface of 106 *Pogonomyrmex barbatus* nests at Brackenridge Field Laboratory (BFL) of the University of Texas at Austin during the ants' winter dormancy in 1985 were sorted into characteristic types as listed in Tables 1–2. Observations as to how the ants cleared each type of plants and the scattered debris were made in early March through late May of 1986, when the ants were devoting themselves to their annual disk reconstruction. For observation of the ants' clearing behavior, three median-sized samples of each of the most common 15 species of plants were chosen, including *Bromus unioloides*, *Poa annua*, *Medicago polymorpha*, *Torilis arvensis*, *Cenchrus incertus*, a species of mosses, a *Paspalum* species, *Evax verna*, *Gaura parviflova*, *Sonchus asper*, *Torilis arvensis*, *Lupinus texensis*, *Euphorbia prostrata*, *Draba cuneifolia* and *Galium aparine*. The location of each plant on the disk was marked by hammering a prenumbered iron nail (8 cm in length) into the ground at the base of the plant. The process by which each plant was cleared by the ants was observed and analyzed. The following observations were recorded using a tape recorder: 1) the parts of the plant, if any, that were attacked first; 2) whether the plant root system was attacked or destroyed; 3) whether all or part of the plant was subdivided into small pieces; 4) what parts, if any, were left; 5) what the fate of the remaining parts was under natural conditions and what the ants did later with these abandoned parts; and 6) what behavior and techniques were used in subdividing the plants and in transporting the debris. A 10X hand lens was used to aid in the observations. An

Table 1
Material commonly seen strewn or encroached onto the nest disks of *Pogonomyrmex barbatus* at Brackenridge Field Laboratory during the ants' winter dormancy

Category	Subdivision	Common examples	Quantity
Plant matter	Live plants	Grass, weeds, mosses, shrubs	80%
	Fresh, dry, or decaying pieces of plants	Perfect and imperfect seeds or fruits; glumes, seed coats or shells, chaff; blades or leaves; roots, culms, stems, twigs, or stems, twigs, or stumps; different sized pieces of wood	>10%
Non-plant matter	Organisms	Live or dead insects	<10%
	Solid substances	Snail shells; gravel or stone; human garbage (discarded food, empty cans, cigarette butts; pieces of cotton, cloth, sponge, paper, plastic or metal products, etc.)	
	Semiliquid or sticky substances	Viscous matters discarded by humans; webs of ground spiders, sink-sand insect traps	

Table 2
Three types of plants that the workers of *Pogonomyrmex barbatus* cleared or tried to clear in the spring

Type of plant	Characteristics of the plants[a]	Examples
I-a:		
Very young plants	Plants less than 5 cm high; leaves or blades soft; stems or culms soft and less than 3 mm in diameter; roots soft and not deeply rooted	Young plants of most local species
I-b:		
Young plants	Plants more than 5 cm high or wide; leaves or blades soft; stems or culms moderately soft and less than 5 mm in diameter; primary roots moderately soft and moderately deeply rooted	Most young plants of Gramineae and weeds
II		
Mature plants	Leaves soft, moderately soft, or tough; stems or culms tough and more than 5 mm in diameter; primary roots moderately soft or tough and deeply rooted	Many mature plants of Gramineae and weeds
III		
Young or mature	Leaves soft, moderately soft, or tough; stems very tough and not slender; primary roots very tough and deeply rooted	Most young or mature shrubs and all trees

[a] Soft=can be separated into pieces by the ants with little effort;
moderately soft=can be separated into pieces by the ants, but needs some degree of time and effort;
tough=not easily separated into pieces, even with great time and effort;
very tough=cannot be separated into pieces by the ants.

assistant protected the observer from being stung. The process of subdividing common non-plant matter was also observed in a method similar to that described above. All of the above observations were made daily between 900–1700 h throughout the spring.

Transporting the debris

The transport of the subdivided pieces of plant and non-plant materials to dumping sites was studied by observing 250 randomly selected cases at a large nest in the field during the spring of 1986. The methods the ants used to transport each of the 250 pieces of debris were recorded on a tape recorder, and the dumping site of each piece in the developing disk was mapped. All of the 250 dumped pieces were collected where they were discarded, and each was put separately into a prenumbered plastic bag. The collected pieces were sorted into groups according to the general methods used to carry them, and each group was analyzed with regard to shape, length and weight.

In order to know whether the ants remove heavy debris cooperatively, the following material was placed onto the disk: 1) a dead beetle (weighed 126 mg), 2) a long (9.3 cm), slender metal wire, 3) a cigarette butt (3 cm in length), 4) a piece of sponge (about 8 cm^3), 5) a plastic slipper, and 6) various sized stones ranging from 20 mg to 350 mg (placed on the nest entrances). The ants' reaction to such heavy debris was observed and recorded.

RESULTS

Partitioning live plants

Type I-a plants (see Table 2 for the definition of each type of plant) were usually attacked by 1–3 ants simultaneously. Type I-b plants were attacked by several to full gangs of ants (defining one gang equal to 5–15 ants). Type II and type III plants almost were always attacked by gangs. In general, the site of attack was random, but often more ants clustered at the junction of the plant stem to the root system (Fig. 1).

In partitioning or cutting a type I-a grass, the ants usually cut the blades and the culm into small pieces of about 1–5 cm long, reducing the whole plant to the ground. The young leaves of a type I-a, non-grass plants were cut at the pedicels. The removed leaves were not further separated into smaller pieces, but the soft stem was cut to the ground. The root systems of all type I plants were severely attacked. The dirt near the roots was scraped out, and soft primary roots were cut. The remaining rootlets were thus exposed to sunlight, rain and wind. Within several days to a few weeks, depending on the plant, the whole root system subsequently deteriorated and was later removed by the ants.

The soft blades of a type II or a type III grass were also cut into small pieces, but the stem was not cut to the ground. Only the very tops of type III plant stems were cut. The remaining lower parts were left in the soil. However, most parts of the moderately tough stems of type II plants were cut into pieces, leaving just the very bottom parts untouched. At the same time, the leaves and units of inflorescence were separated from the plants by cutting the pedicels. The spikelets were removed by cutting the rachilla, which connects the seeds to the stems or culms. The root systems of all type II or type III plants received the same treatment as those of type I plants described above. The remaining parts of stems, together with the exposed root systems, suffered natural deterioration and were later removed easily by the ants. All leaves of type III plants were stripped from their tough stems, which were left untouched. The large and tough root systems of type III plants were not attacked, but all new leaves that subsequently developed were stripped off. Under such treatment the plants usually did not die but nor did they grow in size either. In cases when leaves were broad and tough, and the pedicels were also very tough, the ants, instead of cutting the pedicels, destroyed leaves by stripping off the epidermis and/or parts of the leaf mesophyll. Once the leaves became wilted and dried, they separated from the plant at the abscission point. Such fallen, dry leaves were then easily removed by the ants. In other cases, some of the decayed and/or fell stumps were still too heavy for 1–3 ants to remove (Fig. 7). In these cases the decayed stumps were left in the disk, where they gradually dried out and could be split into small pieces by the ants (Fig. 2).

Separating skills used by the ants

In order to cut a piece of soft and slender blade, stem, pedicel or rachilla, the saw-like edges of the worker's mandibles were applied to the plant, which finally yielded under a process of combined sawing, biting, pulling and twisting. The sawing process was not very noticeable, but the biting, chiselling, tearing and pulling were quite apparent. For example, to cut a piece of grass blade, the ant frequently swung itself to the underside of the blade, pressed its abdomen upward against the surface, and in this tight grip tugged violently at the abrasion already made. The ants also availed themselves of the mechanical advantage of twisting. Firmly grasping the blade, stem, pedicel or rachilla with its mandibles, as with a pair of pincers, it managed to sway the object back and forth and around, the additional strain thus weakening the strength of the fibers (Fig. 6). Usually it took several minutes for an ant to cut a small piece of soft, slender blade.

When cutting a moderately soft but thicker culm, several ants often worked together. The ants grasped the fiber of the first sheath of the culm with the sharp tips of their mandibles and separated the fibers through a combination of biting, paring and gnawing. The fibers were thus gradually broken, and once part of the sheath was loosened, it was then pulled or torn by the ants. After the first sheath was stripped, the ants began to work on the second, the third and so on until the stem was cut into pieces. The whole process was similar to that a man using a pair of small pincers (with saw-like edges and sharp tips) to cut a piece of stem from a banana tree. Three marked ants spent nearly 2 hours cutting 3 pieces of culm (about 5 mm in diameter and 2–3 cm long) from a mature *Bromus unioloides*. The ants paused 43 times within 2 hours (on average each ant paused about 7 times per hour). Each ant worked a few minutes, left for a while, and then returned to work again. However, those that had held at the roots were quite constant in their labor. McCook (1879) also observed the similar behavior.

When working on root systems, the ants usually worked with their heads downward, even thrust a little into the soil (Fig. 1), cutting close to the roots where they joined the culm or stems. The process was accomplished by pushing the anterior tips of the closed mandibles forward and/or up against the soil, thus raking up the soft earth. At the same time, the fore-legs were used for scratching up the soil as a dog digs for a buried bone. Biting, twisting and chewing were also used in cutting the roots, after the soil had been removed from between the gnarled rootlets, the coarse and tough roots were left on the disk where they underwent natural deterioration.

To remove the deteriorating root systems together with the attached drying stem, the ant usually grasped the stump near the roots with its mandibles and extended its meso and meta-thoracic legs from the body at an angle of about 45° or less. Bent, and with its abdomen pressed firmly, the ant swung its body violently. In this position and action the ant followed the motion of the loosening roots, tugging back and forth or left and right, until the decaying roots were completely drawn from the ground. In cases when the drying stump and attached root systems were too big or too heavy for an ant to draw out from the ground, the stump was left on the disk until it became very dry. It was then either split naturally or was separated into smaller pieces by the ants. In the latter case, the ant usually applied the saw-like edges of its mandibles to the thinner edges of the stump, thus breaking the whole stump into pieces (Fig. 2).

When the pedicels supporting the leaves were too tough for the ants to cut, they used the edges of their mandibles to bite, gnaw, chew, pare, push, pull or twist the leaves until they were gradually broken into pieces, or a large part of the epidermis and mesophyll were stripped.

Partitioning non-plant matters

In general, the ants used skills similar to those described above to separate most soft non-plant matters as listed in Table 1. Harder or larger objects (i. e., stones, plastic, metal items or wood, etc.) were not subdivided at all, and were simply left where they were. Some interesting cases observed were: 1) faced with a snail shell filled with soil, the ants first scratched the soil out of the shell before moving it (Fig. 3); 2) intruding small insects, such as ants, were usually driven away or killed and decapitated from the cervix before removal; 3) encountering webs made by ground spiders, viscous matters (such as honey), and sink-sand traps made by ground trap-making beetles or ant lions, the ants threw pieces of earth, gravel or any other debris taken from around the disk onto the problem area, sometimes completely burying them.

The removal of transportable debris

Two categories of transportable, subdivided debris were distinguished in the 250 recorded pieces carried and dumped by ants: 1) light debris (each piece of which weighed less than 150 mg and was removed by only one ant at a time), and 2) heavy debris (each of which weighed more than 190 mg and was removed by more than one ant). All the transportable pieces had at least one dimension smaller than the widest open length of the mandibles of a worker ant (1.5–2.0 mm). The light debris was further sorted into three groups according to shape, length, weight and method of transport:

1) Group I: Seeds and seed-like debris (fragments of stone, wood, plant parts, gravel, pebbles, snail shells and short, round insects). Typically, Group I debris was at two shape variations: less than 1 cm long and generally round or elipsoid; or less than 3 cm long but roughly fan-shaped. To transport a piece of debris such as a round seed, the ant usually grasped the sharp side of the seed with the tip of its opened mandibles. This was followed by a series of movements to adjust the burden for convenient carriage. The ant pulled at the seed husk with its mandibles, turning and pinching it on all sides. After making satisfactory adjustments, the body was raised by straightening out the legs, the abdomen was curved underneath, and the apex applied to the seed, which was then lifted a little distance above the ground surface (Fig. 4). The ant could then walk forward, carrying the seed to the dumping site. When the debris weighed more than 60–90 mg (9–13 times the weight of a single ant) and the ant had difficulty lifting it, the narrower side of the material was grasped, the body stiffened, and movement to the dumping site accomplished by violent, backward tugging. Most of the fan-shaped pieces were removed in this way.

2) Group II: Long slender debris (longer than 1 cm and less than 2 mm in width, including pieces of stem, blade, sheath, pedicel, wood, etc.) was usually grasped in the mandibles about 1/4 to 1/3 the distance from one end of the material, and held by the "neck" and one of the fore-legs so that it was positioned under the body and between the legs of the

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Fig. 1. The ants were attacking a grass plant at the sites near the root system. Bar: 6 mm.
Fig. 2. An ant was subdividing a dried and crispy stump into smaller transportable pieces. Bar: 3.5 mm.
Fig. 3. An ant was scratching the soil out of a snail shell before moving it. Bar: 2.8 mm.
Fig. 4. An ant was doing the adjustments before transporting the seed. Bar: 1.8 mm.
Fig. 5. An ant was transporting a long, slender, dried blade. Bar: 3.5 mm.
Fig. 6. The ants were cutting a grass plant. Bar: 5 mm.
Fig. 7. An ant was removing (drawing) a decaying stump. Bar: 4.5 mm.
Fig. 8. An ant was tugging a heavy stump. Bar: 2.4 mm.
Fig. 9. The ants were transporting a cigarette butt. Bar: 12 mm.

worker. The ant then walked forward, carrying the material while straddling it (Fig. 5). When a piece of long debris was too heavy (more than 60–90 mg) or too wide (more than 2–3 mm) for an ant to accommodate it beneath its body while walking, it usually grasped the narrower side of the material and tugged at it violently while moving backward to the dumping site (Fig. 8).

3) Group III: Leaf-shaped debris (leaves of variable size and dryness, etc.). All pieces of leaf-shaped debris smaller than an ant were simply lifted and carried to the dumping sites. All bigger pieces were grasped at one side by the mandibles of the ant, and tugged away.

As a rule, most of the transportable pieces were carried by only one ant at a time. Yet some interesting cases of co-operating behavior in removing heavy debris were observed, as following. 1) A dead beetle was carried by 2 ants. Each ant grasped the end of a leg of the beetle and tugged violently while moving back-ward to the dumping site. 2) A long (9.3 cm) slender metal wire was moved by 3 ants at the same time. The 3 ants walked astride the wire, as described above, positioned approximately at 1 cm, 3 cm and 6 cm distances from one end of the wire (Fig. 10). 3) A cigarette butt was moved by 30–40 ants at the same time. The butt was moved in varying directions, depending on which side was being pulled by more ants at a particular time, as in a tug of war contest (Fig. 9). In this way, it was finally transported to the east side of the disk. 4) Many ants were observed futilely attempting to tear apart a sponge. The sponge was ulti-mately left in the disk, and was later blown away by the wind. 5) A plastic slipper was placed on the disk. The ants ran around it, touched it and climbed over it, but none of them tried to cut off pieces or to remove it. Gradually the ants ceased to respond to the slipper, and it was left where it had been placed. 6) When a nest entrance was obstructed by a small stone, 1–3 ants cooperated in removing it; if a larger stone was used, such that 3 ants working together could not remove it, a new opening was made. Usually the ants within the nest were the first to penetrate an obstruction. In 20 experiments, the author observed as many as four ants jointly attempting to remove a stone, but with little positive result. Five small fragments of rock carried by individual ants were weighed using an electric balance. They weighed 28.3, 39.5, 50.7, 53.7 and 68.6 mg, respectively, i. e., from 4 to 10 times the weight of a single ant. In one case an ant was seen carrying a long distance a pebble that weighed 116 mg (more than 17 times the weight of a single ant). The heaviest stone that was observed to be coopera-tively moved, in this instance by three ants, weighed 154 mg.

The dumping sites

The dumping sites of the subdivided debris are shown in Fig. 12. In general, the dumping sites (Tkm or Ds in Fig.

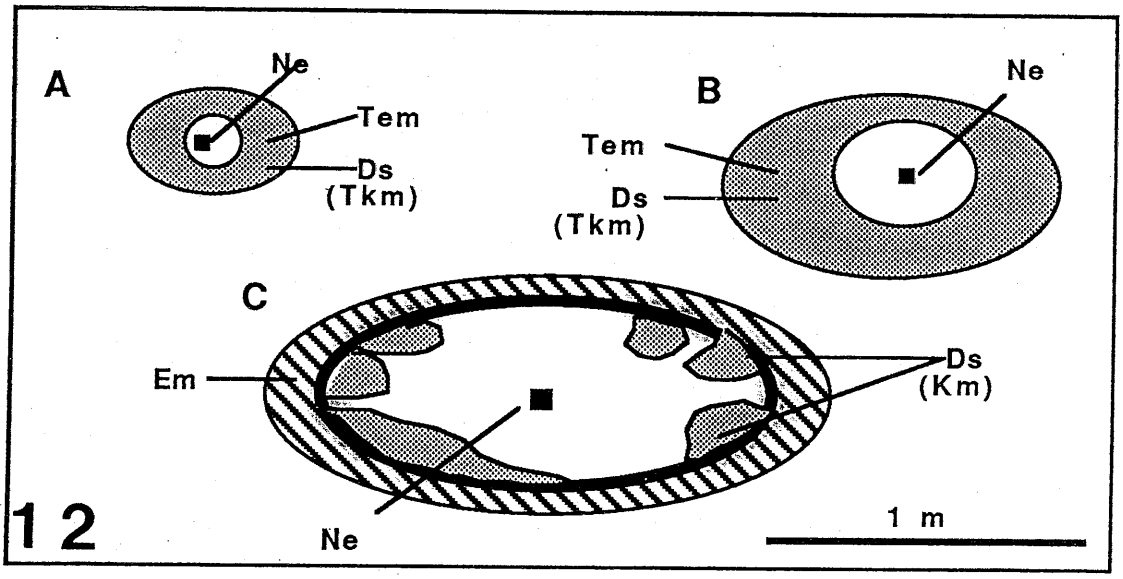
Fig. 10. The ants were transporting a long, slender metal wire. Bar: 2.4 mm.

Fig. 11. Parts of a nest disk showing numerous ants of *Pogonomyrmex barbatus* were cutting the grass to expand their disks in the spring. Bar: 25 cm; Em: the extending margin; Fbs: the flat bare space; Ne: the center nest entrance.

Fig. 12. Figure shows the changing status in the developing disk of a nest of *Pogonomyrmex barbatus* during the period of disk reconstruction in the spring. Fig. 12-A: the disk on March 11; Fig. 12-B: the disk on March 27; Fig. 12-C: the disk on May 14. Ds: debris dumped on the dumping sites (Tkm: temporary kitchen midden or dumping site; Km: permanent kitchen midden or dumping site); Em: permanent extending margin; Ne: center nest entrance: Tem: temporary extending margin.


10


Fbs
11


A
Ne
Tem
Ds
(Tkm)
B
Ne
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(Tkm)
C
Em
Ds
(Km)
Ne
1 m
12

12-A; Tkm or Ds in Fig. 12-B; and Km or Ds in Fig. 12-C) were located in varying positions around the center entrance (Ne in Fig. 12), gradually moving outward during the period of disk clearing in the spring.

The regular sequence of disk clearing in the spring

In general, the regular sequence of disk clearing was from the side nearest the center nest entrance to the side farthest from it (Fig. 11). The precedence of clearing appeared to be the area around the center entrance (Ne) first, then the flat bare space (Fbs) and finally the extending margin (Em) (Fig. 11). The kitchen midden (see Tkm and Km in Fig. 12) or the dumping sites (see Ds in Fig. 12), changed during this period as described above. As a result of the above stated clearing operation, the disks were fully expanded to a size of 1.0–3.0 m in diameter in early May, and most of the disks had a circular shape. The disks were maintained in their denuded state throughout the foraging seasons from late May to mid-November. During this period, no plant was allowed to grow on the disks. The ants retired to the nests when the weather became cold. The disks were obscured by encroaching grass during the ants' winter dormancy from late November to the ensuing February.

DISCUSSION

Observations of the ant disk clearing behavior showed that, in general, the ants cleared all plant and non-plant matters by subdividing separable materials into small pieces that were transportable by only one or two ants at the same time, though occasionally three or more cooperated to move larger pieces. Most of the transportable pieces of debris were carried by only one ant at a time. Tough, large and solid material was left on the disk. Live animals were driven away or killed and removed. Semiliquid and sticky matters were covered up by dumping gravel or bits of earth on it. The precedence of disk reconstruction in the spring was the center zone first, then the flat bare space and finally the extending margins. The tendency of the disk to be circular may play an important role in minimizing clearing costs. For any given surface area, a circle has the smallest circumference. Because plants intrude into the disk primarily at its perimeter, by clearing a circular disk the ants can maintain a bare surface at the lowest energy cost by minimizing the area across which plant intrusion occurs.

There still remains a question to be investigated: why should the ants invest the considerable time and energy each year that it takes to clear such a large barren disk. Several suggestions concerning the benefits that the ants might derive from the disk were posed as hypotheses during the past 130 years, although the hypotheses have never been tested:

1. Disks may provide a space for drying seeds after a heavy rain (Buckley, cited in McCook, 1879; Lincecum, 1862). According to McCook there were two observations that *Pogonomyrmex barbatus* uses the disk to dry seeds in the sun after raining were reported. However, according to the author's observations, swollen, broken and germinating seeds were eagerly consumed by the ants. One therefore wonders whether drying the seeds is necessary or even desirable, and whether this behavior, if it occurs, varies with season. Clearly the anecdotal reports of ants using the disk for sunning and drying the seeds requires critical reexamination.

2. Disks may serve as farms upon which the ants deliberately sow "ant rice

(*Aristida stricta*)" (Lincecum, 1862). Lincecum drew widespread attention to this phenomenon by stating that the *Aristida* was actually planted, cultivated, and harvested in the disk by *P. barbatus* workers (so they would have a nearby source of grain); this assertion has resulted in the common name "Agricultural Ants" for *P. barbatus.* Many other myrmecologists have found that *Aristida* gardens like that described by Lincecum do exist in some nest disks, but none of them have compiled any evidence either for or against Lincecum's statements regarding agricultural care.

3. The open disk may act as a natural solar energy absorber for the upper nursery chambers, warming the brood and thereby enhancing the growth rate of the young during the late spring, summer and autumn (Wheeler, 1960). Temperature in the nurseries has been shown to be the most important factor in the development of many ants (Wasmarm, 1891; Fielde, 1905; Wheeler, 1960; Markin *et al.*, 1972). Forel (cited in Wheeler, 1960) has shown that the mounds of *Formica rufa* serve as incubators for the brood. Although most *P. barbatus* nests have flat, not mounded disks, the nurseries are usually located under and near the surface of the disk which, being exposed to direct sunlight, may act as an incubator. Yet most of the underground chambers under the open disk are seed storage chambers (personal observations). This indicates that disk clearing may be directly related to seed storage.

4. Wheeler's (1960) suggestion that the disk is a mechanism to reduce humidity in the underground seed storage chambers has been accepted by most myrmecologists for over 30 years, although the suggestion has never been tested. A nest with a denuded surface receives direct radiant heat from the sun and is exposed to the air currents that may increase evaporation and drying of the nest after rains. However, an open surface also receives more water from rain and moist air than does the surface soil of an overgrown patch (Went, 1948, 1949; Went *et al.*, 1949), and uptake of water by roots significantly increases water loss from upper layers of soil in an overgrown patch (Nye and Tinker, 1977). Thus it is not clear that simply removing vegetation from the nest surface will increase the rate of drying or decrease wetting by rains. Wheeler's hypothesis should be critically evaluated experimentally.

There is, however, one highly likely benefit that the ants derive from the open disk. The clearing of vegetation may provide more space because it eliminates most (or all) underground roots below the disk, producing an obstacle-free area suitable for subterranean seed storage chambers and nurseries, and facilitating nest excavation and maintenance. Again, this hypothesis requires examination in the field.

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收割蟻 (*Pogonomyrmex barbatus*) 營造光禿區之行爲分析

吳 輝 榮

收割蟻每年春天花三個月的時間，全力除掉其蟻巢表面所有的雜草，清出直徑1～3公尺的圓形光禿區。本研究詳細分析這小小的昆蟲是以何種方法和技術營造如此驚人的大光禿區。研究和觀察指出該蟻使用各種方法和技術，將蟻巢表面所有的植物（包括根部）分割成許多小片段，然後一一地搬運，拋棄到光禿區的外圍。該光禿區在每年五月至十一月收割蟻收集草種子維生的期間，一直被保持完全光禿，連一根雜草也不准留置其上。每年冬天螞蟻冬眠時，雜草大量入侵，使得該蟻必須於冬眠後的翌年春天再重新營造牠們的光禿區。有關該蟻爲何要營造大型光禿區，則有待進一步的研究。