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## The Ecology of Middle Earth

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## The Ecology of Middle Earth

### Abstract

Analysis of Middle-earth's environmental equivalents to our world, by climate and dominant vegetation. Notes that Tolkien's descriptions of the ecology of his Secondary World must be based on "years of close and thoughtful observation of nature"—particularly when describing transitions from one ecological niche to another. Concludes with an "ecological report" on Middle-earth. Covers geography, geology, and plant life in great detail.

### Additional Keywords

Tolkien, J.R.R.—Political and social views—Environmentalism; Tolkien, J.R.R.—Settings—Middle-earth—Animals; Tolkien, J.R.R.—Settings—Middle-earth—Ecology; Tolkien, J.R.R.—Settings—Middle-earth—Fauna; Tolkien, J.R.R.—Settings—Middle-earth—Flora; Tolkien, J.R.R.—Settings—Middle-earth—Geography; Tolkien, J.R.R.—Settings—Middle-earth—Geology; Tolkien, J.R.R.—Settings—Middle-earth—Plants



## The Ecology of Middle-earth

MARCELLA JUHREN

Do we walk in legends or on the green earth in daylight?

'A man may do both,' said Aragorn. 'For not we but those who come after will make the legends of our time. The green earth, say you? That is a mighty matter of legend, though you tread it under the light of day!'<sup>1</sup>

**I**n the making of Middle-earth, Tolkien has superimposed a Secondary, or Enchanted, World upon a strongly constructed Primary World as we see it objectively. He has portrayed this earth with deep understanding, and with as much care for detail as an ecologist would use in, say, preparing a report for his professional society — a report on a hitherto unknown land mass of some two and a half million square miles, of which about one million square miles were explored, and reported on with the thoroughness as to the biotic communities and the dynamic of the vegetation.

Why did Tolkien describe objectively, as a Primary World, the mountains and plains, forests and animals of Middle-earth? For one thing, I believe he thought it a solid foundation on which to create Fantasy. He says, in his essay "On Fairy Stories"

It [Fantasy] does not... obscure the perception of scientific verity. On the contrary. The keener and clearer is the reason, the better fantasy it will make.... For creative Fantasy is founded upon the hard recognition of fact, but not slavery to it.<sup>2</sup>

Faërie... holds the seas, the sun, the moon, the sky; and the earth, and all things that are in it: tree and bird, water and stone,...and ourselves, mortal men, when they are enchanted.<sup>3</sup>

But in that state, men may perceive things differently. So the Walkers, as they traversed the Misty Mountains,

Eregion, the Emyn Muil, ordinarily saw the land as it normally was: with elms, oaks, squirrels in the sheltered valleys, pines starting to regenerate burned woodland; the various kinds of birds where those kinds should be. But sometimes the natural order went awry: pines died of cold winds, that should not kill pines; birds traveled suddenly in great flocks, though not migrating; wolves behaved unwolf-like. This sort of thing signalled the intervention of an otherworldly power; the evil of Sauron, perhaps; or, where leaves remained golden all the year, the gentle beneficence of Lorien. Thus the normality of Middle-earth serves as a backdrop to show forth lucidly the workings of a Secondary World.

Another reason why Tolkien gave so faithful a portrayal of our ordinary Earth may simply have been that he likes it for itself, and finds it full of interest. His Middle-earth has beauty and charm in full measure, even without the enrichment of elves and dragons. His love for trees and all living, growing things is obvious; and he would have men respect them, not senselessly destroy them.

Understanding is the key to respect; and Tolkien shows an understanding that could only have resulted from years of close and thoughtful observation of nature. Because he liked it, he could give descriptions that are not dull. He describes, not the static communities, as a rule, but the transitions from one to another (which requires more knowledge to do), and thus sustain the sense of movement throughout the story. For instance,

the high western ridge fell away, and they came to scattered groups of birch, then to bare slopes where only a few gaunt pine trees grew and firs rose to the furthest ridge.... beyond them, above the fir-trees of the furthest

ridge there rose, sharp and white, the peak of a high mountain Southwards to thier left they could see the forest falling away down into the grey distance. There far away there was a pale green glimmer that Merry guessed to be a glimpse of the plains of Rohan.<sup>4</sup>

To further illustrate, and in the hope that it might be fun to take a trip through Middle-earth in a new, if less adventurous way. Suppose we take the information we have and organize it more or less as an Ecologist might, if he found the Red Book, and wished to prepare a report from it, on the ecology of Middle-earth — perhaps thinking to present it at a meeting or send it to a journal of his society. It is, at the very least, an excellent survey of a land mass, or sub-continent over ten million square miles in extent.

This land mass no longer exists, or exists in an altered form; and as to its exact location, and the geological period in which it existed in the form described, we can only speculate, or at best make some educated guesses.

We know that the Shire, or “regions in which the hobbits then [Third Age] lived, [and] in which they still linger... was in the Northwest of the Old World, east of the Sea” but “the shape of all the lands has changed.”<sup>5</sup> We would assume, then, that there has been raising and subsidence of land, which we know at various times connected the British Isles to the Continent, and the Continent by narrow bridges to North Africa. Since there is little in the way of artifacts, if anything, left from the sophisticated civilizations of that time — far beyond even the Neolithic — we must suppose submergence of glaciation obliterated them. The land north of the Western Hills corresponds in aspect to land recently recovered from glaciation. One of the interglacial periods in which the climate was rather similar to the present one in that part of the world, seems indicated.

If we measure the distance from the source of the Anduin to its mouth, we find it to be about 1,000 miles. If in Europe we measure along a parallel, 1,000 miles takes us across about 15° of latitude, or from latitude 58° N, to 43° N., which latter is that of southern France. If we journeyed from Northern Scotland to say, Toulon, France — which is about 43° and is southeast of Scotland, as was the mouth of the Anduin from the Shire — we would encounter today similar climate changes, and pass through the same great regional “climax” types of vegetation, as we would have encountered in the journey down the Anduin in the Third Age, or through the same degrees of latitude in those lands, during an interglacial period when the British Isles were connected to the Continent and the climate was warming up. The types of vegetation would seem now only here and there, as vestiges, for man has greatly disturbed them. But Middle-earth, too, had been by man, orcs, and even hobbits. The ancestry of some of the oldest forests in Britain, and that of St. Pilon, in France, is as old as that of Fangorn. The Mediterranean woodland, between the mouth of the Rhone and Toulon, is very like that of Ithilien. Both arose by the Pliocene, with the elements from an earlier era. It would be hard to find there

anything like the grasslands of Rohan, for the right sort of place for it — the central plain of Europe — has been too long given to cities and to agriculture.

But to get on with our report of Middle-earth: it is usual to begin with physical features (and we have a map for that), then average annual precipitation (rain or snow), temperature, and prevailing rain-bearing winds. We do not have quantitative data on the location of the plant climaxes, and these are very fully described. Animals, too, where not fully listed, can be arrived at with fair certainty since their habits depend on the shelter provided by the plants.

### Northern Tundra Belt

North of the Great East Road there are short, turfing grasses (probably *Poa* species) sedges, tussocks, small streams filled with reeds and rushes, in which lived small, warbling birds; and overly supplied with gnats, midges, flies and “neekerbreakers.” In such a land the rainfall is always rather low, and what precipitation there is, falls partly as snow. The average is 5 to 10 inches a year.

Still further north a more colorful tundra would be expected; one brightened with campion, daisies, saxifrages, with expanses of the pearl-grey reindeer moss. But this was not the case. Abruptly, snow-and-ice-covered wastes began. The unnatural condition was explained by effects of the reign of Morgoth, and so represents an intrusion of the Secondary World.

### Deciduous Forest

South of the tundra lay a belt once covered with great forests of mixed conifers and hardwoods which had developed by Pliocene times, seven million years ago. These forests had retreated southward before advancing ice-sheets, only to return north in the warm periods between glaciations. Now, in the Third Age, it had been cleared in large sections of Eriador, and in the valley of the Anduin. Some, according to Treebeard, had sunk beneath the sea. But portions of it remained in Fangorn, Mirkwood, the Old Forest, and the Druidan Forest. Forests also remained on the lower slopes of the Grey Mountains, and along the east slopes of the Misty Mountains, north of Fangorn.

Forests require a high rainfall, at least 30 inches per year at latitude 47°. From the position of the forest, we may conclude that the prevailing rain-bearing winds came from the northeast and the north, decreasing toward the south. The east wind that seemed to slight the trees on the Eryn Muil, however, was not a wind of the Primary World; for pine trees do not die of that.

### Grassland

In a country with less rainfall that is required by a forest, a grassland may develop. The grassy plains of Rohan were what we would call in America a tall-grass prairie. We are told that the grasses in many places were up to the knees of the riders. They were doubtless perennials. This is a true “climax” grassland, and it is remarkable that the Rohirrim had used it more than 500 years without damaging it.

The grassland to the north on the Wold, and those in the Valley of the Anduin consisted of short, turfing grasses were not climax forms, but were kept in grazing land by the continuous, or at least recurrent, pasturages of herds.

A "climax" is the highest form of vegetation which can grow in a given climate. Once established, it tends to remain stable. It has a number of plant species which control the kinds of plants which can grow under them, and these are called "dominants." In a forest, trees are dominant, and only those smaller plants which can thrive in their shade can endure. In a grassland, grasses are dominant, for it is difficult for shrubs, though they also can subsist in low rainfall and warmth, to get a start among thick grasses.

Starting from bare rock, several stages lead to a climax; first there are lichens, then mosses and ferns; later come flowering plants, shrubs, and finally trees. Or from a pond, or a quiet backwater, pondweed, then sedges and rushes, iris, etc., may lead to a meadow and thence to a grassland climax; or if a climax is wetter, to willows, alders, and finally a forest. These are called "successions" or "seres."

Sometimes, as in the Shire, the activities of man keep the successions in a stage just before the climax: this is called a "sub-climax," and so would be classed the open woodland, interspersed with meadows, in the Shire. The Stockbrook and the Witherwindle had many spots which were filling with waterlilies, rushes and sedges to form successions leading to forest or meadow. These are called hydrosere; successions from rock or from dry land whose vegetation has been removed by fire, flood, or other devastation, are called xerosere. The nature of the soil has an influence on the kind of plants that can start to repair the damage, and on how long it will take.<sup>6</sup>

Not a great deal has been reported about the soils of Middle-earth. In the northern part of the Misty Mountains, north of Rivendell, there were red rocks and clays; for the River Hoarwell was red; these red clays are highly erodible, which fits in with the dissected nature of the country Bilbo crossed when he approached Rivendell. Obviously, the rocky peak of Caradhras was red; porphyry is another red rock I can think of beside red sandstone, but is a volcanic rock, and if I were to make a wild guess I should say that the Misty Mountains resemble more a great fault-block, such as the Sierra Nevada in California.

In that case, some, at least, of the people dotting the area where the River Running joined the Forest River might be sag ponds. The filling of these in a flood, is one of the few cases, if not the only case, in which we are left in doubt as to whether an agency of the Primary World — an earthquake, or the Secondary World — Smaug — was operating.

The limestone formation of the portage at Sam Gebir may well have extended west across East Emnet, accounting for the ten mile wide sunken area, and continued east and south to the Ithilien; for the layers of hard limestone and of softer, more porous limestone, marls or chalk,



might account for the fountains in Ithilien. This is a speculation, of course; the record does not say.

As to animals, the most exciting were the wolves and bears of the Misty Mountains. The wolves were sometimes of the enchanted world, and sometimes just wolves. In America we rarely if ever think of wolves as a danger to man, not unless attacked; but European literature is full of fear of wolf-packs; and it is hard to tell whether the Rohirrim thought normal wolves were carrion eaters, which they are not; or only that all wolves had been influenced by orcs.

Foxes and squirrels lived in the woods, as well as rabbits, of course. Deer are mentioned in the forests, as are huge moths, butterflies, and spiders; bees and hornets in the flowering meadows. Eagles lived in the Misty Mountains, but the great race of eagles was in the Grey Mountains to the north. Herons and swans lived in the reedy marshes along riverbanks: Tom Bombadil sees, along the Stockbrook, otter, brown water-rat, dalcichicks, willow wrens, water boatmen, fish, and blue king-fishers. In underground streams were bats, eyeless fish; in the Dead Marshes, snakes and worms, swallows, crows, finches, and sturlings are mentioned, and it is noted that the two latter are non-migrating species. Hawks came out of Dunland, ravens and crows from Erebor. The thrush of Erebor was of magic (he could not have found much to eat there). Bats lived among the rocks, which implies insects. The insects of the tundra have been mentioned.

The absence in Rohan of the antelope of the American prairies may seem strange, but this species was missing in Europe during the Pleistocene.

As studies in "Human Ecology" — the newest branch of the science — we could consider the Shire and Rohan, in distinction to northern Rhovanion and Mordor.

In the Shire, although much forest had been cleared and replaced by farmland, much was left. There is no wanton destruction. Man or Hobbit, had struck some sort of balance with wild nature, a balance mutually satisfac-

tory: pleasant to man and not too destructive to animals and plants. If there were fewer trees, there were more of the small flowering plants, and more birds. Thick forest was left along the streams, so there was no erosion losses.

Such an arrangement will yield a comfortable living indefinitely, if the farmer observes sound practices, but only for a certain number of men and their animals per acre. In northern Rhovanion this number came to be exceeded. Sheep were grazed there as well as cattle. The Rohirrim then migrated to the south, to Rohan, where they had kept their herds in balance, with the resources of the land for over 500 years at time of record. Presumably their population had not greatly increased.

In stark contrast to this was Mordor, where volcanism, evil beings, and man at his worst combined to make an utterly sterile land. Food was produced in a restricted, intensely cultivated region by slave labor. Apparently other needs were met by subterranean factories. Probably there was not enough, especially as Sauron kept bringing in more inhabitants. Life was not satisfying and no hope remained but to pour forth and conquer other lands.

Our report cannot treat of Lorien, because it is not at all of the Primary World; men had no part in it. We have tried to keep the two worlds separate, as much as possible, and according to the cues that Tolkien gave us. Yet at the last, the two worlds separate, as much as possible and according to the cues that Tolkien gave us. Yet at the last the two worlds did blend, in the final summer of the Third Age, in the Shire. Then all that grew in the Primary World, grew with the glow and vigor of the world of Enchantment. There was "beauty beyond that of mortal summers" and "all were happy except those that had to mow the grass." Here the two earths blended in a mixture which is Tolkien's own brand of magic — the Euctastrophe which is so rarely achieved.



## Plants of Principal Phyto-Geographic Regions of Middle-earth

### Mixed Deciduous Forest Climax

**Mirkwood:** beech, oak in north; fir in south, but abnormal in growth (influence of Dol Guldur). Alders by streams.

Note: a very dark forest, insects and animals with protective coloration; black. Magical doe was white.

**Old Forest:** no species named (all abnormal in growth) but willow. Willow by Withywindle probably *Salix fragilis*, called "Crack Willow" or "Withy."

**Fangorn:** beech, oak, chestnut, ash, rowan (in America called "mountain ash"), linden, silver birch in drier sports, firs on ridges.

### Woodland Sub-climax

**Shire to Rivendell:** Trees same as above, plus hickory.

*Shrubs:* hazel thickets, willow thickets, probably *Salix aurita* and/or *S. purpurea* (osier). Other species not named. *Ground Cover:* fern, ivy, briar-rose, mushrooms, grasses.

Note: more species and thicker growth found in open woodland than in dark forests as the above.

**Rivendell:** pines on high places, beeches and oak in lower ground. Grassy glades.

**Valley of the Anduin:** elm, oak and willow along streams. Long-grass and short-grass grazing lands, shorter toward lands. Clovers.

### Mediterranean-type Woodland Climax

**Ithilien:** Trees: olive, cedar, holm oak (*Quercus ilex*), ash, probably "manna" ash (*F. peroviflora*). Trees small and

resinous. *Tree-like shrubs:* myrtles, bay, boxwood, terebinth (*Pistacia lentiscus*), filbert brakes. *Small shrubs, ground cover:* bushy thyme, majoram, sage, parsley, anemone, hyacinth, saxifrage, primrose, asphodel, wother sp. lily, bracken.

### Fire Successions

**Old Forest:** wood parsley, fire-weed, thistle, nettles, hemlock — probably water-hemlock (*Cicuta*), though possibly the poison hemlock (*Conium*).

South Ithilien: Briar, eglantine, trailing clematis.

### Montane Province

**Misty Mountains:** In foothills, blackberries, whortleberries, sorrel, hart's tongue, bracken, yellow rockrose (*Helientemum*). Above the foothills on east facing slopes, a pine belt; short fire, nut trees. At Dimrill Dale, fir, birches, ground cover of heather, whin. Higher elevations, Alpine Climax apparently missing, or not described because unexplored except in snowstorm. (Elevation appears to be on the order of 5,000 feet, and was above timber line).

**Ered Nimrais:** Cinifers, lebethron. Grasses extended for up the slopes.

**Ephel Duath:** Thornbush, low shrubby trees, species not named. Brambles, a coarse grey grass, mosses, white-flowered, ill-smelling plant, suggests *Stapelia*, but may have been a plant of Enchantment.

# Hydoserer

Midgewater Marshes  
Junction of the Running  
River and Forest River  
Entwath borders, where  
there are sunken lands  
West Bank of the Anduin  
at Brown Lands  
Withywindle, Stock-  
brook, Swanfleet  
along borders in quiet  
water

All these marshes are in the  
reed swamp stage of pro-  
gression toward either  
meadow or forest. (Withy-  
windle also had spots in  
floating water stage -  
waterlilies).

Gladden Fields: Sedge-meadow stage; blue flag, flower-  
ing reeds.

West Emnet near  
Entwath  
Dead Marshes

Sedge-bog stage, not drained,  
algae, reeds, Peat bog at south  
end. Marsh gas possible cause  
of flickering lights in the Dead  
Marshes

# Xeroseres, or Degraded Lands

Portage around Sarn Gebir (limestone, boulders and  
pits): small shrubs, brambles, briars, weeds  
South Downs: stunted trees, shrubs, grey grass  
Weathertop area: short grass, hazel thickets, bilberry  
brush, athelas  
Brown Lands (abandoned gardens of Entwines): twisted  
birch and fir, dying out  
Nan Curunir: brambles, weeds, thorns  
West of the Morannon: a heath of ling, broom, cornel,  
other small shrubs, a few pines.

Note: Degrading due to fighting, burning, and in some  
cases overgrazing

\*\*Holly bushes in Hollin may be a Shrub Climax in a climate too  
dry for forest, too cold for Mediterranean woodland



## Notes

1. J.R.R. Tolkien, *The Two Towers*, Boston: Houghton Mifflin, 1965. p. 37.)
2. J.R.R. Tolkien, *The Tolkien Reader*, "On Fairy-Stories." New York:  
Ballantine Book, 1966. pp. 54-55.
3. *Ibid.*, p. 9.
4. J.R.R. Tolkien, *The Two Towers*, Boston: Houghton Mifflin, 1965. pp. 84-85.
5. J.R.R. Tolkien, *The Fellowship of the Ring*. Boston: Houghton Mifflin, 1965.  
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## Mythopoeic Core Reading List

MYTHLORE frequently publishes articles that  
presuppose the reader is already familiar with  
the works they discuss. This is natural, given the  
purpose of this journal. To be a general help, the  
following might be considered a core reading  
list, with the most well known and frequently  
discussed works. Due to the many editions  
printed, only the title and original date of  
publication are given here.

### J.R.R. Tolkien

*The Hobbit*, 1937; *Leaf by Niggle*, 1945; "On Fairy-stories,"  
1945; *The Lord of the Rings: The Fellowship of the Ring*  
1954, *The Two Towers* 1954, *The Return of the King* 1955;  
*Smith of Wootton Major* 1967; *The Silmarillion* 1977.

### C.S. Lewis

*Out of the Silent Planet* 1938; *Perelandra* 1943; *That  
Hideous Strength* 1945; *The Lion, the Witch and the  
Wardrobe* 1950; *Prince Caspian* 1951; *The Voyage of  
the Dawn Treader* 1952; *The Silver Chair* 1953; *The  
Horse and His Boy* 1954; *The Magician's Nephew*  
1955; *The Last Battle* 1956; *Till We Have Faces* 1956.

### Charles Williams

*War in Heaven* 1931, *Many Dimensions* 1932, *The Place of  
the Lion* 1932, *The Greater Trumps* 1932, *Shadows of Ec-  
stasy* 1933, *Descent into Hell* 1937, *All Hallow's Eve* 1943  
*Talisman through Logres* 1953, and *The Region of the Sum-  
mer Stars* 1944 (the last two printed together in 1954).

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