

Application Guide of Hyfer Plus Foliar Fertilizer in Rice

Introduction:

Rice (*oryza stiva*), is an annual grass with round, hollow, jointed culms; narrow, flat, sessile leaf blades joined to the leaf sheaths with collars. It is generally grown throughout the Philippines and other tropical regions in the world. Rice growth can be divided into Three agronomic stages of development namely, **vegetative stage** (from germination to panicle initiation), **reproductive stage** (from panicle initiation to heading), and **grain filling and ripening stage** (from heading to maturity)

Rice is the staple food in the Philippines, with growing demands in rice due to population increase, methods of cultivation and new technology in rice production has been introduced to increase yield and productivity to be able to cope up with the growing demand. Optimum yield can be affected by different factors such as yield potential of the cultivar, environmental condition and Proper plant nutrition.

Rice requires Macro and Micro nutrients for proper growth. Macro nutrients (N,P,K,S,Ca) is required in large amount. Micro nutrients (Boron, copper, Iron, Manganese, Zinc and molybdenum) on the other hand, is needed in smaller quantities. However, deficiency of any or combination of these micro nutrients can have a great effect on the yield potential. Proper fertilization and timing is very important. Complete soil analysis is the best way to evaluate and determine the right nutrient and right amount to be supplied. Other plant needs such as vitamins, hormones and humic acid can also be supplied to ensure better yields..Application of needed nutrients by foliar means is also an option in supplying needed nutrients by the plant. Hyfer foliar fertilizer is a unique blend of properly balanced essential macro and micro nutrients, vitamins, hormones, amino acids, humic acid and spreader-sticker. It is formulated to supplement necessary nutrients for optimum plant development. Hyfer Plus Foliar Fertilizer is a complete plant food supplement formulated based on different development stages of the plant. Hyfer Plus Growth Enhancer(Green) is used generally during the vegetative stage while Bloom Booster(Red) is used during flowering and fruiting stage.

1. Vegetative stage: The vegetative growth stage is characterized by active tillering and gradual increase in plant height and leaf emergence at regular intervals. The length of this stage primarily determines the growth duration of different varieties. Some very early maturing varieties have a shortened vegetative growth stage, while others have both shortened vegetative and reproductive growth stages. Panicle initiation may occur before the maximum tiller number is reached in very-short season and some short season varieties. Heading in these varieties maybe staggered due to later tillers which produced panicles. In mid-season varieties, the maximum tiller number is reached and followed by a vegetative lag phase before panicle initiation occurs.

A).Seed germination stage - Occurs when the seed coat has imbibed adequate water becoming soft and elastic.The coleorhizae (the sheath covering the radical or embryonic primary root) elongates slightly,emerging through the seed coat and the radicles breaks through the coleorhizae and becomes anchored in the soil.The coleoptiles or the primary leaf elongates.

B).Seedling emergence stage - Occurs when the first inter node called the mesocotyl has elongated and push the tip of the rice coleoptiles (epiblast or first sheathing leaf) through the soil surface

C).Pre- tillering stage - The period from the development of the first to fourth leaf stage.(requires 15-24 days).During this time,the seminal roots further develop,and the first four leaves appear. ***First application*** of Hyfer Plus growth enhancer. Shake the bottle Vigorously to homogenized the solution.Fill the sprayer tank with clean water approximately ½ of the capacity.Using the measuring cup, pour 40ml. of Hyfer Plus Growth enhancer into the sprayer tank and shake well,add the required volume of water to complete the 16 liters spray solution. Spray over the top of the plant uniformly. Apply during late afternoon to avoid prism effect on the young leaves cause by sunlight. Hyfer plus can be mix with other commercially prepared pesticide for convenience of application.

D).Tillering stage - Usually begins at the fifth leaf stage when the first tiller is visible and emerges from the axillary bud of the second leaf of the culm. Tillering continues when the sixth leaf emerges,the second tiller comes from the axillary bud of the third leaf. Tillering continues in the synchronous manner. During this period,the secondary roots grow down until flooding. Once flooded, these roots grow vertically and laterally. During active tillering, new leaves on the main culm emerge at a faster rate. ***Second application***; apply ***Hyfer Plus growth enhancer*** at the rate of 60ml. per 16 liters of water. Follow the same procedure just like the first application. Spray recommended pesticides (optional) in combination with Hyfer for convenient application.

E).Maximum Tillering stage - At this stage, tillering increases in a sigmoidal- shape curve until the maximum tiller number is reached.At this point,the main culm maybe difficult to distinguish from the tiller.In direct seeded ricefields with a normal plant population(10-20 plants per sq/ft.),rice plants usually produce 2-5 panicle bearing tillers per plant compared to 10 to 30 or more tillers per plant in transplanted rice where more space is available between plants. After maximum tillering has occurred ,no more effective tillers are produced.A portion of the late tillers will generally die due to competition effects. The first yield component, potential panicles per unit area, is determined at this time. ***Third application***; Apply HYFER Plus Growth enhancer at the rate of 80ml. per 16 liters of water. Follow the same mixing procedure. Spray early in the morning or late in the afternoon.Spray recommended pesticides (optional) in combination with Hyfer cor convenient application.

F).Vegetative lag phase - is the period from the end of active tillering to the beginning of the reproductive stage. Tiller number decreases, height and stem diameter continue to increase but at a slower rate. The length of this period is the function of the maturation period of the cultivar. For very short season cultivars(95-110 days variety),this period may not be evident. In this situation, maximum tillering stage and the beginning of the reproductive may overlap .In 120-150 days maturity cultivars, the lag phase period may last more than 10 days. No application of foliar at this stage because of minimum physiological activity of the plant.

2. Reproductive Stage: The reproductive stage is characterized by culm elongation, decline tiller number, booting, emergence of the flag leaf, heading, and flowering. This stage usually last approximately 30 days. This stage is sometimes referred to as the internode elongation or jointing stage and varies slightly by variety and weather condition.

A). Panicle Initiation stage - is the time when the panicle primordial initiates the production of a panicle in the uppermost node of the culm. At this point, the panicle is not visible to the naked eye. It is sometimes referred to as the "green" ring stage in rice. **Fourth application;** Shift to Hyfer Plus Bloom Booster at this stage to ensure immediate availability of potassium into the leaves. Using the same mixing procedure, apply Hyfer Plus Bloombooster at the rate of 100ml./16 liters of water. Spray early in the morning or late in the afternoon. Spray recommended pesticides (optional) in combination with Hyfer for convenient application.

B). Internode elongation stage - begins about the time the panicle initiation is occurring, continues until full plant height is reached and is followed by heading. This stage is referred to as the "jointing stage". Stem internodes can be distinguished from root internodes by the green color in the stem wall.

C). Panicle differentiation(PD) stage- is a stage closely associated with "jointing" or the internode elongation stage. PD is roughly equivalent to ½ to ¾ inch internode elongation. At this point, the panicle is 1 to 2 mm in length and the branching of the panicle is visible. This is a critical stage during rice plant development. At this stage, the environment can have a major effect on its development. The second yield component, number of potential grains per panicle, is set by the time this development stage occurs.

D). Booting stage- This stage is loosely defined as that period characterized by a swelling of the flag leaf sheath which is caused by an increased in the size of the panicle as it grows up the leaf sheath. Full or late boot occurs when the flag leaf has completely extended. Booting is the stage in meiosis occurs. Environmental stress during this stage may reduce grain yields. Late boot occurs about 6 days prior to heading. **Fifth application (optional);** Apply Hyfer Plus Bloombooster at the rate of 100ml/ 16 liters of water.

E). Heading stage- is the time when the panicle begins to exert from the boot. Heading may take over 10 to 14 days due to variations within tillers on the same plant and between plants in the field. Agronomically, "heading date" is defined as the time when 50% of the panicles have at least exerted from the boot. Some panicles may never emerge completely from the boots due to different reasons (environment, genetics, and nutrition).

F). Anthesis- or flowering, refers to the events between the opening and closing of the spikelets (floret) and last for 1 to 2 ½ hours. Flowering generally begins upon panicle exertion or on the following day and is consequently considered synonymous with heading.

3. Ripening Stage- The grain filling and ripening or maturation stage follows ovary fertilization and is characterized by grain growth. During this period, the grain increases in size and weight as the starch and sugars are translocated from the culms and leaf sheaths where they have accumulated, the

grain changes in color from green to gold or straw color at maturity and leaves of the rice plant begin to senesce. Light intensity is very important during this interval since 60% or more of the carbohydrates in grain filling are photosynthesized during this time interval. This period is also affected by temperature.

The final component, individual grain weight is determined during the ripening stage. Although grain weight is relatively stable for a given variety, it can be influenced by the environment and nutrition factors. High temperatures tend to reduce the grain filling period and may reduce grain weight. Low temperatures tend to lengthen the time required for grain fill and ripening.

Stage in the ripening process are:

A). Milk stage-At this stage, Developing starch grains in the kernel are soft, and the interior of the kernels is filled with a white liquid resembling milk. ***Sixth application***; Apply 100ml. of Hyfer Plus Bloom Booster at the rate of 100ml./16 liters of water. Application of high poPotassium foliar fertilizer at this stage is important because it will help improve grain filling, grain weight and minimize broken grains during milling. Spray in the morning or late in the afternoon.

B). Soft dough stage-The starch in the grain is beginning to become firm but is still soft.

C). Hard dough stage-The whole grain is firm during this stage and almost ready for harvest. The moisture content is still above 25%

D). Maturity stage-The whole grain is hard and ready for harvest. This stage is reached at approximately 22-25% moisture content. Harvest the mature crops when 80-85% of the grains in the panicle turned golden yellow.