

Poster # 107: Use of Bi-Polar® ionization technology to combat with the increased PM 2.5 count and aeroallergen indices

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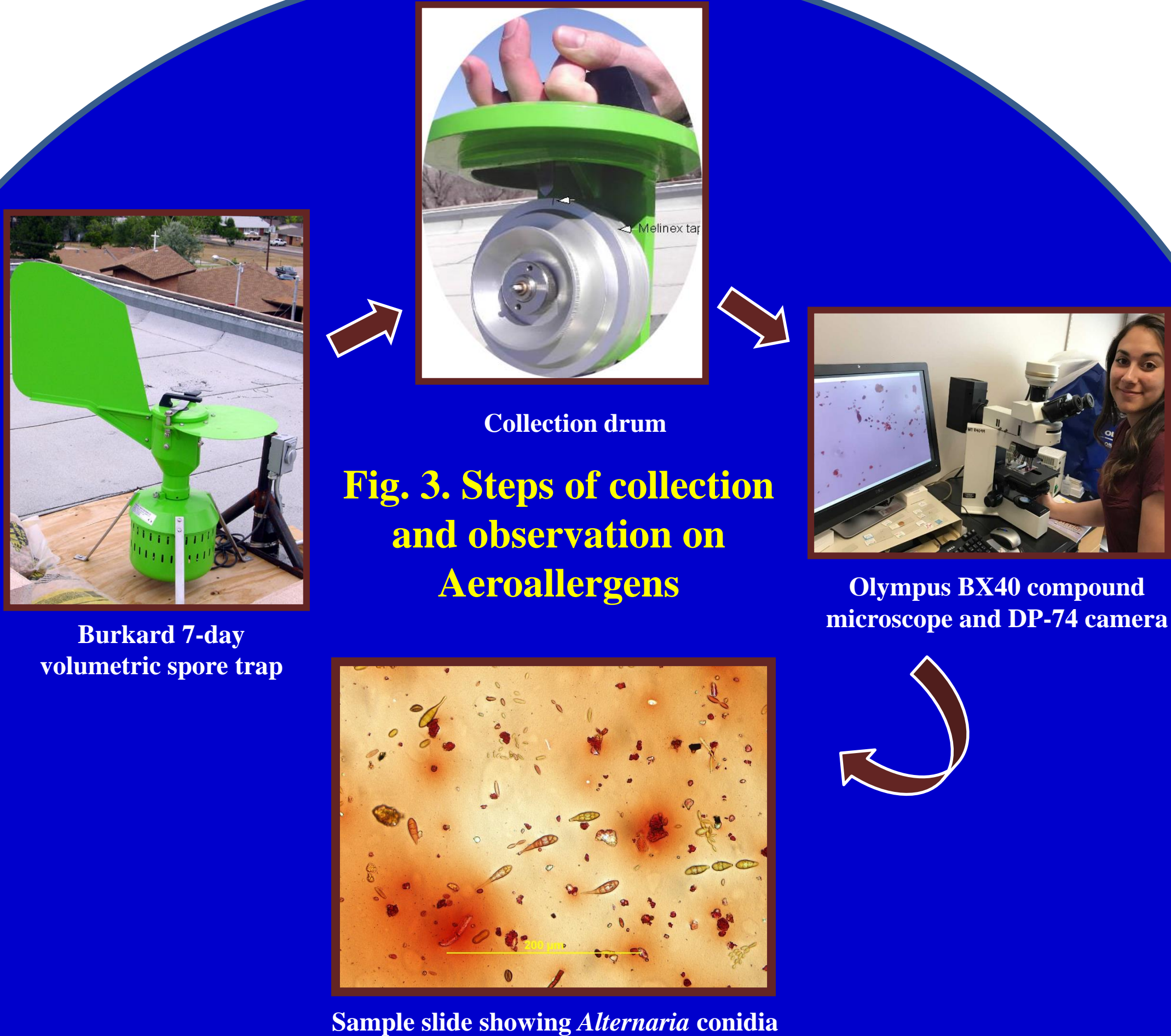


Abstract

RATIONALE: PM 2.5

Particulate Matter 2.5 (PM_{2.5}) refers to various invisible solid and liquid particles present in the environment. Aerosols, including PM_{2.5}, are the culprits of many allergic reactions and respiratory syndromes. PM_{2.5} is present in heavily polluted areas. Based on clinical studies, PM_{2.5} positively correlates with increased cases of allergic rhinitis, asthma, bronchitis, allergic pharyngitis, etc. Our studies on the aeroallergen composition and indices using the Burkard Spore Trap showed an increase in aeroallergen levels. We used the Bi-Polar ionization technology for remediation of the indoor aeroallergens including the PM_{2.5}, fungal and bacterial spores, and VOCs.

Methodology of Aeroallergen Analysis



The daily aeroallergen data for 20 years showed a gradual shift in flowering season and increased production of spores and pollen leading to an increased allergy and asthma cases.

New air purification with Bi-Polar Ionization



Slide preparation from the tape from the Burkard Spore Trap

- We collected the samples of pollen, fibers, particulate matters, gums, resins and fungal spores from the collection tape from the Burkard Volumetric Spore Trap. The tape was stained with 2% Safranin; it was mounted in Gelvatol. The slides were observed using a BX-40 Olympus scope with DP-74 Digital camera. The micrographs were analyzed using Image Pro 6.0 software.
- To view the fluorescence of the pollen, wet mounts were made using 2-3 drops of deionized water to prepare the slides.
- Study on the pollen grains for fluorescence:**
- To improve the visibility of the samples architecture 1-2 drops of 2% Safranin stain was added.
- Pollen collected from anthers of flowers were teased with a clean needle and debris was removed. Half of the slides had 2% Safranin and the other half deionized water. Safranin-stained slides showed better fluorescence.
- The prepared slides were observed, micro-graphed and analyzed with Image Pro 6.0 software.

Burkard Spore Trap showed an increase in aeroallergen levels

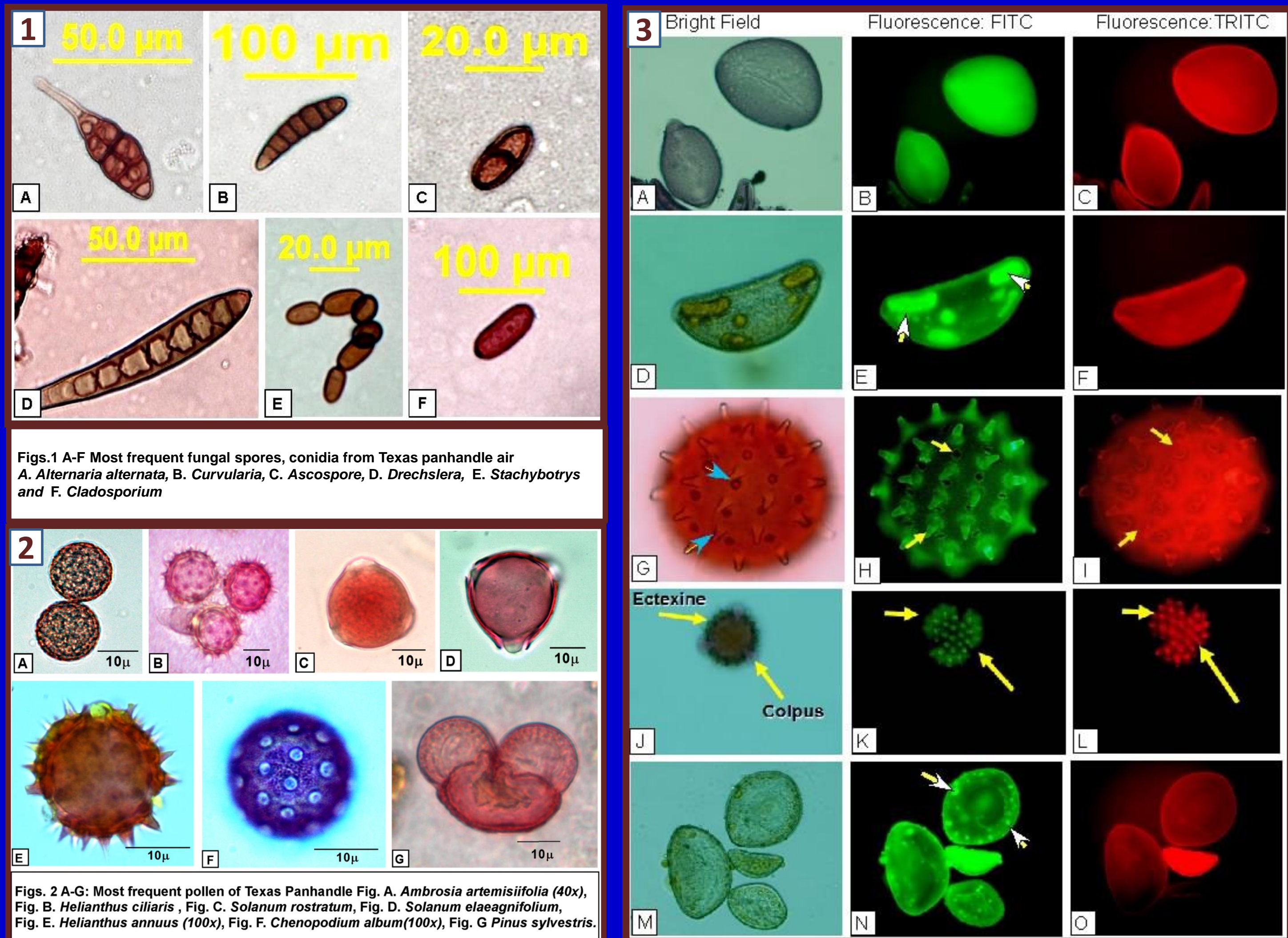
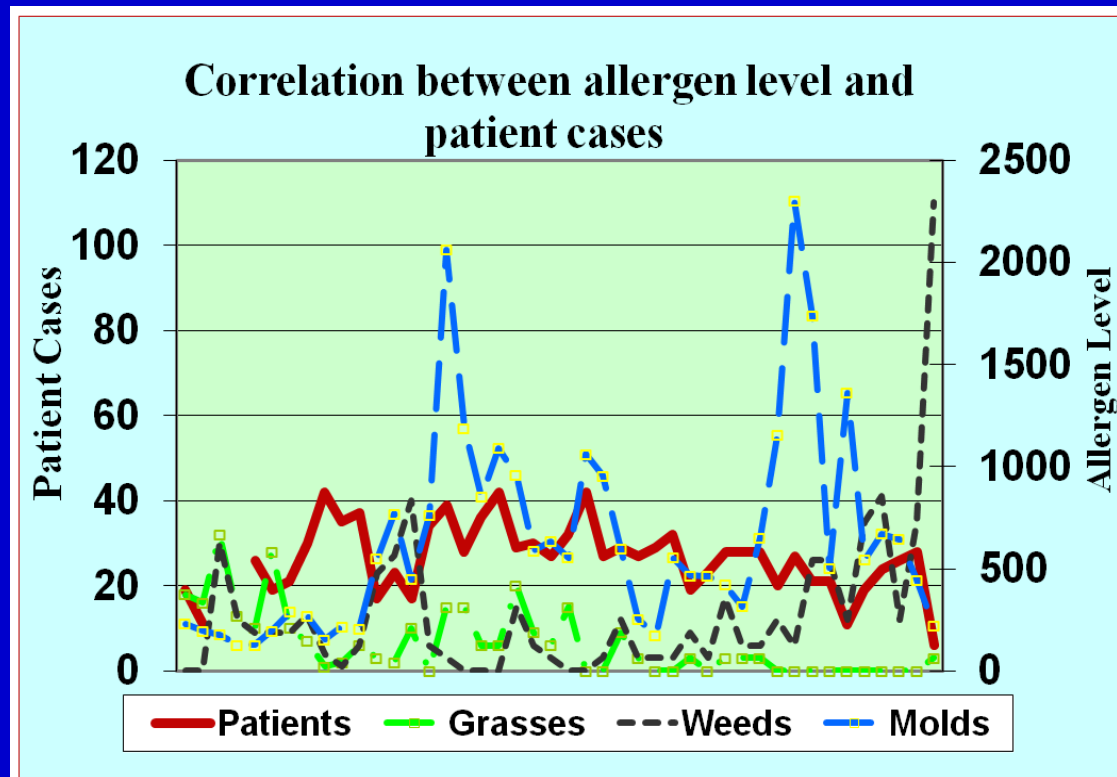
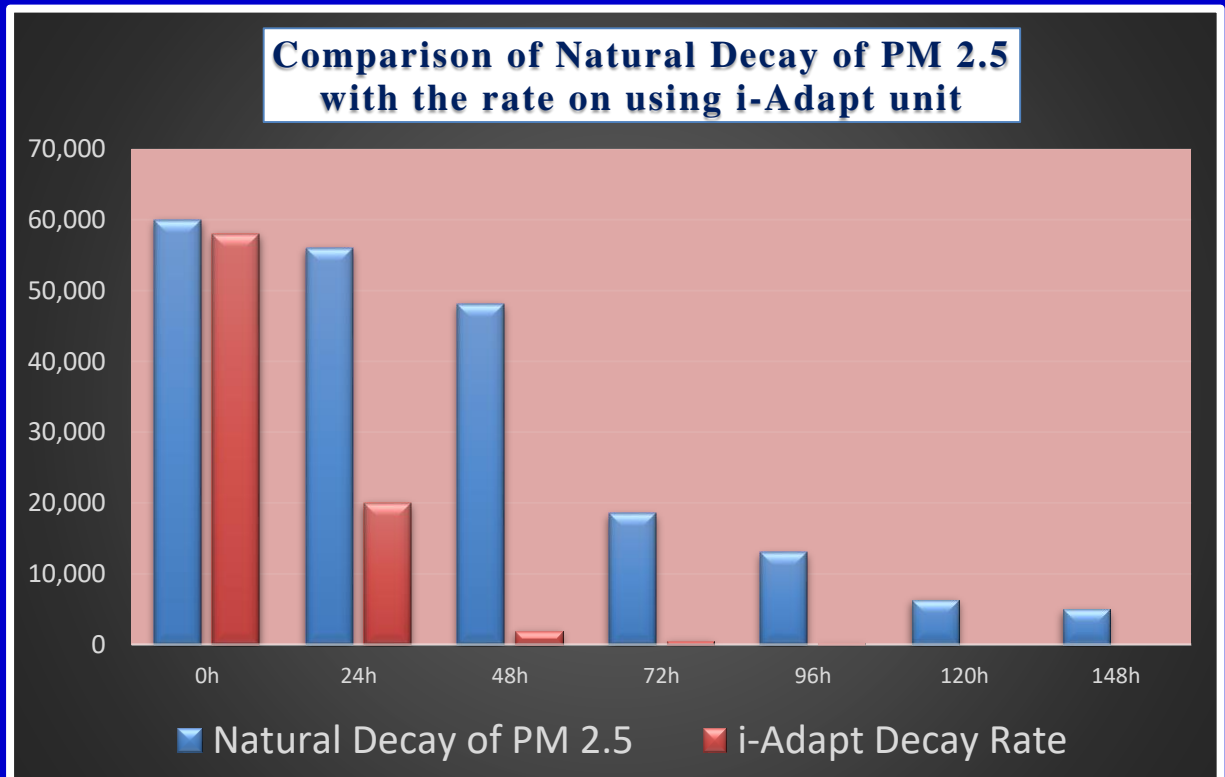


Fig.3. Micrographs of pollen: *Alstroemeria* (Alstroemeriaceae) (Easter lily) bright field, Fig. B with FITC fluorescent filter, Fig. C with TRITC fluorescent filter (Top view), D-F Bottom view. Fig. G *Hibiscus rosa-sinensis* L. (Malvaceae) (China rose) bright field, Fig. H with FITC, Fig. I with TRITC fluorescent filter. Figure J shows *Bellis perennis* L. (Asteraceae) (Common Daisy) bright field, Fig. K with FITC and Fig. L with TRITC fluorescent filter.

- Ambrosia artemisiifolia*, grass pollen (Poaceae) and *Alternaria* conidia were the most prevalent aeroallergen throughout the year.
- i-Adapt* is the air purification unit that uses AHPCO and Bi-Polar technologies with the HEPA filters. Our experiments with the PM 2.5 showed significant reduction in PM 2.5 concentration with time using the *i-Adapt* unit.



Graph-1 shows a significant correlation between the aeroallergen concentration and the number of allergy patients visited the clinic².



Graph-2 shows comparison of the rate of the Natural Decay of the PM 2.5 with the Decay Rate on using *i-Adapt* unit.

References

- Amarillo Globe-News: An Increasing Trend. Web link: <http://amarillo.com/news/local-news/2011-08-28/increasing-trend>
- Ghosh, N., G. Estrada, Veloz, M., Bouyi, D., Bennert, J., Saadeh, C. and Revanna, C. (2017). Meteorological and clinical analysis of aeroallergen data: Increase in allergy and asthma cases in Texas Panhandle. *ALLERGY AND ALLERGEN IMMUNOTHERAPY: New Mechanisms and Strategies*.(2017):101-124. Book Chapter, Apple, CRC Press, New York