

Kosmos kuning merupakan salah satu tanaman model yang digunakan dalam proses transformasi genetik. Keberhasilan transformasi genetik pada kosmos kuning dengan menyisipkan *nptII* dan GFP menggunakan metode floral dip. Keberlanjutan program pemuliaan tanaman perlu adanya informasi terkait dengan stabilitas dan bagaimana transgen diwariskan kepada generasi selanjutnya. Penelitian ini bertujuan untuk menghitung persentase stabilitas dan rasio pewarisan gen *nptII* dan GFP pada tanaman kosmos kuning transgenik generasi T2 dan T3, dan untuk mendeterminasi variasi morfologi yang terjadi pada generasi T2 dan T3.

Penelitian ini dilaksanakan pada bulan September 2023 sampai September 2024 di laboratorium genetika dan pemuliaan tanaman dan di rumah kaca pribadi di Jatiyoso Karanganyar. Bahan tanam yang digunakan dalam penelitian kali ini adalah benih dari populasi T1 hasil transformasi genetik dengan perlakuan perbedaan konsentrasi silwet L-77 (0, 0.05, 0.1)% yang kemudian ditanam menjadi populasi T2. Populasi T2 dilakukan perlakuan tipe penyerbukan *open-pollinated* dan *self-pollinated* sehingga pada generasi T3 dihasilkan populasi tanaman yang berasal dari *self-pollinated* dan *open-pollinated*. 77 tanaman pada generasi T2, 191 tanaman generasi T3 *open-pollinated* dan 50 tanaman generasi T3 *self-pollinated* dilakukan isolasi DNA untuk mengkonfirmasi keberadaan gen *nptII* dan GFP. *nptII* terdeteksi pada ukuran 550bp sedangkan GFP pada 736bp. Analisis pengaruh asal benih serta tipe penyerbukan dianalisis menggunakan anova. Pengamatan terhadap fenotip tanaman dianalisis menggunakan analisis anova dan diuji lanjut dengan BNJ Tukey dengan taraf kepercayaan 5%.

Hasil penelitian menunjukkan stabilitas genetik *nptII* dan GFP pada generasi T2 yaitu 93.50% dan 20.80%, sedangkan pada generasi T3 pada tipe penyerbukan *open-pollinated* berturut-turut 94.74% dan 18.32%, sedangkan *self-pollinated* 97% dan 28%. Rasio pewarisan *nptII* dan GFP pada generasi T2 dan T3 yaitu 15:1. Fenotip generasi T2 dan T3 berbeda nyata dengan wild-type sedangkan antara T3 *open-pollinated* dan *self-pollinated* hanya berbeda nyata pada parameter tinggi tanaman, jarak antar cabang, panjang tangkai bunga, diameter bunga, panjang terminal, lebar lub, dan panjang tangkai daun

Kata Kunci: *nptII*, GFP, stabilitas, rasio pewarisan, variasi fenotip, kosmos kuning

*Yellow cosmos is one of the model plants used in the genetic transformation process. The success of genetic transformation in yellow cosmos by inserting *nptII* and GFP using the floral dip method. The sustainability of plant breeding programs requires information related to stability and how transgenes are inherited to the next generation. This study aims to calculate the percentage of stability and inheritance ratio of *nptII* and GFP genes in transgenic yellow cosmos plants of the T2 and T3 generations and to determine the morphological variations that occur in the T2 and T3 generations.*

*This research was conducted from September 2023 to September 2024 in the genetics and plant breeding laboratory and in a private greenhouse in Jatiyoso Karanganyar. The plant materials used in this study were seeds from the T1 population resulting from genetic transformation with different concentrations of silwet L-77 (0, 0.05, 0.1)% which were then planted into the T2 population. Population T2 was treated with open-pollinated and self-pollinated pollination types so that in the T3 generation a population of plants originating from self-pollinated and open-pollinated was produced. 77 plants in the T2 generation, 191 plants of the T3 generation open-pollinated and 50 plants of the T3 generation self-pollinated were isolated DNA to confirm the presence of the *nptII* and GFP genes. *nptII* was detected at a size of 550bp while GFP was at 736bp. The influence of seed origin and pollination type was analyzed using ANOVA. Observations of plant phenotypes were analyzed using ANOVA analysis and further tested with Tukey's BNJ with a confidence level of 5%.*

*The results showed that the genetic stability of *nptII* and GFP in the T2 generation was 93.50% and 20.80%, while in the T3 generation in the open-pollinated pollination type was 94.74% and 18.32%, respectively, while self-pollinated 97% and 28%. The inheritance ratio of *nptII* and GFP in the T2 and T3 generations was 15:1. The phenotypes of the T2 and T3 generations were significantly different from the wild-type, while between T3 open-pollinated and self-pollinated, there were only significant differences in the parameters of plant height, distance between branches, flower stalk length, flower diameter, terminal length, lobe width, and leaf stalk length*

Keywords: *nptII*, GFP, stability, inheritance ratio, phenotype variation, yellow cosmos