that the P gene is expressed in these same two tissues, but as yet we see no obvious relationship between P controlled pigment and the production of peonidin, which is a methylated form of cyanidin.

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1. Genetics of photoperiodism in corn.

Genetic studies of photoperiodism of corn under natural conditions (field or greenhouse) have been carried out in the past two decades (Singleton 1946, Galinat and Naylor 1951, Shaver 1967, Brown 1967). The short-day corn, Indeterminate (id/id), and the long-day corn, Gaspe Flint, were well established genetic stocks. Observation of these genetic stocks under artificial light in controlled environment was made in this study in order to determine whether photoperiod alone initiates or inhibits the sexual differentiation and flowering process.

Two identical growth chambers (each illuminated with 12 150 W incandescent light bulbs and 34 96" fluorescent lamps) were used to grow the corn plants. Total intensity of the combined light sources was around 10,000 foot-candles at 4 feet distance. Temperature was maintained at 72°-75° F by cooling and heating systems of the growth chambers. Fresh air was circulated through the rooms to insure the normal content of CO_2. Indeterminate and Gaspe Flint seeds were sown in gravel beds and sub-irrigated with nutrient solution twice daily. One room had a 10-hour photoperiod (short-day) from 7 a.m. to 5 p.m.; the other had a 15-hour photoperiod (long-day) from 6 a.m. to 9 p.m.

One hundred seeds from the progeny of a selfed Id/id stock were sown in the short-day room on 12/26, 1967. The silks and tassels emerged on both Id/- and id/id plants on 2/8, 1968. A total of 42 days was required to reach the flowering stage. There were 80 Id/- plants and 20 id/id plants: roughly a 3:1 ratio. The id/id plants were easily

identifiable by the genetic marker, striped leaves and short stalk (8 inches at tasseling stage) under the short-day condition. Two seeds were obtained from one of the id/id tassel-seed plants by selfing. Another 100 seeds from self pollination of the monohybrid (Id/id) were sown in the long-day room on 4/15, 1968. Eighty plants which showed Id/- phenotypes produced tassels and silks on 6/14, 1968. A total of 60 days was required to reach the flowering stage. There were 12 id/id seedlings with typical characteristics on 7/1, 1968, but only 3 survived. At the end of 30 days, 3 id/id plants grew too tall (more than 7 feet) to be housed in the growth chamber and were moved into the greenhouse on 7/15, the normal long-day season. These 3 plants were grown in the greenhouse till 9/15, 1968 and reached 10 feet in height. No tassel or silk emerged at that time.

Kernels of the long-day stock, Gaspe Flint, were sown in the long-day room on 7/11, 1968. Tassels and silks emerged on 7/29, 1968. Only 18 days were needed to reach the flowering stage.

From these findings under the controlled environmental conditions, we may conclude that photoperiod alone regulated the gene action which in turn controls the physiology and differentiation of the plant.

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1. Mitotic inhibition and chromosome damage produced by 5-Bromodeoxyuridine (BUdR) in Zea mays L. root tip cells.

Bromodeoxyuridine (BUdR) is an analogue of thymidine and is incorporated, with concomitant thymine replacement, into the DNA molecule. According to Kit et al. (1958) and Szybalski (1959) 5-BUdR is incorporated into cellular DNA but does not interfere with other metabolic processes. Although Djordjevic and Szybalski (1960) were able to show that a partial substitution of BUdR for thymine in the DNA leads to an increase in U.V. radiosensitivity, they were unsuccessful in extending their observations to changes detectable at the chromosomal level. The present investigation is