

MANUAL SEEDERS FOR NO-TILL

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EQUIPMENT: **MANUAL SEEDER, HAND-JAB PLANTER** or **MATRACA** is a very simple equipment for precision seeding of corn, beans, sorghum, sunflower, cotton, peas, peanut, cover crops species and other medium and large size seeds over mulch or open ground. In regions of small farmers can play an important positive impact on labor savings and increasing fertilizer use efficiency compared to traditional methods of manual seeding. It is low cost, light and easy to maintain and to operate although some training is required. Can be used also for intercropping seeding as well in hilly and stony soil conditions.

DESIGN: There are different models of manual seeders (see below) but the most common has a structure made of steel or wood which supports two handles for the operator; a seed hopper and, optionally a fertilizer hopper; one narrow beak (or a pair, for the model with fertilizer hopper) made of hardened steel; a seed metering device consisted of an adjustable plate which opens or closes a cell according to the seed size; a fertilizer metering device and tubes for seed and fertilizer delivery from the hopper to the beaks by gravity.

OPERATION: The operator has to coordinate the movement of his hands with walking steps. When the handles are pulled apart (Figure 1A), the seeds inside the hopper are captured by the metering device (Figure 2A) and transported by the adjusted cell to the delivery tube where they fall down by gravity (Figure 2B) to the inner side of the beak which is closed. Following that, the operator should penetrate the beak into the soil and, only after that movement (i.e., when the beak is inside the soil slot), the handles should be pushed in the opposite way (one against the other) to open the beak and deliver the seeds in the slot (Figure 1B). A similar process happens with fertilizer if the seeder has also a hopper for that. The complete cycle of movements is: pull apart the handle – penetrate the beak into the soil – push the handles one against the other - pull out the beak from the soil - one step ahead – pull apart the handle.

Training is important to avoid the operator to penetrate the soil with open beak or even to close the beak still inside the soil slot. In both cases, soil clogs the delivery of the seeds and the seeding operation should be stopped for cleaning the beak of the seeder.

CALIBRATION: The operator should define the desired number of seeds per slot according to the seed population and row spacing recommended for the specie and also considering its germination rate. After that, roughly adjust the cell size in order to meter the required amount of seeds per slot and fill the hopper with seeds. Holding the seeder upright, operate it at least ten cycles above a flat surface and count the number of seeds delivered for each cycle. If the number of seeds is greater than desired, decreases the opening of the cell, otherwise increase it and repeat the calibration process until get the desired amount in average. A similar process should be performed for fertilizer calibration but in this case, tie a bag in the corresponding beak and weight the delivered amount or use a marked cup to check.

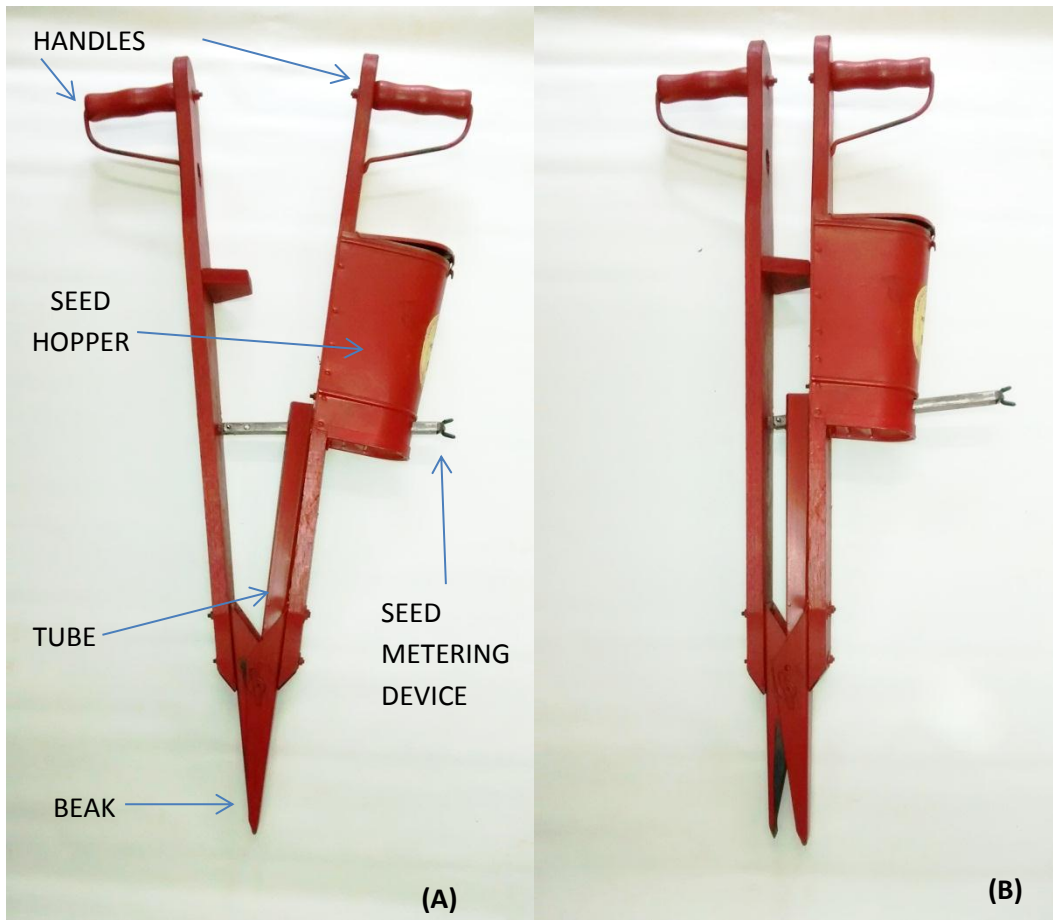
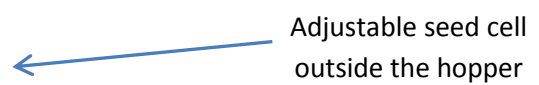
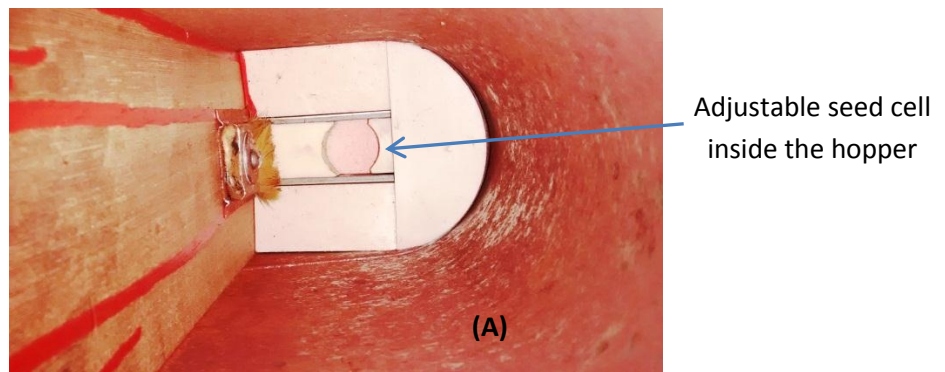


FIGURE 1. Parts of the manual seeder with handles apart and beaks closed (A) and handles together and beaks open (B)



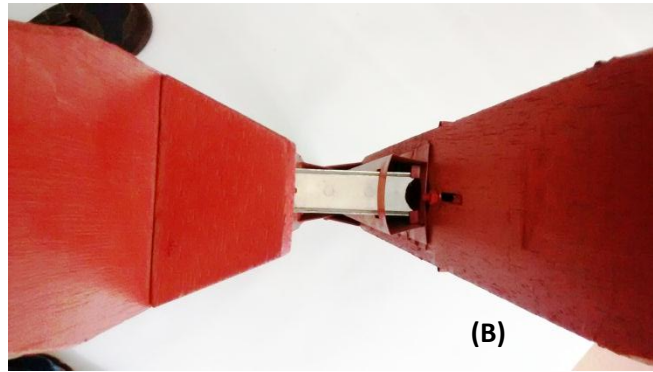
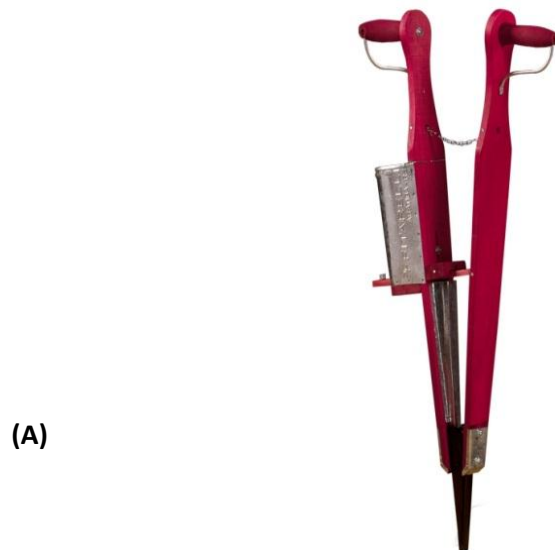


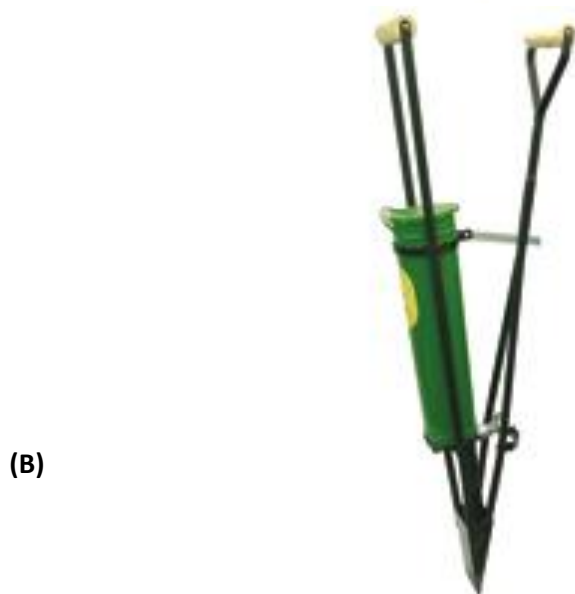
FIGURE 2. Adjustable seed cell for capturing seed inside the hopper with handles together (A) and cell outside the hopper with handles apart (B)

TYPES OF MANUAL SEEDERS

1. SEEDERS FOR NO-TILL



(A)



(B)

(C)



FIGURE 3. Fitarelli model (A); Krupp model with metal structure (B) and Krupp model with seed metering device with cell disc (C)

2. SEEDER + FERTILIZER FOR NO-TILL WITH DOUBLE NARROW BEAKS



(A)



(B)

FIGURE 4. Fitarelli model (A); Krupp model with metal structure (B)

3. PLANTER FOR TOBACCO AND OTHER SEEDLINGS



FIGURE 5. The planter open the slot in the soil and to release the seedling.

BRAZILIAN MANUAL SEEDERS PRODUCERS



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