255 Annual Comparison of Grass, Tree, and Weed Pollen in Las Vegas, Nevada, From 2019-2021

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RATIONALE: The airborne pollen concentrations in the Las Vegas Valley are unique because of the subtropical and hot desert climate. Information on seasonal pollen trends is needed and is important for local allergy sufferers and tourists. This study aims to analyze yearly concentrations of pollen in the Las Vegas Valley and compare them to earlier years.

METHODS: Air samples were collected using a Burkard spore trap from January 1, 2019, to December 31, 2021, at the National Allergy Bureau site located at the University of Nevada, Las Vegas. Slides were analyzed by microscopy at 400X magnification to determine airborne pollen concentrations. Data for tree, weed, and grass pollen were compared using a one-way ANOVA and post-hoc testing.

RESULTS: Three-year maximum grass and tree pollen concentrations peaked in March 2020**,** (73.7 grains/m^3 and 18,803.1 grains/m^3, respectively) and weed in April 2020**,** (299.5 grains/m^3). Annual means of grass, tree, and weed were highest in 2020 (2.2, 357.8, 10.1 grains/m^3, respectively) and were significantly different between the years ($p = 0.001$, $p = 0.012$, $p < 0.000$, respectively). Compared to the other years, grass and weed pollen concentrations were significantly lower in 2021 and tree concentrations were significantly higher in 2020.

CONCLUSIONS: Tree and grass pollen concentrations peaked in 2020, possibly due to high precipitation in 2019. The three-year means of grass, tree, and weed pollen from 2019 – 2021 were considerably lower compared to those from 2016 – 2018. Continued monitoring is essential in understanding seasonal pollen trends and timely forecasts for the Las Vegas valley.

256 The Mystery of Mulberry

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RATIONALE: We have recorded high levels of mulberry pollen at our NAB station in SW Ontario, Canada from 2010 to 2021. Mulberry trees are rare in SW Ontario; could "our" Morus pollen originate elsewhere?

METHODS: Possible sources located to our West & SW where NAB stations regularly report high levels of Morus pollen include Chicago, Omaha, Kansas City, Madison WI & St. Louis. We tracked pollen-containing air currents over 72-hour periods from those locations using NOAA HYSPLIT forward projections to see if some of "their" airborne pollen might be carried our way.

RESULTS: Morus pollen from all the above areas was carried to our location according to their reporting and HYSPLIT trajectories. Pollen from the Chicago area was the main contributor (9 of the 12 years). We also saw examples when conditions were ripe for Morus to be deposited here but was not.

CONCLUSIONS: Our results strongly suggest that mulberry pollen we report is a result of long-distance transport, but sometimes it did not result in local Morus pollen deposition.

257 An Object Detection System for Identifying Pollen Species

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RATIONALE: Exposure to airborne allergens, including pollen, is a primary trigger of allergic airway diseases (AAD) or AAD-like symptoms. Pollen has been the subject of international monitoring using manual counts for decades, a labor-intensive process. Current methods of identification are limited in terms of species and timing. We present a method for identifying pollen species in real-time.

METHODS: Using data accumulated from a collected pollen image dataset that we developed a singular (White Birch) and binary (White Birch and Bermuda Grass) object detection (OD) algorithm. A dataset comprised of 10 species (6 trees, 2 grasses, 2 weeds), $n \simeq 5000$, 400x magnification, were stained at four concentrations of Calberla's Solution in glycerol (0%, 17%, 50%, 100%). Using this dataset, we trained an OD algorithm EdgeImpulse (San Jose, CA) an embedded learning platform to distinguish pollen species.

RESULTS: This system differentiates trees from grass pollen. The singular OD algorithm identified pollen grains within an image with 100% accuracy, and the binary algorithm corrected identified pollen species with 83.14% accuracy.

CONCLUSIONS: Object detection approach is broadly applicable to advance aerobiology and "pollen counts".

258 A 2-Year Study to Analyze the Distribution and Concentration of the Major Airborne Pollen Grains During the Spring Seasons in Northeast Florida

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RATIONALE: There has been an increase in pollen allergy in the last 20-30 years with the anemophilous pollen being responsible for the majority of pollinosis. The increase in allergies from tree pollen is believed to be partly attributed to climate change caused by increasing global temperatures, and changes in precipitation patterns. We hypothesized that significant differences in the seasonal pollen release will be observed between the spring pollen seasons of 2021 and 2022.

METHODS: A 7-day Burkard volumetric sampler was installed on the roof of a 5-story dormitory at Edward Waters University in Jacksonville Florida to collect pollen from December 2020 to April 2022. Grains were analyzed and quantified by light microscopy at 400X using the single longitudinal traverse method. The classification of the daily concentration of the grains (m^3) were as specified by the NAB of the AAAAI.

RESULTS: The 3 most prevalent pollen grains during the collection periods were cedar/juniper, pine and oak. The peak level of the total pollen counts in 2022 were significantly lower than levels in 2021 (2162 grains /m^3 on 3/18/2022 vs. 6341grains /m^3 on 3/28/2021 respectively). High levels (90-1499 grains/m^3) of total pollen grains were first observed on 1/27/2021 while during the spring of 2022, high levels were observed as early as 12/17/2021.

CONCLUSIONS: The significant differences in concentration of total pollen grains between the 2 pollen seasons is a critical justification for the continuation of monitoring the pollen spectrum for the purpose of developing a pollen calendar for Northeast Florida.