TECHNICAL SHEET

NERICA L-IER

Presentation of the rice

As mentioned in the Agronomist's Memento (2002), cultivated rices belong to the genus Oryza, which includes 23 species (Adegbola et *al*, 2019). These species are now found on all continents. The two cultivated species (one of African origin, Oryza glaberrima and the other of Asian origin, Oryza sativa) are found today on all five continents (Adegbola et *al*, 2019).
The Oryza genus includes about 20 different species. Numerous classifications of these species into complexes, tribes, series, etc. have been proposed, with varying degrees of overlap with each other (Adegbola et *al*, 2019).
The species O. sativa has a wide variety of forms. These forms have been classified within two subspecies indica and japonica. Based initially on morphological characters and crossing behavior (Adegbola et *al*, 2019). This classification was confirmed by biochemical and molecular tools to analyze genetic variability (Adegbola et *al*, 2019).

Vegetative cycle of rice

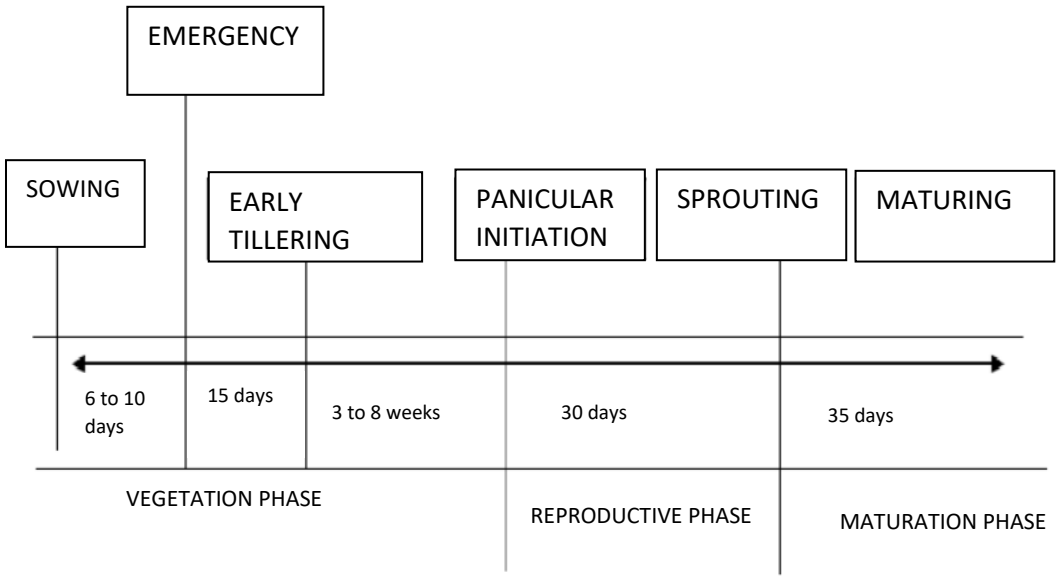

Figure 1: Vegetative cycle of rice (source: Adegbola et *al*, 2019)

The different forms of rice (CORAF, 2009 cited by Adegbola et *al*, 2019)

Paddy rice is in its raw state, it is an "unhulled rice" that has retained its husk after threshing. It is also cultivated in aquarium, for its paramecia in the germ of the grain.

Parboiled rice, often referred to as unpolished rice, is paddy rice that is heat treated, dried and husked before marketing to limit the rate of kernels sticking together. Parboiled rice is richer in nutrients.

Brown rice or **whole grain** rice is a whole grain rice that has been stripped of its fibrous and inedible outer husk but retains the germ (embryo) and bran that make it more nutritious than white rice. In Europe, this rice is often called "cargo rice" because it is mainly transported by sea. Brown rice almost always contains green grains, grains that are not yet fully mature at the time of harvest. This is unavoidable because the grains do not ripen at the same rate along the panicle (as well as because of mixtures of varieties in the seed). Post-harvest sorting is difficult and expensive. These grains are also present in white rice but are less visible because of polishing. Generally, 1 kg of paddy rice yields 750 g of cargo rice.

White rice is husked and polished. It has lost many of its nutrients and contains much less niacin, thiamin, magnesium, zinc, iron, and fiber than brown rice. In some countries, including the United States, it is fortified with iron, niacin, and thiamine to restore some of its nutritional value. White rice can be coated with magnesium silicate or covered with a mixture of glucose and talc ("polished rice", "glazed rice"). Generally, 1 kg of paddy rice yields 600 g of "white rice".

Le **riz rouge** est un riz avec une couche de son rouge : bhoutanais, himalayen, thaï.

Black rice is rice with a thin layer of black bran. Under the bran is a white grain. These include Balinese, Chinese and Thai black rice.

Arborio rice is a classic round white rice that is considered one of the finest rices because it can absorb a good amount of cooking liquid without softening too much.

Aromatic rice (naturally flavored) is much tastier than other rice varieties because of its taste. Basmati rice (grown in India and Pakistan) is one of the best known and most popular, indispensable in Indian cooking, it has a light, dry and fragrant texture, and flavor. Jasmine-scented rice (grown on the Isarn Plateau in northeast Thailand) is also highly regarded.

Types of rice (Adegbola et *al*, 2019)

The usual classification of rice according to the size of its grains, of which the size of commercial varieties is generally between 2.5 and 10 mm, is as follows.

Long seed rice: the grains should measure at least 7 to 8 mm and are rather fine. When cooked, the grains swell little, their shape is preserved, and they hardly clump together. They

are often used in the preparation of main dishes or as a side dish. Many species of the indica group are sold under this name.

Medium seed rice: their grains are wider than the long grain rice (the ratio between length and width oscillates between 2 and 3, and reach a length between 5 and 6 mm, can be according to the varieties intended for the consumption in accompaniment or belong to a variety of glutinous rice (as California mochi for example). This type of rice is usually slightly sticker than long rice.

Short seed rice, **round rice** or **oval grain** rice is the most used variety for desserts. The grains are usually 4 to 5 mm long and 2.5 mm wide. They often stick together.

NERICA rice (INRAN, 2007)

WARDA scientists decided to combine the resistance of O. glaberrima with the productivity of O. sativa. This was a formidable scientific challenge, because the two species have evolved separately for millennia and are so different that several previous attempts had failed to result in reliable varietal development. Using molecular biology, the researchers, in association with a range of partners around the world, were able to overcome hybrid sterility - the main problem in crossing the species. This approach also allowed them to speed up the breeding process, reducing it from 5-7 years to 2 years or less. The fruit of this effort is the New Rice for Africa (NERICA), which has several advantages over traditional varieties. 2 Association pour le Développement de la Riziculture en Afrique de l'Ouest et du Centre 10 advantages over traditional varieties. NERICAs are not just one variety; more than 3,000 families of lines have been developed, paving the way for a new global rice biodiversity.

NERICAs combine the hardiness of the African species with the productivity of the Asian species. NERICAs (New Rice of Africa) are the progeny of interspecific hybrids resulting from crosses between O. glaberrima and Oryza sativa.

Characteristics of NERICA rice

NERICA is a high-yielding, locally stress-resistant variety-specifically designed for the conditions of smallholder rice farmers in Africa. The new plant type combines the following advantages: rapid growth that suppresses weeds, resistance and/or tolerance to local stresses inherited from the African parent, and high grain production and lodging resistance inherited from the Asian parent.

- High yields (50% increase without fertilizer and over 200% with fertilizer).
- Earlier maturity (30 to 50 days shorter cycle).
- Resistance to local constraints.

- Higher protein content (2%).

Characteristics of the technology

- Cycle of 125 days
- Potential yield of 8t/ha

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REGIONAL CENTER OF SPECIALIZATION ON RICE ; HEADQUARTERS INSTITUTION: INSTITUT D'ECONOMIE RURALE (IER) ; HOST COUNTRY: Mali ;; NSC MEMBER INSTITUTIONS: The 3 Regional Agricultural Research Centers working on rice: Niono (main site), Sikasso and Mopti; The Soil-Water-Land Laboratory (CRRA Sotuba, Bamako); The Food Technology Laboratory (CRRA Sotuba, Bamako); The Regional Agricultural Research Centers of IER ; The training structures (IPR/IFRA, USTTB) through the Laboratory of Research in Microbiology and Microbial Biotechnology (LaboREM-Biotech), the Laboratory of Applied Molecular Biology (LBMA), the Laboratory of Agro-Physiogenetics and Plant Biotechnology; Coordinator: Karime TRAORE; Email: kartraore@yahoo.com; Telephone: +223 7618 98 98