

## READING PASSAGE 2

You should spend about 20 minutes on **Questions 14–26**, which are based on Reading Passage 2 below.

### The Fascinating World of Attine Ants

*Nicholas Wade examines leaf-cutter ants and their amazing agriculture*

- A** Leaf-cutting ants and their fungus ‘farm’ are a marvel of nature and perhaps the best-known example of symbiosis — the mutual dependence of two species. Ants cultivate a mushroom-like fungus in ‘farms’. Both the ants and their so-called ‘agriculture’ have been extensively studied over the years, but recent research has uncovered intriguing new findings.

Ants invented agriculture 50 million years before people did, and the leaf-cutters, members of the large attine ant family, practise the most sophisticated example of it. They grow their fungus in underground chambers that can reach the size of a football. A single leaf-cutter nest may contain a thousand such chambers, embedded in an underground metropolis up to 18 feet deep, and support a society of more than a million ants.

- B** These ant communities are the dominant plant-eaters of the Neotropics, the region comprising South and Central America, Mexico and the Caribbean. Biologists believe 15 percent of the leaf production of tropical forests disappears down the nests of leaf-cutter ants. In the nest, the leaves are shredded and added to the fungus, which digests the leaves and is in turn eaten by the ants. The attine ants’ achievement is remarkable because it allows them to consume, courtesy of their mushroom’s digestive powers, the harvest of tropical forests whose leaves are laden with poisonous chemicals.
- C** There are more than 200 known species of the attine ant tribe, divided into 12 groups, or genera. The leaf-cutters use fresh vegetation; the other groups, known as the lower attines because their nests are smaller and their techniques more primitive, feed their gardens with similar leaves that have fallen on the ground and insects that lie on the forest floor. Lower attine ants are all a similar size. However, leaf-cutter worker ants come in made-to-fit sizes — large ants to saw off leaves, medium ones to shred them, and miniature workers to seed them with fungus and clean off alien growths.
- D** In 1994, biologists from the United States Department of Agriculture analysed the DNA of ant fungi. They found that the leaf-cutters’ fungus was descended from a single pure strain, propagated for at least 23 million years. However, the fungi grown by lower attine ants fell into four different groups, as if the ants had domesticated wild fungi at least four times in evolutionary history. What could be driving these two patterns of fungus gardening — the pure clone cultivation of the leaf-cutters and the multiple varieties of the lower attines?

- E** The answer has been suggested by Cameron Currie of the University of Toronto. The pure strain of fungus grown by the leaf-cutters, it seemed to him, resembled the single crops grown by humans to the exclusion of all others, such as potato growing. These 'monocultures', which lack the genetic diversity to respond to changing environmental threats, are particularly vulnerable to parasites — organisms that live and feed on their host, often causing harm. Currie felt there had to be a parasite in the ant-fungus system. But a century of ant research had provided no evidence for his idea. Textbooks describe how leaf-cutter ants scrupulously weed their gardens of all foreign organisms. "People kept telling me the ants keep their gardens free of parasites," said Currie. Nevertheless, after three years of sifting through attine ant gardens, Currie discovered several alien organisms, particularly a family of parasitic moulds called 'Escovopsis'.
- F** Escovopsis is a deadly disease that can devastate a fungus garden in a couple of days. It blooms like a white cloud which envelops the whole garden. Other ants won't go near it, and the ants associated with the garden just starve to death. Evidently, the ants usually manage to keep Escovopsis and other parasites under control. Nevertheless, with any lapse in control Escovopsis will quickly burst forth. Although new leaf-cutter gardens start off free of Escovopsis, within two years some 60 percent become infected.
- G** The discovery of Escovopsis's role brings a new level of understanding to the evolution of the attine ants. In the last decade, evolutionary biologists have been increasingly aware of the role of parasites as driving forces in evolution. With Currie's work, there is now a possible reason for the different varieties of fungus in the lower attine mushroom gardens — to stay one step ahead of the relentless Escovopsis. Interestingly, the leaf-cutters had, in general, fewer alien moulds in their gardens than the lower attines, yet more Escovopsis infections. Clearly, the price they pay for cultivating a pure variety of fungus is a higher risk from Escovopsis.
- H** So how do attine ants keep this parasite under control? People have known for a hundred years that ants have a whitish growth on their body surface. It was thought to be wax but, after examining it under a microscope, Currie discovered a specialised patch on the ants' bodies that harbours a particular kind of bacterium, one well known to the pharmaceutical industry and the source of half the antibiotics used in medicine. This bacterium is a potent poisoner of Escovopsis, inhibiting its growth and suppressing spore formation.

Astoundingly, the leaf-cutter ants are accomplishing feats beyond the power of humans: they are growing a monocultural crop year after year without disaster, and they are using an antibiotic apparently so wisely that, unlike people, they are not provoking antibiotic resistance in the target disease-producing organism.

Questions 14 – 19

Reading Passage 2 has eight paragraphs, **A–H**.

Which section contains the following information?

Write the correct letter, **A–H**, in boxes 14–19 on your answer sheet.

- 14** two things at which leaf-cutter ants have succeeded but humans have failed.
- 15** a comparison between the nests of leaf-cutter ants and lower attine ants.
- 16** an assessment of the impact leaf-cutter ants have on their environment.
- 17** the effect Escovopsis has on ant communities.
- 18** the advantage for lower attine ants of growing a range of fungi.
- 19** the discovery of the age of the attine-ant fungi.

Questions 20 – 24

Classify the following descriptions as relating to

- A** Leaf-cutting ants
- B** Lower attines
- C** Both leaf-cutting ants and lower attine ants

Write the correct letter, **A**, **B** or **C**, in boxes 20–24 on your answer sheet.

- 20** the use of dead vegetation to cultivate their fungus
- 21** very small ants that keep the fungus free of foreign organisms
- 22** the ability to safely eat harmful plants
- 23** the cultivation of a single fungus
- 24** a nest with a very large number of rooms for growing fungus

Questions 25 – 26

Choose the correct letter, **A**, **B**, **C** or **D**.

Write the correct letter in boxes 25 and 26 on your answer sheet.

- 25** What does the writer say about Cameron Currie's research?
- A** No previous work had been done in this area.
  - B** Earlier studies did not support his theory.
  - C** Textbooks on this subject lacked specific detail.
  - D** Currie's initial theory had proven to be incorrect.
- 26** Using a microscope, Currie was the first to discover that the body of attine ants
- A** has a white covering.
  - B** is covered in wax.
  - C** is poisonous to humans.
  - D** has a substance useful to humans.

14–19 段落信息匹配

题号	答案（段落）	精确定位句（摘录）	详细解释（同义改写 + 排除）
14	H	“the leaf-cutter ants are accomplishing feats beyond the power of humans: they are growing a monocultural crop year after year without disaster, and they are using an antibiotic... without provoking antibiotic resistance.”（第 H 段）	题干：two things at which leaf-cutter ants have succeeded but humans have failed（两件人类没做到、蚂蚁做到的事）。定位句明确两点：①在单一作物 (monocultural crop) 上“年复一年无灾害”；②使用抗生素而不产生耐药性。这两点都以“beyond the power of humans（人类做不到）”强调对比，完全对应题干。排除：E 段讲“人类的单一作物易受寄生物侵害”是背景；真正的“人类做不到而蚂蚁做到”只在 H 段总结性提出。
15	C	“The leaf-cutters use fresh vegetation; the other groups... feed their gardens with smaller leaves that have fallen on the ground... because their nests are smaller and their techniques more primitive.”（第 C 段）	题干：a comparison between the nests of leaf-cutter ants and lower attine ants。C 段直接比较：叶切蚁用“新鲜植被”且巢穴更大；下位阿庭蚁用“落在地上的小叶和昆虫”，巢更小。这是唯一同时比较“食材/做法/巢大小”的段落。排除：A 段虽有“巨大地下室”“上千房间”，但未与下位阿庭蚁对照；因此真正的“比较”在 C 段。
16	B	“These ant communities are the dominant plant-eaters of the Neotropics... 15 percent of the leaf production of tropical forests disappears down the nests of leaf-cutter ants.”（第 B 段）	题干：an assessment of the impact... on their environment。B 段量化了影响：主导性植食者，且吞入森林 15% 叶产量；并解释通过真菌消化使有毒叶片也能被利用——这是对生态影响的评价。排除：其它段落多为分类、进化或防治机制，并无环境“影响评估”。
17	F	“Escovopsis is a deadly disease that can devastate a fungus garden in a couple of days... the ants... starve to death... within two years some 60 percent become infected.”（第 F 段）	题干：the effect Escovopsis has on ant communities。F 段说明后果：迅速毁灭 → 蚂蚁群体断粮 → 高感染比例（60%），直接对应“影响/效果”。排除：E 段偏重“发现 Escovopsis”；G 段谈“进化意义”，不是“直接效果”。
18	G	“there is now a possible reason for the different varieties of fungus in the lower attine... — to stay one step ahead of the relentless Escovopsis.”（第 G 段）	题干：the advantage for lower attine ants of growing a range of fungi。G 段给出优势：多样化真菌有助于领先寄生霉一步，降低风险；这正是“种类多”的好处。排除：D/E 段谈“单一纯株/单一作物”的叶切蚁，不符合“lower attines 的优势”。
19	D	“the leaf-cutters’ fungus was descended from a single pure strain, propagated for at least 23 million years.”（第 D 段）	题干：the discovery of the age of the attine-ant fungi。D 段给出至少 2300 万年的时间尺度，属于“真菌培养谱系的年代/年龄”发现。排除：其余段落无年代信息。

20–24 分类题 (A 叶切蚁 / B 下位阿庭蚁 / C 二者皆是)

题号	答案	精确定位句 (摘录)	详细解释 (同义改写 + 排除)
20	B	“the other groups, known as the lower attines, feed their gardens with smaller leaves that have fallen on the ground and insects that lie on the forest floor.” (第 C 段)	“fallen on the ground”=死/落叶 (dead vegetation)。叶切蚁用 “fresh vegetation”，因此此项仅属下位阿庭蚁。排除 A/C。
21	A	“leaf-cutter worker ants come in made-to-fit sizes... miniature workers... clean off alien growths.” (第 C 段)	“very small ants”=miniature workers；“keep free of foreign organisms”=clean off alien growths。这是叶切蚁工蚁分工的一部分，只在叶切蚁描述中出现，选 A。
22	C	“The attine ants’ achievement... allows them to consume... leaves laden with poisonous chemicals, courtesy of their mushroom’s digestive powers.” (第 B 段)	主语是 attine ants (阿庭蚁整体，包括叶切蚁与下位阿庭蚁)；能 “安全食用含毒叶片” 依赖真菌消化，故两者皆是 (C)。
23	A	“leaf-cutters’ fungus was descended from a single pure strain...” (第 D 段)；另见 E 段 “monocultures...”	“cultivation of a single fungus”=单一纯株/单一作物 (monoculture)，为叶切蚁特征。下位阿庭蚁恰相反 (多次驯化、真菌多样化)，故不选 B/C。
24	A	“A single leaf-cutter nest may contain a thousand such chambers... an underground metropolis up to 18 feet deep.” (第 A 段)	题干 “a very large number of rooms”=上千房间，只在叶切蚁巢叙述中出现，选 A。

25–26 单选题 (A/B/C/D)

题号	答案	精确定位句 (摘录)	解析与错误项排除
25	B	“A century of ant research had provided no evidence for his idea. Textbooks describe how leaf-cutter ants... keep their gardens free of parasites.” (第 E 段)	题干问 “作者对 Currie 研究的评价”。定位句表明早期研究并不支持他的 “应当有寄生物” 的假设 (no evidence for his idea) → B。排除：A “此前无研究” 与文意相反；C “教材缺乏细节” 非重点，教材是持 “无寄生物” 观点；D “他的最初理论被证伪” 相反，后文表明他发现了寄生霉，理论被证实。
26	D	“People had long thought it was wax, but under a microscope Currie discovered... a bacterium... the source of half the antibiotics used in medicine.” (第 H 段)	题干问 “显微镜发现：阿庭蚁体表有什么”。H 段指出并非蜡 (排除 B)，而是产抗生素的细菌，与人类医学相关——即 “对人类有用的物质” → D。排除：A “白色覆盖物” 是旧认识；C “对人有毒” 文中未述 (细菌毒杀的是 Escovopsis)。