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Environmental Pollution of Ondal Cave

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Abstract : This paper is attempted to review a cave restoration and preservation plan against environmental destruction and pollution as a preliminary survey for preservation of cave environment. Consequently, it's important to throw an indirect light rather than direct light on cave formations, keeping distance of 2m at least. The already existing moss should be removed using wet cloth or sponge as soon as possible. If it's washed off, be careful not to splash it or water on nearby subjects. Based on an automatic switch-off system, light will automatically turn off when no one is left in the cave. It's also recommended to dualize the cave passage and partially close the cave by taking turns to give a time to recover.
Key Words : Ondal cave, environmental pollution

Ⅰ. Introduction

This paper is attempted to review a cave restoration and preservation plan against environmental destruction and pollution as a preliminary survey for preservation of cave environment.

Ⅱ. Methods

For this, moss habitat around lamplight has been examined, and illuminance, temperature, humidity and the distance from the lamplight have been measured. To measure illuminance, Lux meter has been used while a digital thermometer (HI8564) was used to sense and measure temperature. For humidity, in addition, a digital hygrometer (HI9161) has been used. To figure out the direct causes of moss encroachment, the correlation between its growth and temperature and distance from lamplight has been investigated as well.

Ⅲ. Result and Discussion

Empowered by constant temperature and high humidity in a cave, the light and heat from lamplight have caused green algae and moss growth, which in turn brought 'green

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pollution.' Since many lamps are installed in OndalCave,'green pollution' has been partially observed on walls and secondary cave formations to which light was directed. The more far from the lamplight (and in case of indirect light instead of direct light), the less 'green pollution.' In case of direct light at a close range, severe green pollution has been observed. The moss in the cave disappears if light is gone or temperature decreases. If circumstances are favorable, however, it would occur anytime.

'The black pollution' has been observed on walls, ceiling and soil crust in Area II. It's also detected on the ceiling at the mouth of the cave in Area I. In Area I, however, the pollution developed along the joint on the wall in light brown. The phenomena can be classified into physical phenomenon, microbiological phenomenon and the mixture of both phenomena.

Fig 1. green pollution

Tab 1. environmental factor of green pollution

site	intensity of illumination. (Lux)	temperature (℃)	humidity (%)	lighting distance (cm)	
SⅠ-2	817	11.9	65.4	66	+
SⅠ-5	4620	20.5	68.5	30	++
SⅠ-7	150	23	61.1	200	+
SⅡ-1	1060	17.2	67.2	52	++
SⅡ-2	651	16.1	68.1	1000	-
SⅡ-4	42	14.3	84	300	+
SⅡ-5	1981	14.2	84	170	+
SⅡ-7	15	19.8	66.6	93	++
SⅣ-1	251	17.3	70	50	+
SⅣ-1(photo)	1431	19.5	70	50	+

-:non-pollution, +:common, ++:serious

Fig 2. green pollution

Fig 3. black pollution

Ⅳ. Conclusion

Consequently, it's important to throw an indirect light rather than direct light on cave formations, keeping distance of 2m at least. The already existing moss should be removed using wet cloth or sponge as soon as possible. If it's washed off, be careful not to splash it or water on nearby subjects. Based on an automatic switch-off system, light will automatically turn off when no one is left in the cave. It's also recommended to dualize the cave passage and partially close the cave by taking turns to give a time to recover.

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