# Mechanization of Range Reseeding

**K. R. Frost & Louis Hamilton**

*How can desirable species of grasses be established on arid Arizona ranges? Formation of basins, pits or interrupted furrows, which will catch and hold moisture from summer rains, has been the most promising practice.*

Seedings are made in the basins, and moisture which has soaked into the soil as a result of ponding in the basin is available to sustain the plants after germination. Seeds planted on the flat are often germinated by rainfall moisture, but the seedlings die because moisture has not been stored in the root zone below the seedling.

### Are Fan-Shaped Basins

The Plant Materials Center turned to fan-shaped basins in 1961 to improve stand survival on low rainfall sites with water retaining subsoils. These promising trials led to cooperation between the Agricultural Engineering Department, University of Arizona, and the Tucson Plant Materials Center, USDA Soil Conservation Service.

Excellent initial stands obtained on a semi-desert range in the extremely dry year of 1962 encouraged machine modifications in early 1963 to improve field operation. In addition to forming basins, sloping to the lower side, the machine makes grooves for seed placement and firms over the seed with mulching-type press-wheels.

The machine was constructed by mounting a bulldozer blade on suitable framework and wheels at the rear of a tracklayer. A cam-shaped wheel was placed on one end of the blade to raise and lower it for scraping out the basin and depositing the soil between basins.

Short teeth were welded to the cutting edge of the blade at 12-inch intervals for forming grooves in the basin for the seeds. Seed tubes for depositing the seeds in the grooves were set directly behind the blade, in line with the grooving teeth. Castored press-wheels trailed in the grooves behind the tubes to mulch, firm and cover the seed to shallow depths.

### Tried on Santa Rita Range

The machine was used for seeding test plots on the Santa Rita Experimental Range 25 miles south of Tucson during the 1963 summer. Basins were made and seeded in light, medium and heavy soil on slopes of one to three percent grade. The shallow ends of the basins were placed upgrade so that each would receive runoff from the area above. Each row of basins was oriented by driving the tractor approximately on contour lines. Buffel and Lehmann lovegrass were seeded in the plots.

Seeding was done on May 12-14, 1963. The first summer rain in the plot area occurred on July 16. A total of 1.5 inches was recorded by the rain gauge, so all the basins filled to overflow even in the light soil.

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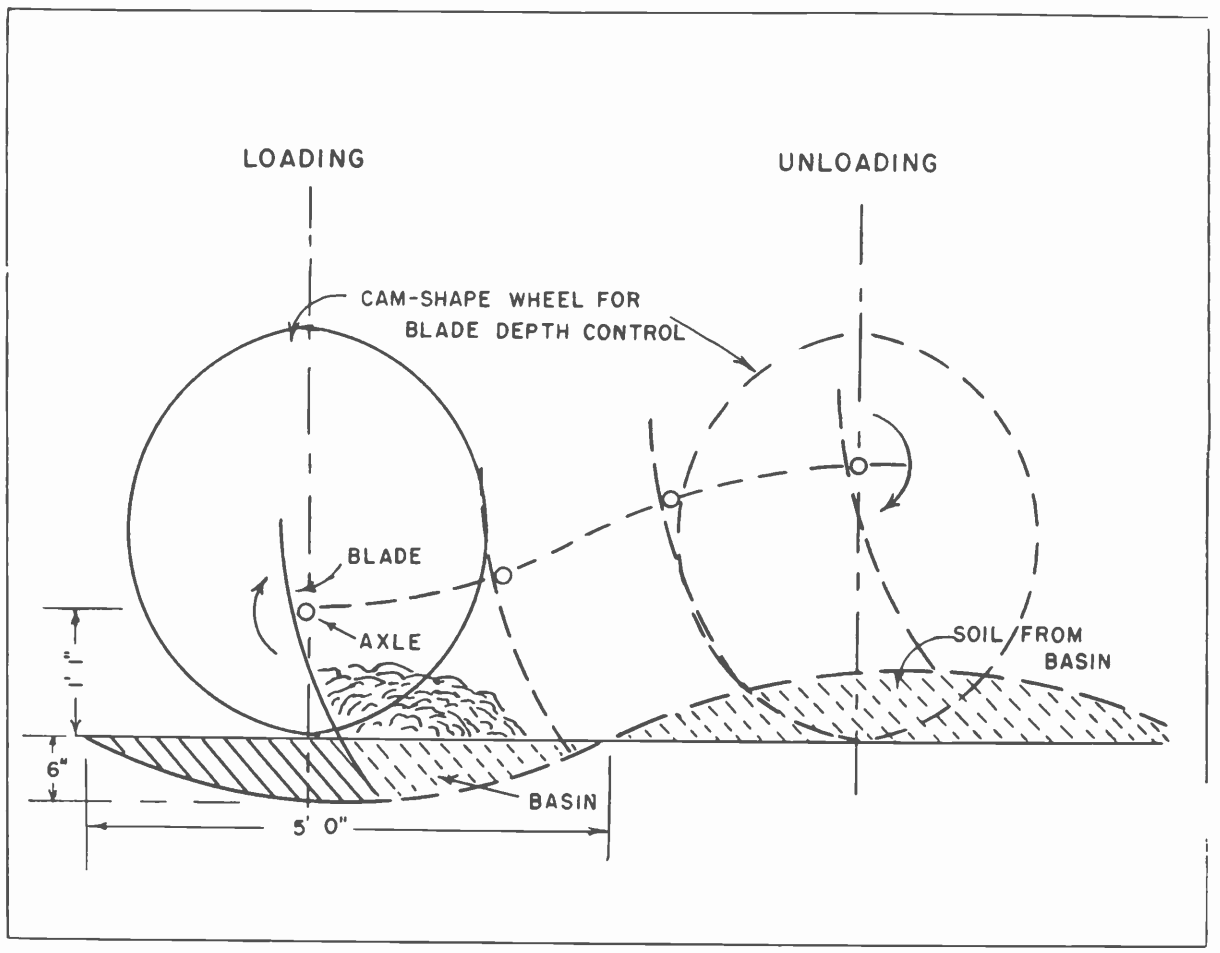
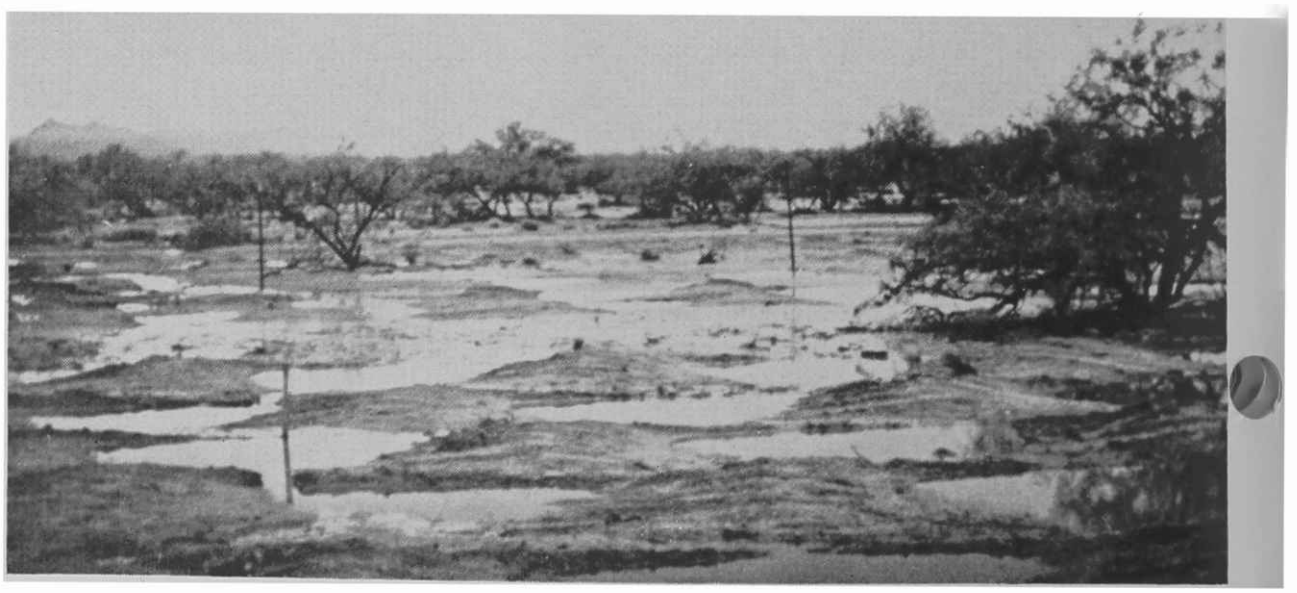



**GRAPH ABOVE SHOWS blade and depth-control cam wheel for forming basins, showing basins and soil deposited between basins.**

**IN THE PHOTO BELOW one can see basins on the Santa Rita Range a few minutes after a third of an inch of rain fell in a 15-minute shower.**



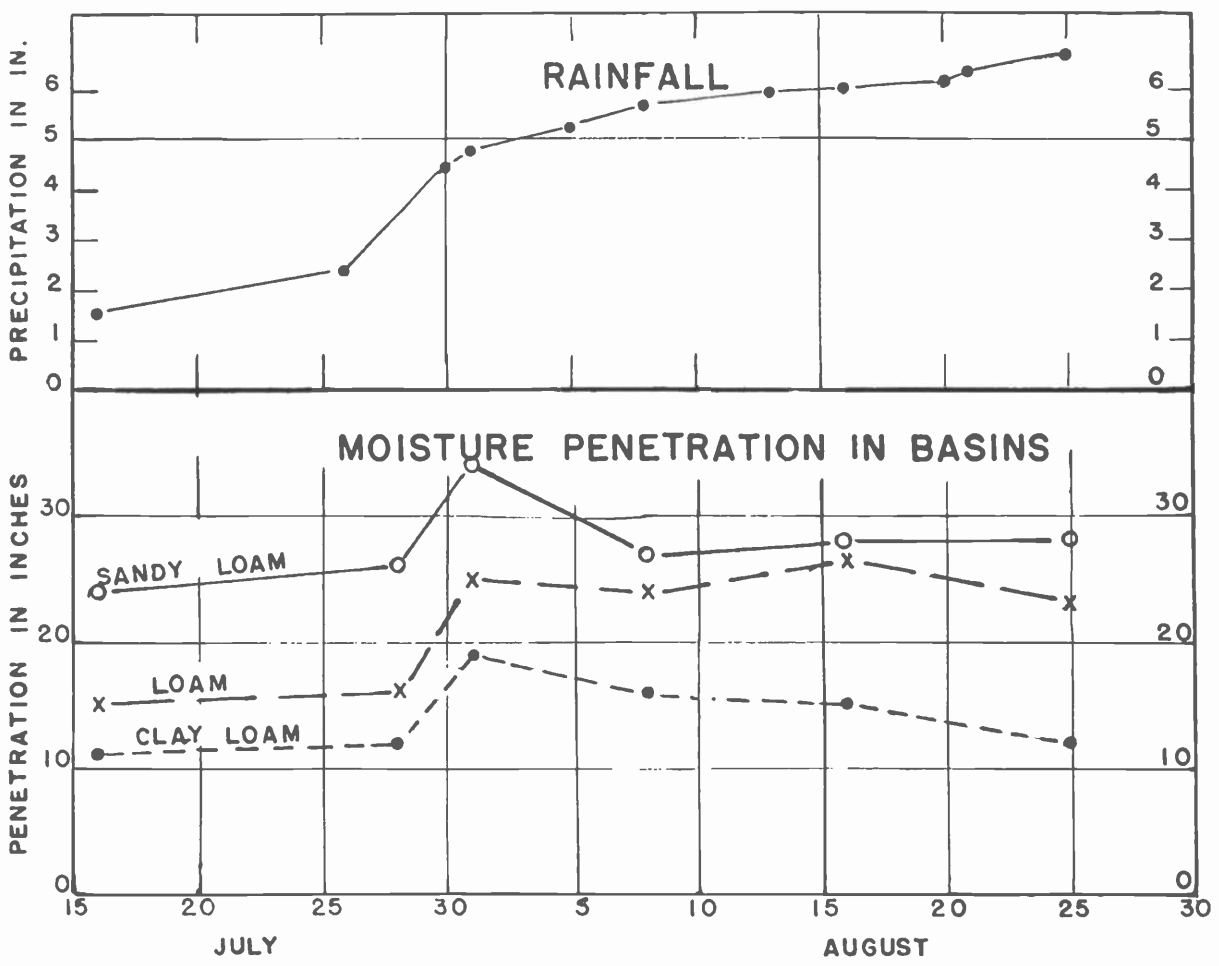
The authors are, respectively, Professor of Agricultural Engineering, University of Arizona and Manager of Tucson Plant Materials Center, Soil Conservation Service USDA.

## Rainfall and Moisture Penetration In and Near Basins On Santa Rita Experimental Range

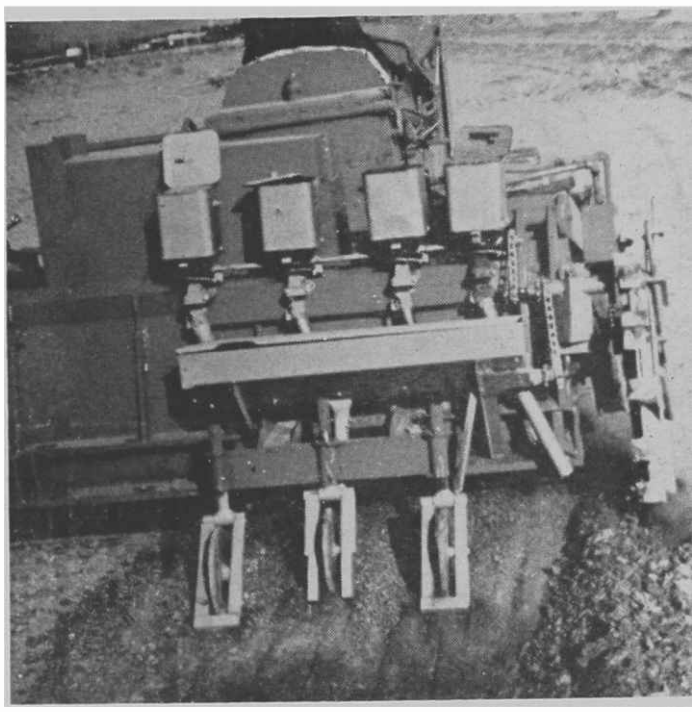
| Date | | 7/16 | 7/26 - 7/27 | 7/30 - 8/1 | 8/5 - 8/8 | 8/13 - 8/16 | 8/20 - 8/21 - 8/25 |
|---|---|---|---|---|---|---|---|
| Rainfall | | 1.50″ | 0.4″ + 0.5″ | 1.65″ + .35″ | 0.35″ + 0.33″ | 0.15″ + .10″ | 0.2″ + 0.22″ + 0.35″ |
| Moisture penetration in inches | | | | | | | |
| Sandy loam | Basin | 24 | 26 | 34 | 27 | 28 | 28 |
| | blank* | 24 | 25 | 34 | 29 | 22 | 31 |
| | flat** | 5 | 9 | 22 | 10 | 17 | 22 |
| loam | Basin | 15 | 15 | 27 | 27 | 27 | 23 |
| | blank | 15 | 16 | 27 | 24 | 29 | 22 |
| | flat | 7 | 9 | 11 | 7 | 17 | 15 |
| Clay | Basin | 11 | 12 | 19 | 16 | 15 | 12 |
| | blank | 11 | 12 | 18 | 14 | 12 | 14 |
| | flat | 2 | 8 | 15 | 5 | 5 | 6 |

* Penetration measured on undisturbed soil 3 inches down slope from the vertical edge of basin wall.

** Penetration measured in area on soil surface several feet from basins.




**GRAPH ABOVE SHOWS 1963 summer rainfall and cumulative moisture penetration in basins on the Santa Rita Experimental Range. Note differences caused by different soil types.**



**HERE THE BASIN-FORMING machine is shown while operating in heavy soil.**

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Seed germination was good and plants survived until the next rain which occurred on July 26. Penetration of moisture was checked by probe every seven to ten days. Rainfall, date of occurrence, and moisture penetration in and near the basins, are recorded in the table at left, above.

A total of 12 storms occurred in the plot area, giving a summer precipitation of six inches. One 0.35″ rain fell in 15 minutes and filled all basins to overflowing, showing how such basins can make use of a small storm which would have little influence on runoff. Rains of this intensity filled the basins eight times during the summer.

The photo on the next page shows growth of grass in basins on medium-textured soil six weeks after the first rain occurred. The graph at left is a record of cumulative rainfall and moisture penetration for 1963 on the plots on the Santa Rita Experimental Range.

### In Avra Valley

A 20-acre area of both light and heavy soil was seeded May 15 and 16, 1963 in the Avra Valley west of Tucson. Rains did not occur until August 1, and less than two inches was recorded for the season. Germination was good in most of the area. The clay soil produced heavy growth and

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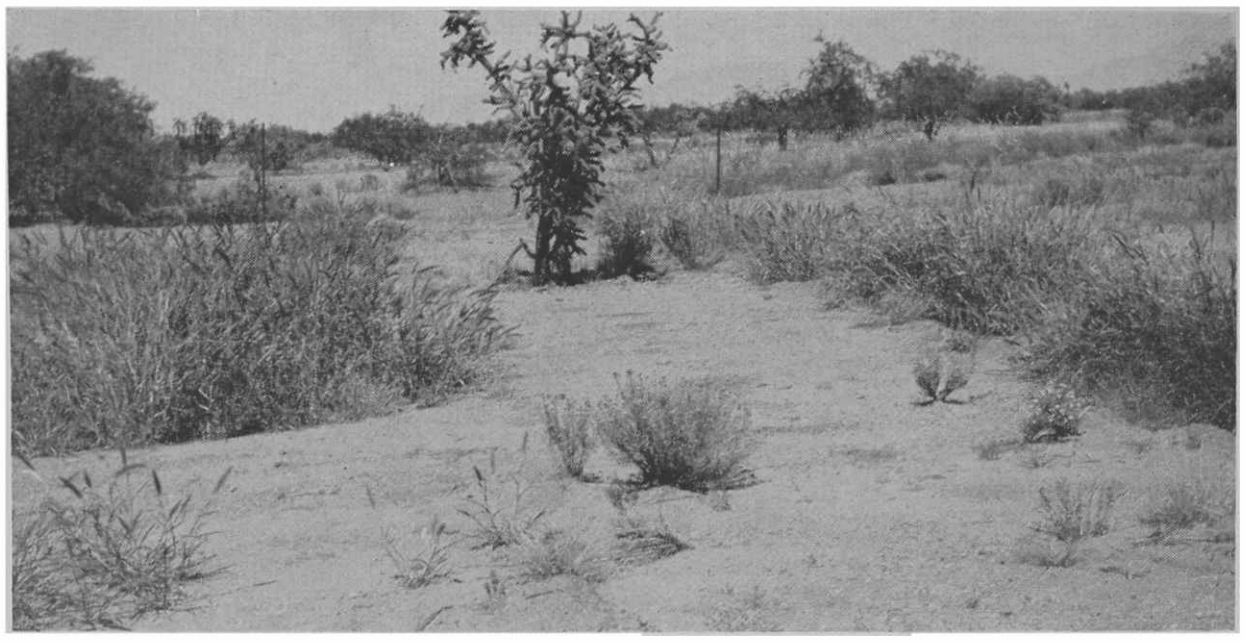

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the Blue Panic grass plants grew three feet high, remaining green for two months after the last summer rain. The light soil dried readily and growth was not as rapid as on the heavy soil, though plants were still alive when fall rains occurred.

The past year's field tests indicate that sufficient moisture can be accumulated on medium to heavy soils to germinate and grow range grasses to maturity. The minimum requirement for satisfactory growth would be four or five rains with intensity sufficient to produce runoff with a total per season of two or three inches.

**NOW, SIX WEEKS after the first summer rain occurred on the Santa Rita Experimental Range, we see Buffel Grass growing in the rows of basins (on both sides, in photo above). Residual moisture in the basins was sufficient to sustain grass until more rains fell later on.**

## Where Was This Picture Taken?

**Our mystery picture in this issue is truly mysterious — an old dry-stone outline of a house, so old that a large mesquite tree has grown out of the doorway.**

**Where was it taken? Look on Page 20 for the answer.**


**JANUARY**

1-4—Arizona National Livestock Show — Phoenix

15-16—13th Annual Dairy Industry Conference, Ramada Inn, Tucson

16-17—Arizona Section, American Society of Range Management Meeting — Student Union Bldg., U of A Campus

20-23—Annual College of Agriculture Conference, U of A Campus

22—12th Annual Meeting Arizona Poultry Federation, U of A

24-25—5th Annual Arizona Pest Control Conference, Student Union Bldg., U of A Campus

28-30—Artificial Insemination Workshop—U of A Dairy Research Center

## Dairy, Plant Breeding Get New Department Heads

Two new department heads are on the job in your College of Agriculture, both men of stature within their professions. They are Dr. G. H. Stott in Dairy Science and Dr. John Endrizzi in Plant Breeding.

In the Department of Plant Breeding, veteran Dr. Elias H. Pressley retired from his administrative post last September, although at 72 he is still very much an active and valued member of the department. Dr. Pressley came to the staff in 1919, making him one of the veteran staff members in this university. His gracious manner has endeared him to staff and students alike.

New head of Plant Breeding is Dr. John E. Endrizzi, an Oklahoma native and a top cytogeneticist. Dr. Endrizzi went directly from high school graduation to the army in 1943. In 1946, when discharged, he entered Texas A & M, receiving his B. S. degree in agronomy in 1949.

He remained at A & M, getting a master's degree in genetics in 1951. In 1951 and 1952 he studied at the University of Virginia, and in 1952 he entered the University of Maryland as a graduate assistant under a National Science Foundation grant. There he received his Ph.D. in cytogenetics in 1955.

From Maryland he went to the Texas Agricultural Experiment Station, in the cotton section of the Department of Soils and Crop Sciences. There Dr. Endrizzi did research and also taught a graduate course in cytogenetics.

He came to the University of Arizona, as head of Plant Breeding, in September. Dr. Endrizzi is author of a dozen scientific publications and member of several professional societies. Married, he is father of three daughters and a son.

"Gary" Stott — it is easy not to use the more formal "Dr. Gerald H. Stott" — was brought to the University of Arizona in 1957 by the then head of Dairy Science, Dr. Vearl Smith, who left last fall to be dean of agriculture at Utah State University, at Logan.

A native of Washington state, Dr. Stott received his B.S. and M.S. degrees at Utah State and his Ph.D. from the University of Wisconsin. He did research work and taught at Utah State, University of Utah, University of Wisconsin and the University of Georgia.

Gary Stott came to Arizona as an assistant dairy scientist in 1957, and has done impressive work here. His studies of heat tolerance in dairy cows, and the effect of hot and humid weather on dairy production, conception and calving, have brought national attention. He has reported his research findings in more than 20 published works, and is a member of the usual scientific organizations.