

from  
Dragonflies  
to fire Flaps

Ülgen Semerci in  
conversation with  
İsmail Bekar



**Ismail Bekar is a fire ecologist pursuing a PhD in Forest Ecology Group at ETH Zurich. He started working on fire ecology during his BA and has been working on fire ecology ever since. Unlike many ecologists, he spends most of his time working with computers rather than fieldwork as he often uses data-driven, statistical, or computer models to understand forest fires.**

**Ülgen:** How did you become a fire ecologist? How do you relate to all of this?

**Ismail:** It wasn't a coincidence. I was interested in biology as a child. I knew I wanted to study biology when I was in primary school and that remained a constant throughout my studies. In high school one of my teachers said to my mom, 'Ismail is one of the rare students who came in wanting to study biology and who's graduating wanting the same thing!' I knew what I wanted. Applying to university, I made four choices and all four were biology degrees.

When I was a kid, newspapers would give away free books. There was this one series called visual books series which had 4-5 books in. There was one on automobiles and one about plants. I was enchanted by the book about plants. It was printed on glossy paper, it was really something! I devoured that book. There, I encountered dragonflies and carnivorous plants. These captivated my attention. My interest continued to grow until university. At university level, I still hadn't discovered what I truly wanted. Initially I thought I could study botanics or zoology. But then I realised I was actually drawn to ecology. I had been trying to learn about climate

change on my own. I was really interested. Cagatay Tavsanoğlu has a fire ecology lab; I started working with him. On one side you have people studying parasites, or genetics, which in my opinion is boring (laughs), on the other hand is FIRE! It is a wicked thing, fire.

What's interesting about studying fire is this... It's a challenging thing for people to accept that fire is actually a good thing. We have a reflex that it is bad. I remember even after a year and a half, still not being totally convinced, and asking my professor; 'Sir, are we sure?' I've always been fascinated by my subject. It is amazing to see nature's destructive force which, on the other hand, can create new life, to try to understand it and model the processes.

It is also an emotional thing for me to study biology and ecology because it was my childhood dream. When we were in high school it was considered a little futile. 'Are you sure you want this? You won't find a job, you'll have to work in a lab...' I can now say it's truly a wonderful thing to be working on something that makes you happy. You know how people say 'I reached my childhood dreams'; I feel exactly this way. Even though a PhD proves to be pretty challenging!

**Ülgen:** When I read your previous interviews I understand that fire regimes are vital to understand and deal with fires. Can you tell me what a fire regime is?



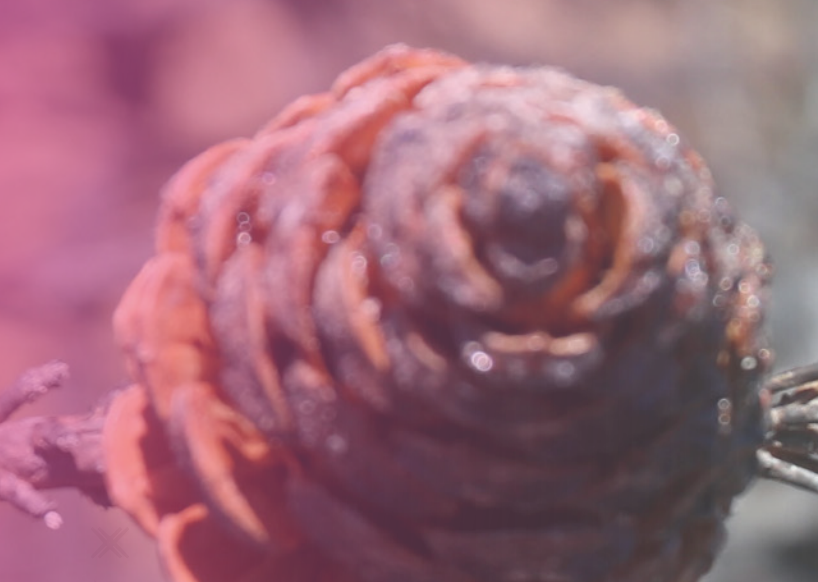
This is the first dragonfly picture that Ismail took when he moved to Switzerland for his PhD. He recalls it as a beautiful moment that reminded him of the plant book that he had in his childhood.

**Ismail:** Fire regime is a concept helping us classify fires in terms of temporal and spatial patterns. Although the concept remains the same throughout the globe, different regions have different regimes. Fire regime entails several criteria: frequency, type (ground fire, surface fire, and crown fire) seasonality, intensity, and size.

Fire regime is a very important concept. I cannot stress this enough. Fire becomes harmful when we alter a region's historical fire regime. As a simple example, when an ecosystem has evolved to burn every 5 to 10 years and we cause fires to be as

frequent as a couple of years, then it becomes problematic. The opposite is also true. When natural fires are suppressed by governments, it results in overgrowth on the forest floor leading to much bigger fires. The flora and fauna of the region will have evolved over hundreds of years to adapt to its fire regime. When we interrupt this cycle with human activities, as a consequence those adaptations become futile causing bigger problems exponentially.

Turkish pines, for instance. These trees have masterfully adapted to fire. Their cones open up when exposed to heat, spreading their seeds to the post-fire soil rich in minerals and vitamins, allowing rapid germination. It is important to get out of the anthropocentric view here. When I say rapid I mean for nature, not for humans. 30-40 years may seem like a long time for human lifespan, however it is pretty quick when nature is in question. Turkish pine forests can recover quickly and completely post-fire. However, in order to do so, the trees need to reproduce their cones which means a few decades. If humans expose these forests to yearly fires then the cones will not have formed, the adaptation will no longer function, and the ecosystem will change dramatically. This is a very problematic process.



The African savanna ecosystem hosts different kinds of fire adaptations. Fires would be more frequent in this environment; every year or two. As an adaptation, some plants grow their reproductive organs underground, allowing them to go through fires unaffected, renewing themselves each year. If you were to suppress fires in these habitats, the bushes or the annual plants in the ecosystem would start changing, perhaps evolving into forests. This would affect animals, insects, flora, and biodiversity. When we start interfering with historic fire regimes this way, we cause changes in the ecosystems which brings everything to a whole new level. This can have extremely severe consequences.

**Ülgen:** Fire suppression sounds like an extremely dangerous strategy. From what I understand, when humans suppress fire, then the undergrowth on the forest ground keeps accumulating, eventually causing much more destructive mega fires. These mega fires are outside of the norm for the ecosystem and much harder to control. So why do we still do it?

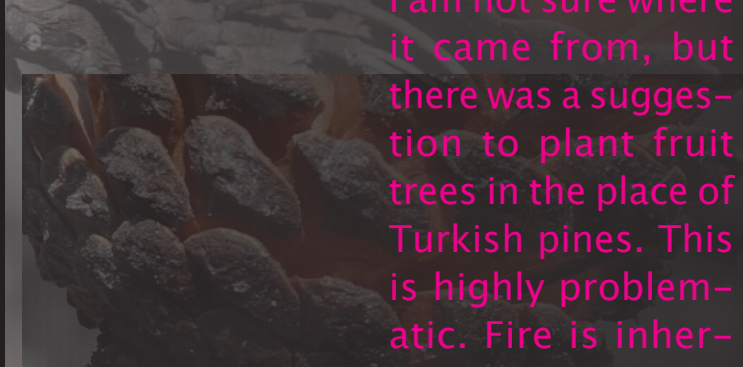
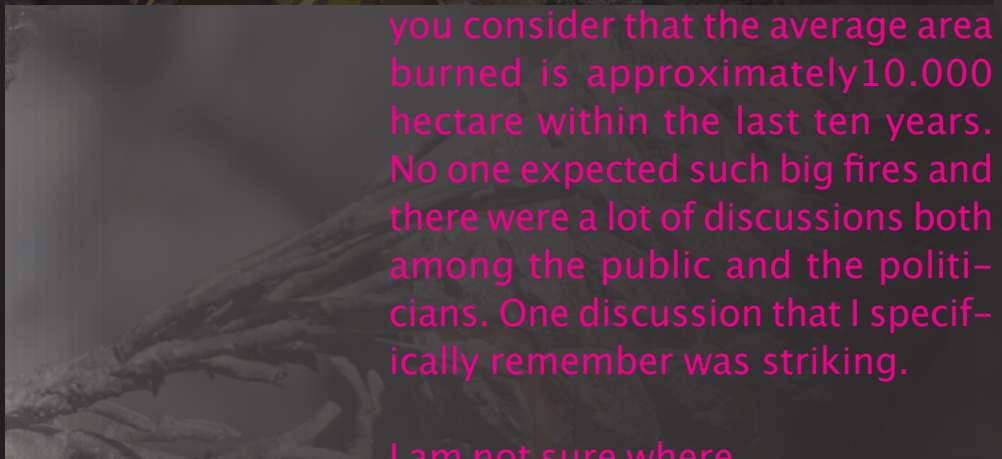
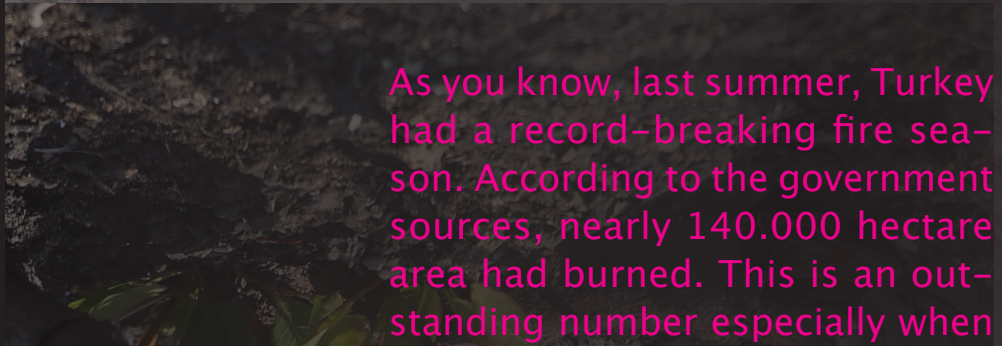
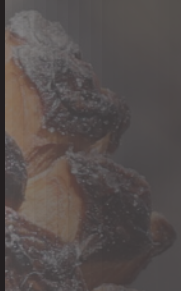
**İsmail:** Because of the politicians (laughs). Channeling scientific knowledge into politics takes time. Some countries, such as Australia,

Canada, and USA, who are more evolved in terms of fire ecology, have started moving away from fire suppression strategies and towards mitigation and prescribed fires. This may sound simple but is not an easy task. When you start a fire you cannot just let it be. It is a fine line to walk.

As you know, last summer, Turkey had a record-breaking fire season. According to the government sources, nearly 140.000 hectare area had burned. This is an outstanding number especially when you consider that the average area burned is approximately 10.000 hectare within the last ten years. No one expected such big fires and there were a lot of discussions both among the public and the politicians. One discussion that I specifically remember was striking.

I am not sure where it came from, but there was a suggestion to plant fruit trees in the place of Turkish pines. This is highly problematic. Fire is inherent to the Mediterranean ecosystem. These trees will eventually burn!

No such thing as a tree that doesn't burn! The advantage of the Turkish pine forest is that it can regenerate itself eventually. But what happens when one plants fruit trees instead? Fruit trees have not adapted themselves to the ecosystem. So humans will need to plant trees again and again and control the entire environment. This is not sustainable. There are ways to cope with fires before they start. Something very important to consider is the wildland-urban interface, where a built environment meets a natural environment. Fire risk must be considered when a land is being developed through human activity. As I mentioned, forests burn regularly and will renew themselves, there is no harm in that from an ecological point of view. But when human losses are in question, then it becomes a different matter.



Kermes oak grows from underground 20-25 days after a fire.

Serotinous cones: Turkish pine cones are covered with resin and stay closed even if the seeds are mature. After fire, resin melts and they open up and release seeds. The one in the middle has already opened up and released its seed.

**Ülgen:** Were you affected by last years' wildfires? I'm asking this both personally and professionally.

**İsmail:** It was unbelievable. When the fires first started I was on vacation in Dalaman, exactly where the wildfires began. People were asking 'How can multiple fires start all at once?' with disbelief on Twitter. I was too writing things on Twitter, as I usually do, on my own. Then, I retweeted one of these, answering 'I am writing this as a fire ecologist; multiple fires can start all at once in one region.' This went viral. All of a sudden dozens of journalists contacted me, wanting an interview. I tried to accept every invitation and answer every question because it is critical to change people's misconceptions. As I said earlier, the policies the Ministry of Forestry are following are harmful. If you know better, you need to do your best in order to change it. So I talked with Youtubers, journalists, even at a panel in the Chamber of Industry, in order to inform and change minds. Politicians do not tend to change things unless pressured by the people. People around me learned some things about fire ecology, and people around them too. Hopefully the circle grows. We need to keep talking about these issues. İsmail then quotes from Juli G. Pausas: "A world without fires is like a sphere without roundness, i.e., we



Fire eventually stops when there is nothing to burn.

cannot imagine it." Especially in a climate like the Mediterranean, no such thing as dreaming a life without fire. Hence we must learn how to live with fire. Instead of trying to eliminate fire, we need to strive to understand life with fire, to perhaps help the ecosystem do its renewal process. Another thing is to try to diminish the effects and losses of fire on human life and possessions. Instead of directly starting or suppressing fire we need to focus on such aspects. In a way, we too, need to adapt to fire.

**Ülgen:** You wrote; 'fire is often thought of together with humanity, yet it is much older than humanity.' Can you explain why you made that statement?

**İsmail:** After the industrial revolution, human activities' capacity to shape the world increased. It is true that today most fires start from human activities. This doesn't mean that fire is not inherent to the nature of that environment. Think about it this way. Tourists go to both the Black Sea region and the Mediterranean region for picnics. Why do we not observe fires in Uzungol, yet almost every spark in Mugla turns into fire? Here, we can talk about fire potential. Some ecosystems are more prone to burn. In fact, in a way they are fire-depen-

dent. They survive because of fire. Some grasslands and shrublands need regular fire in order to exist. In absence of fire, these ecosystems will turn into forests. One may wonder what's wrong with that. Well, there is such a thing as biodiversity. There are countless plants, insects, mammals, and birds living in ecosystems, so turning every piece of land on earth into forests is not a solution nor something we desire. So yes, fire frequency is an important concept, we do not wish for more frequent fires caused by human activity, but nor does it mean every human-caused fire is a bad thing.

**Ülgen:** Let's assume we are respecting the dynamics of the ecosystem and not interfering with the forests' post-fire process. Yet, due to human-caused climate change, the fires become more frequent, not allowing the Turkish pines to form their cones. I'm sure this is a question with a complex answer, but if we cannot let the ecosystem on its own to do its renewal process, then what kind of policies must be in place?

**İsmail:** This is a very complex matter. The first thing that needs to be done, if we're talking about Turkey, is to conduct long-term research. We need to observe and study burnt areas to see how they are affected

by fire. Is germination happening? If it is, to what degree? Currently, we do not fully know how these areas respond to fire. We simply do not know because we keep interfering, trying to rebuild forests straight away. The most beneficial thing the Ministry of Agriculture and Forestry could do would be to provide funding to a number of scientists to work on Turkey's historic fire regimes. There are no such studies at the moment. Since we do not know the history we cannot know how the regimes changed, if they did.

Going back to your question, if the forest cannot renew itself, then there are things that can be done. I'm a little hesitant talking about this because the hasty response is 'we are doing it' when we talk about tree planting. So far we have not seen the proof that the forests in Turkey cannot regenerate post fire. Ecologists would prioritise leaving ecosystems on their own to see if they have the capacity to regenerate. If that is not happening, then sure, we can plant trees. But this is also a delicate matter. Forest ecologists stress the importance of using seeds from the same genetic pool. As you see, it's not as whimsical as 'let's plant fruit trees!'

**Ülgen:** Where did the fruit tree suggestion come from? Why fruit trees?

**İsmail:** Because Turkish pine is a 'useless' tree (laughs). I'm not judging, I did not know the benefits of fire before I studied it. The ultimate goal for foresters would be to show the least attention to an area post fire. Turkey is a large country. The ministry simply cannot turn all the burnt areas from last year into forests. Nor can it afford the maintenance. It's just not economically possible. What would be ideal is for the land to stay in its natural state so that it requires minimal interference and maintenance. Nobody has unlimited sources, we need to consider everything.

**Ülgen:** In a previous interview you mentioned mapping fires. What does this process involve?

**İsmail:** Yes, this is one of the projects I'm planning on developing, to bring together the information that creates a fire regime. It is important to know the fire danger. Meteorological observations entail fire weather index. These indices give us answers for questions like what is the probability of fire on any day? Of course ideally we'd like to know more than the probability of fire. For Turkey, we already know that fire ignition probability is high more

or less from May until September which means the entire summer. What we'd like to know is the risk of a large fire. Not every fire is the same. Most of them are small, only a few are large. However, a few large fires can cause a tremendous amount of burned area. Therefore, the more information that we have on fire danger the better.. We can study fire danger from various different perspectives: modelling, calibration studies etc. If we manage to create such an understanding of fire danger, especially in the Mediterranean region, it would help us understand the bigger picture. That would help tremendously. When you create this kind of understanding, you would have a better chance of being well prepared before the fire season. Therefore, you can plan ahead accordingly and efficiently. We can take precautions. This is why it's so important to understand fire regimes. It helps us to deal with fires before they take place. It makes a big difference ecologically and financially. Fighting fires after they spread out is a very difficult and extremely expensive thing. I'm hoping to conduct such research involving Turkey in my postdoc.

**Ülgen:** You mentioned the benefits of fire. Can you name any, besides creating space for new life?

**İsmail:** Allowing the ecosystem to sustain itself. Think about it this way; if the trees in a region get too old, they become prone to stress factors and risk diseases. It is important for an ecosystem to stay young and healthy. Some trees get too big in the crown as they grow old, cutting off daylight on forest ground, changing its flora. This could mean certain vegetation and animals not being able to survive in this new habitat. The main benefit is to allow an ecosystem to sustain itself, both in terms of flora and fauna.

Let me give an extreme example. I find it very interesting and slightly amusing. There's a bird in Australia which developed such an adaptation they help fires spread. They pick up burning branches, carrying them to unburnt areas, causing small mammals to flee so that they can hunt them. Perhaps there are fire adaptations we have yet to discover in the Mediterranean too.

**Ülgen:** You refer to human-caused fires and natural fires, how sometimes they cannot be distinguished.

**İsmail:** I'm not in the firefighting angle of the matter so I don't know exactly how it works. But I know that the cause of the fire is always investigated afterward. I tend to think it's equally important to

focus on why we see larger fires today. Of course, it is important to understand the cause so that we can take precautions. For instance if you know certain power lines start fires, then you can speak to those electric companies and work on a solution together. However, dwelling on only what started a fire after it's already spread is a little futile because it's already happened. We also need to focus on why they're getting bigger.

**Ülgen:** Is the main reason drier and hotter weather caused by climate change? Plus fire suppression policies?

**İsmail:** Well, there are two main causes. Obviously, climate change is the elephant in the room, but forest and fire management plans also play an important role. For instance, we are already experiencing increasing temperatures and more frequent and intense droughts caused by climate change. When you bring aggressive fire suppression policies that lead to fuel accumulation into the equation, you've prepared a recipe for fire. There is no chance of preventing or suppressing every single fire when you have so much material ready to burn in hot and dry weather. Under these circumstances, when a single fire spreads to a large area, it is unimaginably hard to gain control. The larger the fire becomes, the harder it is to control. Following the

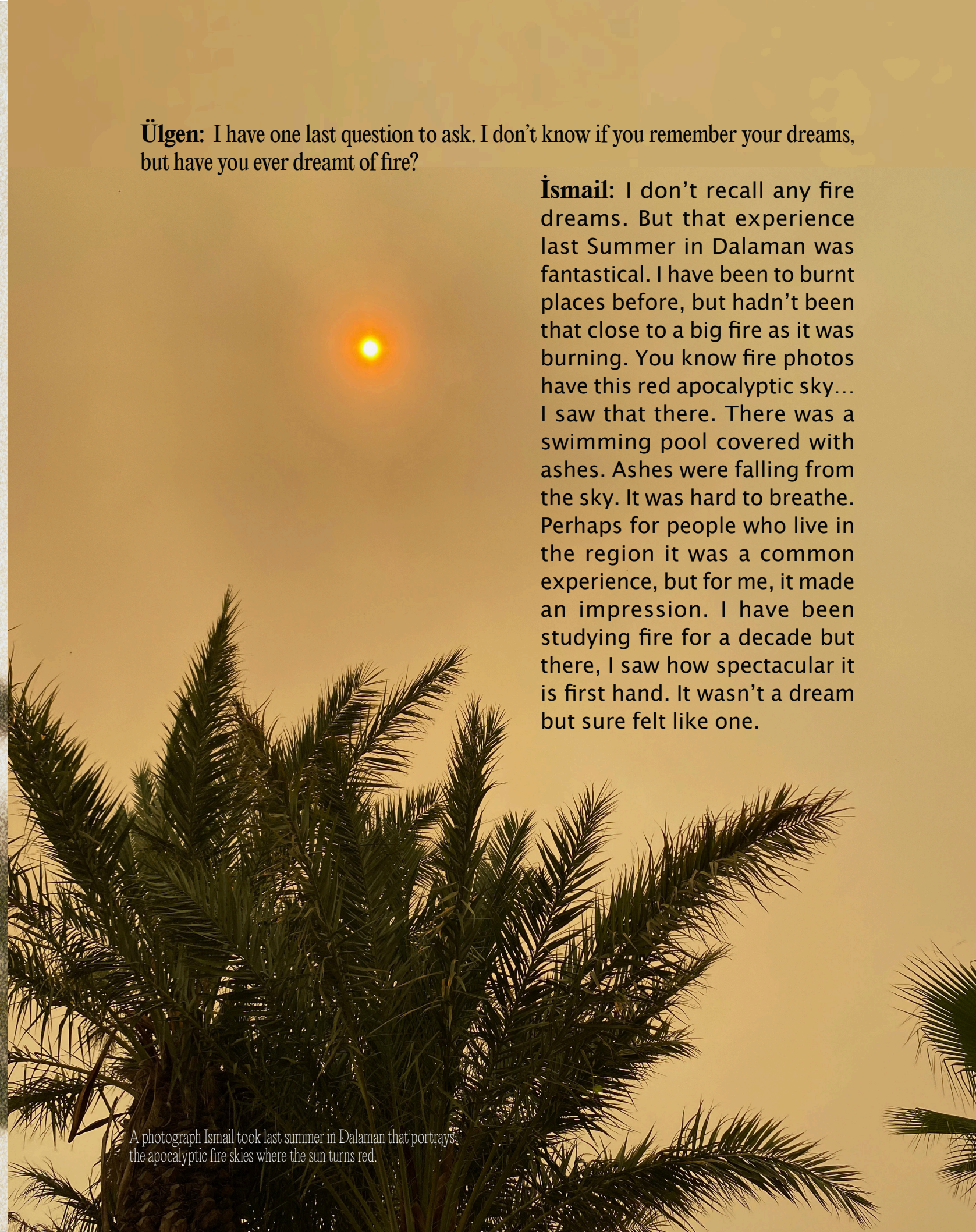
news from Canada and Australia, I often come across firefighting officers praying for rain, in fear of not being able to contain fire without the help of the weather. That's why we need a better understanding of fire. We need to put more effort into adaptation and mitigation rather than focusing only on suppression. Having aggressive fire suppression policies is not working; in fact it is making things much worse.

**Ülgen:** Did we always try to suppress fire? You recently mentioned Native Americans often starting small fires, much like prescribed fires. Can you elaborate on that?

**İsmail:** That is an incredible story. For thousands of years, tribes across California used small, intentional burns to renew resources, create habitat for animals, and to reduce risk of larger fires. For the last 100 years, however, the US government, much like the rest of the world, has considered fire the enemy, an element to suppress and eliminate. This kind of management left the ground filled with vegetation ready to burn. As the climate crisis creates drier and hotter weather, we keep encountering bigger and more destructive fires. After decades of suppression, California is finally setting on the right path. The state is now making investments in prescribed burning. It is ironic how we treat old knowledge like new information.

**Ülgen:** I have one last question to ask. I don't know if you remember your dreams, but have you ever dreamt of fire?

**İsmail:** I don't recall any fire dreams. But that experience last Summer in Dalaman was fantastical. I have been to burnt places before, but hadn't been that close to a big fire as it was burning. You know fire photos have this red apocalyptic sky... I saw that there. There was a swimming pool covered with ashes. Ashes were falling from the sky. It was hard to breathe. Perhaps for people who live in the region it was a common experience, but for me, it made an impression. I have been studying fire for a decade but there, I saw how spectacular it is first hand. It wasn't a dream but sure felt like one.



A photograph İsmail took last summer in Dalaman that portrays the apocalyptic fire skies where the sun turns red.