DAIRY PIPELINE

Ration Balancing Software: DAIR4, NRC Dairy, Spartan, CNCPS, and CPM. Ration formulation software has evolved with the increased power of modern day computers. Some programs (DAIR4 and Spartan) are setup similar to spreadsheets using rows as feeds and columns as nutrients with calculation of ration nutrient level compared to standard requirements. Other programs (NRC Dairy, CNCPS, and CPM) are more models of how feeds are digested and the internal transformations quantified. Many assumptions are made in these processes but it does help put numbers to biological processes to understand more about them. I have listed each program and given a contact and location where they can be obtained.   Demo's are available for all five programs if you are interested in using for ration formulation or evaluation.

Program name: DAIR4 **Program type:** Ration evaluator **Latest version:** 99.281 **Cost:** No charge off internet **URL location:** www.dasc.vt.edu **Contact person:** Charlie Stallings (540-231-4758 or cstallin@vt.edu) **Description:** Calculates the nutrient content of a given ration for replacements, dry cows, and lactating cows. Adjustments made by user to balance. Requirements are the 1989 NRC. Calculates the cost per cow per day to feed the animal. Versions available in Spanish.

Program name: Dairy NRC **Program type:** Nutrient generator with ration evaluation **Latest version:** 2001 **Cost:** No charge off internet; $59.95 for book & CD **URL location:** www.nap.edu/catalog/9825.html **Contact person:** Charlie Stallings (540-231-4758 or cstallin@vt.edu) **Description:** Calculates nutrient needs of individual animals taking into consideration environmental factors. All classes of female dairy animals considered. Does not calculate cost of ration. Does have a nutrient evaluator. Energy and rumen degradable/undegradable protein values for feeds vary with changes in animal's physiological state mainly as a result of changes in dry matter intake.

Program name: Spartan **Program type:** Ration evaluator/balancer   **Latest version:** 2.02 **Cost:** No charge for demo version; $100 for users   **URL location:** www.msu.edu/user/ssl **Contact person:** Herb Bucholtz (517-355-8432 or bucholtz@msu.edu) **Description:** Evaluates and balances rations for replacements, dry cows, and lactating cows using 1989 NRC requirements. New version with 2001 NRC requirements expected in 2004. Calculates ration cost.

Program name: CNCPS – Cornell net carbohydrate and protein system **Program type:** Ration evaluator/optimizer **Latest version:** 4.00.31 (5.0.18 being tested) **Cost:** No charge for demo version; $350 for users **URL location:** 128.253.135.170/CuNMPS/on-line.htm

Contact person: Tom Tylutki (607-255-2255 or tptl@Cornell.edu) **Description:**   Evaluates and optimizes rations for replacements, dry cows, and lactating cows as well as beef animals. Some calculations may not conform to 2001 NRC but most will. Calculates ration cost per cow per day. More applicable for whole herd feed planning and nutrient management than CPM – Dairy.

Program name: CPM – Dairy (Cornell, Penn, and Minor Institute) **Program type:** Ration evaluator/optimizer/least cost formulation **Latest version:** 2.0.21 (2.0.23 being tested) **Cost:** No charge for demo version; $350 for users **URL location:** mail.vet.upenn.edu/~ejjancze/ **Contact person:** E. J. Jancze (610-444-5800 or ejjamcze@vet.upenn.edu) **Description:** This program is a refinement of the CNCPS program and is designed for field application. Much of the internal calculation is similar to CNCPS but has a nonlinear optimizer that allows least cost formulation. Software program is ordered from Cornell and is associated with CNCPS contact above.

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Pregnancy Rate.   Many different measurements have been employed to assess reproductive performance. Some commonly used measurements include average days open, first service conception rate, annual services per conception and calving interval.   Unfortunately, these measures can fail to detect changes in performance on a timely basis.   Ultimately, the question of interest to dairy producers is "How many of the cows eligible to become pregnant actually became pregnant in a given time frame?"   Since the value is in the pregnancy, a measurement is needed to detect the rate that pregnancies are occurring in eligible cows.   Recently, there have appeared articles in the popular press about using pregnancy rate to assess reproductive performance. Pregnancy rate can be defined as the percentage of cows eligible to become pregnant, in a given time frame that actually do become pregnant. A logical time frame would be 21 days, the typical length of an estrous cycle. The pregnancy rate calculation allows an assessment to not only determine how well cows are conceiving but also how quickly they are conceiving. Furthermore, by subdividing the breeding program into twenty-one day intervals, it can determine the effect of any recent changes on the breeding program. Pregnancy rate has often been defined as heat detection rate multiplied by conception rate. In many instances this will give a reasonable approximation of the actual pregnancy rate.   The goal of any

program should be to have 100% of the cows inseminated within 24 days of the voluntary waiting period. Pregnancy rate is the benchmark that incorporates service rate and conception rate in a timely fashion and should be the cornerstone of performance monitoring. DRMS calculates 21 day pregnancy rates and various reports using pregnancy rate are available with DART report 126. Reproductive performance is a function of certain management policies and how well these policies are implemented in the day-to-day management of the herd. It has long been known that there is an important economic advantage to be gained by efficient reproduction in dairy herds. The table below list current levels of five reproductive management benchmarks for Virginia DHI herds consisting of Holstein cows that have a rolling herd average for milk greater than 22,000 lbs. My goal and a level where I recommend a management change or intervention is also listed.

Parameter	Goal	Intervention level	[1]VA DHI herds >22,000 RHA milk
Days Open	130	175	156
Calving interval, months	13.3	15	14.4
Days to first service	75	100	91
Conception rate, first service, %	45	30	39
Heat detection rate, %	60	40	48
Pregnancy Rate	>22	12	16

[1]DairyMetrics report was generated on November 26, 2002 using current DHI information for Virginia Holstein herds that have greater than 22,000 lb rolling herd average for milk (n=156 herds).

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