

### Stages of alfalfa Growth Development (مراحل تطور نمو الجت)

The development of plant growth can be observed by observing the stems on it. When these stems appear, they go through the vegetative growth stage, the buds stage, the flowering stage, and finally the seed formation stage, when the plant is not exposed to weeding and the environmental conditions are suitable for flowering (length of light period with high temperatures). As is known, the plant is indeterminate in growth and the presence of the crown area that has the ability to produce vegetative buds may differ in their development stages to produce stems and then flower buds on it. This difference in development may lead to the presence of stems of different maturity on the same plant. Therefore, the researchers (Kalu and Fick, 1983) By providing a new description of the different growth stages, it is more accurate to determine the maturity stage and know the quality of the feed, as shown in the table:

Stage number	Stage name	Stage specifications
0	Early vegetative growth	The length of the stem is more than 15 cm, and there are no buds, flowers, or pods on the stem
1	Middle vegetative growth	The length of the stem is 15 - 30 cm, and there are no buds, flowers, or pods
2	Late vegetative growth	The length of the stem is more than 30 cm, and there are no buds, flowers, or pods
3	Early flower buds	1 - 2 nodes bearing flower buds, and there are no buds, flowers, or pods
4	Late flower buds	More than 3 nodes bearing flower buds, and there are no buds, flowers, or pods
5	Early flowering	One of the nodes bears an open flower, and there are no pods
6	Late flowering	2 or more nodes bear open flowers, and there are no pods
7	Early seed pods	1-3 nodes bear green pods
8	Late seed pods	4 or more nodes bear green pods
9	Pod maturity	Most nodes bear brown pods (this stage is suitable for harvesting seeds)

To clarify how to calculate the average growth stage, the following steps are followed

- 1- A sample is taken randomly from the field or experimental unit in which the average growth stage is to be determined. The sample size is approximately 40 individual stems from areas representative of the field
- 2- The stems from this sample are separated into groups according to the description of the previous table in terms of the growth stage.
- 3- The number of stems is multiplied by the growth stage, then the resulting numbers are added and divided by the number of stems taken.

Example: A random sample of 40 stems was taken from the Alfalfat field, and after separating and describing them according to the stages, the following was found

Stage	No. of Stems	Mean Growth Stage
0	12	0
1	20	20
2	5	10
3	2	6
4	1	4
<b>Total</b>	<b>40</b>	<b>40</b>

Therefore, the sample representing the field is in stage number 1, which indicates that the field is in the mid-vegetative growth stage.

### **Fertilizer requirements**

**Fertilizer requirements** for alfalfa are legume crops. In the presence of bacteria, especially in this crop, supplying the plant with nitrogen is sufficient to meet the plant's need, even if a small dose of nitrogen, around 20 to 40 kg per hectare, may help stabilize the plants, especially in weak soils. However, what is currently common among farmers is to add nitrogen after each harvest or between harvests, at a rate of 100 kg per hectare, to encourage green ants and increase the yield of green fodder. However, this affects the duration of the crop's survival in the soil. In general, the important nutrients for alfalfa are phosphorus, potassium, and

boron when producing alfalfa seeds. Its need for phosphorus and potassium is relatively large compared to other crops, so they must be compensated for by fertilization. As for the rest of the elements, they can be prepared from the soil for the plant according to what is stored in it. Some researchers have explained that producing ten tons of dry alfalfa material removes 27 kg of phosphorus and 218 kg potassium.

**Irrigation:**

The need for irrigation depends on the seasons of the year, the degree of plant growth and the age of the crop. In the early stages of plant life, the roots of plants are superficial, so the wind is light and at regular intervals to ensure the fixation of the seedlings. There is a common belief among the farmers of the plant in Iraq to dehydrate the plant, thinking that this leads to pushing the roots deeper into the soil, but it is not useful, but rather leads to the loss of seedlings as a result of drought. In general, irrigation dates must be organized so that irrigation is done before signs of thirst appear on the plants. Approximately, 2.5 cm of irrigation water is sufficient to moisten clay soil to a depth of 10 to 12 cm, infertile mixed soils 15 to 25 cm, and sandy soils to a depth of 30 cm. It is noted that the greatest irrigation needs are during the summer months as a result of rapid growth and increased evaporation-transpiration rates, but the plant's need for water decreases in the spring and autumn months and reaches its lowest point in the winter, as well as the period following mowing and until the basal buds begin to grow. Therefore, irrigation must be organized. So that the plants are irrigated before and after mowing for an appropriate period so that the humidity in the field before mowing allows the passage of workers or machinery if the mowing is mechanical. Also, the field should not be irrigated directly after mowing, but rather it should be given a chance for the basal buds to appear and then light irrigation should be given to prevent the accumulation of water and then the suffocation of these buds and their death. It is also preferable to avoid irrigating the crop of heavy rye in the summer and when temperatures rise, especially in heavy soils because this leads to the accumulation of water in the low areas of the field, which causes the roots to suffocate or the leaves to burn.

**Crop rotation:**

The alfalfa stays in the ground for four to six years and gives the highest crown of green fodder under Iraqi conditions in the second year of its life, then the fodder productivity decreases after the third year, leaving strong roots in the soil that need a long time to decompose. Some pathogens and nematodes specific to this crop are also abundant in the soil, so it is preferable to leave the land for a period of no less than one year without planting it with alfalfa, in addition to the reasons mentioned above or because of the presence of a phenomenon called autotoxicity, i.e. self-poisoning of plants planted from alfalfa directly after the old alfalfa, resulting from the production of toxins. These substances reduce the germination of the alfalfa seeds and weaken the growth of seedlings.

**Renovation:**

Alfalfa gives the highest yield of green fodder in the second year of its life and often the crop gradually decreases after that depending on the degree of spread of the jungle and the difficulty of getting rid of it, which leads to a decrease in plant density in the field. When you want to keep these fields, some treatments can be followed to increase their fodder production. This is done by lightly plowing the field after mowing using a disc harrow and then doing the following:

**One** - Planting barley or oats in early autumn at a rate of 60 kg per hectare.

**Second** - Planting millet or Sudanese grass at a rate of 24 to 28 kg per book. This is done in fields that were not planted with a mixture at the beginning. However, if the fields have a mixture, Alfalfa can be replaced with Qart, especially the Medicago scutellate type, which is a self-seeding type, meaning it does not need seeds every year.