Increasing the Drying Rate of Alfalfa Hay Using Windrow Inverters

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Abstract: A one day trial was conducted in Northeastern California utilizing a New Holland 144 windrow inverter on two fields swathed 3 and 4 days previously. A side delivery rake provided a control treatment. Results indicated inverting hay hastened the initial rate of drying, but windrow moisture at the end of the day was no different between inverting and raking. Additional work is needed with conditions of higher yield, adverse drying conditions, and larger differences in moisture between top and bottom of windrows to test the full capability of windrow inverters. Further testing under different conditions is needed to define the place for windrow inverters in haydrying practices in Northeastern California.

Keywords: Alfalfa, drying, inverting.

Introduction

Drying of alfalfa hay is particularly difficult in Northeastern California in the fall when often a 40°F day/night temperature spread creates heavy dew moistures. Growers strive to hasten drying as much as possible. Hay inverters have come into the California market to assist hay drying speed by turning windrows upside down instead of doing a partial or complete roll. The windrows are picked up by tines and the windrow is inverted by either moving across a belt or through a metal chute. This test compared the use of an inverter with a standard side delivery hay rake.

Methods

Location: This trial was conducted in Northeastern California in Big Valley. The elevation of the fields was 4,000 ft. and the test was conducted on a 3/4 to 1-ton fourth cutting of a two-year old Apollo II field (Field A) and a one-year old Oneida field (Field B).

Materials: A 14-foot swather was used to swath the hay. Eight lb/ton of Arm and Hammer Hay-Dri was applied to hasten drying. Inverting was done with a New Holland 144 Hay Inverter and raking was done with a Lely side delivery rake.

Procedure: Fields A and B were swathed on October 5th and 6th respectively. Raking and inverting of both fields was initiated on the morning of October 9th following dew drying. The temperature at daybreak was 32°F, rising to 78°F at mid-afternoon. At five intervals, four ten-inch sections of windrows were cut and weighed. A microwave oven was used to determine moisture percentages. Percent moisture was graphed against the minutes following raking using 3rd order polynomial equations.

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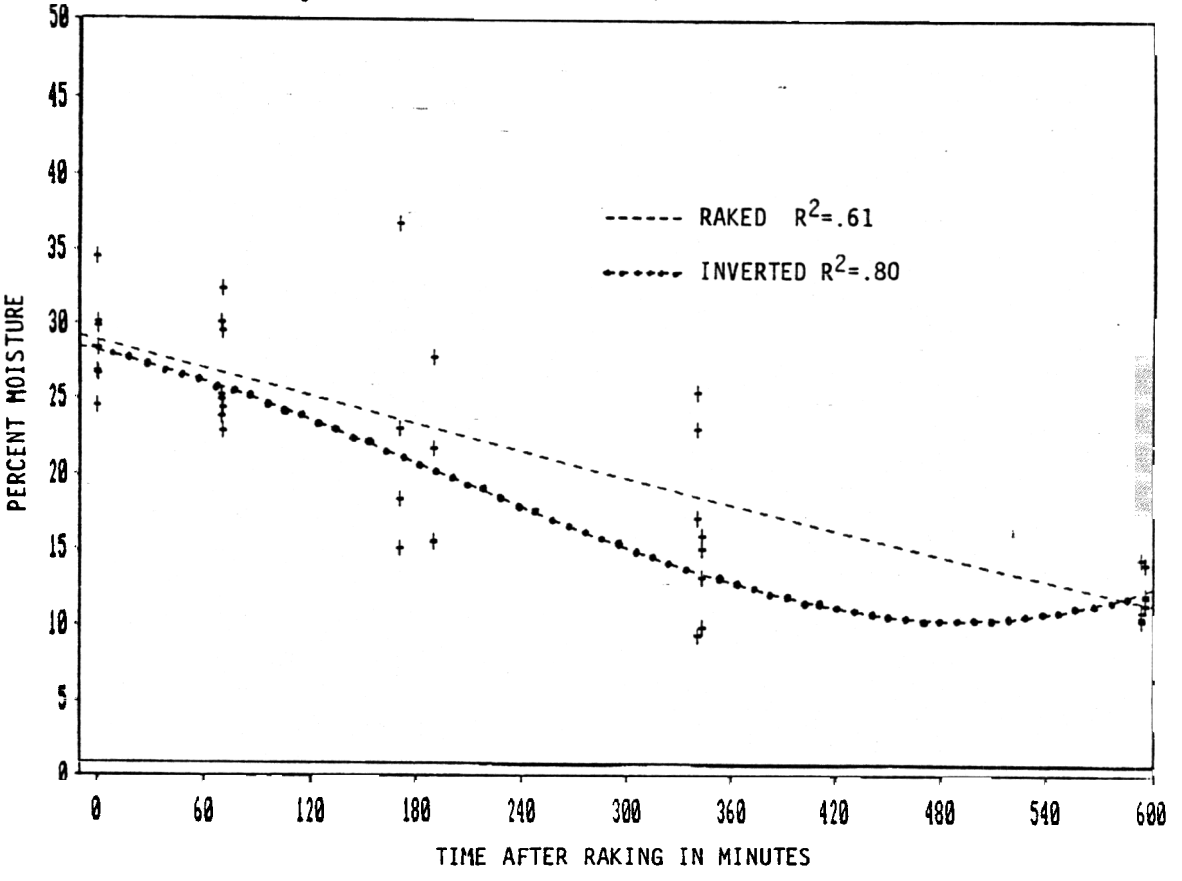
Results and Conclusions

Inverting on Field B was more difficult and had more clumping of hay, probably because of the high initial hay moisture and a lack of dry stems to hold the windrow together. In the lower moisture hay of Field A, the drydown was faster with the inverter in the afternoon (figure 1). In the higher moisture hay of Field B, the drydown was faster with the inverter in the morning (figure 2). However, there was no significant difference in final drydown between the two treatments in both fields and the combined result is a slow, steady drying of alfalfa hay over the entire day (figure 3).

This test was done in conditions of low hay yields and excellent drying conditions. Growers report that the method provides significant differences in conditions of high yield, adverse drying conditions, and when the top of the windrow is much drier than the bottom at the time of normal raking. Additional tests are needed to find the place for windrow inverters in hay drying practices in Northeastern California.

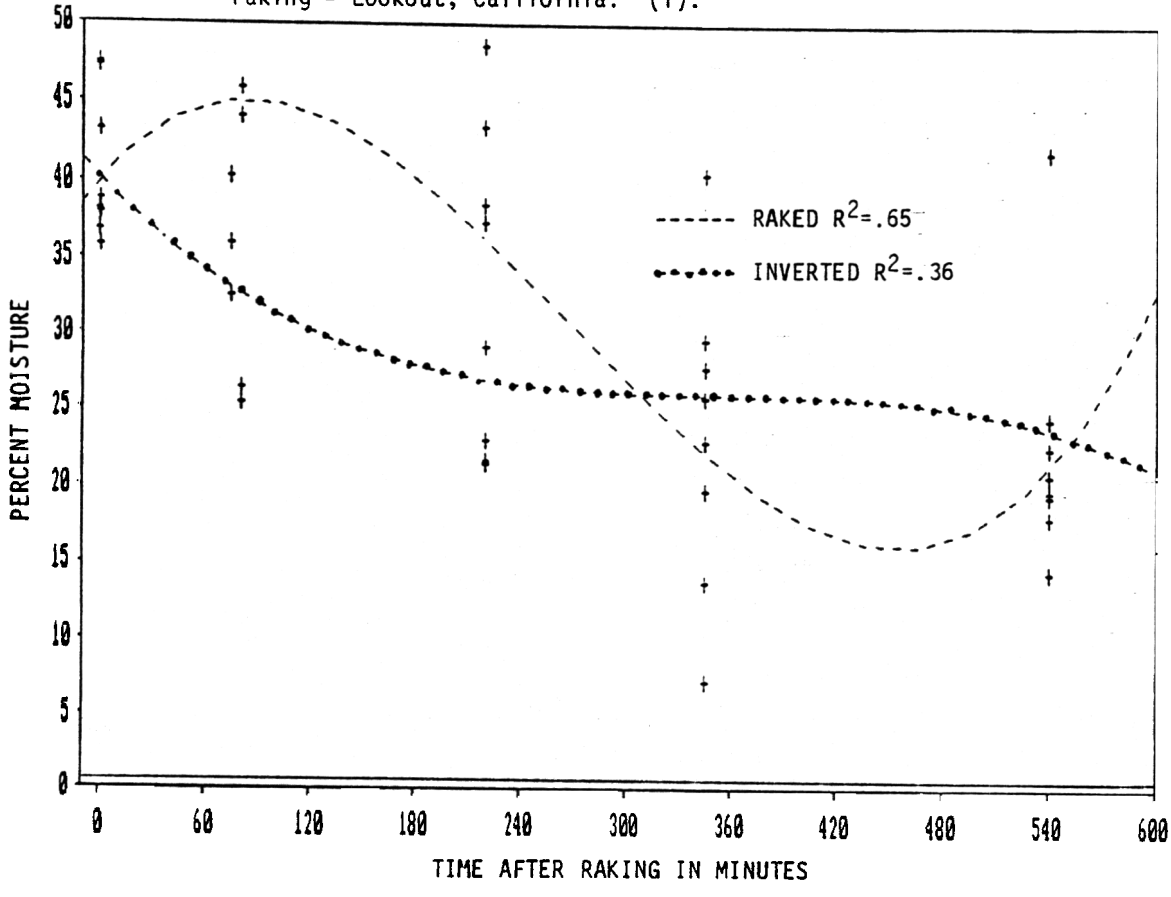
FIGURE 1. One day decline in moisture of alfalfa hay following inverting and raking - Lookout, California. (1).



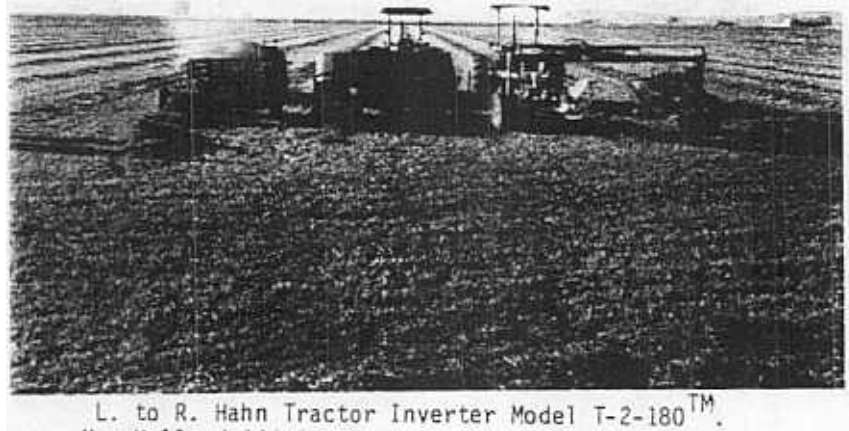
1 Raking with Lely side delivery rake. Inverting with New Holland Model 144 Hay Inverter. FIELD A. Raking began at 8:30AM on October 9, 1988.

Foreground: New Holland Model 144 Inverter.
Background: Lely Side Delivery Hay Rake.

FIGURE 2. One day decline in moisture of alfalfa hay following inverting and raking - Lookout, California. (1).

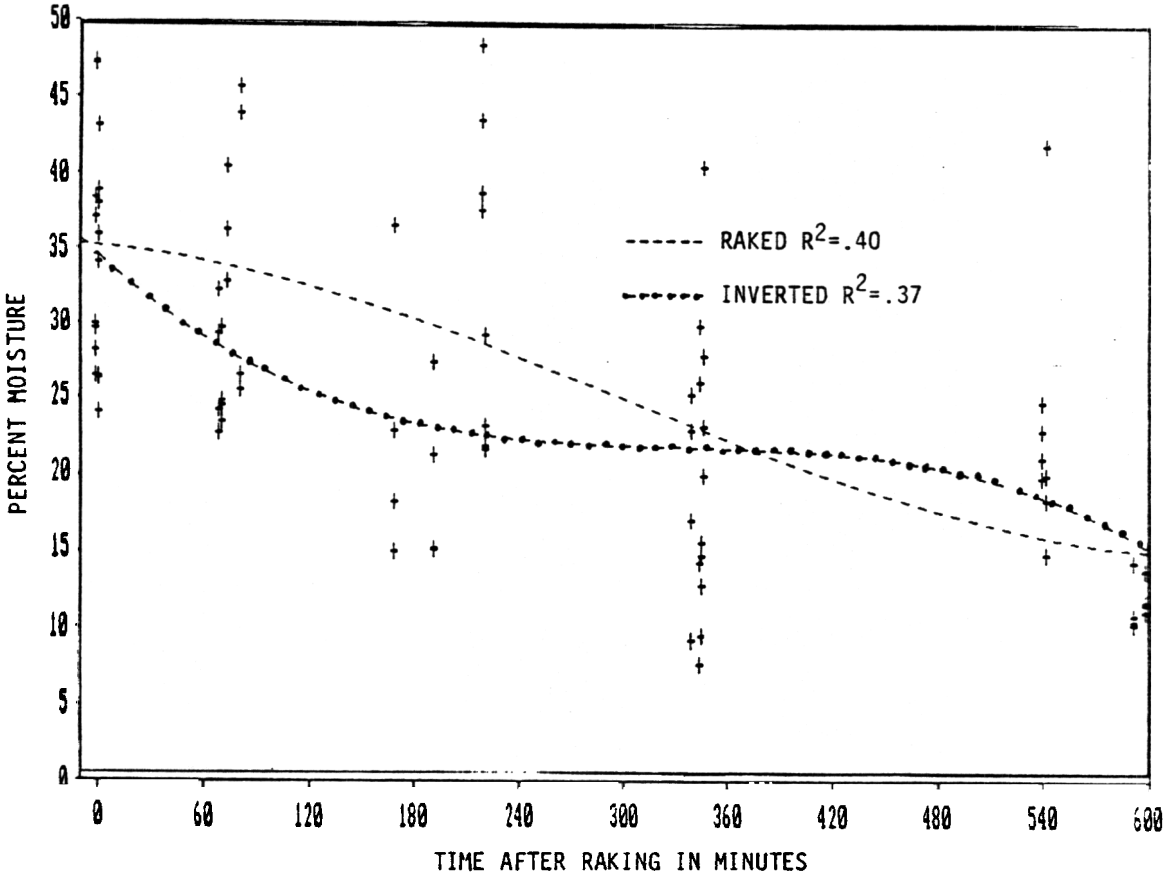


1 Raking with Lely side delivery rake. Inverting with New Holland Model 144 hay inverter. FIELD B. Raking began at 9:18AM on October 9, 1988.



L. to R. Hahn Tractor Inverter Model T-2-180™.
New Holland 144 Inverter. Lely Side Delivery Rake.

FIGURE 3. One day decline in moisture of alfalfa hay following inverting and raking - Lookout, California. (1).



1. Raking with Lely side delivery rake. Inverting with New Holland Model 144 hay inverter. Combination of two fields. October 9, 1988.