

## The Sun in Uganda (2)

Continuing from the last issue, I will introduce some more stories related to the sun in Uganda, which is, as you know, an equatorial country.

### **The day length is 12 hours and is constant throughout the year in Kampala.**

Rice is basically a short-day plant. Many rice varieties have the property of forming panicles in response to the seasonal change in the day length (photosensitivity) and this ability is more common in traditional varieties. In Cambodia and Sri Lanka, where I have experience, the maximum differences in annual day length are 1 hr. 28 min. in Phnom Penh and 54 min. in Colombo, respectively. These maximum day length differences are significantly shorter than those in Tokyo (4 hr. 50 min.), but there are native rice varieties that are sensitive to these slight differences and through the long history of rice cultivation of those countries, the traditional rice cultivation patterns have been developed using a combination of rainfall patterns and these native varieties. It is known that tropical varieties are more sensitive than temperate varieties to small differences in day length. For example, in Melaka, Malaysia, located on 2°N, the maximum day length difference is only 14 min. but there is a traditional rice variety that is sensitive to that slight difference in day length. However, in Uganda, no rice cultivation pattern utilizing the special characteristics of photosensitivity is found. Maybe it is because Uganda has only a short history of rice cultivation and has had no chance to develop traditional varieties. But it is also an important factor that Kampala is located at 0°19'N, and the maximum difference of day length is only 2 min. I believe rice can't detect such small differences. Arua district is located at a latitude of 3°N, about 500 km north of Kampala. The



The difference in day length is about 20 min there, so photosensitivity might be exploited if using a

sensitive variety. It may be possible to find a variety that shows a different growth reaction at Kampala in the future.

### **The Sun moves north and south.**

Around February one year, a young Japanese colleague planted an upland NERICA variety in a sunny open south facing area in front of our office. He had sought to make it an effective demonstration for office visitors. Initially, upland rice was exposed to the sun and grew satisfactorily. And then, by the Spring equinox in March, the sun passed just above the building and the sunshine became weaker, and after April, the sun passed to the north side of the building and the upland rice was in the shade all day long and the rice growth stagnated. In Japan, which is north of the Tropic of Cancer, the sun is always visible to the south, but in the equatorial region, it tilts north in the Summer Solstice and south in the Winter Solstice. Although the equatorial region has little seasonal change, the sun on the equator exhibits a dramatic change from south to north.

### **Strong ultraviolet radiation**

When conducting experimental cultivation using pots in Uganda, it is convenient to use plastic buckets as pots. However, this requires careful handling. The bucket deteriorates quickly, and when you try to hold the rim of the bucket to move it, it cracks easily. Ultraviolet rays become higher at lower latitudes and at higher altitudes, so it seems that ultraviolet rays are particularly strong at Kampala with an altitude of 1000 m or more almost on the equator. I believe that this strong ultraviolet light accelerates the deterioration of the buckets.

At one point, I met a doctor at a party and he pointed out the redness and the pterygium of my eyes and kindly explained that it was highly possible that this was the effect of ultraviolet ray exposure due to working outdoors. At the time of flowering of rice, I always got rice pollen allergy and my eyes were red, so I had thought that my eyes were red because of rice pollen. My eyes, however exhibit symptoms of hyperemia even when the rice is not flowering, so it may be because of the sun in Uganda.

(Kojima, February 2019)