THE plant breeder working with the castor plant, *Ricinus communis* L., is concerned with the development of higher yielding varieties that can be efficiently machine-harvested. To accomplish this task, it is essential that a careful study be made of the pollination habits and breeding behavior of the crop. The effects of temperature, humidity, light, and wind on pollination are of prime importance.

Pollen grains, spores, and some seeds are known to be dispersed to great distances and altitudes by air currents. Since the castor plant is often cross pollinated, the procedures and requirements for the production and maintenance of superior strains or varieties must be based on facts regarding the wind dissemination of its pollen.

The castor plant is a monoecious plant that is native to the tropics, where it is a perennial. In the United States, where it is subjected to freezing temperatures, it behaves as an annual. Once flowering commences, spikes are produced until frost in most strains. The unisexual flowers normally are grouped on an elongated axis, with the pistillate florets at the top and the staminate florets below; however, occasionally the staminate flowers may be mixed with the pistillate flowers.

The objectives of this investigation were to determine the time of day of pollen shedding; the relative amounts of pollen dispersed in the air at various distances from their sources, and the number of days that the staminate florets shed pollen.

**Review of Literature**

A comprehensive review of the literature concerning environmental factors that affect pollination in grasses is given by Jones and Newell (3). Most of the investigators indicated that temperature was the most important external factor affecting the time of pollen shedding in grasses, but that relative humidity and wind movement also had an effect. Jones and Newell concluded from their studies with a number of grasses that when the meteorological conditions were optimum for blooming, the daily pollination periods occurred rather regularly for each grass throughout its seasonal pollination cycle. It seemed to them that the time of day of blooming of grass florets is a result of the interaction of inherent and external factors.

According to White (6), at the Brooklyn Botanical Garden, the male florets of the castor plant were all mature and shed pollen this to an abundance of the plant’s own pollen near the female flowers, and the sheltering effect of the foliage currents bearing foreign pollen. In contrast, under conditions in Illinois, Domingo (1) found 36% crossing between the same row and between plants in adjoining rows. Woodworth (5) states that this difference could be due to greater air movement in Illinois.

An isolation distance of about 7 rods was found to be sufficient to prevent crossing of castor plants in the British West Indies, while Weihel and Woodworth (5) state that this difference could be due to greater air movement in Illinois.

The amount and distance of pollen dispersal for seven species of cross-pollinated grass crops were studied by Jones and Newell (3). The pollen of all the grasses followed about the same general trend. Gravity and dispersion decreased the pollen load of grasses from the field. Considerable quantities of pollen were dispersed in the air at 25 rods and the amount of pollen reduced to small quantities until 40 rods was reached. Thereafter, as much pollen was caught at 60 rods as was caught at the field source. Their data suggested to them that an isolation distance of 60 rods or greater would give better chances of maintaining genetic identity with these crops than would lesser distances.

Hodgson (2) measured pollen dispersal for a grass by collection on microscope slides and by isolating populations which were segregating for albinos, at various distances from the north of a homozygous green tester field. From studies of approximately 110,000 plants, he concludes that 60 rods would be sufficient for the production of superior farmers for establishing pastures, but at least 90 rods were required if the seed is to be harvested in the next generation.

**Materials and Methods**

Studies of the time of day of pollen shedding, and the number of days pollen is shed were conducted on the castor plant at the Oklahoma Agricultural Experiment Station at Stillwater, Okla., in 1947 and 1948.

Pollen shedding and dispersal were determined by placing sets of microscope slides having approximately 250 square inch of surface coated with vaseline in holders attached to weather vanes at various degrees (Fig. 1). Exposure of slides by this method turned into the wind and at an angle that would allow whether blown through the air or falling as a result of gravity. Temperature and relative humidity for all the plots were recorded by means of a hygrothermograph. Wind velocity was obtained by observing an anemometer. General light intensity was determined by visual inspection.

To determine the time of day of pollen shedding, the slides were exposed in the center of the castor plant at 8:00 a.m. and at 10 a.m. each day in early June, 1948, when the temperature, wind velocity, and general light intensity were presumably similar.