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NEW TECHNIQUE FOR PREPARATION OF FEATHER REMAINS

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Abstract

As the sample received for the bird identification after the bird aircraft collision, is extremely small and badly mangled, hence the cleaning and preparation of the samples for the microscopic identification and examination become a crucial exercise. Several workers like Laybourne (1992) and Brom (1990) have given various techniques for cleaning and preparing the feather sample. Generally, to remove organic impurities, blood etc. the samples are treated with various grades of alcohol. The present study employed the new technique of washing the feather samples with Triton-X-100, then treating with successive grades of alcohol, finally air drying after treatment with fresh dry acetone. One set of the sample after treatment with successive grades of alcohol was immersed in HMDS (Hexa Methyl Di Salazan). Three changes of HMDS were made for half an hour each and finally HMDS was made to air dry till the characterstic odour of HMDS disappeared. The HMDS treated samples were mounted along with alcohol treated samples and were examined for comparison.

It was observed that HMDS treated samples were more swollen in shape as compared to just alcohol cleaned samples, which were seen to be more wrinkled. The general texture of the node has more clarity in the HMDS treated samples. Significant information is received by the nodal structure hence it is important to restore the original shape of the node for the identification of the bird species. This become all the more important in the sample received in the bird hit cases as these are very minute and badly mangled and are usually collected by scraping as these get stuck with the blood.

The present study shows that HMDS treated samples are more close to the original feather fragment in the shape of the node and also reveals more information as compared to the alcohol cleaned samples.

Key Words: Feather remains, Identification, HMDS, SEM

Introduction

As the sample received for the bird identification after the bird aircraft collision, is extremely small and badly mangled, hence the cleaning and preparation of the samples for the microscopic examination and identification become a crucial exercise. Several workers like Laybourne (1992) and Brom (1990) have given various techniques for cleaning and preparing the feather sample. Generally, to remove organic impurities, blood etc.the samples are treated with various grades of alcohol. The present study employed the new technique of treating the feather sample with HMDS after normal cleaning procedure.

Materials and methods

Materials

Feathers of the birds posing threats to the aircraft were collected from dead or caged specimens. They were plucked from different locations of the body. Seperate plumulaceous barbs were taken from the same feather to look for the possible differences within the feather of the same individual. Seperate plumulaceous barbs were taken from different locations on the body of the same individual.

Chemicals

Alcohol, Dry Acetone, Triton-X-100, HM DS(Hexa Methyl Di Salazan)

Equipments

Scanning Electron Microscope (JEOL, Japan), Gold Ion Sputter, Aluminium Stubs, Adhesive Carbon double sided tapes.

Methods

Cleaning and drying

The plumulaceous barbs were plucked gently from the feather fragment and were taken in 1,5 ml. micro tube and were thoroughly but gently rinsed with non ionic detergent Triton-X- 100(diluted with luke warm water) for at least two hours. These were then washed with distilled water. At least 4-5 washings of water were done for each sample. Now these were air dried after treatment with acetone. Samples were treated with different grades of alcohol for 15 min. each. The samples were kept for half an hour in absolute alcohol and subjected to three changes. To one set of samples after alcohol treatment few drops of HMDS were added and samples were submerged in HMDS. The HMDS treatment was done for 30 min.. Then the samples were air dried till

the characteristic odour of HMDS disappeared. The dried samples were taken out and were mounted on aluminium stub over double coated carbon adhesive tapes. The number of barbs mounted depended upon the space available on the alumiunium stub. These were then sputtered in a Gold Ion sputter at 7ma. And 10KV for 10 minutes. The sputtered samples were then observed in Scanning Electron Microscope and Electromicrographed with Nova BIW 12Omm. film at different magnifications.

Results and discussions

As the sample received for the bird identification after the bird aircraft collision, is extremely small and badly mangled, hence the cleaning and preparation of the samples for the microscopic identification and examination become a crucial exercise. Laybourne (1992) and Brom (1990) have given various techniques for cleaning and preparing of the feather sample. The widely used technique that involves a non- ionic detergent (Triton-X-100) and washing this detergent with luke warm water removes dust impurities from the feather samples. To remove organic impurities, blood etc. the samples were treated with various grades of alcohol. Present study indicates that the washing with successive grades of alcohol rather than direct treatment with absolute alcohol gives better result as in latter case some shrinkage in the feather sample was observed. Some workers like Akahane & Murryama (1977) treated the feather sample with fresh dry acetone to remove the oil impurities and then air dried.

The present study employed the new technique of washing the feather samples with Triton-X-100, then treating with successive grades of alcohol, finally air drying after treatment with fresh dry acetone. In order to observe the effect of HMDS, one set of the sample after treatment with successive grades of alcohol was immersed in HMDS, three changes of HMDS were made for half an hour each and finally HMDS was made to air dry till the characteristic odour of HMDS disappeared. The HMDS treated samples were mounted along with alcohol treated samples and were examined for comparison.

It was observed that HMDS dried samples were more swollen in shape (Plate 1 Fig. 4) as compared to the alcohol dried samples which were seen to be more wrinkled (Plate 1 Fig. 2). The structure of the lobes in the nodes were more sharply visible (Plate 1 Fig. 3) as compared to the blunt edges seen in the alcohol dried samples (Plate 1 Fig. 1). Hence this difference can be vital if the identification has to take place within the same order. Moreover it was found that the general texture of the nodes have more clarity in the HMDS treated samples (Plate 1 Fig. 4).

Comparison between HDMS & ALCOHOL treated samples of Pigeon (***Columba livia***) feather.

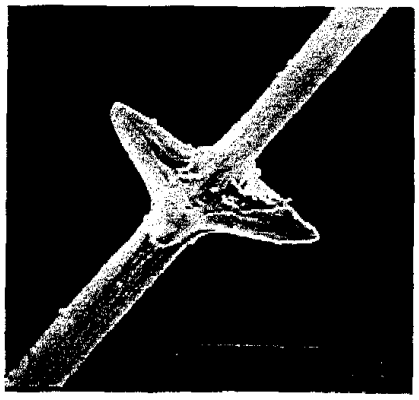

Figure 1

(6000 x)

Blunt edges of nodes as seen in alcohol treated samples

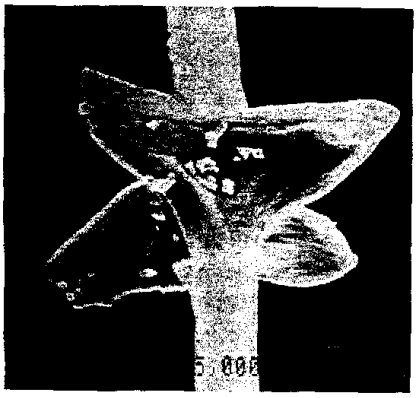

Figure 2

(6000 x)

Wrinkled alcohol dried samples

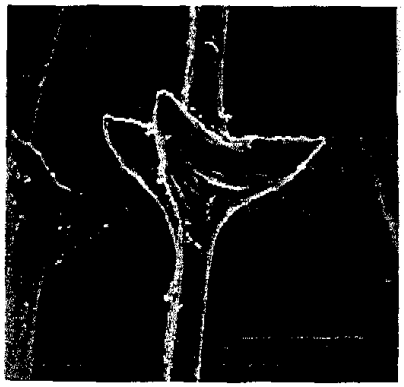

Figure 3

(6000 x)

Structure of lobes in HMDS treated samples

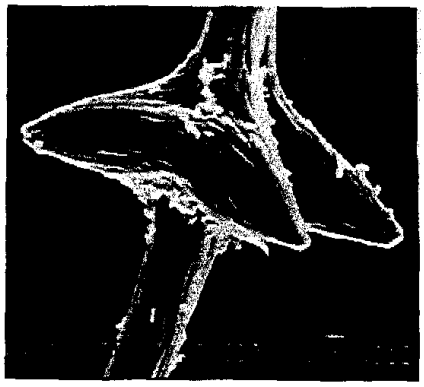

Figure 4

(6000 x)

General structure of node in HMDS dried samples

Plate 1.

Conclusion

Significant information is received by the nodal structure, hence it is important to restore the original shape of the node for the identification of the bird species. This becomes all the more important in the sample received in the bird hit cases as these are very minute, badly mangled and are usually collected by scrapping, as these get stuck with the blood.

The present study shows that the HMDS treated samples are more close to the original feather fragment in the shape of the node and also reveals more information as compared to the alcohol dried sample.

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