

## INDONESIAN AQUACULTURE JOURNAL

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Hamdan Syakuri, Keisyazka Fathaya Putri, Ratika Nur Arifah, Petrus Hary Tjahja Soedibya, Sri Marnani, Kasprijo, Anandita Ekasanti, Rima Oktavia Kusuma, Rudy Wijaya, Dewi Nugrayani, Emyliana Listiowati, and Mustika Palupi (Aquaculture Study Program, Faculty of Fisheries and Marine Science, Jenderal Soedirman University)

Growth performance and intestinal *Aeromonas spp.* of bonylip barb (*Osteochilus vittatus*) after receiving diet containing salt and herbal concoction supplementation

Indonesian Aquaculture Journal, 19(2), 2024, 111-122

*Salt and herbal supplementations in fish feed are expected to promote aquaculture productivity, including for slow-growing fish such as Bonylip barb (Osteochilus vittatus). The objective of this study was to evaluate the growth performance and occurrence of Aeromonas spp. in the intestine of Bonylip barb fed a diet supplemented with salt and herbs. This experiment was conducted using a completely randomized design with four treatments: 1) control, 2) salt 3% supplementation, 3) herbal supplementation, and 4) Salt 3% and herbal supplementation. Growth performance evaluation included weight gain, relative growth rate, and specific growth rate after 30 and 60 days of rearing. Bacterial samples were isolated on trypticase soy agar (TSA) and glutamate starch phenol red agar (GSP) media. Yellow colonies on GSP were counted and confirmed as Aeromonas spp. via molecular identification based on 16S rDNA sequence. Results showed that herbal supplementation, either alone or in combination with 3% salt, insignificantly increased the fish growth performance in the short-term (30 days), but tended to decrease it over the long-term (60 days). Salt supplementation consistently decreased fish growth performance but improved fish survival rates. Aeromonas isolates comprised more than 60 % of the culturable intestinal bacteria in all treatments. Furthermore, herbal supplementation appeared to increase the percentage of Aeromonas spp. in the intestine, with identified species including Aeromonas veronii, Aeromonas caviae, and Aeromonas jandaei.*

KEYWORDS: *Osteochilus vittatus*; salt; herbs; growth; *Aeromonas*

Elgen M. Arriesgado, Dan Arriesgado, Fernand Fagutao, Cassiano Jr. Choresca, Gwen Anuevo, and Fiona Pedroso (Mindanao State University at Naawan, Philippines)

Growth, survival and production of *Penaeus monodon* and other species in integrated multitrophic aquaculture ponds

Indonesian Aquaculture Journal, 19(2), 2024, 123-131

*The growth and survival of Penaeus monodon and other commercial species and the production performance of Integrated Multitrophic Aquaculture (IMTA) system were evaluated in a 500 m<sup>2</sup> experimental grow-out ponds of Mindanao State University at Naawan for 120 days. Three triplicated treatments, monoculture (P. monodon only), polyculture (P. monodon and Chanos chanos) and IMTA (P. monodon, C. chanos, Perna viridis and Gracilaria verrucosa) were evaluated in a semi-intensive pond culture operation. Salinity (24.3 to 34.36‰), temperature (28 to 40.64°C) and pH (7.5 to 9.49) exceeded the maximum ideal limit for the cultured organisms in all treatments. Dissolved oxygen levels (2.76-5.43) were within the optimal range of some cultured organisms. Growth of shrimp (5.33±0.02 %SGR P <0.05) and milkfish (4.49±0.03 %SGR P <0.05) were significantly better in IMTA than in polyculture. Shrimp's survival was also significantly higher in IMTA (24.13%±3.95, P <0.05) than in the other treatments. Shrimp-milkfish biomass was highest in IMTA (89.67 kg), followed by polyculture (57.72 kg) and lowest in monoculture (11.33 kg). The higher biomass and survival of shrimp and milkfish in IMTA ponds could be attributed to the cultured organisms' synergistic interaction, such as shading and nutrient remediation by G. verrucosa and bioremediation by P. viridis. Revenue and profit followed a similar trend, with IMTA revealing profitability over the polyculture and monoculture. Hence, the results demonstrate the efficiency of the IMTA systems over monoculture and polyculture in the growth and survival of the high-valued jumbo tiger shrimp, P. monodon and the overall production and profitability.*

KEYWORDS: IMTA; monoculture; *Penaeus monodon*; pond; polyculture

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Siti Zuhriyyah Musthofa, Alimuddin Alimuddin, Harton Arfah, Dinar Tri Sulistyowati, Odang Carman, and Eni Kusri (National Research and Innovation Agency)

Morphometric and molecular variation of neon tetra fish (*Paracheirodon innesi*) from Bojongsari district, Indonesia  
Indonesian Aquaculture Journal, 19(2), 2024, 133-145

*Neon tetra, Paracheirodon innesi, is endemic to rivers and streams in southeastern Colombia, eastern Peru, and western Brazil and is commercially traded as aquarium fish in the world. In Indonesia, neon tetras were mass produced in Bojongsari District, Depok, West Java as the centre of neon tetra fish production. Understanding their genetic variation is useful for implementing their selective breeding programs, environmental restoration, and estimating genetic contributions in stocks. The current study aimed to investigate the patterns of morphometric and molecular diversity using randomly amplified polymorphic DNA-polymerase chain reaction techniques among farmed broodstocks of P. innesi in Indonesia. Three populations, namely: the Bojongsari, Curug, and Pondok Petir derived from the Bojongsari District, Depok, west Java, were used in the study. Thirty live fish from each location were analyzed based on 25 truss morphometric characters. Sixty fresh fish samples were obtained for DNA analysis using the RAPD-PCR technique, which uses three random primers. Principal component analysis (PCA) was performed to distinguish morphometric variations among populations. Morphological and molecular analysis displayed a similar result that Bojongsari and Pondok Petir neon tetra fish had high similarities, while Curug neon tetra was distinguished from others. The closest genetic distance was between the Pondok Petir and Curug populations (0.4088), while the farthest genetic distance was between the Curug and Bojongsari populations (0.4138). The results will be useful in developing breeding programs to improve broodstock quality.*

KEYWORDS: Molecular variation; neon tetra; *Paracheirodon innesi*; truss morphometric; RAPD

Rosmiati Rosmiati, Harlina Harlina, Andi Parenrengi, Emma Suryati, and Irmawati Irmawati (Research Center for Fishery, National Research and Innovation Agency)

Anti-biofouling activity of sponge *Callyspongia pseudoreticulata* components extract against *Balanus amphitrite*  
Indonesian Aquaculture Journal, 19(2), 2024, 147-156

*Biofouling attached to floating net cages and other aquaculture containers is an obstacle in aquaculture. The presence of biofouling can reduce the quality of the environment and interfere with the health of farmed animals, resulting in large losses. This study assessed the anti-biofouling activity of the Callyspongia pseudoreticulata extract component (EMCp) against the Barnacle Balanus amphitrite. For this purpose, C. pseudoreticulata was extracted with 80% methanol using the maceration method at <40°C to obtain EMCp. B. amphitrite was cultured in an aquarium at 25 ppt. The anti-biofouling activity of EMCp was tested against B. amphitrite larvae using asbestos plates. The study used a Complete Randomized Design with three treatments, namely, A) asbestos plate smeared with EMCp + varnish, B) asbestos plate smeared with varnish, and C) asbestos plate not smeared with EMCp and varnish (control). EMCp toxicity test on the larvae used clear bottles, and the adhesion test using 24-well polystyrene plates. Toxicity observations were done after 24 hours, and the number of dead larvae was calculated. The attachment of the larvae was calculated under a microscope at 10× magnification. Identification of groups of chemical compounds using a thin-layer chromatography chromatogram detected under UV lamps and spraying of reagents. The study found that EMCp effectively inhibited the attachment and growth of B. amphitrites with the LC50 of 150 mg/L. Studies of chemical constituents identified various compounds in the extract, including alkaloids, flavonoids, and terpenoids. These results suggest that C. pseudoreticulata has potential as a natural alternative to chemical-based antifouling agents.*

KEYWORDS: Anti-biofouling activity, *Callyspongia pseudoreticulata*, *Balanus amphitrite*, toxicity test

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Dinamella Wahjuningrum, Irzal Effendi, Shavika Miranti, Khoirul Umam, Nida Ulzanah, and Taufiq Abdullah (Department of Aquaculture, Faculty of Fisheries and Marine Science, IPB University)

Control of vibriosis by using Turmeric-Kalmegh extract with different period treatments in whiteleg shrimp in the floating net-cages

Indonesian Aquaculture Journal, 19(2), 2024, 157-165

*Whiteleg shrimp* *Penaeus vannamei* cultured in marine floating net-cage systems are highly susceptible to stress and diseases caused by *Vibrio harveyi*. This study aimed to evaluate the effect of turmeric *Curcuma longa* and kalmegh *Andrographis paniculata* on the growth performance and immune system of whiteleg shrimp against *V. harveyi* infection. The study utilized a completely randomized design with treatments including control (C), one week (1W), two weeks (2W), and four weeks (4W) of supplementation. The challenge test consisted of C+, C-, 1W, 2W, and 4W treatments. Parameters observed included growth performance, immune response, and resistance to *V. harveyi*. Results showed that the combination of turmeric and kalmegh significantly improved final biomass, weight gain, specific growth rate, and feed conversion ratio compared to the control. Survival rates after challenge tests revealed the highest survival in the C- group ( $93.33 \pm 5.77\%$ ), followed by treatment 4W ( $86.67 \pm 11.55\%$ ), 2W ( $76.67 \pm 20.82\%$ ), 1W ( $46.67 \pm 35.12\%$ ), and the lowest in C+ ( $33.33 \pm 26.46\%$ ) with significant differences ( $P < 0.05$ ) across treatments. Immune responses, including total hemocytes, phagocytosis activity, phenoloxidase activity, and respiratory burst, were also significantly improved in the treatment groups compared to the positive control. In conclusion, the combination of turmeric and kalmegh (2:1 ratio, 6 mL/kg of diet) significantly enhances both growth and immune responses of whiteleg shrimp, offering a potential alternative to antibiotics for controlling vibriosis in shrimp aquaculture.

KEYWORDS: *Andrographis paniculata*; *Curcuma longa*; *Penaeus vannamei*; *Vibrio harveyi*

Siti Fadilah, Petrus Rani Pong-Masak, Aditia Farman, and Pustika Ratnawati (Jakarta Technical University of Fisheries, Ministry of Marine Affairs and Fisheries (KKP))

Genetic diversity, growth and carrageenan quality of kotoni (red seaweed) across three cultivation sites in Eastern Indonesia

Indonesian Aquaculture Journal, 19(2), 2024, 167-178

*Indonesia is a leading global producer of seaweed, with kotoni seaweed highly valued for its high-quality carrageenan, an essential ingredient in various industries. This study aimed to evaluate the growth, carrageenan quality, and genetic diversity of kotoni seaweed cultivated at three distinct sites in eastern Indonesia: Banggai, West Halmahera, and Biak. The research involved cultivating kotoni seaweed over a 45-day period using the long-line technique, with growth monitoring conducted every five days and water quality parameters measured concurrently. Additionally, ex situ analyses of nitrate, phosphate, and ammonia were performed every 15 days. Carrageenan quality was assessed by measuring carrageenan content, gel strength, and viscosity, in addition to proximate composition analysis. Genetic diversity was evaluated using the cytochrome oxidase subunit 1 (COI) gene, involving DNA extraction, PCR amplification, and sequencing to determine genetic similarity across the cultivation sites. Significant differences in growth rates and carrageenan quality were observed across the three sites. West Halmahera exhibited the highest growth rate, making it the most favorable site for large-scale seaweed cultivation. Although Biak had a lower growth rate, it produced carrageenan with superior gel strength and viscosity, indicating higher product quality. Genetic analysis confirmed 100% similarity among the samples across sites. These findings underscore the importance of site-specific cultivation practices to optimize both yield and carrageenan quality, supporting the sustainability and economic viability of kotoni seaweed cultivation in Indonesia.*

KEYWORDS: Carrageenan; cultivation sites; genetic diversity; kotoni; seaweed cultivation

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Shofihar Sinansari, Agus Oman Sudrajat, Harton Arfah, Alimuddin Alimuddin, Eni Kusriani, and Odang Carman (Research Institute for Ornamental Fish Culture, Ministry of Marine Affairs and Fisheries, Indonesia)

Different led light effect on gonad maturation and gene expression in female synodontis broodstocks (*Synodontis* sp.)

Indonesian Aquaculture Journal, 19(2), 2024, 179-187

*The study investigated the influence of the different LED light spectrums on the maturation of the gonads in female synodontis broodstock and examined the maturation-related gene expression levels. Female synodontis were exposed to four different LED light spectra, specifically: white, blue, green, and red, for a continuous period of 120 days rearing. This study employed a completely randomized design, consisting of four treatments and five individual fish as replication for each treatment. An analysis was conducted on the gonadosomatic index (GSI), hepatosomatic index (HSI), gonad histology, estradiol levels, kiss2 and gnrh2 mRNA expression levels. The utilization of blue LED light treatment is highly effective in enhancing the reproductive parameters in female synodontis fish. The results show that brain and gonad kiss2 mRNA expression levels are not significantly different ( $P < 0.05$ ), while gnrh2 mRNA expression levels were significantly different ( $P < 0.05$ ) and had the highest expression in the gonads. The results suggest that light exposure can induce changes in the expression levels of kiss2 and gnrh2 mRNA, as well as control reproduction.*

KEYWORDS: Female synodontis; LED light; gonad maturation; kiss2; gnrh2

Sinar Pagi Sektiana, Muhammad Fiqi Zulendra, Sinung Rahardjo, and Rina (Jakarta Technical University of Fisheries)

The addition of coconut water through feed effective on masculinization of guppy fish (*Poecilia reticulata*)

Indonesian Aquaculture Journal, 19(2), 2024, 189-200

*The production of male guppies is more desirable due to its higher selling value than females. One way to produce male guppies is change its sex, namely masculinization which can be enhanced through the addition of coconut water, with high potassium level. Potassium can convert all cholesterol in the larvae into pregnenolone, which functions to convert estrogen into progesterone and produces testosterone. Hormones required in sex change can be supplemented by the oral method through feed. The research, which was conducted from November 2022 - March 2023, was divided into two stages, first is to determine the dosage of coconut water and the second one is to determine the appropriate coconut water sterilization method. Each stage used a completely randomized design with four treatments and four replicates. Doses of coconut water added to feed were 0.06 ml/g feed, 0.09 ml/g feed, 0.12 ml/g feed, and 0.15 ml/g feed. The sterilization methods conducted in this research are using UV light, autoclave, and ozone. Observation of male genitalia was done after 45 days by observing the urogenital organs and confirmed by hematoxylin-eosin histological staining after 52 and 59 days. The highest percentage of male guppies at 71.75% was produced by the dose of 0.15 ml/g feed, while sterilization treatment produces lower male percentage than control ( $p < 0.05$ ). No significant difference in fish survival was obtained. Fish survival ranges from 88% - 93%. Thus, the addition of 0.15 ml of coconut water to feed is the most effective treatment in producing male guppies.*

KEYWORDS: Coconut water; male guppies; masculinization, oral feed, sterilization

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Romi Novriadi, Mochammad Farkan, Muhammad Sabaruddin, Amyda Suryati Panjaitan, Lakonardi Nurraditya, Ayi Santika, Luki Sanjaya Setia Permana, Nafsika Karakatsouli, and Fotios Nitsas (Jakarta Technical University of Fisheries, Indonesia)

Effect of dietary oregano *Origanum vulgare* essential oil contained with carvacrol and thymol on the growth performance and resistance of striped catfish *Pangasianodon hypophthalmus* against *Aeromonas hydrophila* infection

Indonesian Aquaculture Journal, 19(2), 2024, 201-211

*The production efficiency of striped catfish Pangasianodon hypophthalmus is very dependent on the quality of feed, which can increase the fish's growth rate and health condition. Thus, the aimed of this study was to investigate the effects of different levels of Oregano Essential Oil (OEO) contained with thymol and carvacrol, at the concentration level of 0.1, 0.2, and 0.4% OEO, which is applied using top-dressing method and included in feed formulation on the growth rate, body composition, digestive health and resistance of striped catfish P. hypophthalmus against the pathogenic bacteria Aeromonas hydrophila. The results of growth trials using top-dressing method for 122 days using formulated feed method for 70 days showed that the application of OEO yielded better growth than the control, with 0.2% OEO providing better growth performance than 0.1 and 0.4% OEO. The body composition analysis results also showed a better level of nutrient absorption in fish fed the OEO-based diet compared to the control. For the number of bacteria in the digestive tract, OEO supplementation can also significantly reduce the number of bacteria compared to fish-fed control feed. The challenge test results after the fish were given treatment feed for 24 days showed that the application of 0.1% OEO provided better protection against Aeromonas hydrophila. However, there was no significant difference with 0.2% OEO. The application of 0.2% OEO can be recommended to increase the efficiency and productivity of catfish cultivation.*

**KEYWORDS:** *Pangasianodon hypophthalmus*; growth performance; health; thymol; carvacrol; *Origanum vulgare*

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# SEND INSTRUCTIONS FOR WRITING AND PUBLISHING ARTICLES OF INDONESIAN AQUACULTURE JOURNAL 2016 (12pt Bold)

I Nyoman Adiasmara Giri<sup>\*)#</sup>, Ketut Sugama<sup>\*)</sup>, Alimuddin<sup>\*\*\*</sup>), and Anang Hari Kristanto<sup>\*\*\*\*</sup>)

<sup>\*)</sup> Research and Development Institute for Mariculture, Gondol

<sup>\*\*)</sup> Center for Fisheries Research and Development, Jakarta

<sup>\*\*\*</sup>) Bogor Agricultural University, Bogor

<sup>\*\*\*\*</sup>) Institute for Freshwater Research and Development, Bogor (10pt Normal Italic)

## ABSTRACT (12pt Bold)

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KEYWORDS: Author guidelines; research journal; aquaculture; article template

## 1. Introduction

Indonesian Aquaculture Journal has a p-ISSN 0215-0883; e-ISSN: 2502-6577 with Accreditation Number: 591/AU2/P2MI-LIPI/03/2015 (period April 2015-April 2018). First published in 2006, with the publication frequency of twice a year, in June and December. (<http://ejournal-balitbang.kkp.go.id/index.php/iaj>) is a peer-reviewed Journal Indonesian Aquaculture accept manuscripts or articles in the field of aquaculture various academics and researchers nationally.

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---

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Writing subtitles on the contents of the article (Introduction, Materials and Methods, Results and Discussion, Conclusions, Acknowledgements). Subtitles are in bold with the Title Case and structured format left without a bottom line price. Sub-sub-headings in bold format Sentence case and compiled left flat.

Manuscripts can be written in English, with the maximum number of pages to 15 pages, including figures and tables. Manuscript must be written according to the template of this article in the form of print-ready (Camera ready). Articles should be written in a text field size A4 (210 x 297 mm) and with a format of 4 cm left margin, right margin 3 cm, lower margin 3 cm, and the top margin of 3 cm. The manuscript must be written with the font Times New Roman 12 pt font size (unless the article title, author name and title abstract), within two spaces, and in the format of the column. Words or foreign terms are written in italics (Italic). Should avoid the use of foreign terms to articles in Indonesian language. New paragraph starting 1 cm from the left border, while the spacing between paragraphs given 2. All numbers written with arabic numerals, except at the beginning of the sentence. Writing unit using the International System of Units (SI). Examples of unit symbols abbreviations: gram (g), liters (L), cubic meters (m<sup>3</sup>) per cubic meter (m<sup>3</sup>).

Tables and Figures placed in the group after the text of the referenced tables or figures. Each image must be given the title of the image (Figure Caption) on the bottom of the image and numbered in Arabic numerals followed by the title picture in Indonesian and English. Each table should be titled table (Table Caption) and numbered in Arabic numerals on the top of the table followed by the title of the table in Indonesian and English. The pictures should be printed clearly warranted (font size, resolution and size of the line to be sure printed clearly). Figures and tables and diagrams / schematics should be placed among the groups corresponding column of text, or if too much is placed in the middle of the page. Tables should not contain vertical lines, while the horizontal lines are allowed but only the essentials only.

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INTRODUCTION: Introduction must contain (in order) the general background, previous literature review (state of the art) as a basis for claiming a scientific novelty of the article, a statement of scien-

tific novelty, and the research problem or hypothesis. At the end of the preliminary assessment purposes should be written the article. In the scientific article format is not allowed their review of the literature as well as in the research report, but expressed in previous literature review (state of the art) to demonstrate the scientific novelty of the article.

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**CONCLUSION:** The conclusion describes the response of hypotheses and / or research purposes. Conclusions not contain looping of results and discussion, but rather to a summary of the research results.

Table 1. Response to selection and final mean body weight of the third generation compared to the control population of the African catfish *Clarias gariepinus* at the end of larval rearing, nursery and grow-out phases

Phases	Periods (days)	Final mean body weight (g)		Response to selection	
		Third generation	Control	Gram (g)	Percentage (%)
Larval rearing	25	0.19 ± 0.10	0.19 ± 0.07	-	-
Nursery	30	6.12 ± 2.93	5.80 ± 3.50	-	-
Grow-out	60	198.67 ± 82.82	165.22 ± 71.09	33.45	20.24

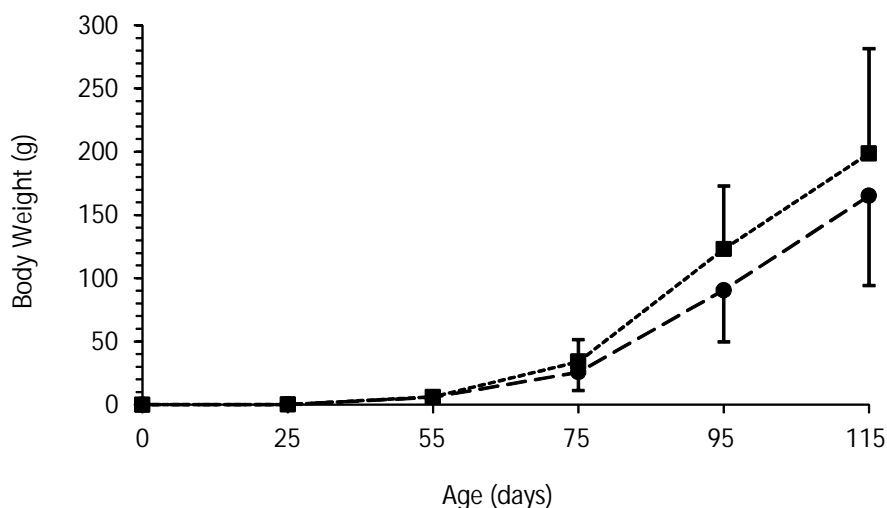


Figure 1. Growth performances based on body weight during 25 days of larval rearing phase, 30 days of nursery phase and 60 days of grow-out phase (based on samplings of 2% populations) of the third generation (■) and control population (●) of the African catfish (*Clarias gariepinus*) genetic improvement program held at Research Institute for Fish Breeding, Sukamandi. Vertical lines represent its each standard deviation

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#### 5. Free Writing Equations

Each equation is written centered and numbered columns are written in parentheses and placed at the end of the right margin. Equations should be written using Equation Editor in MS Word or Open Office (Primack, 1983).

$$RPS = \left( 1 - \frac{\% \text{ fish mortality of vaccinated}}{\% \text{ Fish mortality of control}} \right) \times 100$$

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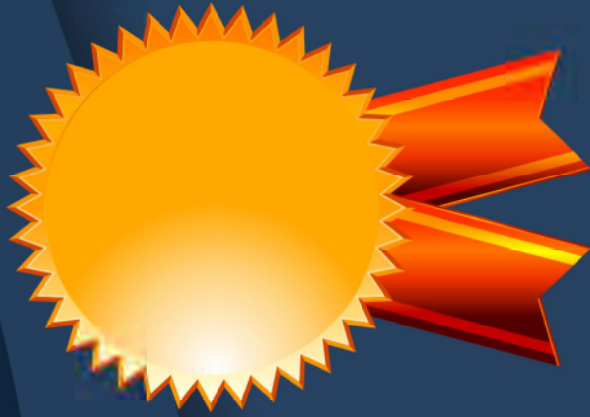
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