

INDUCTION OF TRIPLE GYMNADINIUMINAE (*Dioscorea esculenta*)  
BY DEAD STICK TREATMENT

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Introduction of triploidy in patin bunga (*Pangasius sutchi*) by cold shock treatment. / Nurul Huda Mahidin@Mahasan.

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PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

**INDUCTION OF TRIPLOIDY IN PATIN BUNGA (*Pangasius sutchi*) BY COLD  
SHOCK TREATMENT**

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**This project report is submitted in partial fulfillment of the requirement of the  
degree of Bachelor of Science in Agrotechnology (Aquaculture)**

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## ABSTRACT

A study was carried out to determine the possibility of inducing triploid *P. sutchi* by cold shock treatment and to assess the success of triploidy by erythrocytes measurement. The eggs were subjected to cold (1, 2, 4 and 7°C at 2, 5, 10 and 15 minutes duration) water temperature shock, 2 minutes after fertilization. Determination of ploidy was carried out on 7-weeks-old fry through the assessment of erythrocyte nuclei measurement. Triploid was observed when eggs subjected to cold shock at 2, 4 and 7°C at all durations (2, 5, 10 and 15 minutes duration), meanwhile cold shock at 1°C, triploid was observed at 10 and 15 minutes duration. Cold-shocked fish with a red blood cell nuclear volume value  $>150.12 \mu\text{m}^3$  were considered triploids. Cold shock treatment at 2°C at 2 and 10 minutes duration and 4°C at 5 minutes duration yielded 100% triploids, while the rest were 90%, 80%, 70%, 60% and 50%. No triploids were observed when eggs treated at 1°C at 2 and 5 minutes duration. It was found that red blood cell nuclear volume of triploid fish was approximately 1.53 times larger than diploids. Treatment at 4°C at 5 minutes duration gave the highest volume of nuclear erythrocyte which is  $321.38 \mu\text{m}^3$  compared to control  $150.12 \mu\text{m}^3$ . Erythrocytes nuclear volumes have been widely cited as a well-established means for determination of ploidy because an increase in the number of chromosome sets causes a theoretical increase in the size of the cell nucleus. Results showed that the fertilization, hatching, survival and growth rates between triploid and diploid, there were no significantly different ( $P>0.05$ ). Cold shock at 4°C at 5 minutes duration is the best treatment to produce triploid with successfully yielded 100% triploidy, biggest volume of erythrocytes nuclei and highest growth rate.

## ABSTRAK

Satu kajian telah dijalankan untuk mengetahui kemungkinan menghasilkan triploid *P.sutchi* dengan rawatan kejutan suhu sejuk dan menilai kejayaan triploid dengan mengukur saiz eritrosit. Telur telah dideahkan pada air bersuhu sejuk (1, 2, 4 dan 7°C pada tempoh 2, 5, 10 dan 15 minit) selepas 2 minit persenyawaan. Penentuan triploid telah dijalankan ke atas larva berumur 7 minggu dengan kaedah pengukuran nucleus eritrosit. Triploid telah berjaya dihasilkan apabila telur didedahkan pada rawatan suhu sejuk 2, 4 dan 7°C pada kesemua tempoh masa (2, 5, 10 dan 15 minit), manakala suhu sejuk pada 1°C, triploid terhasil pada tempoh masa 10 dan 15 minit. Ikan yang dirawat dengan suhu sejuk yang mempunyai nilai isipadu eritrosit melebihi  $150.12\mu\text{m}^3$  adalah dikira sebagai triploid. Rawatan suhu sejuk pada 2°C pada tempoh 2 dan 10 minit serta 4°C pada tempoh 5 minit menghasilkan 100% triploid manakala yang selebihnya adalah 90%, 80%, 70%, 60% dan 50%. Tiada triploid terhasil apabila telur dikejutkan dengan suhu 1°C pada tempoh 2 dan 5 minit. Didapati isipadu eritrosit triploid adalah 1.53 kali ganda besar berbanding diploid. Rawatan suhu pada 4°C pada tempoh 5 minit menghasilkan isipadu eritrosit terbesar iaitu  $321.38\mu\text{m}^3$  berbanding kawalan,  $150.12\mu\text{m}^3$ . Keputusan menunjukkan bahawa tiada perbezaan bererti ( $P>0.05$ ) di antara triploid dan diploid dari segi kadar persenyawaan, penetasan, kemandirian dan tumbesaran. Rawatan suhu sejuk pada 4°C pada tempoh 5 minit adalah rawatan terbaik untuk menghasilkan ikan triploid dengan kejayaan 100% triploidy, isipadu eritrosit terbesar dan kadar tumbesaran tertinggi.