CONDUCTED FIELD WORK IN BAJA CALIFORNIA from late January to early February on a project entitled **Evolutionary History of Coastal Lichen Species in the Genera Niebla, Ramalina and Vermilacinia (Ramalinaceae)** on which I am co-investigator with Professor Emmanuël Sérusiaux who — at the University of Liège in Belgium — has been elucidating the phylogeny of the Ramalinaceae.

A lichen is a composite life form consisting of a fungus and an alga in a symbiotic relationship — the entire “plant body” (thallus) bearing no resemblance to either of its partners. There are perhaps 18,000 lichen species. Those of *Niebla* and *Vermilacinia* depend on fog for their moisture requirements; most of them occur along the Pacific coast of North America. They can be found growing abundantly on branches of shrubs and on rocks (Fig. 1); indeed, they can contribute up to 75% of the landscape vegetation (Rundel et al., *The Bryologist* 75:501-508. 1972).

In 1996, I had named and described 53 of these lichens as new (*Sida Botanical Miscellany* 14). I had also described the genus *Vermilacinia* as new the previous year in Flechten Follmann (*Koeltz Scientific Books*). Many are known only from examples in Baja California, while others are found from California to southeastern Alaska. One species, *V. zebrina Spjut*, is found in the fog desert of Namibia and also in the Pacific Coast of North America.* Several other North American species, *V. leopardina Spjut* and *V. tigrina Spjut & Hale*, also occur in the fog desert of Chile.

The epithets for these species were selected for their distinctive black bands or spots on their “plant bodies”. Besides the tiger, leopard, and zebra *vermilacinias*, there is a lion *vermilacinia*, *V. leonis* Spjut, which differs, as one might suspect, by the absence of black bands; it occurs in southern Baja California and in South America (Fig. 2, 3).

During our expedition about 500 lichen specimens were collected. Evening hours were devoted to reviewing field identifications, entering collection data into a spreadsheet, preparing DNA samples and duplicate specimens for deposit at BCMEX before returning to San Diego.

Occurrences of *Niebla* seem less frequent than what I recalled seeing between 1985 and 1996. At least eight localities where I had collected *nieblas*, cited in my 1996 book on *Niebla* and *Vermilacinia*, had none. We also specifically searched for *Niebla usneoides* Spjut at four sites; *nieblas* were found at two of these sites, but not *N. usneoides*. This species was common on the Vizcaíno Peninsula north of Bahía Asunción.

*Niebla usneoides* is distinctive for reproducing asexually by tiny pustular projections (isidia) that develop abundantly over the entire thallus, a characteristic feature easily recognized in the field. The disappear-
ance of nieblas appears related to climate change. For example, if temperature rises, fog may precipitate at higher elevations, or not at all. At other locations, particularly along the immediate coast, human disturbance is clearly evident by growth of local residential communities further into the undisturbed desert. Similar disturbances had already occurred in California; for example, Albert Herre complained in 1936 about “Our Vanishing Lichen Flora” having been “devastated” by the “real estaters”.

Returning to Bakersfield, I needed to photograph specimens and prepare duplicates and labels for their deposit at the U.S. National Herbarium, Smithsonian Institution, then send the remaining original material to Professor Sérusiaux. There is an urgency for this due to degradation of the DNA that will occur in time, especially Vermilacinia species that will develop a moldy appearance within months after collection.

How can a mold become moldy if it was already a mold to start with? Most species of Vermilacinia contain a diterpenoid compound, [-]-16 α-hydroxykaurane, which is rare in lichens, and which reportedly causes efflorescence, defined as: “the changing of certain crystalline compounds to a whitish powder or powdery crust through loss of their water of crystallization.” After Vermilacinia specimens are collected, the cortex breaks down leading the inner white filamentous cells (medullary hyphae) to ooze out, from which crystalline deposits appear (Fig. 3). Not only is there a loss of DNA, but the whole thallus becomes a white mass, making it difficult to identify the morphological characteristics, which in this case is the presence of soredia, a powderpuff-like mass of fungal and algal tissue that disperses and reproduces the species.

* V. Wirth in Lichens of the Namib Desert (Hess, Göttingen. 2010) presents a color image of Niebla cephalota. This corresponds to the image of the holotype of V. zebrina presented by Spjut in Niebla and Vermilacinia (Ramalinaceae) from California and Baja California of a specimen collected by Mason E. Hale, Jr. in July 1980 on branches of shore pine at Lamphere-Christenson Dunes Preserve near Arcata, California. Images shown in Fig. 2 above were taken in Baja California, January 2016.