

Wollemia Nobilis: An Evolutionary Clock

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Review Article

Received date: 27/09/2017

Accepted date: 02/11/2017

Published date: 07/11/2017

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Keywords: Gymnosperms conifers, monotypic,
IUCN, evolution, threats

ABSTRACT

Gymnosperms are the always of the great values, they have tremendous kinds of the metabolites and the nucleic acid components, the fossil records of the gymnosperms are the gateways for the evolution world of the great Mesozoic era, among the gymnosperms the conifers are the very terrific and they are the only living gymnosperms besides the cycadales and the genetales group, in this review articles we are presenting one of the genus entitled as the **Wolloemia nobilis** as the theme of the review articles, here we are discussing some of the aspects of the genus specifically the evolution and the IUCN conservation pattern. **Wollemia nobilis** is the monotypic genus having the distribution in the new south wales of the Australia (endemic), IUCN versions declared the plants as the endangered according to the different kinds of their parameters

INTRODUCTION

Gymnosperms are the naked seed plants, they have the seed without the covering, and this is the basic difference between the angiosperms and the gymnosperms. The whole of the gymnosperms is divided in to the three classes, these are the Cycadopsida and Coniferopsida and the Gnetopsida. Coniferopsida are the assemblage of the conifers, conifers are the evergreen plants with the seeds on the typical ouvliferous scale on the cones ^[1,2]. The sizes and the shape of the ovuliferous scales is the features of the taxonomic significances. Conifers are valuables from the ecologically and the evolutionary points of view, they form the main carbon influx and the biomass of ecosystem and the different plant part forms the Varity of the functions ^[3,4].

One of the family of the conifers is the Arucariaceae, the members of the arucariaceae are commonly known as the aruvarians, this family is the very primitive, this family and their members separated in the early Jurassic and the cretaceous period, fossil records of the family have been found in the form of the wood and the leaves and in the form of the compression and the petrification. The plants are generally being the evergreen trees, with primitive structures and the cones, some of the genera of the arucaricaeae are enlisted as the **Araucaria**, **Agathis** and **wollemia** here in this review article we are discussing some of the aspects of the genus **Wollemia**. This is the tree which has the unique discovery history in the 1995, when David Nobel was searching some of the adventures places in the new south wales of Australia, he found the patches of the Wollemia in some of the restricted places of the Wollemi national park new south wales, till 1995 wollemia is known only through the fossil records, the findings of the **wollemia nobilis** was like the findings of the small dinosaurs of the Jurassic era (**Figures 1 and 2**) ^[5-6].



Figure 1. Wollemia national park (sources olivia Caldwell).



Figure 2. *Wollemia nobilis* (botanic garden university of leicester).

Description of plant

Some of the features of the *wollemia* are enlisted as:

- A) The plant is typically of the evergreen natures.
- B) They have the height of the 50-60 meters, with the distinct bark on the trees; the bark of the tree is of the dark colour and of the distinct odour.
- C) Coppice formation is the typical feature of the *wollemia*, the branches of the coppice approaches near the height of the tree.
- D) The sizes of the cones are from few mm to the 4 cm, they have the typical archegonia and the ouvliferous scales bearing the seeds.
- E) The life cycles of the *Wollemia* follows the typical gymnosperms pattern of the sporophytic generation ^[7-8].
- F) The genus of the wollemia contains only the one species termed as the nobilies, so the genera are the monotypic ^[4].

IUCN categorization

After its discovery in the 1995 the genus was considered as the critically endangered, it was found only some of the places of the New South Wales of Australia, so on the basis of the endemism the genus was declared as the critically endangered. initially the members were reported only 50 on the basis of the area of the occupancy and the area of the extent of the occurrences, later on it was found that the members of the genera were more than the 85, so on the basis of the area of occupancy (A00) and the extent of the occurrences (E00) the genus now considered as the Endangered ^[4,8].

All data of the *wollemia* ware based on the findings of the *wollemia* national park.

Threats

The small sizes of the genera pollution and the very narrow kinds of the distribution shows that the genus is susceptible to the degradation of the many kinds of the threats [8]. The genus was very well distributed in the Jurassic and the cretaceous times periods on the basis of the fossil findings, however, later on the genus is endemic to the some of the places of the new south Wales this shows the retrogressive kinds of the evolution of the genera [4,8]. The most common kinds of the threats are the by the plant pathogen is the **Phytophthora cinnmoi**, this is the major threat to the genus, in addition the introduction of the exotic weds also the reasons for the degradation of the populations of the **wollemia**, forest fires are another point of the degradation of the genus, however change climatic conditions are also the another factors for the restricted occurrence of the genus [8].

Phylogeny of the genus

The genus **wollemia** is typical conifers; they have the feature intermediate the **Agathis** and the **araucaria** [1-3,5,6].

Similarities between the **Araucaria** and the **wollemia**:

- 1) The closely crowned sessile leaves.
- 2) The Amphistomatic leaves.
- 3) Aristate bract scales.

Similarities between the Agathis and the wollemia

- 1) Fully fused bracts
- 2) Ovuliferous scales
- 3) Winged seeds

However recent findings of the fossil recorders of the arucarianas family shows the complex relationship between the genera of the araucaria, it is supposed that early lines of the evolution separate in the early cretaceous, among them some of the cladistics leads to the **Agathis**, **Araucarans** and the **wollemia** lines of the evolution. Some of the genera are extinct during the courses of the evolution.

On the basis of the chloroplastic genome and the Ribulose 1.5 diphosphate findings it was proposed that it was proposed that **wollemia** at the basal zone of the araucarians phylogenetic trees. However, some of initial unclear findings it was proposed that **Agathis** and the **arucasrian** were at the base of the tree and the **wollemia** lines of the evolution derived from them. On the basis of the chloroplastic sequences and the mitochodral sequesnes it was fond the **wollemia** is the sister branches of the **Agathis** lines of the evolution (**Figure 3**).

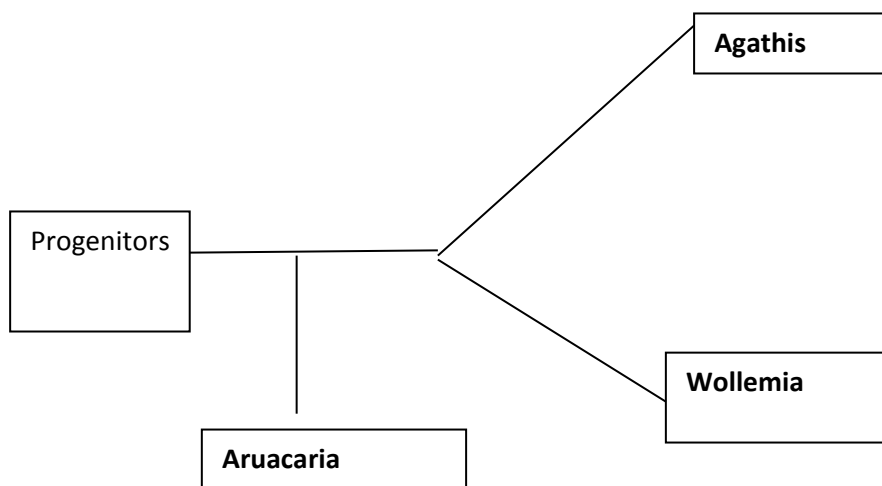


Figure 3. Cladogram of the **Wollemia**.

Protective measures include restricting access to the site and strict phytosanitary precautions for all researchers visiting the sites to undertake approved research and monitoring. Some ex-situ conservation and research programme was also initiated. As part of this programme, commercial propagation was undertaken, and the resultant plants distributed for sale worldwide. The primary purpose of the commercialisation programme was to protect the wild stands from impacts associated with illegal collections and generate income for the continued conservation of *W. nobilis* and other threatened species. The official recovery plan is available from the New South Wales Department of Environment and Conservation (2006) [4,8].

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