# Morphological Characteristics Of Some Local Upland Rice Strain New Type Of Mass Selection Results

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***Abstract*-**Identification of morphological characters is one way to distinguish the nature of an individual plant from other plants which are the characteristics of each plant. This research was conducted to identify several new types of local upland rice lines resulting from the mass selection with the best morphological characters. This research was carried out at the Gogo Rice Research and Development Center, Faculty of Agriculture, Tadulako University, and in Kalama Sub-Village, Tamarenja Village at an altitude of 180 to 250 meters above sea level with a latitude of 00° 26'51.5" South Latitude and 119°49'50,6" East Longitude, Sindue District, Donggala Regency, Central Sulawesi Province. The time study started from May to October 2022. This study was arranged using a Randomized Block Design (RAK) with six new upland rice strains treatment types: Untad I, Untad II, Untad III, Untad IV, Untad V, and Untad VI, which was repeated 4 times so that 24 experimental plots were obtained. The research data were analyzed using analysis of variance followed by the tukey test at a 5% level to determine differences in characters between strains. The results showed that the Untad V line was the best because it produced, the number of, the number of tillers and productive tillers, harvest age, the percentage of empty grain, and production.

***Keywords*-**Morphology, Upland rice, Mass selection, new type

## I. INTRODUCTION

Rice paddy cultivation has been proven to be one of the contributors to the increase of methane gas in the air, impacting global warming [1]. Methane gas production is caused by the activity of anaerobic methanogenic bacteria that are only active when the rice field is flooded [2]. One study showed that rotating paddy fields with non-rice fields can reduce methane emissions by 76% [3]. Therefore, reducing the area of paddy rice cultivation is one of the steps to reduce the negative impact of greenhouse gases.

Thus, the development and expansion of upland rice cultivation can be an alternative to fulfill environmentally friendly food availability. Various researchers have conducted research on upland rice growth and production.

The results of morphological and agronomic analysis of upland rice plants in the Filipina arakan show that differences also follow morphological differences between local upland rice plants in 1000 seed weight yield [4]. In addition, 149 local upland rice genotypes in Brazil also showed that differences in morphological characters between upland rice genotypes were also followed by differences in agronomic characters, especially 1000 seed weight [5]. Observations of morphological characters of rice in Indonesia have also been carried out in several regions such as Java [6], Sumatra [7], Lombok [8], and Sulawesi [9].

Some local upland rice cultivars of central Sulawesi province, Indonesia, also showed a level of genetic diversity in plant height, plant age, number of seeds per Panicle, leaf length, leaf tongue length, stem angle, leaf angle, seed length, stem diameter, panicle exit age, 1000 seed weight, number of productive tillers, and grain tip hairiness [10]. However, the study only observed characters on six local upland rice cultivars in Central Sulawesi.

Thus, additional information related to agronomic and morphological characteristics of other local upland rice plants in Central Sulawesi is still needed to become an additional scientific contribution in efforts to provide superior upland rice varieties in Indonesia and other countries.

## II. RESEARCH METHODS

### *A. Place and Time*

This research was conducted in the agricultural land of Tamarenja Village (Kalama) with latitude location LS 00o26'51.4 BT 119o 49'50.5 Sindue Tobata District, Donggala Regency, Central Sulawesi Province. with an altitude of 185-250 masl. The research time started from June 2022 to November 2022.

### *B. Tools and Materials*

The tools used in this study consisted of sickle, hoe, sprayer or spray tank, lirang, meter, scissors, camera, stationery, label paper, plastic, while the materials to be used in this study consisted of local upland rice from mass selection, NPK fertilizer.


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### *C. Research Design*

Character Identification Research and Determination of Appropriate Fertilizer Dosage were arranged using Randomized Group Design (RAK), then for Character Identification research using 6 cultivars as treatments, namely, Untad I, Untad II, Untad III, Untad IV, Untad V, and Untad IV which were repeated 4 times so that 24 experimental units were obtained.

### *D. Data Analysis Technique*

Observations of agronomic characters (quantitative) were analyzed using analysis of variance, if the treatment gives a real or very real effect then it will be continued with DMRT. Observations of morphological characters (qualitative) were carried out by comparing the results of observations with morphological descriptions of rice plants published by the government.

## III. RESULTS

| Upland rice type | Agronomic Parameters | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Plant height | Number of leaves | Leaf length | Number of tillers | Number of productive tillers | Harvest Time | panicle length | Amount of Grain per panicle | Weight 1000 seeds | % empty grain | Production |
| Untad I | 127.17$^{a}$ | 4.42 | 47.71 | 1.92$^{a}$ | 1.75$^{a}$ | 128.50$^{c}$ | 24.08$^{ab}$ | 117.75$^{bc}$ | 32.00$^{ab}$ | 21.89$^{b}$ | 1.14$^{a}$ |
| Untad II | 122.58$^{a}$ | 4.67 | 45.00 | 2.00$^{a}$ | 1.83$^{a}$ | 115.00$^{a}$ | 23.88$^{ab}$ | 98.25$^{a}$ | 33.00$^{b}$ | 21.01$^{ab}$ | 1.02$^{a}$ |
| Untad III | 142.54$^{b}$ | 4.58 | 54.00 | 2.75$^{b}$ | 2.25$^{ab}$ | 122.08$^{b}$ | 29.96$^{b}$ | 136.42$^{d}$ | 31.50$^{a}$ | 20.17$^{ab}$ | 1.55$^{b}$ |
| Untad IV | 153.79$^{b}$ | 4.92 | 49.33 | 3.50$^{c}$ | 2.83$^{b}$ | 127.33$^{c}$ | 30.83$^{b}$ | 119.33$^{c}$ | 31.50$^{a}$ | 24.04$^{b}$ | 1.62$^{b}$ |
| Untad V | 142.13$^{b}$ | 5.00 | 50.50 | 3.75$^{c}$ | 3.33$^{b}$ | 115.00$^{a}$ | 22.21$^{a}$ | 131.67$^{d}$ | 31.50$^{a}$ | 17.64$^{a}$ | 1.99$^{c}$ |
| Untad VI | 144.88$^{b}$ | 4.42 | 51.17 | 2.17$^{ab}$ | 2.00$^{a}$ | 115.00$^{a}$ | 27.83$^{ab}$ | 108.58$^{b}$ | 33.50$^{b}$ | 30.67$^{c}$ | 1.22$^{a}$ |
| DMRT 5% | 12.76 | 0.35 | 8.75 | 0.68 | 0.71 | 2.32 | 4.13 | 9.85 | 1.19 | 3.74 | 0.33 |

Fig 1. Agronomic Parameters Data

The observations on agronomic parameters show that each agronomic character observed has diversity in the five types of local upland rice except on the parameters of the number of leaves and leaf length. This research shows that the five types of upland rice compared cannot be distinguished based on the number of leaves and leaf length. However, other agronomic character parameters differ, such as plant height, number of tillers, number of productive tillers, harvest time, panicle length, number of seeds per Panicle, 1000 seed weight, percentage of empty grains, and production are sufficient to be used in the characterization process.

Production is the main agronomic parameter in this study. The results showed that untad type V was the upland rice type with the highest production among the six rice types. While untad I, untad II, and untad III have relatively similar but lower production compared to untad V. The second agronomic parameter that is very important is the harvest age, where plants with short harvest age are more efficient in resource utilization. Upland rice types untad II, untad V, and untad VI have the fastest harvest time among the six types of upland rice. While upland rice type untad I is the type of upland rice with the longest harvest time and not significantly different from the upland rice type untad IV.

| Perlakuan | Morphological Parameters | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Panicle Appearing | flag leaf corner | leaf surface | Leaf ear color | leaf node color | Leaf sheath color | Color of Ligule | Shape of Ligule | Stem Segment Color | Panicle Type |
| Untad I | The panicles only appear up to the neck of the panicles | Medium | Medium | Light Green | Green | Green | Green | 2-cleft | Green | Intermediate |
| Untad II | The panicles only appear up to the neck of the panicles | Flat | Medium | Light Green | Green | Green | Green | 2-cleft | Green | Intermediate |
| Untad III | Full panicles | Medium | Medium | Light Green | Green | Green | Green | 2-cleft | Green | Intermediate |
| Untad IV | Full panicles | Upright | Medium | Light Green | Green | Green | Green | 2-cleft | Green | Intermediate |
| Untad V | The panicles only appear up to the neck of the panicles | Flat | Medium | Light Green | Green | Green | Green | 2-cleft | Green | Intermediate |
| Untad VI | Full panicles | Flat | Medium | Light Green | Green | Green | Green | 2-cleft | Green | Compact |

Fig 2. Morphological Parameters Data

The results of observations of morphological parameters show that the characters of the six types of upland rice observed can be distinguished based on the characters of flag leaf corner and Panicle appearing and cannot be distinguished based on the characters of leaf surface, leaf ear color, leaf node color, leaf sheath color, color of ligule, stem segment color, and panicle type.

Untad I, untad II, and untad V have the same panicle-appearing characters and different from untad III, untad IV, and untad V which all three have the same panicle-appearing characters. In addition, untad IV type upland rice has flag leaf corner characters that are different from the five types of upland rice observed. Upland rice type untad I and untad III have the same flag leaf corner character as upland rice type untad III. Untad II type upland rice has the same flag leaf corner character with untad V type and untad VI type upland rice.

## IV. CONCLUSION

The results showed that the Untad V line was the best because it produced, the number of leaves (5 pieces), the number of tillers (3.75 per clump) and productive tillers (3.33 per clump), harvest age (115 days), the percentage of empty grain (17.64%), and production (1.99 tons/ha).

The character of the Panicle Appearing and the flag leaf angle are the two morphological characters with the most differences.

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