

Dr. Harvey Babich

Dr. Babich is a Professor of
Biology at Stern College for
Women.

V'TEN TAL U'MATAR LIVRACHAH: THOUGHTS ON DEW

Beginning with the first week in December and continuing until the first day of Pesach, the phrase *v'ten tal u'matar livrachah*—"and give dew and rain for a blessing," is incorporated into the ninth blessing (*Birkat HaShanim*) of the *shemoneh esrei*. This blessing commences with the words, "Bless for us, G-d, this year and all the kinds of its fruits," and continues with "and give dew and rain for a blessing." "*V'ten tal u'matar livrachah*" is a "request" (*HaShe'elah*) for economic sustenance through agricultural productivity, and, as such, differs from the phrase "*mashiv haruach u'morid hageshem*"—"Who causes the wind to blow and the rain to fall," recited at the beginning of the *shemoneh esrei*, which is an acknowledgment of the powers of G-d.

Within the supplication of "*v'ten tal u'matar livrachah*," the request for rain is obvious: certainly, agricultural productivity is heavily dependent on rainfall. However, why was "dew" included? Before this question can be answered, the concept of "dew" needs to be defined. Dew is the condensation of atmospheric moisture on objects that are colder than the dew-point temperature of the surrounding air. The "dew-point" is the temperature at which air with a given water vapor content and at a given pressure becomes saturated—that is, when its relative humidity is 100%. The environmental conditions favoring the deposition of dew are clear nights, moist air, and light winds in the surface layers of the atmosphere.

The droplets formed on the cooler exposed surfaces are often so numerous and tightly packed that they form a continuous film of water. Such dew covers the upper portions of blades of grass, dry leaves, and small plants. The essential process in this kind of dew formation is the cooling of a surface at night by its radiation of heat to a clear sky. Dew forms only on those surfaces whose temperature falls below the dew-point of the adjacent air. A second, less common kind of dew formation sometimes occurs when

a brisk, warm, moist wind blows over a cold ground, usually under a cloudy sky. The ground becomes visibly damp, but the moisture does not stand out in tiny droplets.¹

In *Eretz Yisrael*, from the beginning of May through middle of October there is an almost unbroken succession of cloudless, rainless days, during which time the soil becomes parched. In the latter part of August and continuing into September and October, westerly winds bring large amounts of atmospheric moisture from the Mediterranean Sea. This atmospheric moisture becomes condensed by the cool night air and is deposited on the summer crops and vegetation.² In most regions in *Eretz Yisrael* dew is more plentiful in summer than in winter.

The quantity of dew depends much on local topography, soil structure, the amount and type of vegetation, and irrigation methods.³ Slopes receive little dew, while level and concave areas receive it in abundance. For example, Mt. Carmel, being relatively low and the nearest hill to the Mediterranean Sea, is the dewiest hill in Israel. While there is much dew in the low and level Jezreel Valley, dew is scarce in the Jordan Valley, particularly in Jericho.⁴ The persistence of dew depends on a number of parameters, including the intensity of the deposit and the type of vegetation. For example, in the absence of wind, the drying of small closely spaced dewdrops is slow, particularly on low and dense plant communities.³

The agricultural importance of dew was recognized in the *Gemara*. Rabbi Chanina stated that dew is considered so significant to the well functioning of the world that it is never completely withheld (*Ta'anit*, 3a,b). The *Yerushalmi Berakhot* (5:2) states the following:

Rabbi Jacob of the village of Hanan said in the name of Reish Lakish: "[G-d said,] 'When your ancestor Abraham acted accordingly to My will, I swore to him that I would never withhold the dew from his descendants.'"

It is further mentioned in *Gemara Ta'anit* (4a) that while rain is not beneficial at all times, as it is detrimental in the summer, dew is desirable all year round. During the summer months when we do not ask for rainfall; rather, we substitute "*v'ten b'rachah*"—"and grant a blessing," for "*v'ten tal u'matar livrachah*." Rabbi S. Y. Zevin noted that it is unnecessary to

request "dew" in the summer, as dew is continually supplied. Nevertheless, Rabbi Zevin mentioned that in the *Machzor Vitry* the phrase read in the summer months was changed to "v'ten tal livrachah"—"and grant dew for a blessing." Additionally, he noted that in the *Sephardi* prayer books the request in the summer is "and bless our years with the dews of Your favor."⁵

The "Prayer for Rain" said on *Shemini Atzeret* commences with "Af-Bri," which is the name of the angel appointed over clouds. This term is formed from two separate words: "af," meaning "anger," and "bri," meaning "health". The *Mateh Levi*, as cited by Rabbi M. Lieber, suggests that this term alludes to the two ways in which rain falls. Sometimes it comes in harsh, destructive torrents indicative of the anger ("af") of G-d, whereas, at other times, it falls in a gentler fashion that provides health ("bri") to humanity.⁶ Similarly, the rabbis differentiated between different types of dew: the dew of blessing, the dew of no blessing, and the dew of evil. The *Gemara Hagigah* (12b) quotes Reish Lakish, who stated that the treasuries of hurtful and beneficial dewdrops are housed in the sixth heavenly firmament, termed *Machon*.

There are several verses, scattered throughout the *Tanach*, indicating that dew is beneficial for vegetation and is associated with an abundance of crops. Selected verses include:

And may G-d give you the dew of heaven and of the richness of the land and an abundance of grain and wine. (*Bereishit*, 27:28)

I will be like dew to Israel, they shall blossom like a rose and it shall strike its roots like the Lebanon. Its branches show grow forth and its beauty shall be like the olive tree and its fragrance like the Lebanon. Those who dwelt in its shade shall return; they shall revive like corn and blossom like the vine; its fragrance shall be like the wine of Lebanon. (*Hoshea*, 14:6-8)

There are several verses that note a beneficial correlation between dew and plant productivity, including *Devarim*, 33:13; *Zechariah*, 8:12; *Iyov*, 29:19; *Yeshayahu*, 18:4; and *Micha*, 5:6. A limited or insufficient supply of dew was identified as detrimental to plant productivity. For, example, "Therefore, because of you the heavens have kept back, so that there is no

dew, and the earth has kept back its produce" (*Haggai*, 1:10). Other examples are found in *Sh'muel II* (1:21) and *Melachim I* (17:1).

The beneficial effects of dew for crop productivity are used to explain the following *halacha*: When reciting the *shemoneh esrei* during the winter months, if "*mashiv haruach u'morid hageshem*" was inadvertently omitted, the person must go back and repeat the *shemoneh esrei*. However, if the person inadvertently recited "*morid hataf*" then he need not go back and repeat the *shemoneh esrei* (*Shulchan Aruch, Orach Chaim*, 114:5). Why? The *Mishnah B'rurah* notes that the mention of dew, like that of rain, is praise for G-d, and, thus, the person need not repeat the prayer. The *T'az* (*Shulchan Aruch, Orach Chaim*, 117:4), however, offers a different explanation and states that it is well known that dew, like rain, gives "life to the world," in that dew, as rain, promotes the growth of crops.

There are some scientific studies, primarily performed in Israel, demonstrating a positive correlation between dew and plant growth. Dew is an important source of water in extreme dry environments, such as deserts.⁷ In the Negev Desert, plants often utilize dew⁸; apparently, water may be taken up from dew by the leaves, as the outer cuticle is moderately permeable when wet.⁹ Studies conducted in the Negev Desert have shown that crop plants on which dew forms, such as corn, beans, cucumber, pumpkin, and watermelons, have more leaves, better stem growth, and yield more fruit than those deprived of this moisture. Apparently, "in Israel, dew may contribute to the growth of plants during the dry summer months."³ Lower forms of plant life also can utilize dew. Algae, lichens, and mosses can take up water directly and instantaneously from dew, with such uptake leading to a burst of metabolic activity.¹⁰

What about the other types of dew, the dew that was not beneficial and the dew that was termed "evil?" The verse, "For your goodness is as a morning cloud and as the dew that early passes away" (*Hoshea*, 6:4) may apply to that dew which is not beneficial to vegetation. As noted by Dr. Y. Feliks, Professor of Biblical and Talmudic Botany at Bar-Ilan University, this refers to the dew that descends on the plants shortly before dawn and disappears immediately thereafter, bringing no ecological benefit at all.¹¹

"Evil" dew is one degree worse than this non-beneficial dew and may apply to dew that is actually harmful to plant productivity.¹¹ Thus, in the *Yerushalmi Peah* (7:4) the following story is recorded:

Once a person sowed a single *seah* of beans. These produced three hundred *seahs* [as their yield]. They said to him, "G-d has begun to bless you." He replied, "the hell you say! An evil dew must have fallen upon them. Had that not been the case, they would have produced twice as much!"

Dr. Feliks postulated that injurious dew is conducive to the reproduction and development of microscopic parasitic fungi, similar to wheat rust. The fungal diseases stripe rust (causative agent: *Puccinia striiformis*) and stem rust (causative agent: *Puccinia graminis* f. sp. *tritici*), which attack wheat, barley, and related grasses, develop rapidly when dew and moderate temperature prevail.¹² The concept of harmful dew is noted also in *Midrash Rabbah*¹³ on *Vayikra*, 28:3, and in the *Yerushalmi Sotah* (9:14). According to *Gemara Sukkah* (37b), the purpose of waving the *lulav* up and down on *succot* is to restrain harmful dew, and the purpose of the side-to-side movement is to restrain harmful winds.

A closer look at the phrase, "v'ten tal u'matar livrachah," indicates that this request is for the transfers of water through the biosphere. "Matar," or rainfall, represents precipitation from the atmosphere to the earth. "Tal," or dew, is the opposite transfer, as it is water that has evaporated from aquatic and terrestrial environments and is returning to the atmosphere. In the evaporation process, because of temperature differences, some of this atmospheric gaseous water temporarily leaves the vapor phase and condenses as droplets of liquid water on cooler surfaces. This condensation, which represents dew, is short-lived, and eventually this water returns to the gaseous phase and evaporation continues. Thus, it would appear that the request "v'ten tal u'matar livrachah" is actually a request for the proper functioning of the ecological water cycle, both the downward precipitation processes and the upwards evaporation processes. Disturbances in either transfer process would disrupt the water flow through the biosphere.

It is difficult to state definitively, or with any certainty, that when the rabbis formulated the phrase, "v'ten tal u'matar livrachah," they intended it to also encompass a request for the cycling of water through the biosphere. However, there is enough proof, both in the *Tanach* and *Gemara*, to confirm that the rabbis had an understanding of cycling water through the biosphere and of evaporation. The cycling of water is noted in the beginning of the

Torah: "A mist rose up from the earth and it watered all the face of the ground" (*Bereishit*, 2:6), meaning that water evaporated from the earth as a mist, formed rain clouds, which yielded precipitation upon terrestrial environments. A strong statement acknowledging the two-way transfer of water between the atmosphere and the terrestrial and aquatic environments can be found in *Yeshayahu* (55:10):

For when rain and snow come down from heaven and they do not **return** there without having refreshed the earth and make it bring forth and bud and give seed to the ones who sows and bread for the ones who eat.

The cycling water is clearly noted in *Gemara Ta'anit* (9b); Rabbi Eliezer stated that, "the entire world drinks from the waters of the ocean," meaning that the water which evaporates from the salty oceans returns to the earth in form of precipitation.

Evaporation, albeit an invisible phenomenon, was also recognized by the rabbis. In explaining, "And when the layer of the dew was gone up" (*Shemot*, 16:14), which concerns the layer of dew that initially covered the manna, Rashi states:

When the sun shone, the dew that was on the manna went up to the sun, in the manner of dew that rises to the sun. Even if you fill the shell of an egg with dew and close its opening and place it in the sun, it would go up itself into the air.

In *MeAm Lo'ez* there are several descriptions of evaporation. For example, mention is made of sailors who travel on the ocean and were in need of sweet water. They boiled sea water in one vessel and allowed the steam to condense in another vessel. Thereby, the salt remained in the first vessel and the sweet water condensed in the second vessel. A further example of desalination is given, in which evaporation *per se*, rather than boiling, was the mode of changing liquid water to gaseous water: "If one takes a sponge and places it a bit above a jug filled with sea water, the sponge will gradually become wet. If he then squeezes it out, the water from the sponge will be sweet, because only pure water can evaporate and be absorbed by the sponge. Salt is heavier than water, so it does not evaporate. In a similar manner, only pure, sweet water rises from sea to the clouds."¹⁴

Thus, perhaps, the phrase: “v'ten tal u'matar livrachah” does include—at least to some limited extent—a request for the well functioning of the entire water cycle. This can only be hypothesized and suggested, since clearly, when formulating the phrase, “v'ten tal u'matar livrachah,” the stress by the rabbis was on “matar” (rain). That rain, rather than dew, was the critical focus in formulating “v'ten tal u'matar livrachah” is seen in the following *halacha* (*Shulchcn Aruch, Orach Chaim, 117:4*): If “tal” was inadvertently omitted from “v'ten tal u'matar livrachah” the person need not go back and repeat the *shemonch esrei*. Conversely, if “matar” was accidentally omitted, the person must repeat the *shemonch esrei*. Rain is one of the three events (the other two are childbirth and the future revival of the dead) that G-d never permanently gave over to anyone. The formation of dew is a process that occurs continuously, that is not as discernible as rain, and that will never be completely withheld (*Ta'anit, 3a,b*).

Acknowledgments:

Appreciation is expressed to Dean K. Bacon, Rabbi S. Hochberg, Rabbi D. Pahmer, and Mr. E. Babich for reviewing this manuscript.

NOTES

1. “Dew.” *The Encyclopedia Americana International Edition*. Vol. 9. Danbury, CT: Grolier Inc., 1992. 42-43.
2. “Dew.” *Encyclopaedia Biblica*. Vol. 1. London: The Macmillan Co., 1899. 1094-1096.
3. Duvdevani, S. “Dew in Israel and its effects on plants.” *Soil Science* **98**: 14-21 (1964).
4. “Dew.” *Encyclopaedia Judaica Jerusalem*. Vol. 5. Jerusalem: Keter Publishing House, Ltd., 1971. 1599-1604.
5. Zevin, S. Y. *The Festivals in Halachah*. Vol. 2. New York: Mesorah Publications, Ltd., 1985. 33-47.
6. Lieber, M. *Simchas Torah*. New York: Mesorah Publications, Ltd., 1966. 144.
7. Odum E. P. *Fundamentals of Ecology*. 3rd ed. Philadelphia: W.B. Saunders Company, 1971. 123.
8. Salisbury, F. B., Ross, W. C. *Plant Physiology*. 2nd ed. Belmont, CA: Wadsworth Publishing Company, 1992. 582-588.

9. Hoddinott, J. "Uptake of water and its movement through plants." *Botany 431 - Physiological Plant Ecology*, Lecture 6, 1995, <http://gause.biology.ualberta.ca/courses.hp/bot431.hp/lec06.html>
10. Evenari, E., Schulze, E. D., Kappen, L., Buschbom, D., and Lange, O. L. "Adaptive mechanisms in desert plants." *Physiological Adaptation to the Environment*. Ed. Vernberg, F. J. New York: Intext Educational Publishing, 1975. 111-129.
11. Feliks, Y. *Nature & Man in the Bible*. New York: The Soncino Press, 1981. 152-154.
12. **Wong, J., Matthews, D.E., and Kephart, K. D. "Wheat Diseases and Pests: a guide for Field Identification." 1997.** <http://greengenes.cit.cornell.edu/wpest.html#leafrust>.
13. *Midrash Rabbah*. Vol. 4. Translated by J.J. Slotki. London: The Soncino Press, 1961. 360-361.
14. Culi, Y. *The Torah Anthology*. Vol. 1. Translated by A. Kaplan. New York: Maznaim Publishing Corporation, 1977. 221.

DERECH HATEVA

A Journal Relating Torah and Science

A Publication of
Stern College for Women
Yeshiva University

Sarah T. Friedman
Editor-in-Chief

Shoshana Greenberg
Literary Editor

Julie Stampnitzky
Cover Design

Volume 2
1997-1998
5758

**Derech Hateva gratefully acknowledges the support and
funding of the Office of the Dean of Stern College for Women**

Printed by Marko Press